

## Radiometric geochronology in the Eastern Alps: results and problems

FRANCESCO PAOLO SASSI, G. CAVAZZINI, DARIO VISONÀ

Istituto di Mineralogia e Petrologia e Centro di Studio per i Problemi dell'Orogeno  
delle Alpi Orientali del C.N.R., Corso Garibaldi 37, 35100 Padova

ALDO DEL MORO

Istituto di Geocronologia e Geochimica Isotopica del C.N.R., Via Cardinale Maffi 36, 56100 Pisa

**ABSTRACT.** — The Eastern Alps are one of the European regions in which geological research has benefitted by the highest number of radiometric data and the most significant. The contributions of radiometric geochronology to the reconstruction of the Alpine, Hercynian, « Caledonian » and older events are critically discussed. All radiometric data available in the literature up to 1984 are listed in the attached tables. Some specific problems involving geochronology in the Eastern Alps are discussed in detail. They include: 1) the radiometric age of the « Caledonian » metamorphism, which is confirmed to be close to 460 Ma, as the first result by BORSI et al. (1973) indicates; 2) the hypothesis of a Paleozoic Megacycle, to which all geological processes developed during the Paleozoic (including the Hercynian events) should be referred. This hypothesis is rejected and a two-event Paleozoic history is suggested (« Caledonian » plus Hercynian events); 3) the existence of Caledonian regional uplifting, for which new evidence is shown; 3) the hypothesis that the presumed « Caledonian » processes are Cadomian (or Assynthian), a hypothesis which is rejected on the basis of radiometric data and geologic reasoning.

**Key words:** Radiometric Geochronology, Eastern Alps, « Caledonian » processes, Hercynian processes, Alpine processes.

**RIASSUNTO.** — Le Alpi Orientali sono una delle regioni europee in cui la ricerca geologica ha potuto disporre di un elevatissimo numero di dati radiometrici di elevata significatività. In questa nota vengono criticamente discussi i contributi dati dalla geocronologia radiometrica alla ricostruzione degli eventi Alpino, Ercinico, « Caledoniano » ed anteriori. Tutti i dati radiometrici disponibili in letteratura fino al 1984 sono elencati nelle tabelle allegate. Vengono discussi in dettaglio alcuni specifici problemi che coinvolgono la geocronologia, e precisamente: 1) l'età radiometrica del metamor-

fismo « Caledoniano », che è confermata prossima a 460 Ma circa, in accordo con i primi risultati di BORSI et al. (1973); 2) l'ipotesi del Megaciclo Paleozoico, al quale appartenerebbero tutti i processi geologici verificatisi nel Paleozoico, inclusi quelli Ercinici: tale ipotesi viene respinta, a favore di una articolazione della storia paleozoica su due eventi ben distinti, il « Caledoniano » e l'Ercinico; 3) l'esistenza di un sollevamento regionale « Caledoniano », per il quale viene messa in luce una nuova prova; 4) l'ipotesi che i processi ritenuti « Caledoniani » siano in realtà Cadomiani (o Assintici), ipotesi che viene respinta sulla base di dati radiometrici e considerazioni geologiche.

**Parole chiave:** Geocronologia radiometrica, Alpi Orientali, Processi « Caledoniani », Processi Ercinici, Processi Alpini.

### Introduction

Following the title closely, the present report consists of two different sections.

The first summarizes the most important radiometric results, selected among those which contributed most to the construction or improvement of the presently available regional geologic picture.

The second section is a discussion of some problems related to radiometry in the Eastern Alps, crucial for an understanding of pre-Alpine geology in this region. The specific items proposed for discussion were taken into consideration because, in the authors' opinion, they represent the main geological problems in which the type of geological thinking is crucially controlled by the type of consideration given to the geochronological data.

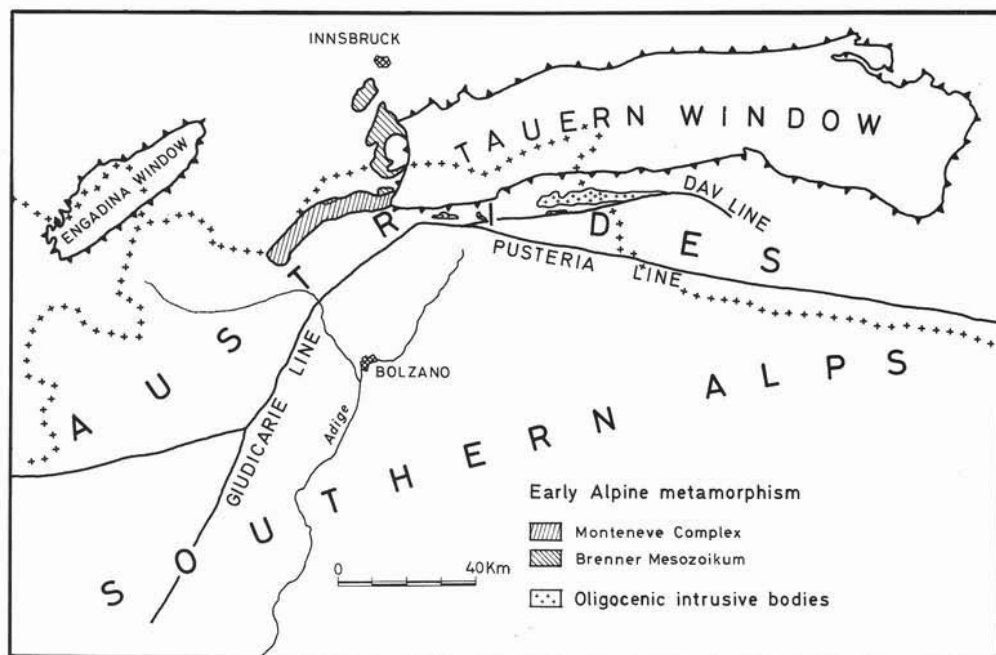


Fig. 1. — Distribution of the early Alpine (Cretaceous) metamorphic effects and location of the Oligocene intra-Austridic alignment Renssen-Vedrette di Ries.

## 1. Results

The Eastern Alps are one of the European regions in which geological research has benefitted by the highest number of radiometric data, and the most meaningful. These top-level results are mainly due to the systematic joint efforts carried out by authors from Pisa and Padova, as well as the important activity developed by scientists from Bern, Hannover, Leeds and Vienna.

The history of radiometric geochronologic research in the Eastern Alps is short, only about fifteen years. Indeed, the first significant isotopic datations go back to the late 1960s (BORSI et al., 1966, 1968, 1969; BORSI & FERRARA, 1967; MILLER et al., 1967; SCHMIDT et al., 1967; GRAUERT, 1969), and most of the presently available age values were produced in the second half of the 1970s and during the present decade.

The most important age results will be mentioned below, following a chronological classification.

### 1.1. ALPINE EVENTS

#### 1.1.1. Early Alpine regional metamorphism

The Cretaceous age of the metamorphism in the Brenner Mesozoikum (fig. 1) was demonstrated by MILLER et al. (1967) by means of some Rb-Sr data obtained on biotites from the Raibl beds. The regional importance of this Early Alpine metamorphism and its implication in the metamorphic evolution of the pre-Mesozoic basement soon began to come to light: in fact SCHMIDT et al. (1967) supplied some Rb-Sr data demonstrating that biotite in the Monteneve Complex (Schneebergerzug; fig. 1) has the same Cretaceous age as the biotite in the Brenner Mesozoikum.

This very important result, however, was not sufficient to avoid the development of a widespread controversy concerning the age of the main metamorphism in the Monteneve Complex: some authors attributed a pre-Alpine age (e.g., PURTSCHALLER, SCHMIDT)

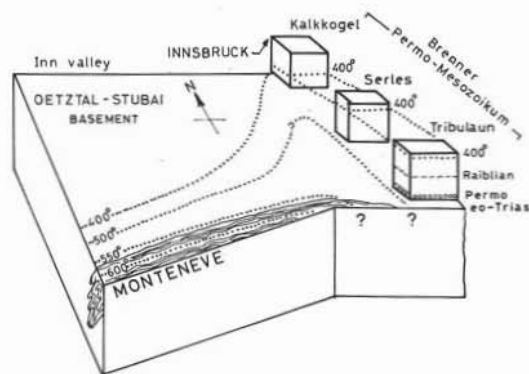


Fig. 2. — Reconstruction of the northern part of the early Alpine thermal structure (taken from SASSI et al., 1980).

to this metamorphism, others an Alpine age (e.g., JUSTIN-VISENTIN & ZANETTIN, SASSI). This controversy has only died down in the last few years, when the bulk of data was so rich and clear (see summarizing pictures in SASSI et al., 1980; DEL MORO et al., 1982; THÖNI, 1983) that no objections could be raised.

These data, also based on different lines of evidence including Rb-Sr and K-Ar isotopic interpretations, demonstrated that the Cretaceous metamorphic temperature was sufficiently high to produce the crystallization of kyanite + staurolite in the Monteneve Al-rich metapelites. Furthermore, the regional character of the related thermal anomaly was clearly shown: a NE-SW-stretched, dome-like, Cretaceous thermal structure affected a large part of the Austriatic block to the west of the Tauern Window (Oetzal-Breone area plus Monteneve Complex plus Merano-Mules basement) as sketched in figs. 2 and 3). All these data revealed that the pre-Alpine interpretation was erroneous.

### 1.1.2. Alpine regional metamorphism

While the Early Alpine metamorphism was revealing all its importance in the above-mentioned areas by means of the determining support of radiometric geochronology, the same isotopic methods were important for determining the age and distribution of the Alpine metamorphism.

This event developed close to the Eocene-Oligocene boundary, approx. 40 Ma ago. The related regional cooling began approx. 30 Ma ago, finishing approx. 12-20 Ma ago. These results are mainly due to BESANG et al. (1968), JÄGER et al. (1969), KREUZER et al. (1973), SATIR (1975), BORSI et al. (1978 a) and CLIFF (1981).

The most important result concerning the Alpine metamorphism in the Eastern Alps is related to its regional distribution. To the same extent that all authors were, rightly, convinced that the typical Alpine domain is represented by the Pennides (Tauern Window), almost all of them also firmly believed that the Austrides were not involved in the Alpine metamorphism. On the contrary, BORSI et al. (1973, 1978 a) demonstrated that large parts of the Austrides south of the Tauern Window were significantly affected by the Alpine recrystallization (fig. 4). More precisely, their Rb-Sr data on micas demonstrated that the northernmost Austridic block — lying between the Pennides-Austrides boundary to the north and the Deferegger-Anterselva-Valles tectonic line to the south — was completely affected by Alpine recrystallization, the mineral effects of which were described by CONTINI & SASSI (1980).

Therefore, radiometric data were able to display the unexpected importance of a regional tectonic line, which had been known for a long time (DAL PIAZ, 1936) but which had been consigned to oblivion by almost all authors.

### 1.1.3. Post-Permian magmatism

Other important results of radiometric research are related to the intra-Austriatic Periadriatic Alignment of granitoid bodies (fig. 1): Rensen - M. Alto - Rio Vena - Cima di Vila - Vedrette di Ries (+ Polland, in the surroundings of (Lienz). Their Alpine age (30 Ma) was demonstrated by BORSI et al. (1978 a, 1978 b, 1979). Furthermore, the same Rb-Sr isotopic data suggested a complex origin for these acidic melts, in which Sr/Sr ratios are significantly lower than those in the typically crustal acidic melts.

As regards the contribution of radiometric research to the reconstruction of the post-Hercynian geology of the Eastern Alps, we must also mention here the important re-

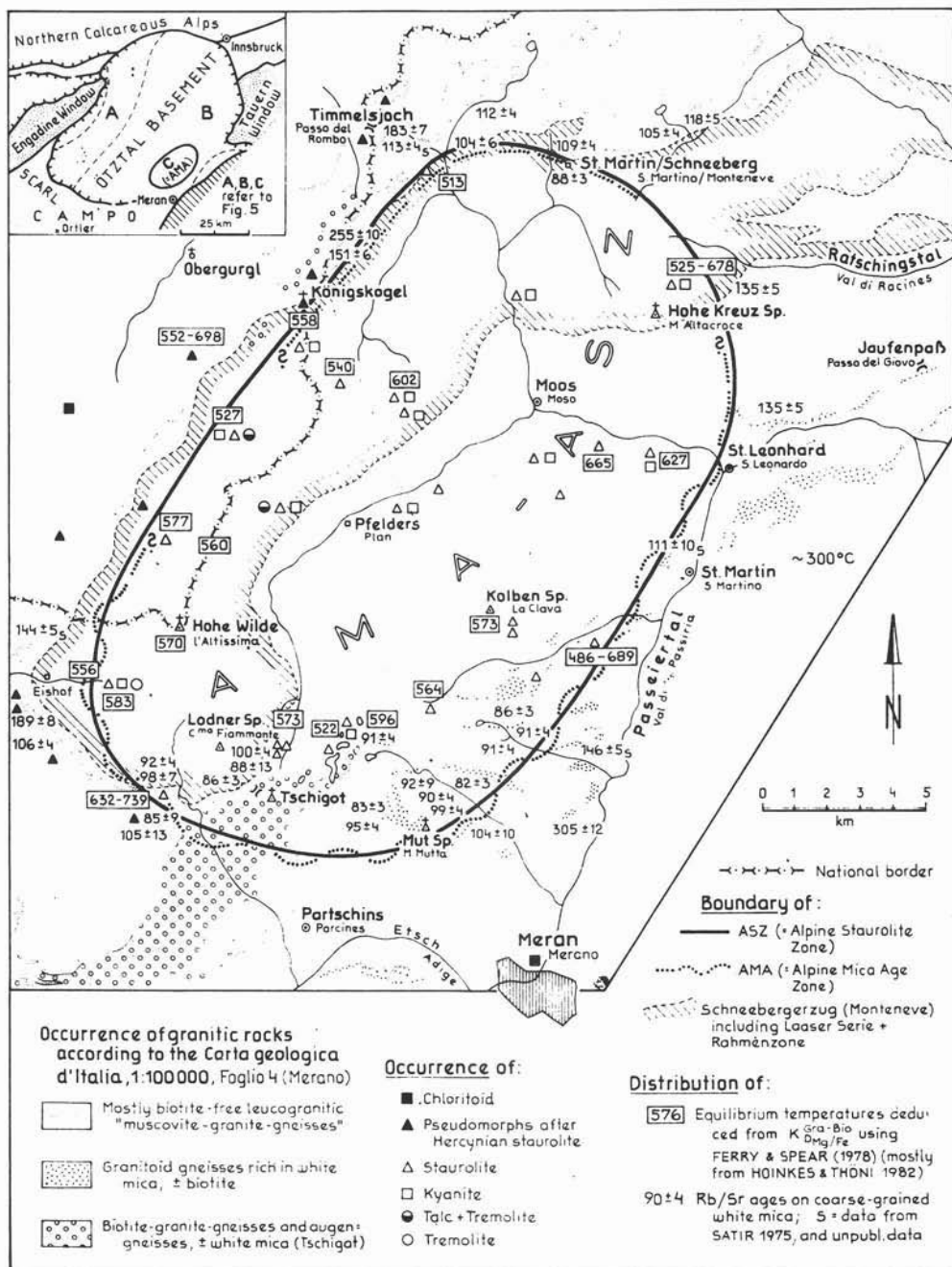


Fig. 3. — Distribution of white mica Rb/Sr ages and equilibrium temperatures in Schneebergerzug (Monte Neve) area and the bordering Altkristallin (taken from THÖNI, 1983).

sults regarding Triassic magmatism (BORSI & FERRARA, 1967; BORSI et al., 1968; FERRARA & INNOCENTI, 1974) and Tertiary volcanism (BORSI et al., 1969) in the Southern Alps.

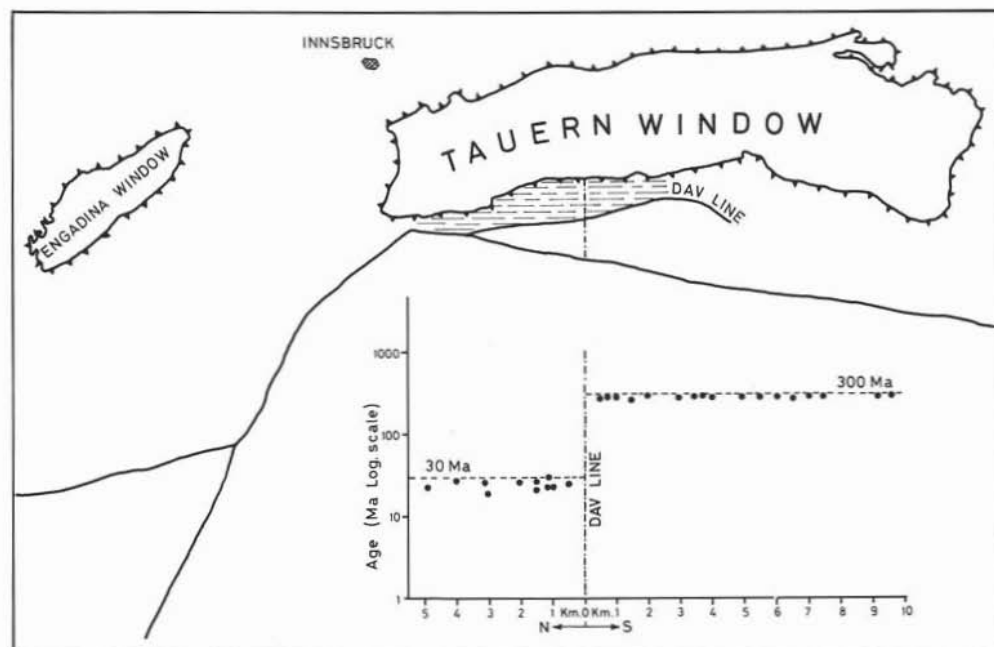


Fig. 4. — Distribution of the Alpine recrystallization within the Austric basement to the south of the Tauern Window (taken from BORSI et al., 1973, 1978 a).

## 1.2. HERCYNIAN EVENTS

### 1.2.1. Hercynian granitoid plutonism

Let us begin from the Hercynian granitoids occurring *within the Southern Alps*, where many radiometric data finally managed to extinguish the age-old debate concerning the Alpine versus Hercynian age of the Peri-adriatic Plutons (fig. 5).

Some authors maintained their Paleozoic age, mostly giving reliability and confidence to the very rare and ambiguous finding of granitoid pebbles in the Permian conglomerate (e.g., SANDER, 1923). Instead, other authors (e.g., DAL PIAZ, 1942), considering the unquestionably Alpine age of the Adamello massif (which produced contact metamorphism on Mesozoic rocks) and the particular localization of all these granitoid bodies along very important tectonic lines of Alpine age (Giudicarie and Insubric Lines), supported an Alpine age for the whole granitoid alignment.

Radiometric data demonstrated the Upper Paleozoic age of these granitoids (age range 280-290 Ma: BORSI et al., 1966, 1972; DEL MORO & VISONÀ, 1982, and unpubl. data),

showing that in geology a very good line of reasoning (such as that used by the Alpine party: DAL PIAZ, 1942) sometimes turns out to be wrong because a completely unexpected new « truth » comes to light. In the case in point, the new unexpected truth was the existence of a Hercynian paleo-Insubric Line, which clearly controlled the injection of the Upper Paleozoic melts, and was then significantly reactivated during the Alpine orogeny. It is worth pointing out here that this important result of large-scale structural geology was obtained by means of radiometric geochronologic research.

The above-mentioned age of the Peri-adriatic granitoids is not very different from that obtained for the Cima d'Asta massif (fig. 5: 274 Ma, BORSI et al., 1974). Similar age values were also obtained for the Hercynian part of the Eisenkappel massif, located along the Insubric Line in Austria, across the boundary with Yugoslavia.

All the reported age values indicate that the Hercynian granitoid plutonism developed in the Southern Alps and along the Peri-adriatic Lineament during the Upper Carboniferous and Lower Permian, and that it

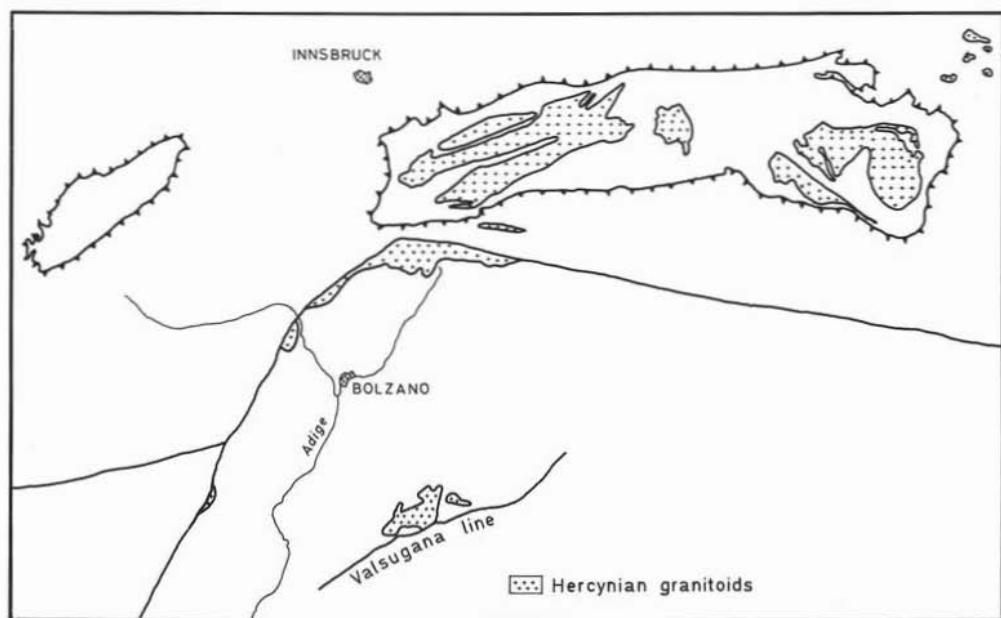


Fig. 5. — Location of the Hercynian intrusive bodies.

was preceded by the emplacement of basic to intermediate rocks, dated at  $282 \pm 14$  Ma (DEL MORO & VISONÀ, 1982) in the Bressanone district.

Instead, as regards the Hercynian granitoids *within the Austrides*, they seem to be very rare. In fact, these rocks can be recognized only by means of radiometric age determinations and not by field observation or petrographic analyses, and only a few acidic bodies turn out to be Hercynian in age (fig. 5; 262 Ma by BORSI et al., 1980; 289 Ma by KÖHLER, fide SÖLLNER et al., 1982; 240 Ma by CAVAZZINI, 1983;  $248 \pm 29$  Ma by JÄGER & METZ, 1971).

The predominance of relatively young age values (in comparison with those found in the Southern Alps) may be explained by the fact the dated Austroalpine rocks are mostly aplites and pegmatites.

The extremely small amount of Hercynian granitoids within the Austrides demonstrates that the crustal level rich in Hercynian granitoids was not yet reached by post-Alpine plus post-Hercynian erosion activities: only the uppermost part of the Hercynian metamorphic domain was split open — the part

in which only a few, very mobile, aplitic and pegmatitic veins were injected from the hotter (and granitoid-rich) underpart.

As regards the Hercynian granitoids *within the Pennides*, we may say that a very important Hercynian plutonism is well recorded. In fact, the core of the Tauern Window consists entirely of Hercynian granitoids (fig. 5), altered into gneisses (the so-called Central Gneisses) by the Alpine metamorphism. The age of this plutonism is certainly Upper Paleozoic. However, the radiometric chronologic picture is not so clear as initially believed, and complicated problems have recently been pointed out (CLIFF, 1981). Considering that the whole of this very important set of problems concerns Austrian (and not Italian) territories, we will not give it further space here, but we recommend our readers to become aware of these problems by reading CLIFF (1981) and references quoted in it.

### 1.2.2. Hercynian regional metamorphism

Its two-phase development in the Southern Alps was pointed out nearly twenty years

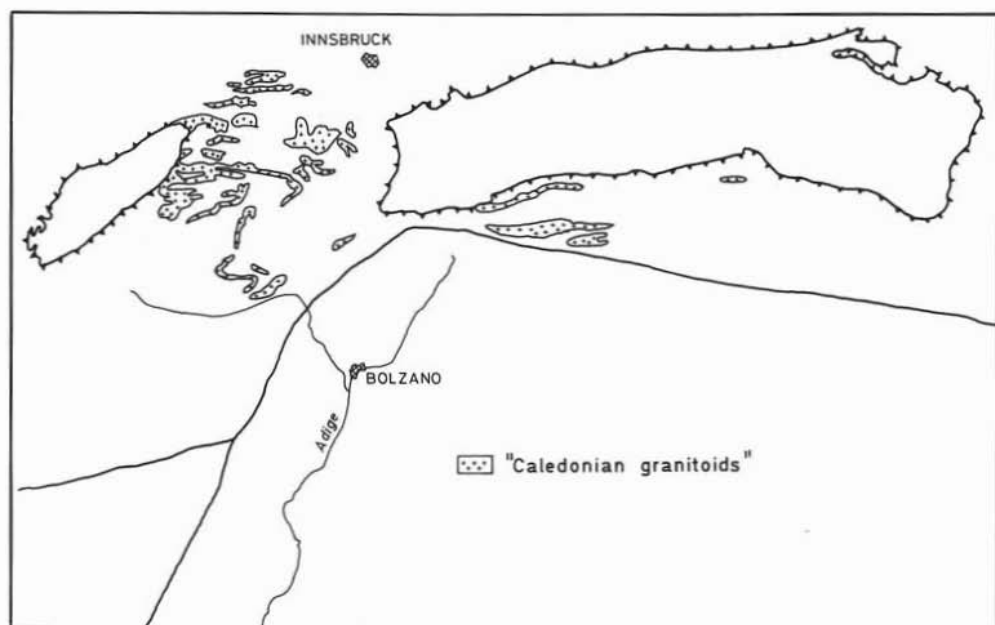


Fig. 6. — Location of the main acidic magmatic bodies of «Caledonian» age.

ago (e.g., SASSI & ZIRPOLI, 1968). Recently, radiometric geochronologic data have confirmed this two-phase development and assigned an age value of 350 Ma (corresponding to the Viséan according to the time-scale proposed by ODIN, 1982) to the older phase, and 320 Ma (corresponding to the Viséan-Namurian boundary according to the same time-scale) to the younger one (DEL MORO et al., 1980, 1984).

It is worth pointing out that these age values obtained in the Southern Alps agree perfectly with those obtained from the Lower Austroalpine rocks to the north of the Tauern Window by SATIR & MORTEANI (1979). Furthermore, some age values obtained from micas in Austria fall in this range, showing on one hand the significant consistency of the regional chronological picture of the Hercynian metamorphism, and on the other, the synchronism of the Hercynian metamorphic processes on a regional scale.

Numerous Rb-Sr data from biotites indicate that the Hercynian regional cooling took place in the time range 310-300 Ma. The fact that these age values have systematically been found throughout the Eastern Alps in

the districts which escaped Alpine reworking shows that no parts of the pre-Permian basement are known in the Eastern Alps (Pennides, Austrides, Southern Alps) which escaped the Hercynian metamorphism. This metamorphism however was very low-grade in western Carnia and vanishes eastwards.

### 1.3. « CALEDONIAN » EVENTS

The contribution provided by radiometric geochronology to the unravelling of pre-Hercynian events is very important. However, in every case this contribution was the datation of a geological process which had previously been detected by means of geologic and petrologic research.

#### 1.3.1. « Caledonian » acidic magmatism

During the first stage of this research, geologic and petrologic criteria indicated the existence within the Austrides of numerous old granitoids, the emplacement of which must have been pre-Carboniferous, i.e., such that Viséan metamorphism (350 Ma old) could have affected them. Later, radiometric geochronology demonstrated the Upper Or-

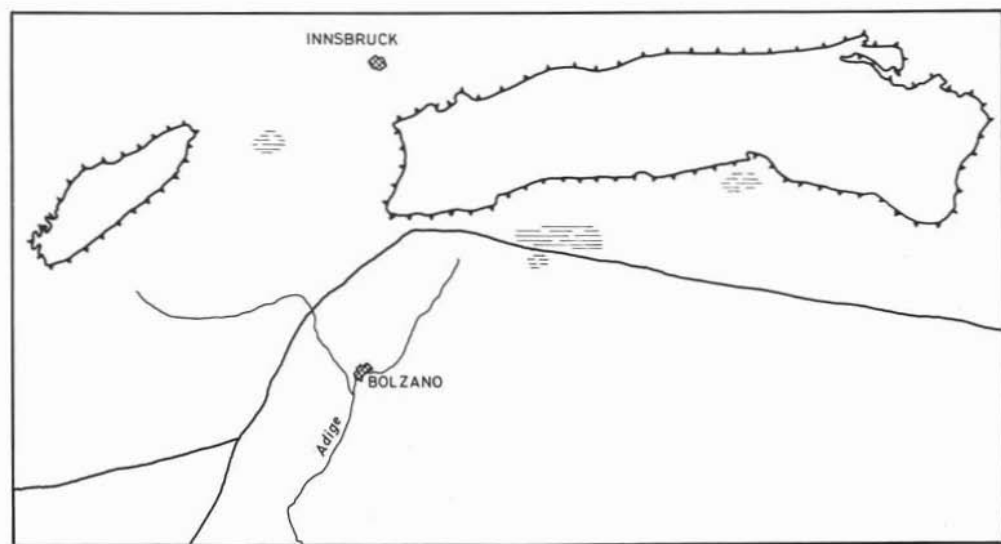


Fig. 7. — Approximate source areas of metasedimentary rock samples which supplied Rb/Sr « Caledonian » age values.

dovician age of this widespread plutonism — the most important recorded in the Austrides of the Eastern Alps. The age range is 450-420 Ma (HARRE et al., 1968; BORSI et al., 1973, 1980; SATIR, 1975; mostly Rb-Sr isochrons on whole rocks), and 450-440 Ma if a more restrictive selection of the data to be included in the statistical analysis is carried out (SASSI & ZIRPOLI, 1979).

A similar age range was obtained from the acidic sheet-like gneisses, sometimes characterized by an augen texture (SCHMIDT et al., 1967; HARRE et al., 1968; SATIR, 1975; BRACK, 1977; BORSI et al., 1980; HAMMERSCHMIDT, 1981; SÖLLNER & SCHMIDT, 1981; mostly Rb-Sr whole-rock isochrons). These rocks probably represent old volcanics (HERITSCH & TEICH, 1976; SASSI & ZIRPOLI, 1979; HEINISCH & SCHMIDT, 1982), i.e., outpoured products of the same acidic magmatism which also produced the above-mentioned abundant plutons.

If the amount of all these melts (emplaced either in plutonic or volcanic conditions) is evaluated (fig. 6) and the coeval South-Alpine and Austridic porphyroids are also taken into consideration (BELLINI & SASSI, 1981; HEINISCH, 1981), this Ordovician magmatic cycle — called « Caledonian » acidic magmatism or, better, « Upper Ordovician granite-

rhyolite association » — turns out to be extremely important, the most important magmatic activity recorded in the presently outcropping crustal levels in the whole of the Eastern Alps. In this respect, an intriguing piece of information is that a granitoid having a similar age ( $446 \pm 18$  Ma) has also been found underneath the Po Plain, in actual fact about 5000 meters below Venice (Assunta hole, drilled by AGIP in 1976).

### 1.3.2. « Caledonian » regional metamorphism

Field data SASSI & ZANFERRARI, 1972; BORSI et al., 1973; PURTSCHALLER & SASSI, 1975) indicate that the above-mentioned plutonic bodies were emplaced in previously metamorphosed foliated rocks. Furthermore, it was pointed out (SASSI et al., 1974) that the abundant production of Ordovician acidic melts cannot have been unrelated to a regional thermic anomaly, which must necessarily also have produced a regional metamorphism. Therefore, field data and theoretical expectations agree in maintaining the existence of a « Caledonian » regional metamorphism, and in assigning to it a slightly older age than that of the Caledonian acidic plutonism.

Radiometric geochronology has confirmed these expectations. BORSI et al. (1973) obtained the first significant although not perfectly defined (see discussion below, in the second section of this paper) — age value:  $497 \pm 38$  Ma (Rb-Sr whole-rock isochron on paragneisses). Similar values have been obtained in the neighbouring Austrian areas by BRACK (1977;  $466 \pm 166$  Ma; Rb-Sr whole-rock on paragneisses); SÖLLNER & SCHMIDT (1981;  $460 \pm 30$  and  $463 \pm 37$  Ma; Rb-Sr whole-rock isochrons on paragneisses and migmatites respectively; ca. 460 Ma: U/Pb on zircons). Finally, DEL MORO et al. (1984) obtained an identical value ( $463 \pm 18$  Ma) from an albite-muscovite Rb-Sr isochron from the Pusteria phyllites (Southern Alps).

All these data (the source area of which is sketched in fig. 7) are extremely consistent in indicating that the age of the «Caledonian» regional metamorphism in approx. 460 Ma.

#### 1.4. THE OLDEST (PRE-CAMBRIAN) EVENTS

No systematic radiometric data exist, for the Italian part of the Eastern Alps, concerning pre-Cambrian events. However, it is useful to summarize here briefly, for the sake of completeness, the presently available data concerning the whole of the Eastern and Central Alps.

In the Eastern Alps, the pre-Cambrian stage is only indicated by a few radiometric age values and U/Pb data on detrital zircons contained in the metasediments (paragneisses) from the Silvretta Kristallin. Integrating these data with other zircon age values from the Central Alps, major pre-Cambrian events producing zircons may be admitted at 2000, 1500 and 700 Ma.

However, these pre-Cambrian ages have only been obtained from isolated zircon grains and not from their host-rocks, which in all cases turn out to be younger — Paleozoic — in their magmatic or metamorphic ages. Therefore, neither pre-Cambrian magmatic rocks nor metamorphic rocks have been found in the Eastern Alps.

As regards sedimentation, the only pre-Cambrian age which may at present be supposed refers to the sedimentation of the protoliths of the paragneisses and micaschists making up the bulk of the Austroalpine

segment: a maximum age value of  $800 \pm 125$  Ma has been estimated by SCHMIDT & SÖLLNER (1982), by means of an integrated interpretation of all isotopic data available for the Eastern Alps.

## 2. Discussion of some «Caledonian» geochronological problems

Let us now consider in detail some geochronological problems concerning the «Caledonian» event in the Eastern Alps. This topic is proposed here because, in the authors' opinion, it represents the major problem in the Alps in which geochronology has been used, improperly and on a pretext, by some authors for stocking the fires of unnecessary controversies.

### 2.1. WHAT IS AGE OF THE «CALEDONIAN» METAMORPHISM?

The controversy on the age of the «Caledonian» metamorphism will first be summarized and analysed.

As mentioned above, BORSI et al. (1973) published a Rb-Sr isochron on the Pusteria paragneisses, specifying that the data points fit a fan of parallel isochrons (related to an age value in the range 450-500 Ma) better than the calculated isochron value of  $497 \pm 38$  Ma.

SATIR (1975) criticized this age result, and reinterpreted BORSI et al.'s isotopic data, classifying them into two sample subgroups. However, this classification is not based on any geological or petrographic reasoning. Furthermore, Satir's age data calculated from each of these two isochrons ( $350 \pm 70$  and  $370 \pm 134$  Ma) are at least as meaningless as the age value proposed by BORSI et al. (1973), both from the radiometric (compare the spread of the errors) and from the geologic viewpoints.

It is astonishing to realize that the type of defect which stimulated Satir's criticism (i.e., the scattering of data points along the isochron) affects most of the published and uncriticized isochrons, and very often the spread of the scatter is larger than that which aroused Satir's sensibilities. If the criteria used in Satir's criticism are applied to all isochrons published in the world, Rb-Sr geochronology would be reduced to very

few exceptionally good results, while the majority of them would be accused of being unreliable and involved in Byzantine and bizarre reinterpretations.

The conclusions are:

(i) Satir's criticism is methodologically incorrect;

(ii) the age value suggested by BORSI et al.'s (1973) isochron on paragneisses maintains all its validity as regards the dating of the « Caledonian » metamorphism in the range 500-450 Ma.

The above statements are supported by the following further radiometric results: 1) Rb-Sr whole-rock isochron on the Winnebach paragneisses by SÖLLNER & SCHMIDT (1981:  $460 \pm 30$  Ma); 2) Rb-Sr whole-rock isochron on the Winnebach migmatites by SÖLLNER & SCHMIDT (1981:  $463 \pm 37$  Ma); 3) U/Pb data on zircons from the same area by SÖLLNER & SCHMIDT (1981: ca. 460 Ma); 4) Rb-Sr muscovite-albite isochron from South Alpine phyllites by DEL MORO et al. (1984:  $463 \pm 18$  Ma); 5) lastly, if we calculate a three-point Rb-Sr isochron on whole rock utilizing the paragneiss data points published by FRANK et al. (1976) for constructing a mixed isochron based on para- and ortho-derivates, an age value of  $456 \pm 24$  Ma is obtained (see SCHMIDT & SÖLLNER, 1982).

All these data indicate that the age of the « Caledonian » metamorphism (ca. 460 Ma) falls close to the age value first reported by BORSI et al. twelve years ago.

## 2.2. ARE WE DEALING WITH A MEGACYCLE?

Another important problem related to geochronology is ascertaining whether the pre-Hercynian Paleozoic processes represent a single event (i.e., the « Caledonian » Event) or parts of a long-lasting megacycle (i.e., a Paleozoic Megacycle).

The latter interpretation was proposed by HEINISCH & SCHMIDT (1976) and SCHMIDT (1977). After a period of latency, it seems to have found new supporters in that Schmidt demonstrated instead that he was more inclined towards accepting the « Caledonian » event (SASSI & SCHMIDT, 1982).

The megacycle idea was based on a statistical analysis of all radiometric data available in the literature: they cover the whole Paleozoic time range almost continuously. This

result, however, is only obtained if all data are included in the statistical analysis, whatever the type of isotopic system (i.e., K-Ar, Rb-Sr, etc.) and whatever the type of analysed body (i.e., biotite, zircon, whole-rock, etc.).

If this approach is extended to post-Paleozoic times, we obtain a really sensational result: the Megacycle which began in the early Paleozoic and operated throughout the Paleozoic prolonged its activity during the Mesozoic and Tertiary!

Joking apart, as a matter of fact the grounds for the megacycle interpretation vanish completely if the statistical analysis is carried out rigorously, i.e., only putting strictly homogeneous radiometric data (that is, those having identical significance) in the same sample population. SASSI & ZIRPOLI (1979) demonstrated that, following this rigorous approach, a clear two-modal distribution of the age values is obtained, consisting of a « Caledonian » cluster of age values and a Hercynian one. The age data published after SASSI & ZIRPOLI's statistical analysis confirm this result, increasing the statistical weight of both clusters and making the interposed empty space more significant.

Therefore, if our reasoning is kept very close to the facts, the megacycle does not exist at all or, if it does exist, data for detecting it are not yet available in the Eastern Alps. Currently available radiometric data indicate clearly that the Paleozoic thermal history (magmatism and metamorphism) in the Eastern Alps is a two-event history, consisting of a « Caledonian » event (magmatism and metamorphism) of Ordovician age (SASSI & SCHMIDT, 1982) and a Hercynian event (magmatism and metamorphism) of Carboniferous to Lower Permian age.

## 2.3. CHRONOLOGICAL EVIDENCE FOR A « CALEDONIAN » REGIONAL UPLIFT

A few lines above, we wrote: Paleozoic thermal history. However, readers should not believe that the « Caledonian » event was only thermal. Indeed, dynamic activity related to the « Caledonian » event was reported ten years ago (SASSI et al., 1974), and more recently radiometric geochronology (U/Pb method) has been used for demonstrating tectonic activity in the age range

450-420 Ma (CLIFF, 1980). SASSI & SCHMIDT (1982) agreed in defining the « Caledonian » event in the Eastern Alps as a « tectonic-thermic » event, thus stressing the importance of both its components, tectonic and thermic.

Radiometric geochronology supplies an indirect tool for detecting an effect of an important regional uplift of « Caledonian » age. In fact, radiometric geochronology in the Austrides indicate that:

(I) Alpine granitoids only occur in the Rensen-Vedrette di Ries alignment, the emplacement of which was strictly controlled by a tectonic line (fig. 1). This means that only Alpine granitoids injected into a very high (shallow) crustal level outcrop, and that post-Alpine erosion was not deep enough to affect the level rich in Alpine granitoids;

(II) Hercynian granitoids outcrop only locally in the Austrides (fig. 5), and they are mostly aplites and pegmatites. In this case too, only rare and shallow granitoids outcrop, indicating that the post-Hercynian erosion of the Austrides was not deep enough to affect the crustal level rich in Hercynian granitoids;

(III) « Caledonian » granitoids outcrop abundantly in the Austrides (fig. 6). As a matter of fact, the Ordovician crust outcropping below the Upper Ordovician to Silurian

metasediments (i.e., the Austric phyllitic complexes) is abundantly riddled with Ordovician granitoids (compare the distribution of acidic magmatic rocks within the Austrides in figs. 5 and 6).

Therefore, the Ordovician crust was deeply eroded, and this erosion cannot be related either to the post-Hercynian or to the post-Alpine uplifts, for the above reasons.

These considerations are graphically represented in fig. 8, which shows the present erosion level and the different levels rich in variously aged granitoids. The erosion which abundantly split open the Ordovician plutonic bodies must have taken place definitely after their emplacement (440-420 Ma ago) but, significantly, before the Hercynian metamorphism (Viséan, 350 Ma ago): in fact, this erosion stage must certainly have been followed by a burial stage, necessary for these rocks to have been involved in the Viséan metamorphism, as radiometric data demonstrate.

#### 2.4. « CALEDONIAN » OR CADOMIAN?

A final remark deals with the possibility that the processes considered above as « Caledonian » are instead Cadomian (or Assynthian).

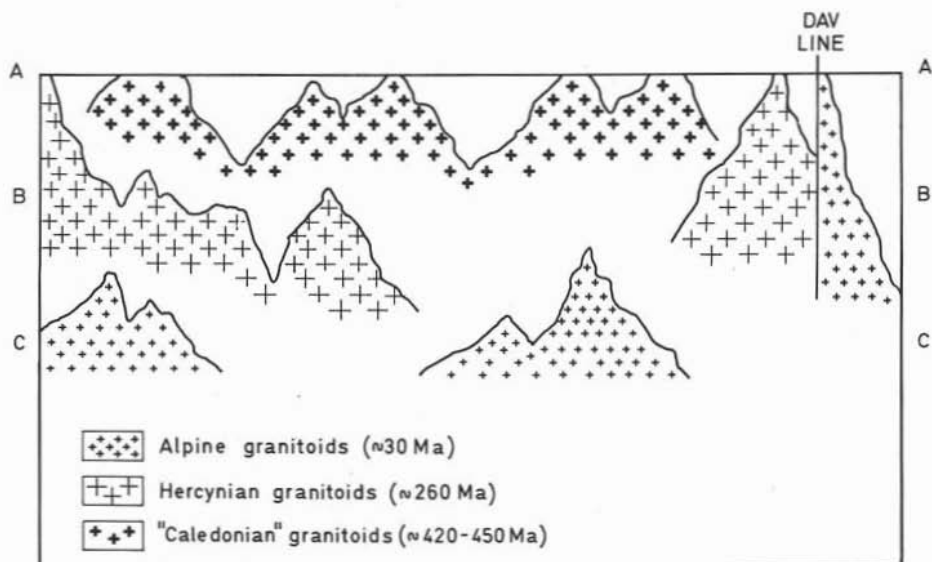


Fig. 8. — Schematic representation of the variously-aged granitoids in the Austrides. - AA: present erosion level; BB: level rich in Hercynian granitoid bodies; CC: level rich in Alpine granitoids.

First of all, it should be noted that the use of the term « Caledonian » only aims at indicating a given time range—that in which true Caledonian event took place in the Caledonides. Any causal or spatial relationships between Ordovician evolution in the Eastern Alps and the Caledonian event in the Caledonides is not implicit in our use of the term « Caledonian » inserted, as it is here, within quotation marks.

VAI (1975) maintains that a Cadomian hypothesis is more well-founded than a « Caledonian » one. However, a detailed comparison of the age values from the Eastern Alps with the true Cadomian and the true Caledonian values led BORSI et al. (1975) to reject Vai's view and to confirm the « Caledonian » interpretation.

More recently, discussing the « Caledonian » age values from Central Europe, DORNSIEPEN (1979) considered them as Cadomian, partially rejuvenated by the Hercynian event.

Two main objections are to be made against Dornsiepen's hypothesis, after having recalled that: (i) a partial (i.e., incomplete) rejuvenation is expected to produce random scatter of data points in the isochron diagram below the original isochron line, i.e., within the field between the original line (isochron of 650 Ma in our case) and the isochron line corresponding to the younger rejuvenating event (350 Ma, in our case); (ii) a new alignment according to a pseudo-isochron could only appear occasionally, as a random and rare *lusus*.

With these premises, the objections are:

- 1) Why should the assumed partial rejuvenation have produced new alignments of

the data points in the isochron diagram everywhere, i.e., the less probable result?

- 2) Why do the unexpected new alignments not correspond to several, random age values in the range 650-350 Ma, but in every case fit isochron lines systematically corresponding to Caledonian age values?

These objections are sufficient to discredit the Cadomian hypothesis definitely. We could also add the observation that geological evidence for a Cadomian event is completely lacking in the Eastern Alps: therefore a Cadomian hypothesis in this region is completely arbitrary, because it has no direct support, either radiometric or geologic. On the contrary, the « Caledonian » hypothesis is not only based on a rich set of well-defined radiometric data, but also on numerous geological indications. Furthermore, the Upper Ordovician age of the « rhyolite-granite association » is not only based on radiometric data, but also on strictly consistent biostratigraphic datings, which indicate that volcanism certainly took place in the Upper Ordovician (FLAJS & SCHÖNLAUB, 1976), and not in pre-Cambrian times, as the Cadomian hypothesis would imply.

*Acknowledgements.* — The present research was financially supported by Italian C.N.R. (Centro di Studio per i Problemi dell'Orogeno delle Alpi Orientali, Padova). Many thanks are due to Prof. G. FERRARA for the critical reading of the manuscript and to Mr. P. AGOSTINI and Mrs. G. GIACONI (Istituto di Geocronologia e Geochimica Isotopica of the C.N.R., Pisa) respectively for having drawn the figures and typed the long tables.

## PRESENTATION OF THE TABLES

In order to obtain directly comparable data, three types of standard tables were compiled, one for each of the three radiometric methods. When necessary, isotopic parameters and age values were recalculated by using the recommended decay constants (STEIGER and JÄGER, 1977). However, such recalculation was not possible in some cases, when the used values of the decay constants were not mentioned in the papers.

The numerous Rb/Sr and K/Ar data were assembled following different criteria. Rb/Sr data firstly were divided according to the structural geological units to which they belong: three large groups of data (Southern Alps, Austrides and Pennides) were thus obtained. Inside each of these three groups, data were further assembled considering both the geographical location and the age range. As regards K/Ar tables, these were compiled on geographical base only.

TABLE 1  
*U/Pb analytical data*

| Rock type                | Sample n. | Mat.    | U ppm | Th ppm | Pbtotppm | 206Pb  | 207Pb | 208Pb  | AGE Ma             |                    |       |                    | Ref.               |    |
|--------------------------|-----------|---------|-------|--------|----------|--------|-------|--------|--------------------|--------------------|-------|--------------------|--------------------|----|
|                          |           |         |       |        |          | 204Pb  | 204Pb | 204Pb  | 206Pb              | 207Pb              | 208Pb | 207Pb              |                    |    |
|                          |           |         |       |        |          |        |       |        | 238U               | 235U               | 232Th | 206Pb              |                    |    |
| SE Tauern Window         |           |         |       |        |          |        |       |        |                    |                    |       |                    |                    |    |
| Tonalite                 | C 6716    | Zi      | 854   | --     | --       | 4077   | --    | --     | --                 | --                 | --    | --                 | 314 <sup>+7</sup>  | 18 |
|                          |           | Zi      | 355   | --     | --       | 2019   | --    | --     | --                 | --                 | --    | --                 |                    |    |
|                          |           | Zi      | 881   | --     | --       | 1818   | --    | --     | --                 | --                 | --    | --                 |                    |    |
| Biotite augen gneiss     | G 5447    | Zi      | 3268  | --     | --       | 498    | --    | --     | --                 | --                 | --    | --                 | 343                |    |
|                          |           | Zi      | 3313  | --     | --       | 824    | --    | --     | --                 | --                 | --    | --                 |                    |    |
|                          |           | Zi      | 2857  | --     | --       | 961    | --    | --     | --                 | --                 | --    | --                 | 313 <sup>+10</sup> |    |
|                          |           | Zi      | 2990  | --     | --       | 1064   | --    | --     | --                 | --                 | --    | --                 |                    |    |
|                          |           | Zi      | 3929  | --     | --       | 657    | --    | --     | --                 | --                 | --    | --                 |                    |    |
|                          |           | Zi      | 4082  | --     | --       | 799    | --    | --     | --                 | --                 | --    | --                 |                    |    |
|                          |           | Zi      | 3550  | --     | --       | 1218   | --    | --     | --                 | --                 | --    | --                 |                    |    |
|                          |           | Zi      | 4203  | --     | --       | 1948   | --    | --     | --                 | --                 | --    | --                 |                    |    |
| Zi                       | 3178      | --      | --    | 1237   | --       | --     | --    | --     | --                 | --                 |       |                    |                    |    |
| Foliated granodiorite    | F T4      | Zi      | 1654  | --     | --       | 2478   | --    | --     | --                 | --                 | --    | --                 | --                 |    |
|                          |           | Zi      | 1830  | --     | --       | 3138   | --    | --     | --                 | --                 | --    | --                 | --                 |    |
| Granodioritic gneiss     | F T7      | Zi      | 1872  | --     | --       | 1600   | --    | --     | --                 | --                 | --    | --                 | --                 |    |
|                          |           | Zi      | 2287  | --     | --       | 2086   | --    | --     | --                 | --                 | --    | --                 | --                 |    |
| Metamorphic tonalite     |           | Ep      | 8.47  | --     | 50.09    | 18.60  | 15.60 | 41.91  | --                 | --                 | --    | --                 | --                 | 19 |
|                          |           | Sph     | 93.27 | --     | 11.24    | 45.90  | 16.99 | 49.66  | 215                | --                 | --    | --                 | --                 |    |
|                          |           | WR      | 10    | --     | 12.85    | 18.49  | 15.56 | 38.98  |                    | --                 | --    | --                 | --                 |    |
|                          |           | Clinoz. | 6.94  | --     | 43.47    | 18.50  | 15.59 | 38.59  |                    | --                 | --    | --                 | --                 |    |
|                          |           | Clinoz. | 7.29  | --     | 46.48    | 18.53  | 15.63 | 38.71  | 22                 | --                 | --    | --                 | --                 |    |
|                          |           | Pl      | .11   | --     | 7.08     | 18.45  | 15.60 | 38.34  |                    | --                 | --    | --                 | --                 |    |
|                          |           | KF      | .20   | --     | 46.12    | 18.48  | 15.61 | 38.40  |                    | --                 | --    | --                 | --                 |    |
|                          |           | Ap      | 18.42 | --     | 4.87     | 18.60  | 15.62 | 38.44  |                    | --                 | --    | --                 | --                 |    |
| Oetzal-Monteneve         |           |         |       |        |          |        |       |        |                    |                    |       |                    |                    |    |
| Two-mica granitic gneiss | KAW 280   | Zi      | 1118  | --     | 84.5     | 1265.6 | 85.29 | 76.71  | 483 <sup>+13</sup> | 480 <sup>+15</sup> | --    | 476 <sup>+20</sup> | 34                 |    |
| Tonalitic gneiss         | B 3/4     | Zi      | 730.5 | --     | 60.2     | 1097.1 | 72.63 | 169.25 | 474 <sup>+15</sup> | 486 <sup>+19</sup> | --    | 540 <sup>+25</sup> |                    |    |

TABLE 2  
*K/Ar analytical data*

| Rock type                   | Sample n. | Material | K%    | <sup>40</sup> Ar rd ml/g | <sup>40</sup> Ar rd% | AGE Ma | Ref. |
|-----------------------------|-----------|----------|-------|--------------------------|----------------------|--------|------|
| <u>Euganean Hills</u>       |           |          |       |                          |                      |        |      |
| Basalt                      | 10        | WR       | 1.50  | 1.68·10 <sup>-4</sup>    | 65                   | 42+1.5 | 6    |
| Latite                      | 29        | Bi+Px    | 3.48  | 1.44·10 <sup>-4</sup>    | 68                   | 35+1   |      |
| Trachyte                    | 8         | Bi       | 6.48  | 1.20·10 <sup>-4</sup>    | 72                   | 30+1   |      |
| Trachytic dyke              | 9         | Bi       | 6.07  | 1.29·10 <sup>-4</sup>    | 73                   | 32+1   |      |
| Trachytic dyke              | 11        | Bi       | 6.79  | 1.13·10 <sup>-4</sup>    | 52                   | 28+1   |      |
| Trachyte                    | 14        | WR       | 3.79  | 1.30·10 <sup>-4</sup>    | 71                   | 32+1   |      |
| Trachyte                    | 26        | Bi       | 5.96  | 1.31·10 <sup>-4</sup>    | 68                   | 33+1   |      |
| Trachyte                    | 27        | Bi       | 6.47  | 1.20·10 <sup>-4</sup>    | 79                   | 30+1   |      |
| Rhyolite                    | 12        | WR       | 4.98  | 1.36·10 <sup>-4</sup>    | 90                   | 34+1   |      |
| Rhyolite                    | 21        | WR       | 4.25  | 1.33·10 <sup>-4</sup>    | 91                   | 33+1   |      |
| Rhyolite                    | 25        | Bi       | 6.26  | 1.33·10 <sup>-4</sup>    | 69                   | 33+1   |      |
|                             |           | WR       | 3.98  | 1.31·10 <sup>-4</sup>    | 81                   | 33+1   |      |
| Rhyolitic dyke              | 28        | WR       | 3.72  | 1.28·10 <sup>-4</sup>    | 68                   | 32+1   |      |
| <u>Adamello</u>             |           |          |       |                          |                      |        |      |
| Medium grained granodiorite | A/4       | Bi       | 7.58  | 11.8 ·10 <sup>-5</sup>   | --                   | 30+2   | 4    |
| <u>Mules</u>                |           |          |       |                          |                      |        |      |
| Tonalitic granodiorite      | AA7       | Bi       | 2.69  | 1.76·10 <sup>-4</sup>    | 13                   | 41+1   | 7    |
| <u>Vedrette di Ries</u>     |           |          |       |                          |                      |        |      |
| Muscovitic pegmatite        | AA74-15   | Mu       | 9.01  | 1.14·10 <sup>-4</sup>    | 48                   | 28+1   | 12   |
| Muscovitic pegmatite        | AA74-16   | Mu       | 11.55 | 1.07·10 <sup>-4</sup>    | 52                   | 27+1   |      |
| Tonalite                    | AA74-46   | Bi       | 8.04  | 1.06·10 <sup>-4</sup>    | 62                   | 26+1   |      |
| Tonalite                    | AA74-60   | Bi       | 7.96  | 1.08·10 <sup>-4</sup>    | 67                   | 27+1   | 21   |
| ---                         | D7401     | Bi(Chl)  | 5.83  | 7.27·10 <sup>-6</sup>    | 75.5                 | 30.9   |      |
| ---                         | D7402     | Bi       | 7.29  | 8.63·10 <sup>-6</sup>    | 75.8                 | 29.4   |      |
|                             |           | Hbl      | .821  | 1.07·10 <sup>-6</sup>    | 37.7                 | 32.4   |      |
|                             |           |          |       | 1.23·10 <sup>-6</sup>    | 57.8                 | 37.1   |      |

TABLE 2 (continued)

K/Ar

| Rock type                          | Sample n.     | Material     | K%   | $^{40}\text{Ar}$ rd ml/g | $^{40}\text{Ar}$ rd% | AGE Ma         | Ref. |
|------------------------------------|---------------|--------------|------|--------------------------|----------------------|----------------|------|
| <u>Predazzo</u>                    |               |              |      |                          |                      |                |      |
| Monzonite                          | P.te Cast. 65 | WR           | 3.57 | $9.66 \cdot 10^{-4}$     | 44                   | 230            | 3    |
| Monzonite                          | Malgola 49c   | WR           | 3.02 | $7.44 \cdot 10^{-4}$     | 45                   | 179            |      |
| Monzonite                          | Canzocoli     | WR           | 5.89 | $9.94 \cdot 10^{-4}$     | 89                   | 236            |      |
| Vulcanite                          | Vulcanite 34  | WR           | 3.67 | $9.92 \cdot 10^{-4}$     | 75                   | 212            |      |
| Vulcanite                          | Vulcanite 60  | WR           | 3.67 | $9.72 \cdot 10^{-4}$     | 86                   | 231            |      |
| Vulcanite                          | Vulcanite 103 | WR           | 3.86 | $9.13 \cdot 10^{-4}$     | 92                   | 217            |      |
| <u>Monzoni</u>                     |               |              |      |                          |                      |                |      |
| ---                                | FT            | Ph1          | 7.91 | $9.66 \cdot 10^{-4}$     | 87                   | 229 $\pm$ 8    | 5    |
| ---                                | FP            | Ph1          | 7.61 | $9.49 \cdot 10^{-4}$     | 90                   | 225 $\pm$ 8    |      |
| <u>Bressanone-Ivigna-Mt. Croce</u> |               |              |      |                          |                      |                |      |
| Granodioritic granite              | B9            | Bi           | 5.19 | $1.22 \cdot 10^{-3}$     | 83                   | 228 $\pm$ 8    | 7    |
| Granodioritic granite              | B13           | Bi           | 4.94 | $1.20 \cdot 10^{-3}$     | 94                   | 230 $\pm$ 8    |      |
| Granodioritic granite              | AA9           | Bi           | 5.60 | $1.19 \cdot 10^{-3}$     | 95                   | 230 $\pm$ 8    |      |
| Granite-Granodiorite               | I22           | Bi           | 4.54 | $1.19 \cdot 10^{-3}$     | 78                   | 230 $\pm$ 8    |      |
| Granodiorite                       | I23           | Bi           | 1.45 | $8.71 \cdot 10^{-4}$     | 34                   | 197 $\pm$ 7    |      |
| Granite-Granodiorite               | I26           | Bi           | 5.32 | $1.17 \cdot 10^{-3}$     | 85                   | 229 $\pm$ 8    |      |
| Granite or Granodiorite            | I XIV         | Bi           | 6.24 | $9.70 \cdot 10^{-4}$     | 84                   | 218 $\pm$ 8    |      |
| Granite-Granodiorite               | I19           | Bi           | 7.13 | $7.31 \cdot 10^{-4}$     | 82                   | 167 $\pm$ 6    |      |
| Fayalite granite                   | 333           | Bi           | 3.49 | $1.10 \cdot 10^{-3}$     | 98                   | 258 $\pm$ 3    |      |
| Fayalite granite                   | 79/7          | Bi           | 3    | $1.20 \cdot 10^{-3}$     | 94                   | 279 $\pm$ 3    |      |
| <u>Mt. Sabion</u>                  |               |              |      |                          |                      |                |      |
| Medium grained granodiorite        | A/6           | Bi           | 7.44 | $80.2 \cdot 10^{-5}$     | --                   | 192 $\pm$ 7    | 4    |
| Fine grained granodiorite          | A/7           | Bi           | 4.64 | $75.8 \cdot 10^{-5}$     | --                   | 182 $\pm$ 6    |      |
| Biotitic pegmatite                 | A/8           | Bi           | 3.50 | $74 \cdot 10^{-5}$       | --                   | 178 $\pm$ 6    |      |
| Muscovitic pegmatite               | A/10          | Mu           | 7.54 | $63.6 \cdot 10^{-5}$     | --                   | 154 $\pm$ 5    |      |
| <u>SE Tauern Window</u>            |               |              |      |                          |                      |                |      |
| Mu-Bi-Augengneiss                  | Gr            | Bi           | 6.47 | $4.93 \cdot 10^{-6}$     | 50                   | 19 $\pm$ .5    | 20   |
|                                    |               | Mu           | 7.87 | $7.44 \cdot 10^{-6}$     | 74                   | 23.5 $\pm$ .5  |      |
| Augengneiss                        | Tr            | Bi           | 6.75 | $6.83 \cdot 10^{-6}$     | 84                   | 25.2 $\pm$ .5  |      |
|                                    |               | Mu           | 8.70 | $7.51 \cdot 10^{-6}$     | 67                   | 20.9 $\pm$ .5  |      |
| Amphibolite                        | A346          | Bi           | 7.59 | $14.91 \cdot 10^{-6}$    | 85                   | 48.6 $\pm$ 1   |      |
| Bi-Augengneiss                     | C308          | Bi           | 5.94 | $8.92 \cdot 10^{-6}$     | 75                   | 37 $\pm$ 2     |      |
| Coarse Augengneiss                 | C213          | Bi           | 6.69 | $5.96 \cdot 10^{-6}$     | 84                   | 22 $\pm$ .5    |      |
| Bi-Gneiss                          | Z162          | Bi           | 6.51 | $5.70 \cdot 10^{-6}$     | 72                   | 21.9 $\pm$ .5  |      |
| Bi-Gneiss                          | Z160          | Bi           | 7.08 | $6.09 \cdot 10^{-6}$     | 76                   | 21.5 $\pm$ .4  |      |
| Aplitic Gneiss                     | C18           | Bi           | 7.12 | $5.53 \cdot 10^{-6}$     | 82                   | 19.5 $\pm$ 1   |      |
| Bi-Pegmatite                       | C212          | Bi           | 7.10 | $5.58 \cdot 10^{-6}$     | 81                   | 19.5 $\pm$ .5  |      |
| Bi-Gneiss                          | Z150          | Bi           | 7.41 | $5.17 \cdot 10^{-6}$     | 79                   | 17.5 $\pm$ .2  |      |
| Bi-Gneiss                          | Z151          | Bi           | 7.19 | $4.62 \cdot 10^{-6}$     | 72                   | 16.1 $\pm$ .2  |      |
| Bi-Gneiss                          | Z159          | Bi           | 7.23 | $4.61 \cdot 10^{-6}$     | 72                   | 16 $\pm$ .3    |      |
| Mu-Schist                          | C422          | Mu           | 8.48 | $7.46 \cdot 10^{-6}$     | 58                   | 22 $\pm$ 1     |      |
| Mu-Schist                          | C55           | Mu           | 7.99 | $7.04 \cdot 10^{-6}$     | 79                   | 22 $\pm$ .5    |      |
| Mu-Qz-Schist                       | C495          | Mu           | 8.74 | $7.55 \cdot 10^{-6}$     | 51                   | 21.5 $\pm$ 1   |      |
| Mu-Dol-Quartzite                   | O VI          | Mu           | 7.67 | $6.46 \cdot 10^{-6}$     | 82                   | 21 $\pm$ .5    |      |
| Micaschist                         | C315          | Mu           | 8.49 | $7.21 \cdot 10^{-6}$     | 61                   | 21 $\pm$ 1     |      |
| Ga-Mu-Schist                       | C31           | Mu           | 6.97 | $4.86 \cdot 10^{-6}$     | 78                   | 17.5 $\pm$ .5  |      |
| Bi-Amphibolite                     | A346          | Amph(40-80)  | .312 | $7.89 \cdot 10^{-6}$     | 94                   | 597 $\pm$ 12   |      |
|                                    |               |              |      | $8.74 \cdot 10^{-6}$     | 86                   | 546 $\pm$ 10   |      |
|                                    |               | Amph(80-120) | .365 | $7.41 \cdot 10^{-6}$     | 89                   | 450 $\pm$ 9    |      |
| Amphibolite                        | A233          | Amph(80-120) | .21  | $1.61 \cdot 10^{-6}$     | 64                   | 183 $\pm$ 4    |      |
| Amphibolite                        | A300          | Amph(80-120) | .853 | $3.44 \cdot 10^{-6}$     | 88                   | 98.3 $\pm$ 2.1 |      |
| Amphibolite                        | A255          | Amph(80-120) | .796 | $1.77 \cdot 10^{-6}$     | 69                   | 54.9 $\pm$ 1.3 |      |
| Amphibolite                        | C250          | Amph(80-120) | .27  | $.46 \cdot 10^{-6}$      | 33                   | 42.9 $\pm$ 2.2 |      |
| Amphibolite                        | C170          | Amph(80-120) | .244 | $.32 \cdot 10^{-6}$      | 21                   | 32.7 $\pm$ 2.8 |      |
| Kyanite schist                     | C523          | WR           | 4.02 | $3 \cdot 10^{-6}$        | 24                   | 18.5 $\pm$ 2   | 20   |
| Phyllite                           | L122          | WR           | 1.68 | $1.22 \cdot 10^{-6}$     | 53                   | 18.2 $\pm$ .5  |      |
| Calc-phyllite                      | L52           | WR           | 3.47 | $1.63 \cdot 10^{-6}$     | 69                   | 11.7 $\pm$ .2  |      |

TABLE 2 (continued)

K/Ar

| Rock type                               | Sample n. | Material<br>( $\nu$ ) | K%    | $^{40}\text{Ar}$ rd ml/g | $^{40}\text{Ar}$ rd% | AGE Ma         | Ref. |
|-----------------------------------------|-----------|-----------------------|-------|--------------------------|----------------------|----------------|------|
| <u>SW Tauern Window</u>                 |           |                       |       |                          |                      |                |      |
| Tonalitic granite                       | 76        | Bi                    | 7.62  | $113.4 \cdot 10^{-6}$    | 95                   | 343 $\pm 3$    | 2    |
|                                         |           | Hbl                   | .764  | $104.9 \cdot 10^{-7}$    | 85                   | 318 $\pm 3$    |      |
|                                         |           |                       | .749  | $94.7 \cdot 10^{-7}$     | 85                   | 294 $\pm 3$    |      |
| Tonalitic granite                       | 77        | Bi                    | 7.66  | $105.5 \cdot 10^{-6}$    | 90                   | 319 $\pm 3$    |      |
|                                         |           | Hbl                   | .592  | $93 \cdot 10^{-7}$       | 90                   | 360 $\pm 3$    |      |
|                                         |           |                       | .750  | $94 \cdot 10^{-7}$       | 85                   | 293 $\pm 3$    |      |
| Tonalitic granite                       | 78        | Bi                    | 7.56  | $87.6 \cdot 10^{-7}$     | 75                   | 28.9 $\pm .3$  |      |
| Tonalitic granite                       | 79        | Bi                    | 7.65  | $90.3 \cdot 10^{-7}$     | 70                   | 29.6 $\pm .3$  |      |
| Tonalitic granite                       | 83        | Bi                    | 7.30  | $58.7 \cdot 10^{-7}$     | 65                   | 20.2 $\pm .2$  |      |
|                                         |           | Mu                    | 7.82  | $74.5 \cdot 10^{-7}$     | 75                   | 23.9 $\pm .2$  |      |
| Tonalitic granite                       | 82        | Bi                    | 7.55  | $80.5 \cdot 10^{-7}$     | 80                   | 26.7 $\pm .2$  |      |
| Hornblende                              | 403       | Bi                    | 7.02  | $74.7 \cdot 10^{-7}$     | 80                   | 26.6 $\pm .2$  |      |
| Hornblende                              | 404       | Bi                    | 7.13  | $75.7 \cdot 10^{-7}$     | 85                   | 26.6 $\pm .2$  |      |
| Tonalitized Augen & Flasergneiss        | 84        | Bi                    | 7.04  | $53.9 \cdot 10^{-7}$     | 65                   | 19.3 $\pm .2$  |      |
| Augen & Flasergneiss                    | 86        | Bi                    | 7.13  | $63.4 \cdot 10^{-7}$     | 70                   | 22.3 $\pm .2$  |      |
| Augen & Flasergneiss                    | 87        | Bi                    | 7.10  | $66.2 \cdot 10^{-7}$     | 70                   | 23.3 $\pm .2$  |      |
| Aplitic granite                         | 80        | Bi                    | 7.26  | $60.6 \cdot 10^{-7}$     | 60                   | 20.9 $\pm .2$  |      |
| Aplitic granite                         | 80a       | Bi                    | 5.91  | $50.4 \cdot 10^{-7}$     | 55                   | 21.4 $\pm .2$  |      |
| Aplitic granite                         | 81        | Mu                    | 8.64  | $73.2 \cdot 10^{-7}$     | 70                   | 21.3 $\pm .2$  |      |
| Aplitic granite                         | 85        | Bi                    | 6.84  | $57.5 \cdot 10^{-7}$     | 55                   | 21.1 $\pm .2$  |      |
| <u>W Tauern Window</u>                  |           |                       |       |                          |                      |                |      |
| Granitic gneiss                         | KAW 816   | Ph                    | 8.25  | $5.06 \cdot 10^{-6}$     | 74.65                | 14 $\pm 1$     | 33   |
| Granitic gneiss                         | KAW 811   | Ph                    | 8.98  | $5.39 \cdot 10^{-6}$     | 73.79                | 15 $\pm 1$     |      |
|                                         |           | Bi (96%)              | 6.61  | $3.85 \cdot 10^{-6}$     | 62.35                | 14.6 $\pm 1$   |      |
|                                         |           |                       | 6.88  | $3.99 \cdot 10^{-6}$     | --                   | 12             |      |
|                                         |           | Chl (90%)             | .81   | $.88 \cdot 10^{-6}$      | 29.70                | 27 $\pm 4$     |      |
|                                         |           |                       | .14   | $.54 \cdot 10^{-6}$      | --                   | 97             |      |
|                                         |           | KF                    | 12.28 | $19.85 \cdot 10^{-6}$    | 80.35                | 40.8 $\pm 2$   |      |
| Granitic gneiss                         | KAW 824   | Ph                    | 8.87  | $6.66 \cdot 10^{-6}$     | 73.73                | 19 $\pm 1$     |      |
|                                         |           | Bi                    | 5.16  | $3.35 \cdot 10^{-6}$     | 61.9                 | 16 $\pm 1$     |      |
| Granitic gneiss                         | KAW 422   | Ph                    | 8.24  | $7.55 \cdot 10^{-6}$     | 79.44                | 23 $\pm 1$     |      |
| Calcareous micaschist                   | KAW 1318  | Mu                    | 6.42  | $8.03 \cdot 10^{-6}$     | 76.14                | 31 $\pm 2$     |      |
|                                         |           | Bi                    | 6.28  | $4.42 \cdot 10^{-6}$     | 61.63                | 17.7 $\pm 1$   |      |
| <u>Merano-Mules-Anterselva basement</u> |           |                       |       |                          |                      |                |      |
| Paragneiss                              | KAW 1319  | Mu                    | 6.61  | $9.15 \cdot 10^{-6}$     | 88.24                | 34 $\pm 2$     | 33   |
| Biotite gneiss                          | KAW 1320  | Bi                    | 7.14  | $5.48 \cdot 10^{-6}$     | 69.14                | 19 $\pm 1$     |      |
| Leucogranitic gneiss                    | T 1066    | WM(>.43)              | 8.91  | $67.18 \cdot 10^{-6}$    | 81.75                | 184 $\pm 9$    |      |
| Granitoid gneiss                        | T 1246    | WM(>.43)              | 9     | $55.13 \cdot 10^{-6}$    | 95.65                | 151 $\pm 6$    | 35   |
| Granitoid gneiss                        | T 1247    | WM(.15-.43)           | 8.91  | $34.82 \cdot 10^{-6}$    | 94.89                | 98 $\pm 4$     |      |
| Granitoid gneiss                        | T 1285    | WM(>.43)              | 8.94  | $28.03 \cdot 10^{-6}$    | 86.77                | 79 $\pm 3.6$   |      |
| Leucogranitic gneiss                    | T 1298    | WM(>.43)              | 8.94  | $27.24 \cdot 10^{-6}$    | 75.17                | 77 $\pm 4$     |      |
| Leucogranitic gneiss                    | T 1299    | WM(>.43)              | 9.03  | $28.07 \cdot 10^{-6}$    | 77.45                | 78 $\pm 4$     |      |
| Leucogranitic gneiss                    | T 1307    | WM(>.43)              | 8.74  | $99.50 \cdot 10^{-6}$    | 96.02                | 271 $\pm 11$   |      |
| Leucogranitic gneiss                    | T 1316    | WM(.15-.43)           | 8.69  | $29.55 \cdot 10^{-6}$    | 94.04                | 85 $\pm 3.6$   |      |
| Leucogranitic gneiss                    | T 1319    | WM(>.43)              | 9.03  | $28.58 \cdot 10^{-6}$    | 87.23                | 80 $\pm 3.7$   |      |
| Leucogranitic gneiss                    | T 1325    | WM(>.43)              | 8.73  | $27.98 \cdot 10^{-6}$    | 86.37                | 81 $\pm 3.7$   |      |
| Granite gneiss                          | T 1349    | KF                    | 8.84  | $19.69 \cdot 10^{-6}$    | 44.22                | 56.4 $\pm 5$   | 35   |
|                                         |           | KF (augen)            | --    | $19.49 \cdot 10^{-6}$    | 84.85                | 55.8 $\pm 2.6$ |      |
| Muscovite-pegmatite                     | T 1364    | WM .15-.43 mm         | 8.77  | $27.62 \cdot 10^{-6}$    | 65.20                | 79 $\pm 5$     |      |
| Leucogranitic gneiss                    | T 1373    | WM >.30 mm            | 8.89  | $29.42 \cdot 10^{-6}$    | 93.35                | 83 $\pm 3.5$   | 28   |
| Augengneiss                             | 1554      | WM(80-100)            | 9.42  | $21.05 \cdot 10^{-6}$    | 52.55                | 56.3 $\pm 1.8$ |      |
|                                         |           | WM(100-200)           | 8.97  | $18.98 \cdot 10^{-6}$    | 63.70                | 53.3 $\pm 2.5$ |      |
| Augengneiss                             | 1555      | WM(100-200)           | 9.05  | $21.62 \cdot 10^{-6}$    | 88.81                | 60.1 $\pm 2$   |      |
| Augengneiss                             | 1556      | WM(60-80)             | 9.12  | $29.48 \cdot 10^{-6}$    | 92.92                | 80.8 $\pm 2.6$ |      |
|                                         |           | WM(80-100)            | 9.19  | $24.40 \cdot 10^{-6}$    | 91.83                | 66.7 $\pm 2.2$ |      |
|                                         |           | WM(100-200)           | 9.31  | $19.63 \cdot 10^{-6}$    | 92.08                | 53.1 $\pm 1.7$ |      |
| Augengneiss                             | 1796      | Bi(80-100)            | 7.97  | $8.24 \cdot 10^{-6}$     | 79.45                | 26.2 $\pm .9$  |      |
| Augengneiss                             | 1799      | Bi(80-100)            | 7.79  | $6.76 \cdot 10^{-6}$     | 71.01                | 22 $\pm .9$    |      |
|                                         |           | WM(100-150)           | 9.10  | $10.98 \cdot 10^{-6}$    | 75.41                | 30.5 $\pm 1.2$ |      |

TABLE 2 (continued)

K/Ar

| Rock type                             | Sample n. | Material    | K%    | $^{40}\text{Ar}$ rd ml/g | $^{40}\text{Ar}$ rd% | AGE Ma         | Ref. |
|---------------------------------------|-----------|-------------|-------|--------------------------|----------------------|----------------|------|
| Augengneiss lamella                   | 1557      | WM(50-60)   | 9.21  | $18.49 \cdot 10^{-6}$    | 92.24                | $50.6 \pm 1.6$ |      |
|                                       |           | WM(60-80)   | 9.08  | $17.96 \cdot 10^{-6}$    | 91.02                | $49.9 \pm 1.6$ |      |
| Pegmatitic orthogneiss                | AA14      | Mu          | 9.08  | $4.65 \cdot 10^{-4}$     | 87                   | $114 \pm 3$    | 8    |
| Pegmatitic orthogneiss                | AA15      | Mu          | 9.08  | $4.23 \cdot 10^{-4}$     | 72                   | $104 \pm 3$    |      |
| Orthogneiss                           | D7353     | Bi          | 7.82  | $74.48 \cdot 10^{-6}$    | 96.4                 | 233            | 21   |
| Orthogneiss                           | D7382     | Bi          | 7.72  | $84.79 \cdot 10^{-6}$    | 97.1                 | 257            |      |
| Orthogneiss                           | D7391     | Bi          | 6.73  | $63.78 \cdot 10^{-6}$    | 94.5                 | 224            |      |
|                                       |           | Mu          | 8.47  | $108.69 \cdot 10^{-6}$   | 96.1                 | 297            |      |
|                                       | D7420     | Hbl         | .342  | $4.91 \cdot 10^{-6}$     | 86.9                 | 329            |      |
| <u>Monteneve</u>                      |           |             |       |                          |                      |                |      |
| Orthogneiss                           | KW1135    | Ph          | 9.02  | $30.3 \cdot 10^{-6}$     | 92.5                 | $82.5 \pm 4$   | 33   |
|                                       |           | Bi          | 6.87  | $21.6 \cdot 10^{-6}$     | 90.7                 | $77.5 \pm 3$   |      |
| Muscovite gneiss                      | KAW 1208  | Mu          | 8.815 | $31.5 \cdot 10^{-6}$     | 64.8                 | $89 \pm 5$     | 33   |
| Garnet micaschist                     | KAW 1207  | Mu          | 7.46  | $26.1 \cdot 10^{-6}$     | 90.3                 | $87 \pm 4$     |      |
|                                       |           | Mu          | 7.46  | $25.8 \cdot 10^{-6}$     | 86.2                 | $86 \pm 4$     |      |
|                                       |           | Bi          | 6.995 | $21.25 \cdot 10^{-6}$    | 93.6                 | $75.5 \pm 3.0$ |      |
| Garnet micaschist                     | KAW 1150  | Mu          | 7.94  | $28.86 \cdot 10^{-6}$    | 88.6                 | $90 \pm 4$     |      |
|                                       |           | Bi          | 7.33  | $23.75 \cdot 10^{-6}$    | 91.1                 | $81 \pm 3$     |      |
| Garnet micaschist                     | KAW 1151  | Mu          | 7.53  | $25.3 \cdot 10^{-6}$     | 91.95                | $82.5 \pm 4.0$ |      |
|                                       |           | Bi          | 6.23  | $20.09 \cdot 10^{-6}$    | 89.1                 | $79.5 \pm 4.0$ |      |
| Pegmatite                             | KAW 1143  | Mu          | 8.79  | $34.0 \cdot 10^{-6}$     | 93.0                 | $96 \pm 4$     |      |
|                                       |           | Mu          | 8.79  | $33.7 \cdot 10^{-6}$     | 90.1                 | $95 \pm 4$     |      |
|                                       |           | Mu          | 8.84  | $29.6 \cdot 10^{-6}$     | 85.1                 | $82.5 \pm 4.0$ |      |
| Paragneiss                            | KAW 1136  | Mu          | 7.875 | $29.1 \cdot 10^{-6}$     | 89.7                 | $91 \pm 4$     |      |
|                                       |           | Bi          | 6.97  | $28.7 \cdot 10^{-6}$     | 95.4                 | $102 \pm 4$    |      |
|                                       |           | Bi          | 6.97  | $28.2 \cdot 10^{-6}$     | 94.5                 | $101 \pm 4$    |      |
| Bi-Mu-schist                          | KAW 1134  | Mu          | 6.77  | $23.9 \cdot 10^{-6}$     | 86.0                 | $87 \pm 4$     |      |
|                                       |           | Bi          | 7.23  | $23.5 \cdot 10^{-6}$     | 91.7                 | $81 \pm 4$     |      |
| Augengneiss                           | KAW 421   | Ph          | 9.09  | $31.0 \cdot 10^{-6}$     | 89.5                 | $85 \pm 4$     |      |
|                                       |           | Bi          | 7.11  | $23.2 \cdot 10^{-6}$     | 95.4                 | $81 \pm 3$     |      |
| Orthogneiss                           | KAW 1138  | Mu          | 9.06  | $111.2 \cdot 10^{-6}$    | 95.5                 | $287 \pm 12$   |      |
|                                       |           | Bi          | 7.42  | $42.4 \cdot 10^{-6}$     | 96.3                 | $139 \pm 6$    |      |
|                                       |           | Bi          | 7.42  | $40.8 \cdot 10^{-6}$     | 98.2                 | $134 \pm 5$    |      |
| Orthogneiss                           | KAW 1141  | Mu          | 9.16  | $28.6 \cdot 10^{-6}$     | 91.7                 | $77.5 \pm 3.0$ |      |
|                                       |           | Bi          | 8.04  | $24.1 \cdot 10^{-6}$     | 93.7                 | $74.5 \pm 3.0$ |      |
| Orthogneiss                           | KAW 1127  | Mu          | 8.47  | $29.0 \cdot 10^{-6}$     | 91.7                 | $85 \pm 4$     |      |
|                                       |           | Bi          | 8.03  | $28.7 \cdot 10^{-6}$     | 93.4                 | $89 \pm 4$     |      |
| Paragneiss                            | KAW 1126  | Mu          | 8.07  | $44.3 \cdot 10^{-6}$     | 89.0                 | $133 \pm 6$    |      |
|                                       |           | Bi          | 7.36  | $53.6 \cdot 10^{-6}$     | 94.9                 | $175 \pm 7$    |      |
| <u>Oetzal</u>                         |           |             |       |                          |                      |                |      |
| Biotite-plagioclase gneiss            | 169       | Bi(600-300) | 6.62  | $24.56 \cdot 10^{-6}$    | 89.9                 | $90.7 \pm 1.1$ | 29   |
|                                       |           | Bi(600-300) | 6.73  | $24.61 \cdot 10^{-6}$    | 90.2                 |                |      |
| Biotite-plagioclase gneiss            | 170       | Bi(600-400) | 6.97  | $24.92 \cdot 10^{-6}$    | 86.3                 | $88.1 \pm 1.1$ |      |
|                                       |           | Mu(600-400) | 2.69  | $33.91 \cdot 10^{-6}$    | 83.5                 | $294 \pm 4$    |      |
|                                       |           | Mu(400-200) | 7.05  | $37.83 \cdot 10^{-6}$    | 90.5                 | $129 \pm 2$    |      |
| Granitized biotite-plagioclase gneiss | 171       | Bi(400-200) | 7     | $108.1 \cdot 10^{-6}$    | 94.9                 | $355 \pm 4$    |      |
|                                       |           | Bi(400-200) | 7.05  | $109.3 \cdot 10^{-6}$    | 92.4                 |                |      |
| Biotite-plagioclase gneiss            | 172       | Bi(600-400) | 6.10  | $37.93 \cdot 10^{-6}$    | 86.6                 | $151 \pm 2$    |      |
|                                       |           | Bi(400-200) | 6.15  | $35.68 \cdot 10^{-6}$    | 86                   | $141 \pm 2$    |      |
|                                       |           | Mu(600-400) | 5.05  | $53.24 \cdot 10^{-6}$    | 92                   | $249 \pm 3$    |      |
|                                       |           | Mu(400-200) | 6.35  | $62.25 \cdot 10^{-6}$    | 93.6                 | $232 \pm 3$    |      |
| Muscovite granitic gneiss             | 173       | Mu(600-400) | 7.74  | $59.26 \cdot 10^{-6}$    | 92.7                 | $184 \pm 2$    |      |
|                                       |           | Mu(400-200) | 8.59  | $54.50 \cdot 10^{-6}$    | 83.1                 | $154 \pm 2$    |      |
| Diabase                               | 174       | WR(630-400) | .576  | $12.79 \cdot 10^{-6}$    | 85.3                 | $490 \pm 6$    |      |
|                                       |           | WR(400-200) | .558  | $12.39 \cdot 10^{-6}$    | 77.6                 | $491 \pm 6$    |      |
|                                       |           | WR(200-100) | .542  | $12.13 \cdot 10^{-6}$    | 81.6                 | $494 \pm 6$    |      |
|                                       |           | WR(100-63)  | .520  | $11.38 \cdot 10^{-6}$    | 75.5                 | $484 \pm 6$    |      |
|                                       |           | WR(<63)     | .584  | $12.28 \cdot 10^{-6}$    | 63.7                 | $468 \pm 6$    |      |
| Diabase                               | 375       | WR(630-500) | 3.144 | $12.05 \cdot 10^{-6}$    | 95.8                 | $94.3 \pm 1.2$ |      |
|                                       |           | WR(630-500) | 3.136 | $12.01 \cdot 10^{-6}$    | 95.7                 |                |      |
|                                       |           | WR(630-500) |       | $12.05 \cdot 10^{-6}$    | 95.8                 |                |      |
|                                       |           | Bi(630-500) | 6.22  | $22.14 \cdot 10^{-6}$    | 93.7                 | $88.1 \pm 1.1$ |      |
|                                       |           | Bi(630-500) | 6.29  | $22.56 \cdot 10^{-6}$    | 94.5                 |                |      |

TABLE 2 (continued)

K/Ar

| Rock type                  | Sample n. | Material<br>( $\mu$ ) | K%    | $^{40}\text{Ar}$ rd ml/g | $^{40}\text{Ar}$ rd% | AGE Ma                | Ref. |
|----------------------------|-----------|-----------------------|-------|--------------------------|----------------------|-----------------------|------|
| Diabase                    | 376       | WR(400-315)           | 2.065 | $8.50 \cdot 10^{-6}$     | 92.3                 | 101 $\pm 1.3$         | 29   |
|                            |           | WR(200-100)           | 1.583 | $6.62 \cdot 10^{-6}$     | 91.5                 | 102.6 $\pm 1.3$       |      |
|                            |           | WR(630-500)           | .866  | $15.60 \cdot 10^{-6}$    | 95                   | 407 $\pm 5$           |      |
|                            |           | WR(400-315)           | .840  | $15.54 \cdot 10^{-6}$    | 94.8                 | 413 $\pm 5$           |      |
|                            |           | WR(400-315)           | .860  | $15.59 \cdot 10^{-6}$    | 94.8                 |                       |      |
|                            |           | WR(400-315)           |       | $15.62 \cdot 10^{-6}$    | 94.6                 |                       |      |
|                            |           | WR(200-100)           | .802  | $14.57 \cdot 10^{-6}$    | 93.9                 | 410 $\pm 5$           |      |
| Biotite-plagioclase gneiss | 175       | Bi(600-400)           | 5.84  | $56.19 \cdot 10^{-6}$    | 92.0                 | 228 $\pm 3$           |      |
|                            |           | Bi(400-200)           | 6.68  | $65.74 \cdot 10^{-6}$    | 89.3                 | 233 $\pm 3$           |      |
|                            |           | Mu(400-200)           | 6.54  | $48.31 \cdot 10^{-6}$    | 88.8                 | 176 $\pm 2$           |      |
|                            |           | Mu(400-200)           | 6.71  | $48.74 \cdot 10^{-6}$    | 91.7                 |                       |      |
|                            |           | Mu(400-200)           | 6.73  |                          |                      |                       |      |
| Granodiorite               | 176       | Bi(400-200)           | 7.46  | $101.3 \cdot 10^{-6}$    | 92.6                 | 314 $\pm 4$           |      |
| Augengneiss                | 177       | Bi(600-400)           | 6.54  | $45.28 \cdot 10^{-6}$    | 83.8                 | 167 $\pm 2$           |      |
|                            |           | Bi(400-200)           | 6.61  | $41.83 \cdot 10^{-6}$    | 84.8                 | 154 $\pm 2$           |      |
|                            |           | Mu(400-200)           | 8.32  | $101.2 \cdot 10^{-6}$    | 90.0                 | 286 $\pm 4$           |      |
|                            |           | Mu(400-200)           | 8.43  | $103.5 \cdot 10^{-6}$    | 92.7                 |                       |      |
|                            |           | Augengneiss           | 178   | Bi(400-200)              | 7.28                 | $62.61 \cdot 10^{-6}$ |      |
| Bi(600-400)                | 7.33      |                       |       | $67.54 \cdot 10^{-6}$    | 91.9                 | 218 $\pm 3$           |      |
| Mu(600-400)                | 8.10      |                       |       | $104.6 \cdot 10^{-6}$    | 92.1                 | 300 $\pm 4$           |      |
| Mu(400-200)                | 8.40      |                       |       | $62.4 \cdot 10^{-7}$     | 70.0                 | 179 $\pm 2$           |      |
| Diabase                    | 372       |                       |       | WR(600-500)              | .507                 | $46.15 \cdot 10^{-7}$ |      |
|                            |           | WR(600-500)           | .516  | $46.21 \cdot 10^{-7}$    | 90.4                 |                       |      |
|                            |           | WR(400-315)           | .516  | $46.26 \cdot 10^{-7}$    | 90.3                 | 214 $\pm 3$           |      |
|                            |           | WR(200-100)           | .591  | $54.35 \cdot 10^{-7}$    | 87.2                 | 219 $\pm 3$           |      |
|                            |           | Diabase               | 373   | WR(600-500)              | .366                 | $39.81 \cdot 10^{-7}$ |      |
| WR(600-500)                | .358      |                       |       | $39.64 \cdot 10^{-7}$    | 93.7                 |                       |      |
| WR(400-315)                | .348      |                       |       | $38.93 \cdot 10^{-7}$    | 89.6                 | 265 $\pm 3$           |      |
| WR(200-100)                | .455      |                       |       | $50.10 \cdot 10^{-7}$    | 89.2                 | 259 $\pm 3$           |      |
| Diabase                    | 374A      |                       |       | WR(630-500)              | 1.487                | $73.48 \cdot 10^{-7}$ |      |
|                            |           | WR(400-315)           | 1.452 | $72.33 \cdot 10^{-7}$    | 92.9                 | 121.7 $\pm 1.5$       |      |
|                            |           | WR(200-100)           | 1.340 | $68.34 \cdot 10^{-7}$    | 89.2                 | 124.4 $\pm 1.6$       |      |
| Diabase                    | 374B      | WR(630-400)           | 1.292 | $50.36 \cdot 10^{-7}$    | 91.0                 | 95.8 $\pm 1.2$        |      |
|                            |           | WR(400-315)           | 1.284 | $49.54 \cdot 10^{-7}$    | 90.5                 | 94.9 $\pm 1.2$        |      |
|                            |           | WR(200-100)           | 1.238 | $49.12 \cdot 10^{-7}$    | 82.6                 | 97.4 $\pm 1.2$        |      |

TABLE 3  
Rb/Sr analytical data - SOUTHERN ALPS

| Rock type                                     | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma | Ref. |
|-----------------------------------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|--------|------|
| <u>Euganean, Lessinian, Marosticano Hills</u> |           |          |        |        |                                 |                                     |                                     |        |      |
| Mugearite                                     | CE 86     | WR       | 50     | 850    | .166                            | .7028                               | .7028                               |        |      |
| Latitbasalt                                   | CE 92     | WR       | 60     | 1140   | .149                            | .7033                               | .7032                               |        |      |
| Latite                                        | CE 42     | WR       | 45     | 670    | .190                            | .7036                               | .7035                               |        |      |
| Trachyte                                      | CE 119    | WR       | 180    | 580    | .877                            | .7038                               | .7033                               |        |      |
| Trachyte                                      | CE 116    | WR       | 141    | 252    | 1.580                           | .7043                               | .7035                               |        |      |
| Trachyte                                      |           | P1       | 19     | 1530   | .035                            | .7032                               | .7032                               |        |      |
| Trachyte                                      | CE 113    | WR       | 120    | 450    | .753                            | .7038                               | .7034                               |        |      |
| Alkali Rhyolite                               | CE 114    | P1       | 15     | 894    | .047                            | .7035                               | .7035                               |        |      |
| Alkali Rhyolite                               | CE 52     | WR       | 180    | 400    | 1.271                           | .7041                               | .7035                               |        |      |
| Persilicic alkali-rhyolite                    | CE 57     | KF       | 396    | 58     | 19.280                          | .7125                               | .7031                               |        |      |
| Nephelinitic basalt                           | L 1       | WR       | 25     | 1150   | .061                            | .7028                               | .7028                               |        |      |
| Ankaratritic basalt                           | M 103     | WR       | 30     | 920    | .092                            | .7037                               | .7036                               |        |      |

TABLE 3 (continued)

Rb/Sr

| Rock type       | Sample n.           | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma | Ref. |
|-----------------|---------------------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|--------|------|
| <u>Predazzo</u> |                     |          |        |        |                                 |                                     |                                     |        |      |
| Granite         | B-GE-44             | WR       | 459    | 20.3   | 66.3                            | .875                                |                                     | 181± 9 | 3    |
| Granite         | B-GT-18             | WR       | 329    | 102.2  | 9.3                             | .726                                |                                     |        |      |
| Granite         | B-GT-36             | WR       | 546    | 11.8   | 139.6                           | 1.161                               |                                     | 230± 7 |      |
| Granite         | B-RS                | Mu       | 11117  | 11.0   | 38952                           | 126.760                             |                                     | 227± 7 |      |
| Granite         | B-GE-9              | WR       | 291    | 56.9   | 14.9                            | .756                                |                                     | 244±12 |      |
|                 |                     | Bi       | 1516   | 5.3    | 1156                            | 4.750                               |                                     | 245± 7 |      |
| Granite         | B-GT-10B            | WR       | 365    | 138.4  | 7.6                             | .734                                |                                     |        |      |
|                 |                     | Bi       | 1050   | 26.0   | 121.5                           | 1.120                               |                                     | 238± 7 |      |
| Granite         | B-GT-30             | WR       | 372    | 122.2  | 8.8                             | .725                                |                                     |        |      |
|                 |                     | Bi       | 970    | 33.7   | 85.5                            | .997                                |                                     | 241± 7 |      |
|                 |                     | Feld.    | 674    | 96.6   | 20.3                            | .756                                |                                     | 179± 9 |      |
| Granite         | Pr-6 bis            | Bi       | 1685   | 14.0   | 393                             | 2.010                               |                                     | 233± 7 |      |
| Granite         | Pr-7                | Feld.    | 436    | 29.5   | 43.4                            | .843                                |                                     | 225±11 |      |
| Monzonite       | B Canzoccoli<br>5   | Bi       | 567    | 32.8   | 50.7                            | .873                                |                                     | 234±12 |      |
| Monzonite       | B Malgola 49C       | Bi       | 599    | 32.5   | 54.1                            | .874                                |                                     | 222±11 |      |
|                 |                     | Bi       | 602    | 31.4   | 56.6                            | .888                                |                                     | 228± 7 |      |
| Monzonite       | B Pente Cast.<br>65 | Bi       | 463    | 40.8   | 33.1                            | .815                                |                                     | 235±12 |      |
|                 |                     | Bi       | 504    | 28.4   | 52.2                            | .880                                |                                     | 236±12 |      |
| Monzonite       | B-151               | Bi       | 504    | 26.0   | 57.1                            | .911                                |                                     | 241± 7 |      |
| Monzonite       | L-3                 | Bi       | 440    | 23.4   | 55.3                            | .885                                |                                     | 230±11 |      |
| Syenite         | L-1                 | Bi       | 728    | 14.8   | 148.9                           | 1.210                               |                                     | 237± 7 |      |
| Syenite         | B-114               | Bi       | 449    | 40.2   | 32.6                            | .816                                |                                     | 241±12 |      |
| Syenite         | B-30-J              | Bi       | 424    | 76.0   | 16.2                            | .758                                |                                     | 235±12 |      |
| Granite         | Pr-6                | WR       | 378    | 121.4  | 9.0                             | .736                                |                                     |        |      |
| Granite         | Pr-6                | Bi       | 1435   | 16.5   | 274                             | 1.640                               |                                     | 239± 7 | 3    |
|                 |                     | Feld.    | 667    | 87.9   | 22.1                            | .777                                |                                     | 234±12 |      |
| Granite         | Pr-8                | WR       | 286    | 50.5   | 16.5                            | .757                                |                                     | 227±11 |      |
|                 |                     | Bi       | 1446   | 13.1   | 358.4                           | 1.912                               |                                     | 236± 7 |      |
|                 |                     | Feld.    | 387    | 48.3   | 23.4                            | .783                                |                                     | 237±12 |      |
| Granite         | B-GE-14             | WR       | 387    | 32.4   | 34.9                            | .816                                |                                     | 226±11 |      |
| Granite         | B-GT-19             | WR       | 422    | 18.0   | 69.3                            | .914                                |                                     | 213± 6 |      |
| Granite         | B-GT-22A            | WR       | 378    | 15.3   | 72.8                            | .932                                |                                     | 219± 7 |      |
| Granite         | B-GT-36             | WR       | 546    | 8.6    | 195.3                           | 1.352                               |                                     | 233± 7 |      |
| Granite         | B-GT-147            | WR       | 389    | 15.3   | 75.6                            | .948                                |                                     | 227± 7 |      |
| Camptonite      | Pr-2                | WR       |        |        | .40                             | .7041                               | .7028                               |        |      |
| Camptonite      | Pr-3                | WR       |        |        | .20                             | .7055                               | .7048                               |        |      |
| Granite         | B-GT-30             | WR       |        |        | 8.59                            | .7360                               | .7072                               |        |      |
| Monzonite       | B-cp-18             | WR       |        |        | .34                             | .7034                               | .7023                               |        |      |
| Monzonite       | B-151               | WR       |        |        | .59                             | .7053                               | .7033                               |        |      |
| Syenite         | B-180               | WR       |        |        | 1.32                            | .7100                               | .7057                               |        |      |
| Syenite         | B-170               | WR       |        |        | 1.59                            | .7094                               | .7040                               |        |      |
| Monzonite       | B<br>P.Castellani   | WR       |        |        | .30                             | .7080                               | .7070                               |        |      |
| Monzonite       | B<br>Canzoccoli     | WR       |        |        | .30                             | .7062                               | .7050                               |        |      |
| Volcanite       | B-60                | WR       |        |        | .42                             | .7059                               | .7046                               |        |      |
| <u>Monzoni</u>  |                     |          |        |        |                                 |                                     |                                     |        |      |
| Monzodiorite    | X2                  | Bi       | 429    | 24.7   | 51.07                           | .8712                               |                                     | 229± 8 | 5    |
| Monzodiorite    | X1                  | Bi       | 503    | 24.9   | 59.63                           | .9099                               |                                     | 241± 8 |      |
| Gabbro          | 48                  | Bi       | 380    | 63.4   | 17.45                           | .7630                               |                                     | 234±8  | 5    |
| Gabbro          | 28                  | Bi       | 446    | 75.9   | 17.09                           | .7642                               |                                     | 243±8  |      |
| Diorite         | 121                 | Bi       | 434    | 49.4   | 25.62                           | .7948                               |                                     | 246±8  |      |
| Diorite         | 274                 | Bi       | 617    | 31.4   | 57.95                           | .8910                               |                                     | 226±8  |      |
| Syenitic dyke   | F-1                 | Bi       | 530    | 33.3   | 46.74                           | .8680                               |                                     | 245±8  |      |
| Gabbro          | GT                  | WR       | 13     | 875    | .04                             | .7037                               |                                     |        |      |
| Gabbro          | 48                  | WR       | 34     | 1395   | .07                             | .7034                               |                                     |        |      |
| Gabbro          | 268                 | WR       | 12     | 802    | .04                             | .7039                               |                                     |        |      |
| Gabbro          | 320                 | WR       | 40     | 1238   | .09                             | .7052                               |                                     |        |      |

TABLE 3 (continued)

Rb/Sr

| Rock type               | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma | Ref. |
|-------------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|--------|------|
| Gabbro                  | 28        | WR       | 79     | 992    | .23                             | .7058                               |                                     |        |      |
| Gabbro                  | 84        | WR       | 41     | 1177   | .10                             | .7073                               |                                     |        |      |
| Monzogabbro             | 64        | WR       | 87     | 973    | .26                             | .7048                               |                                     |        |      |
| Monzodiorite            | X1        | WR       | 124    | 873    | .40                             | .7062                               |                                     |        |      |
| Monzodiorite            | X2        | WR       | 96     | 1347   | .20                             | .7060                               |                                     |        |      |
| Monzodiorite            | 301       | WR       | 208    | 710    | .84                             | .7074                               |                                     |        |      |
| Diorite                 | 274       | WR       | 102    | 1118   | .26                             | .7055                               |                                     |        |      |
| Syenitic dyke           | F-1       | WR       | 225    | 520    | 1.25                            | .7084                               |                                     |        |      |
| Syenitic dyke           | F-100     | WR       | 240    | 286    | 2.43                            | .7125                               |                                     |        |      |
| Pyroxenite              | PT        | WR       | 21     | 144    | .40                             | .7083                               |                                     |        |      |
| Ladinian limestone      | CL        | WR       | 4      | 127    | .08                             | .7094                               |                                     |        |      |
| Monzodiorite            | MD        | WR       | 144    | 830    | .50                             | .7091                               |                                     |        |      |
| Xenolith in MD          | IMD       | WR       | 210    | 253    | 2.40                            | .7261                               |                                     |        |      |
| Phyllite                | SM-153    | WR       | 128    | 117    | 3.20                            | .7326                               |                                     |        |      |
| <u>Mt. Sabion</u>       |           |          |        |        |                                 |                                     |                                     |        |      |
| Granodiorite            | A/6       | Bi       | 522    | 4.61   | 377.07                          | 2.2481                              |                                     | 285+ 9 | 4    |
| Granodiorite            | A/7       | Bi       | 454    | 4.03   | 374.33                          | 2.2190                              |                                     | 283+ 9 |      |
| Biotitic pegmatite      | A/8       | Bi       | 650    | 4.33   | 523.49                          | 2.8031                              |                                     | 278+ 9 |      |
| Muscovitic pegmatite    | A/10      | Mu       | 1392   | 4.11   | 1592.26                         | 7.0993                              |                                     | 282+ 9 |      |
| <u>Mt. Croce</u>        |           |          |        |        |                                 |                                     |                                     |        |      |
| Leucogranite            | 18        | WR       | 198    | 125    | 4.59                            | .7264                               |                                     |        | 7    |
| Pegmatite               | 18p       | WR       | 248    | 30     | 23.60                           | .8046                               |                                     |        |      |
| Granodioritic granite   | AA9       | WR       | 144    | 213    | 1.96                            | .7196                               |                                     |        |      |
| Granodioritic granite   | MC14      | WR       | 144    | 198    | 2.10                            | .7197                               |                                     |        |      |
| Granodioritic granite   | MC I      | WR       | 150    | 176    | 2.47                            | .7201                               | .7101+7                             | 285+ 4 |      |
| Granitic porphyryite    | MC II     | WR       | 163    | 135    | 3.49                            | .7229                               |                                     |        |      |
| Basic dyke              | MC VI     | WR       | 145    | 296    | 1.42                            | .7151                               |                                     |        |      |
| Leucogranite            | MC VII    | WR       | 243    | 36     | 19.70                           | .7919                               |                                     |        |      |
| Pegmatite               | MC VIII   | WR       | 179    | 116    | 4.48                            | .7294                               |                                     |        |      |
| Aplitic granite         | MC IX     | WR       | 202    | 68     | 8.60                            | .7460                               |                                     |        |      |
| Leucogranite            | 18        | Bi       | 740    | 5.39   | 465.56                          | 2.4748                              | (.7101)                             | 266+ 5 |      |
| Granodiorite            | AA9       | Bi       | 604    | 5.29   | 380.00                          | 2.2345                              | (.7101)                             | 282+ 6 |      |
| Granodiorite            | MC14      | Bi       | 544    | 11.14  | 149.94                          | 1.3351                              | (.7101)                             | 292+10 |      |
| Granodiorite            | MC I      | Bi       | 475    | 3.66   | 443.44                          | 2.5261                              | (.7101)                             | 287+ 5 |      |
| <u>Ivigna</u>           |           |          |        |        |                                 |                                     |                                     |        |      |
| Granite-Granodiorite    | I21       | WR       | 155    | 187    | 2.39                            | .7189                               |                                     |        |      |
| Granite-Granodiorite    | I22       | WR       | 153    | 208    | 2.13                            | .7183                               |                                     |        |      |
| Microgranite            | I22a      | WR       | 211    | 31     | 19.30                           | .7904                               |                                     |        |      |
| Granodiorite            | I23       | WR       | 154    | 228    | 1.90                            | .7171                               |                                     |        | 7    |
| Granite-Granodiorite    | I26       | WR       | 155    | 178    | 2.52                            | .7171                               |                                     |        |      |
| Granite-Granodiorite    | I19       | WR       | 134    | 255    | 1.50                            | .7142                               |                                     |        |      |
| Lamprophyric dyke       | I XII     | WR       | 108    | 272    | 1.15                            | .7116                               | .7079+4                             | 301+ 2 |      |
| Pegmatitic dyke         | I XIII    | WR       | 204    | 107    | 5.52                            | .7333                               |                                     |        |      |
| Aplite                  | I XVIIa   | WR       | 172    | 114    | 4.36                            | .7260                               |                                     |        |      |
| Granite or Granodiorite | I XVIIg   | WR       | 208    | 141    | 4.26                            | .7258                               |                                     |        |      |
| Pegmatite               | I XVIII   | WR       | 293    | 21     | 40.50                           | .8819                               |                                     |        |      |
| Granite-Granodiorite    | I19       | Bi       | 591    | 2.85   | 712.50                          | 2.6187                              | (.7079)                             | 188+ 4 |      |
| Granite-Granodiorite    | I22       | Bi       | 469    | 10.81  | 131.75                          | 1.2105                              | (.7079)                             | 267+11 |      |
| Granodiorite            | I23       | Bi       | 110    | 27.91  | 11.45                           | .7500                               | (.7079)                             | 258+98 |      |
| Granite-Granodiorite    | I26       | Bi       | 389    | 11.50  | 101.40                          | 1.0791                              | (.7079)                             | 257+13 |      |
| Granite-Granodiorite    | I XIV     | Bi       | 435    | 5.61   | 242.04                          | 1.5049                              | (.7079)                             | 231+12 |      |
| <u>Bressanone</u>       |           |          |        |        |                                 |                                     |                                     |        |      |
| Granodioritic granite   | AA3       | WR       | 160    | 179    | 2.58                            | .7212                               |                                     |        |      |
| Granodioritic granite   | B10       | WR       | 155    | 162    | 2.78                            | .7205                               |                                     |        |      |
| Granodioritic granite   | B9        | WR       | 179    | 142    | 3.65                            | .7255                               |                                     |        |      |
| Granodioritic granite   | B13       | WR       | 166    | 160    | 3.02                            | .7222                               |                                     |        |      |
| Granodioritic granite   | B12       | WR       | 155    | 181    | 2.48                            | .7204                               | .7091+ 5                            | 291+ 6 |      |
| Granodioritic granite   | 3Dv       | WR       | 146    | 188    | 2.24                            | .7177                               |                                     |        |      |

TABLE 3 (continued)

Rb/Sr

| Rock type                 | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma       | Ref. |
|---------------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|--------------|------|
| Granodioritic granite     | 50v       | WR       | 147    | 192    | 2.21                            | .7161                               |                                     |              |      |
| Microgranite              | B XIX     | WR       | 153    | 139    | 3.19                            | .7217                               |                                     |              |      |
| Aplite or Aplitic granite | B XXI A   | WR       | 187    | 50     | 10.80                           | .7535                               |                                     |              |      |
| Aplite                    | B XXII    | WR       | 188    | 39     | 13.90                           | .7658                               |                                     |              |      |
| Aplite                    | B XXIV    | WR       | 178    | 45     | 11.50                           | .7579                               |                                     |              | 7    |
| Granodioritic granite     | B XXV     | WR       | 164    | 173    | 2.75                            | .7195                               |                                     |              |      |
| Granodiorite              | AA3       | Bi       | 391    | 7.75   | 154.99                          | 1.3360                              | (.7091)                             | 284 $\pm$ 11 |      |
| Granodiorite              | B10       | Bi       | 546    | 4.82   | 376.19                          | 2.2266                              | "                                   | 283 $\pm$ 6  |      |
| Granodiorite              | B9        | Bi       | 522    | 9.40   | 171.65                          | 1.4030                              | "                                   | 284 $\pm$ 9  |      |
| Granodiorite              | B13       | Bi       | 394    | 24.17  | 48.11                           | .9120                               | "                                   | 296 $\pm$ 25 |      |
| Granodiorite              | B XXV     | Bi       | 512    | 4.00   | 435.76                          | 2.5043                              | "                                   | 289 $\pm$ 5  |      |
| Gabbrogranites & Diorites | 80-11     | WR       | 82     | 209    | 1.14                            | .7121 $\pm$ 2                       | .7076 $\pm$ 2                       |              | 23   |
|                           | 80-12     | WR       | 24     | 213    | .33                             | .7096 $\pm$ 2                       | .7083                               |              |      |
|                           | 80-9      | WR       | 123    | 319    | 1.11                            | .7138 $\pm$ 2                       | .7094                               |              |      |
|                           | 80-10     | WR       | 203    | 340    | 1.73                            | .7177 $\pm$ 3                       | .7108                               |              |      |
|                           | 80-42     | WR       | 42     | 255    | .48                             | .7100 $\pm$ 2                       | .7081                               |              |      |
|                           | 1230      | WR       | 193    | 168    | 3.33                            | .7226 $\pm$ 4                       |                                     |              |      |
|                           | 293a      | WR       | 175    | 134    | 3.78                            | .7241 $\pm$ 3                       |                                     |              |      |
|                           | 269       | WR       | 168    | 241    | 2.02                            | .7182 $\pm$ 3                       |                                     |              |      |
|                           | 345       | WR       | 174    | 177    | 2.85                            | .7213 $\pm$ 4                       | .7102 $\pm$ 4                       |              |      |
|                           | 264       | WR       | 156    | 187    | 2.42                            | .7190 $\pm$ 4                       |                                     |              |      |
| Granodiorites & Granites  | 510       | WR       | 113    | 239    | 1.37                            | .7141 $\pm$ 5                       | .7096 $\pm$ 6                       | 282 $\pm$ 14 |      |
|                           | 340       | WR       | 167    | 180    | 2.68                            | .7200 $\pm$ 4                       | .7095 $\pm$ 5                       |              |      |
|                           | 237       | WR       | 184    | 137    | 3.89                            | .7249 $\pm$ 2                       | .7096 $\pm$ 4                       |              |      |
|                           | 229       | WR       | 196    | 180    | 3.15                            | .7226 $\pm$ 2                       | .7102 $\pm$ 4                       |              |      |
|                           | 274       | WR       | 206    | 130    | 4.59                            | .7285 $\pm$ 4                       |                                     |              |      |
|                           | 360       | WR       | 184    | 172    | 3.10                            | .7221 $\pm$ 1                       |                                     |              |      |
|                           | 311/4     | WR       | 158    | 80.4   | 5.69                            | .7324 $\pm$ 2                       |                                     |              |      |
|                           | 311/3     | WR       | 185    | 60     | 8.99                            | .7455 $\pm$ 2                       |                                     |              |      |
| Fayalite granites         | 315       | WR       | 229    | 71     | 9.31                            | .7460 $\pm$ 4                       |                                     |              |      |
| Fayalite granites         | 79/7      | WR       | 168    | 33.5   | 14.63                           | .7676 $\pm$ 3                       |                                     |              | 23   |
|                           | 316       | WR       | 245    | 39     | 18.53                           | .7826 $\pm$ 3                       |                                     |              |      |
|                           | 1291      | WR       | 186    | 24.3   | 22.35                           | .7972 $\pm$ 5                       | .7101 $\pm$ 2                       | 275 $\pm$ 1  |      |
|                           | 290Fg     | WR       | 207    | 19.7   | 30.88                           | .8315 $\pm$ 2                       | .7085 $\pm$ 3                       | 266 $\pm$ 1  |      |
|                           | 305/c     | WR       | 217    | 17.6   | 36.23                           | .8516 $\pm$ 3                       |                                     |              |      |
|                           | 6         | WR       | 169    | 77     | 6.37                            | .7327 $\pm$ 9                       |                                     |              |      |
|                           | 527       | WR       | 216    | 44     | 14.27                           | .7622 $\pm$ 6                       |                                     |              |      |
|                           | 311/8     | WR       | 301    | 12.1   | 74.24                           | .9882 $\pm$ 8                       |                                     |              |      |
|                           | 333       | WR       | 352    | 12.4   | 84.37                           | 1.0286 $\pm$ 7                      |                                     |              |      |
|                           | 6         | Bi       | 330    | 22.3   | 43.59                           | .8749 $\pm$ 8                       | .7084 $\pm$ 10                      | 269 $\pm$ 5  |      |
| Fayalite granite          |           | Bi       | 398    | 20.0   | 58.98                           | .9340 $\pm$ 21                      | .7083 $\pm$ 10                      | 269 $\pm$ 5  |      |
|                           |           | KF       | 363    | 86     | 12.29                           | .7480 $\pm$ 5                       |                                     |              |      |
|                           |           | PI       | 33     | 116    | .83                             | .7207 $\pm$ 3                       |                                     |              |      |
|                           |           | Fa       | 51     | 7.5    | 19.78                           | .7850 $\pm$ 7                       |                                     |              |      |
|                           | 79-7      | Bi       | 293    | 9.3    | 94.21                           | 1.0729 $\pm$ 14                     | .7101 $\pm$ 14                      | 271 $\pm$ 5  |      |
|                           |           | KF       | 393    | 41     | 28.28                           | .8117 $\pm$ 4                       |                                     |              |      |
|                           |           | PI       | 11     | 16.5   | 1.98                            | .7291 $\pm$ 3                       |                                     |              |      |
|                           |           | Fa       | 30     | 9.0    | 9.76                            | .7369 $\pm$ 8                       |                                     |              |      |
|                           | 290Fg     | Bi       | 843    | 9.5    | 285.41                          | 1.7893 $\pm$ 16                     | .7153 $\pm$ 26                      | 264 $\pm$ 4  |      |
|                           | 305/c     | Bi       | 705    | 4.9    | 492.03                          | 2.5532 $\pm$ 62                     | .7163 $\pm$ 3                       | 262 $\pm$ 4  |      |
| Fayalite granite          | 1291      | Bi       | 671    | 4.4    | 535.92                          | 2.7820 $\pm$ 71                     | .7108 $\pm$ 20                      | 272 $\pm$ 4  |      |
| Fayalite granite          | 333       | Bi       | 802    | 3.1    | 1032.15                         | 4.4726 $\pm$ 145                    | .7220 $\pm$ 70                      | 255 $\pm$ 4  |      |
| Fayalite granite          | 315       | Bi       | 645    | 18.0   | 107.76                          | 1.1055 $\pm$ 22                     | .7121 $\pm$ 9                       | 257 $\pm$ 5  |      |
| Fayalite granite          |           | PI       | 30     | 61     | 1.43                            | .7187 $\pm$ 3                       |                                     |              |      |
|                           | 311/4     | Bi       | 494    | 16.6   | 88.77                           | 1.0465 $\pm$ 18                     | .7109 $\pm$ 5                       | 266 $\pm$ 5  |      |

TABLE 3 (continued)

Rb/Sr

| Rock type                    | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma   | Ref. |
|------------------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|----------|------|
| Two-mica cordierite granites | 321       | WR       | 227    | 87     | 7.59                            | .7408± 5                            |                                     |          | 23   |
|                              | 329       | WR       | 217    | 155    | 4.05                            | .7282± 7                            |                                     |          |      |
|                              | 344       | WR       | 238    | 92     | 7.51                            | .7413± 7                            | .7106± 2                            | 286± 5   |      |
|                              | 245       | WR       | 225    | 81     | 8.06                            | .7435± 3                            |                                     |          |      |
| Two-mica cordierite granite  | 329       | Bi       | 619    | 3.5    | 650.34                          | 3.2909± 46                          | .7121± 7                            | 279± 4   |      |
|                              |           | Pl       | 119    | 449    | .77                             | .7137± 2                            | .7107                               |          |      |
| Two-mica cordierite granite  | 344       | Bi       | 1089   | 6.3    | 624.16                          | 3.1907±144                          | .7115± 9                            | 279± 5   |      |
| Gabbroonorite                | 80-11     | Bi       | 493    | 6.8    | 228.05                          | 1.6032± 11                          |                                     | 276± 4   |      |
| Gabbroonorite                | 237       | Bi       | 317    | 9.4    | 101.21                          | 1.1078± 42                          |                                     | 277± 5   |      |
| Gabbroonorite                | 345       | Bi       | 497    | 3.8    | 444.95                          | 2.4479±125                          |                                     | 274± 5   |      |
| Granodiorites & Granites     | 229       | Bi       | 416    | 9.0    | 140.56                          | 1.2646± 33                          |                                     | 277± 5   |      |
|                              | 340       | Bi       | 537    | 3.6    | 514.13                          | 2.7306±100                          |                                     | 276± 4   |      |
|                              | 1230      | Bi       | 509    | 4.1    | 422.07                          | 2.3588± 32                          |                                     | 275± 4   |      |
| <u>Cima d'Asta</u>           |           |          |        |        |                                 |                                     |                                     |          |      |
| Granito di Cima d'Asta       | 1         | Bi       | 863    | 10.49  | 263.23                          | 1.7900                              |                                     | 282± 8   | 27   |
| Granito di Cima d'Asta       | 2         | Bi       | 940    | 3.78   | 1004.36                         | 4.7697                              |                                     | 281± 8   |      |
| Granito di Caoria            | 3         | Bi       | 1604   | 6.20   | 1066.67                         | 5.0405                              |                                     | 285± 8   |      |
| Granodiorite                 | 4         | Bi       | 555    | 4.49   | 443.51                          | 3.1592                              |                                     | 290±10   |      |
| Granite                      | CDA46     | WR       | 205    | 97     | 6.12                            | .7345                               |                                     |          | 9    |
| Granite                      | CDA47     | WR       | 290    | 28     | 30.42                           | .8297                               |                                     |          |      |
| Granite                      | CDA48     | WR       | 275    | 26     | 30.12                           | .8264                               |                                     |          | 9    |
| Pegmatite                    | CDA49     | WR       | 328    | 11     | 85.93                           | 1.0441                              | .7102± 5                            | 273± 1   |      |
| Granodiorite                 | CDA54     | WR       | 120    | 245    | 1.41                            | .7154                               |                                     |          |      |
| Granite                      | CDA62     | WR       | 182    | 135    | 3.89                            | .7248                               |                                     |          |      |
| Qz-Diorite                   | CDA52     | WR       | 68     | 265    | .74                             | .7096                               | .7067±13                            |          |      |
| Qz-Norite                    | CDA61     | WR       | 45     | 253    | .52                             | .7087                               | .7067± 8                            |          |      |
| Granite                      | CDA33     | WR       | 146    | 190    | 2.21                            | .7154                               |                                     |          |      |
| Granite                      | CDA34     | WR       | 180    | 196    | 2.65                            | .7187                               |                                     |          |      |
| Aplite-Pegmatite             | CDA35     | WR       | 218    | 179    | 3.52                            | .7224                               | .7087± 7                            | 273± 6   |      |
| Granodiorite                 | CDA36     | WR       | 154    | 210    | 2.13                            | .7183                               |                                     |          |      |
| Aplite-Pegmatite             | CDA37     | WR       | 274    | 52     | 15.25                           | .7676                               |                                     |          |      |
| Aplite                       | CDA38     | WR       | 224    | 75     | 8.61                            | .7433                               |                                     |          |      |
| Tonalite                     | CDA40     | WR       | 123    | 241    | 1.47                            | .7149                               |                                     |          |      |
| Granite                      | CDA13     | WR       | 176    | 184    | 2.77                            | .7214                               |                                     |          |      |
| Tonalite                     | CDA15     | WR       | 129    | 220    | 1.69                            | .7167                               |                                     |          |      |
| Aplite                       | CDA18     | WR       | 115    | 124    | 2.68                            | .7216                               |                                     |          |      |
| Granite                      | CDA19     | WR       | 197    | 199    | 2.85                            | .7233                               |                                     |          |      |
| Porphyrite                   | CDA20     | WR       | 186    | 267    | 2.02                            | .7172                               |                                     |          |      |
| Porphyrite                   | CDA28     | WR       | 54     | 45     | 3.49                            | .7244                               |                                     |          |      |
| Granite                      | CDA47     | Bi       | 1250   | 10.07  | 415.81                          | 2.3240                              |                                     | 272± 5   |      |
| Granodiorite                 | CDA63     | Bi       | 554    | 4.80   | 372.51                          | 2.1644                              |                                     | 268± 4   |      |
| Granite                      | CDA34     | Bi       | 839    | 5.42   | 539.50                          | 2.8029                              |                                     | 272± 5   |      |
| Tonalite                     | CDA40     | Bi       | 557    | 5.21   | 350.38                          | 2.0546                              |                                     | 269± 6   |      |
| Granodiorite                 | 83        | Bi       | 742    | 3.43   | 805.82                          | 3.9583                              |                                     | 277± 5   |      |
| Granite                      | 116       | Bi       | 914    | 4.41   | 758.59                          | 3.7173                              |                                     | 273± 5   |      |
| Granite                      | CDA19     | Bi       | 491    | 3.53   | 473.59                          | 2.5220                              |                                     | 269± 5   |      |
| Qz-Diorite                   | CDA52     | Bi       | 402    | 13.95  | 86.15                           | 1.0459                              |                                     | 276±14.5 | 9    |
| Granite                      | CDA19     | Pl       | 104    | 211    | 1.42                            | .7167                               | .7113±17                            |          |      |
| Granodiorite                 | CDA36     | Pl       | 17     | 401    | .12                             | .7092                               | .7087±13                            |          |      |
| <u>Basement</u>              |           |          |        |        |                                 |                                     |                                     |          |      |
| Porphyroids                  | AA 76.2   | WR       | 70     | 232    | .88                             | .7165± 4                            |                                     |          | 24   |
|                              | AA 76.3   | WR       | 74     | 95     | 2.25                            | .7226± 4                            |                                     |          |      |
|                              | AA 76.20  | WR       | 84     | 85     | 2.89                            | .7260± 4                            |                                     |          |      |
|                              | AA 76.34  | WR       | 142    | 33     | 12.58                           | .7745± 6                            | .7118± 2                            | 350± 3   |      |
|                              | AA 76.35  | WR       | 145    | 32     | 13.34                           | .7777± 7                            |                                     |          |      |
|                              | AA 76.37  | WR       | 161    | 31     | 14.98                           | .7870± 3                            |                                     |          |      |

TABLE 3 (continued)

Rb/Sr

| Rock type                   | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_0$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma           | Ref. |  |
|-----------------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|------------------|------|--|
| Metavolcanoclastics         | AA 76.1   | WR       | 50     | 25     | 5.87                            | .7385+ 6                            | .7119+ 9                            | 317+ 6           |      |  |
|                             | AA 76.19  | WR       | 66     | 67     | 2.87                            | .7252+ 6                            |                                     |                  |      |  |
|                             | AA 76.36  | WR       | 48     | 41     | 3.43                            | .7272+ 2                            |                                     |                  |      |  |
| Phyllite                    | AA 78.22  | Bi       | 419    | 9.5    | 134.88                          | 1.3165+10                           |                                     | 314+ 5           |      |  |
| Phyllite                    | AA 77.13  | WR       | 62     | 199    | .91                             | .7175+ 2                            |                                     | 312+ 6           |      |  |
|                             |           | P1+Qz    | 14     | 57     | .71                             | .7233+ 3                            |                                     |                  |      |  |
| Metavolcanoclastic Phyllite | AA 76.1   | Mu       | 323    | 10.3   | 94.26                           | 1.1336+23                           |                                     | 314+ 5           |      |  |
| Metavolcanoclastic Phyllite | AA 78.23  | WR       | 99     | 4      | 5.29                            | .7488+ 4                            |                                     | 354+10           |      |  |
|                             |           | Mu       | 349    | 103    | 9.73                            | .7702+ 2                            |                                     |                  |      |  |
|                             |           | Ga       | 8      | 7      | 3.29                            | .7380+ 1                            |                                     |                  |      |  |
| Acidic gneisses             | AA 80-13  | WR       | 121    | 163    | 2.15                            | .7230+ 2                            | .7155+ 5                            | 257+17           | 26   |  |
|                             | AA 80-14  | WR       | 112    | 113    | 2.87                            | .7260+ 2                            |                                     |                  |      |  |
|                             | AA 80-15  | WR       | 119    | 153    | 2.26                            | .7237+ 2                            |                                     |                  |      |  |
|                             | AA 80-22  | WR       | 132    | 154    | 2.49                            | .7249+ 3                            |                                     |                  |      |  |
|                             | AA 80-27  | WR       | 95     | 167    | 1.65                            | .7216+ 1                            |                                     |                  |      |  |
| Acidic gneiss               | AA 80-13  | KF       | 165    | 249    | 1.92                            | .7227+ 4                            | .7160+11                            | 248+33           | 26   |  |
| Acidic gneiss               | AA 80-14  | KF       | 173    | 186    | 2.71                            | .7255+ 3                            |                                     |                  |      |  |
| Acidic gneiss               | AA 80-15  | KF       | 189    | 212    | 2.58                            | .7250+ 2                            |                                     |                  |      |  |
| Acidic gneiss               | AA 80-22  | KF       | 170    | 219    | 2.25                            | .7238+ 2                            |                                     |                  |      |  |
| Acidic gneiss               | AA 80-27  | KF       | 165    | 203    | 2.36                            | .7247+ 3                            |                                     |                  |      |  |
| Acidic gneiss               | AA 80-13  | WR       | 121    | 163    | 2.15                            | .7230+ 2                            |                                     | 309+24           |      |  |
|                             |           | KF       | 165    | 249    | 1.92                            | .7227+ 4                            |                                     |                  |      |  |
|                             |           | Ab       | 7.7    | 35.9   | .62                             | .7164+ 3                            |                                     |                  |      |  |
| Acidic gneiss               | AA 80-14  | WR       | 112    | 113    | 2.87                            | .7260+ 2                            |                                     | 293+ 6           |      |  |
|                             |           | KF       | 173    | 186    | 2.71                            | .7255+ 3                            |                                     |                  |      |  |
|                             |           | Ab       | 6.0    | 28.9   | .60                             | .7166+ 4                            |                                     |                  |      |  |
| Acidic gneiss               | AA 80-15  | WR       | 119    | 153    | 2.26                            | .7237+ 2                            |                                     | 302+ 4           |      |  |
|                             |           | KF       | 189    | 212    | 2.58                            | .7250+ 2                            |                                     |                  |      |  |
|                             |           | Ab       | 6.4    | 29.7   | .62                             | .7166+ 4                            |                                     |                  |      |  |
| Acidic gneiss               | AA 80-22  | WR       | 132    | 154    | 2.49                            | .7249+ 3                            |                                     | 326+ 3           |      |  |
|                             |           | KF       | 170    | 219    | 2.25                            | .7238+ 2                            |                                     |                  |      |  |
|                             |           | Ab       | 6.5    | 26.1   | .72                             | .7170+ 3                            |                                     |                  |      |  |
| Acidic gneiss               | AA 80-27  | Bi       | 445    | 15.0   | 89.16                           | 1.1292+23                           |                                     | 321+ 1           |      |  |
|                             |           | WR       | 95     | 167    | 1.65                            | .7216+ 1                            |                                     |                  |      |  |
|                             |           | KF       | 165    | 203    | 2.36                            | .7247+ 3                            |                                     |                  |      |  |
| Acidic gneiss               | AA 78-28  | Ab       | 11.5   | 40.3   | .83                             | .7179+ 5                            | .7227                               | 414+97<br>463+18 |      |  |
|                             |           | Bi       | 460    | 8.9    | 161.11                          | 1.4503+17                           |                                     |                  |      |  |
|                             |           | WR       | 301    | 78     | 11.26                           | .7869+ 6                            |                                     |                  |      |  |
| Acidic gneiss               | AA 80-21  | Ab       | 5.4    | 2.6    | 6.17                            | .7634+ 3                            |                                     |                  |      |  |
|                             |           | Mu       | 390    | 96     | 11.90                           | .8012+ 6                            |                                     |                  |      |  |
|                             |           | WR       | 203    | 104    | 5.71                            | .7561+ 3                            |                                     |                  |      |  |
| Acidic gneiss               | AA 80-21  | Mu       | 353    | 189    | 5.44                            | .7559+ 8                            |                                     |                  |      |  |
|                             |           |          |        |        |                                 |                                     |                                     |                  |      |  |
|                             |           |          |        |        |                                 |                                     |                                     |                  |      |  |
| Ateşino Porphyry Plateau    |           |          |        |        |                                 |                                     |                                     |                  |      |  |
| Rhyolitic ignimbrites       | DAV 1     | WR       | 251    | 59     | 12.32                           | .7537+ 5                            | .7103+ 6                            | 239+ 8           | 22   |  |
|                             | DAV 2     | WR       | 224    | 91     | 7.12                            | .7361+ 4                            |                                     |                  |      |  |
|                             | DAV 3     | WR       | 226    | 80     | 8.22                            | .7385+ 6                            |                                     |                  |      |  |
|                             | DAV 5     | WR       | 258    | 74     | 10.16                           | .7443+ 6                            |                                     |                  |      |  |
|                             | DAV 6     | WR       | 276    | 75     | 10.70                           | .7448+10                            |                                     |                  |      |  |
|                             | DAV 7     | WR       | 272    | 58     | 13.56                           | .7564+ 5                            |                                     |                  |      |  |
|                             | DAV 8     | WR       | 202    | 97     | 6.05                            | .7315+ 4                            |                                     |                  |      |  |
|                             | DAV 9     | WR       | 222    | 98     | 6.58                            | .7323+ 4                            |                                     |                  |      |  |
|                             | VA 719    | WR       | 208    | 138    | 4.36                            | .7258+ 3                            |                                     |                  |      |  |
|                             | VA 721    | WR       | 189    | 101    | 5.42                            | .7273+ 2                            |                                     |                  |      |  |
|                             | VA 731    | WR       | 192    | 150    | 3.69                            | .7234+ 2                            |                                     |                  |      |  |
|                             | VA 739    | WR       | 192    | 149    | 3.73                            | .7233+ 2                            |                                     |                  |      |  |
|                             | VA 779    | WR       | 199    | 98     | 5.88                            | .7296+ 2                            |                                     |                  |      |  |
|                             | VA 780    | WR       | 196    | 103    | 5.51                            | .7288+ 2                            |                                     |                  |      |  |
|                             | VA 1016   | WR       | 210    | 120    | 5.05                            | .7266+ 3                            |                                     |                  |      |  |

TABLE 3 (continued)

Rb/Sr

| Rock type            | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma        | Ref. |
|----------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|---------------|------|
| Rhyolitic ignimbrite | VA 719    | Bi       | 416    | 14.5   | 85.7                            | $1.0419 \pm 3$                      |                                     | $272 \pm 4$   |      |
| Rhyolitic ignimbrite | VA 739    | Bi       | 425    | 10.8   | 119.7                           | $1.1770 \pm 6$                      |                                     | $274 \pm 4$   |      |
| Rhyolitic ignimbrite | VA 746    | Bi       | 528    | 4.9    | 353.7                           | $2.0676 \pm 57$                     |                                     | $270 \pm 4$   |      |
| Rhyolitic ignimbrite | VA 757    | Bi       | 736    | 5.3    | 471.7                           | $2.5053 \pm 39$                     |                                     | $268 \pm 4$   |      |
| Rhyolitic ignimbrite | VA 779    | Bi       | 609    | 6.6    | 294.2                           | $1.8125 \pm 42$                     |                                     | $263 \pm 4$   |      |
| Rhyolitic ignimbrite | VA 780    | Bi       | 577    | 7.7    | 234.6                           | $1.5983 \pm 8$                      |                                     | $266 \pm 4$   |      |
| Rhyolitic ignimbrite | DAV 1     | Bi       | 605    | 3.7    | 571.9                           | $2.9234 \pm 41$                     |                                     | $272 \pm 4$   |      |
| Rhyolitic ignimbrite | DAV 2     | Bi       | 624    | 9.9    | 195.0                           | $1.4601 \pm 11$                     |                                     | $270 \pm 4$   |      |
| Rhyolitic ignimbrite | DAV 9     | Chl      | 102    | 36.3   | 8.1                             | $.7407 \pm 5$                       |                                     | $(265 \pm 7)$ |      |
| Rhyolitic ignimbrite | VA 719    | Bi       | 416    | 14.5   | 85.7                            | $1.0419 \pm 3$                      |                                     |               | 22   |
| Rhyolitic ignimbrite | VA 739    | Bi       | 425    | 10.8   | 119.7                           | $1.1770 \pm 6$                      |                                     |               |      |
| Rhyolitic ignimbrite | VA 746    | Bi       | 528    | 4.9    | 353.7                           | $2.0676 \pm 57$                     |                                     |               |      |
| Rhyolitic ignimbrite | VA 757    | Bi       | 736    | 5.3    | 471.7                           | $2.5053 \pm 39$                     |                                     |               |      |
| Rhyolitic ignimbrite | VA 779    | Bi       | 609    | 6.6    | 294.2                           | $1.8125 \pm 42$                     | $.7171 \pm 52$                      | $267 \pm 2$   |      |
| Rhyolitic ignimbrite | VA 780    | Bi       | 577    | 7.7    | 234.6                           | $1.5983 \pm 8$                      |                                     |               |      |
| Rhyolitic ignimbrite | DAV 1     | Bi       | 605    | 3.7    | 571.9                           | $2.9234 \pm 41$                     |                                     |               |      |
| Rhyolitic ignimbrite | DAV 2     | Bi       | 624    | 9.9    | 195.0                           | $1.4601 \pm 11$                     |                                     |               |      |
| Rhyolitic ignimbrite | DAV 1     | KF       | 278    | 229    | 3.52                            | $.7209 \pm 2$                       |                                     |               |      |
|                      |           | P1+Qz    | 56     | 64     | 2.51                            | $.7186 \pm 3$                       |                                     |               |      |
| Rhyolitic ignimbrite | DAV 9     | KF       | 357    | 204    | 5.06                            | $.7258 \pm 5$                       |                                     |               |      |
|                      |           | P1+Qz    | 128    | 171    | 2.17                            | $.7170 \pm 3$                       | $.7102 \pm 4$                       | $226 \pm 8$   |      |
| Rhyolitic ignimbrite | VA 739    | KF       | 364    | 231    | 4.56                            | $.7248 \pm 1$                       |                                     |               |      |
|                      |           | P1       | 82     | 422    | .56                             | $.7123 \pm 6$                       |                                     |               |      |
| Rhyolitic ignimbrite | VA 780    | KF       | 443    | 179    | 7.17                            | $.7337 \pm 3$                       |                                     |               |      |
|                      |           | P1+Qz    | 19     | 18     | 3.07                            | $.7204 \pm 3$                       |                                     |               |      |

TABLE 4  
Rb/Sr analytical data - AUSTRIDES

| Rock type                               | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma          | Ref. |
|-----------------------------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|-----------------|------|
| <u>Mules</u>                            |           |          |        |        |                                 |                                     |                                     |                 |      |
| Tonalitic granodiorite                  | AA7       | WR       | 50     | 370    | .39                             | .7083                               |                                     |                 | 7    |
| "                                       | AA7a      | WR       | 53     | 319    | .48                             | .7102                               |                                     |                 |      |
| "                                       | AA7b      | WR       | 46     | 383    | .35                             | .7110                               |                                     |                 |      |
| "                                       | AA7c      | WR       | 38     | 327    | .34                             | .7083                               |                                     |                 |      |
| "                                       | AA12      | WR       | 45     | 326    | .40                             | .7096                               |                                     |                 |      |
| "                                       | AA7       | Bi       | 324    | 7.84   | 120.19                          | .7625                               | $(.7080)$                           | $32.1 \pm 10.4$ |      |
| <u>Merano-Mules-Anterselva basement</u> |           |          |        |        |                                 |                                     |                                     |                 |      |
| Epimetamorphic dyke                     | AA76-33   | Bi       | 507    | 5.7    | 257.68                          | $.7976 \pm 30$                      |                                     | $24.2 \pm 2.1$  | 10   |
|                                         |           | WR       | 97     | 277    | 1.02                            | $.7091 \pm 4$                       |                                     |                 |      |
|                                         |           | Mu       | 296    | 82     | 10.45                           | $.7133 \pm 8$                       |                                     | $31.4 \pm 17.4$ |      |
| Epimetamorphic dyke                     | AA77-30   | WR       | 98     | 311    | .91                             | $.7080 \pm 2$                       |                                     | $17.6 \pm 20$   |      |
|                                         |           | Bi       | 448    | 14.8   | 87.61                           | $.7297 \pm 9$                       |                                     |                 |      |
|                                         |           | Mu       | 227    | 161    | 4.07                            | $.7092 \pm 4$                       |                                     |                 |      |
| <u>Rensen</u>                           |           |          |        |        |                                 |                                     |                                     |                 |      |
|                                         | AA76-4    | WR       | 149    | 259    | 1.66                            | $.7109 \pm 4$                       |                                     |                 | 11   |
|                                         | AA76-5    | WR       | 142    | 260    | 1.58                            | $.7106 \pm 7$                       |                                     |                 |      |
| Granites                                | AA76-8    | WR       | 134    | 207    | 1.87                            | $.7106 \pm 3$                       | $.7097 \pm 3$                       | $42.4 \pm 19.7$ |      |
|                                         | AA76-9    | WR       | 183    | 196    | 2.70                            | $.7114 \pm 2$                       |                                     |                 |      |
|                                         | AA76-10   | WR       | 130    | 249    | 1.50                            | $.7108 \pm 5$                       |                                     |                 |      |
|                                         | AA76-12   | WR       | 140    | 123    | 3.27                            | $.7117 \pm 8$                       |                                     |                 |      |
|                                         | AA76-6    | WR       | 69     | 307    | .65                             | $.7079 \pm 5$                       |                                     |                 |      |
|                                         | AA76-7    | WR       | 66     | 347    | .55                             | $.7078 \pm 6$                       |                                     |                 |      |
|                                         | AA76-11   | WR       | 75     | 311    | .70                             | $.7083 \pm 3$                       |                                     |                 |      |

TABLE 4 (continued)

Rb/Sr

| Rock type                                         | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma    | Ref. |
|---------------------------------------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|-----------|------|
| Granodiorites & tonalites                         | AA76-13   | WR       | 78     | 367    | .62                             | .7079± 4                            |                                     |           | 11   |
|                                                   | AA100     | WR       | 84     | 338    | .72                             | .7083± 3                            |                                     |           |      |
|                                                   | AA101     | WR       | 72     | 348    | .60                             | .7077± 5                            |                                     |           |      |
|                                                   | AA102     | WR       | 79     | 356    | .64                             | .7070± 6                            |                                     |           |      |
| Granite                                           | AA76-4    | Bi       | 683    | 4.1    | 479.02                          | .8299±27                            |                                     | 17.5±1.0  |      |
|                                                   |           | Mu       | 469    | 32     | 42.50                           | .7281±17                            |                                     | 29.6±8.1  |      |
| Granite                                           | AA76-5    | Bi       | 650    | 7.6    | 246.43                          | .7748±15                            |                                     | 18.4±1.2  |      |
|                                                   |           | Mu       | 514    | 20.6   | 50.28                           | .7314± 3                            |                                     | 30.8±2.9  |      |
| Granodiorite                                      | AA76-11   | Bi       | 471    | 2.2    | 630.89                          | .8710±64                            |                                     | 18.2±1.7  |      |
| Granodiorite                                      | AA33      | Bi       | 492    | 3.6    | 395.47                          | .8095                               | (.709)                              | 18.0±4.0  | 8    |
| <u>Vedrette di Ries</u>                           |           |          |        |        |                                 |                                     |                                     |           |      |
| Granites, acid dykes, tonalites and granodiorites | AA75-1    | WR       | 191    | 86     | 6.40                            | .7125± 9                            |                                     |           | 12   |
|                                                   | AA75-2    | WR       | 181    | 113    | 4.66                            | .7116± 7                            |                                     |           |      |
|                                                   | AA75-3    | WR       | 118    | 227    | 1.50                            | .7102± 3                            |                                     |           |      |
|                                                   | AA75-5    | WR       | 215    | 67     | 9.26                            | .7135± 4                            |                                     |           |      |
|                                                   | AA75-8    | WR       | 146    | 342    | 1.24                            | .7097± 5                            | .7096± 1                            | 31 ±3     |      |
|                                                   | AA75-9    | WR       | 159    | 263    | 1.76                            | .7105± 3                            |                                     |           |      |
|                                                   | AA75-10   | WR       | 188    | 224    | 2.42                            | .7109± 3                            |                                     |           |      |
|                                                   | AA75-11   | WR       | 223    | 49     | 13.20                           | .7154±10                            |                                     |           |      |
|                                                   | AA75-12   | WR       | 181    | 85     | 6.17                            | .7125± 4                            |                                     |           |      |
|                                                   | AA73-57a  | WR       | 120    | 275    | 1.26                            | .7116± 3                            |                                     |           |      |
|                                                   | AA74-45   | WR       | 30     | 431    | .20                             | .7110± 4                            |                                     |           |      |
|                                                   | AA74-46   | WR       | 101    | 318    | .92                             | .7112± 3                            | .7109± 1                            | 24 ±12    |      |
| Tonalites                                         | AA74-47   | WR       | 123    | 331    | 1.07                            | .7113± 5                            |                                     |           |      |
|                                                   | AA74-48   | WR       | 97     | 272    | 1.03                            | .7115± 5                            |                                     |           |      |
|                                                   | AA74-60   | WR       | 106    | 243    | 1.27                            | .7114± 5                            |                                     |           |      |
|                                                   | AA74-61   | WR       | 104    | 286    | 1.05                            | .7110± 4                            |                                     |           | 12   |
| Tonalite                                          | AA30 a    | WR       | 159    | 220    | 2.10                            | .7116± 3                            |                                     |           |      |
|                                                   | AA30 b    | WR       | 111    | 270    | 1.19                            | .7112± 4                            |                                     |           |      |
|                                                   | AA30      | Bi       | 497    | 2.6    | 575.27                          | .9417                               | (.709)                              | 28 ± 3    | 8    |
| Tonalite                                          | AA31      | Bi       | 522    | 2.9    | 539.47                          | .9219                               | (.709)                              | 28 ± 3    |      |
| Granites                                          | AA73-81   | WR       | 172    | 203    | 2.45                            | .7101± 2                            |                                     |           | 12   |
|                                                   | AA74-53   | WR       | 197    | 147    | 3.86                            | .7108± 4                            |                                     |           |      |
|                                                   | AA74-67   | WR       | 170    | 317    | 1.55                            | .7097± 4                            |                                     |           |      |
|                                                   | AA74-68   | WR       | 163    | 388    | 1.21                            | .7097± 3                            | .7089± 1                            | 33 ± 7    |      |
|                                                   | AA74-69   | WR       | 167    | 376    | 1.28                            | .7095± 3                            |                                     |           |      |
|                                                   | AA74-70   | WR       | 176    | 348    | 1.46                            | .7095± 4                            |                                     |           |      |
|                                                   | AA73-84   | WR       | 153    | 315    | 1.40                            | .7107± 4                            |                                     |           |      |
|                                                   | AA74-49   | WR       | 132    | 377    | 1.02                            | .7105± 3                            |                                     |           |      |
|                                                   | AA74-52   | WR       | 126    | 373    | .98                             | .7105± 4                            |                                     |           |      |
|                                                   | AA74-55   | WR       | 112    | 325    | 1.00                            | .7102± 3                            | .7098± 4                            | 43.5±44.5 |      |
|                                                   | AA74-71   | WR       | 139    | 345    | 1.16                            | .7107± 3                            |                                     |           |      |
|                                                   | AA74-72   | WR       | 145    | 323    | 1.30                            | .7105± 3                            |                                     |           |      |
|                                                   | AA75-4    | WR       | 119    | 349    | .99                             | .7105± 5                            |                                     |           |      |
|                                                   | AA73-57b  | WR       | 145    | 97     | 4.30                            | .7225± 4                            |                                     |           |      |
|                                                   | AA73-57c  | WR       | 137    | 145    | 2.75                            | .7219± 4                            | .7207± 5                            | 28 ±22    |      |
|                                                   | AA73-59   | WR       | 154    | 130    | 3.45                            | .7219± 4                            |                                     |           |      |
| Microgranites granodiorites and aplites           | AA73-58   | WR       | 148    | 126    | 3.39                            | .7285± 9                            |                                     |           |      |
|                                                   | AA73-64   | WR       | 99     | 201    | 1.43                            | .7131± 4                            |                                     |           |      |
|                                                   | AA74-44   | WR       | 130    | 178    | 2.11                            | .7158± 4                            |                                     |           |      |
|                                                   | AA74-65   | WR       | 110    | 222    | 1.44                            | .7126± 5                            |                                     |           |      |
|                                                   | AA74-73   | WR       | 152    | 190    | 2.31                            | .7159± 3                            |                                     |           |      |
|                                                   | AA73-43   | WR       | 143    | 589    | .70                             | .7082± 4                            |                                     |           | 12   |
|                                                   | AA73-43   | Bi       | 712    | 4.5    | 457.77                          | .9068±32                            |                                     | 30.5±1.1  |      |
|                                                   | AA74-50   | WR       | 145    | 612    | .69                             | .7079± 4                            |                                     |           |      |
| <u>Mt. Alto</u>                                   |           |          |        |        |                                 |                                     |                                     |           |      |
|                                                   | AA32      | WR       | 122    | 579    | .61                             | .7111± 3                            |                                     |           |      |
|                                                   | AA32      | Bi       | 586    | 3.9    | 446.24                          | .8669                               | (.7090)                             | 25.0±3.0  | 8    |
|                                                   | AA32 b    | WR       | 94     | 475    | .57                             | .7115± 4                            |                                     |           | 12   |
|                                                   | AA32 b    | Bi       | 524    | 3.6    | 432.12                          | .8577±17                            |                                     | 24.0±0.7  |      |
| <u>Vedrette di Ries</u>                           |           |          |        |        |                                 |                                     |                                     |           |      |
|                                                   | AA73-58   | WR       | 146    | 125    | 3.40                            | .7285± 4                            |                                     |           |      |
|                                                   | AA73-58   | KF       | 313    | 202    | 4.49                            | .7295± 2                            |                                     | 28.2±2.0  |      |
|                                                   | AA73-58   | Bi       | 760    | 1.2    | 2021.24                         | 1.5360±27                           |                                     |           |      |

TABLE 4 (continued)

Rb/Sr

| Rock type                               | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma   | Ref. |
|-----------------------------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|----------|------|
| Tonalite                                | AA73-98   | WR       | 95     | 291    | .95                             | .7115+ 3                            | .7111+ 1                            | 29.9+1.3 |      |
|                                         | AA73-98   | Pl       | 51     | 543    | .27                             | .7111+ 5                            |                                     |          |      |
|                                         | AA73-98   | Bi       | 445    | 23     | 56.14                           | .7349+25                            | (.7100)                             | 26.9+3.0 |      |
|                                         | AA74-9    | Bi       | 579    | 4.2    | 401.25                          | .8629+13                            |                                     |          |      |
|                                         | AA74-44   | WR       | 130    | 178    | 2.11                            | .7158+ 4                            | .7145+3                             | 28.1+3.6 |      |
|                                         | AA74-44   | KF       | 268    | 263    | .96                             | .7166+ 3                            |                                     |          |      |
|                                         | AA74-44   | Pl       | 41     | 317    | .37                             | .7146+ 2                            |                                     |          |      |
|                                         | AA74-44   | Bi       | 588    | 3      | 587.35                          | .9469+ 5                            |                                     |          |      |
|                                         | AA74-46   | WR       | 101    | 318    | .92                             | .7112+ 5                            | .7110+16                            | 26.9+1.0 |      |
|                                         | AA74-46   | Pl       | 10     | 497    | .06                             | .7110+16                            |                                     |          |      |
| Tonalite                                | AA74-46   | Bi       | 496    | 2.5    | 568.19                          | .9238+44                            | .7110+ 1                            | 28.1+0.5 |      |
|                                         | AA74-60   | WR       | 106    | 243    | 1.27                            | .7114+ 5                            |                                     |          |      |
|                                         | AA74-60   | Pl       | 5.7    | 555    | .03                             | .7109+ 5                            | .7121+ 1                            | 27.1+ .7 |      |
|                                         | AA74-60   | KF       | 49     | 204    | .69                             | .7113+ 2                            |                                     |          |      |
|                                         | AA74-60   | Ho       | 17     | 35     | 1.44                            | .7104+ 5                            | 1.0461+14                           |          | 12   |
|                                         | AA74-60   | Ga       | 10     | 14     | 2.12                            | .7117+ 4                            |                                     |          |      |
|                                         | AA74-60   | Bi       | 433    | 4.6    | 270.10                          | .8189+ 9                            | .7126+ 5                            | 27.1+ .7 |      |
|                                         | AA74-65   | WR       | 110    | 222    | 1.44                            | .7126+ 5                            |                                     |          |      |
|                                         | AA74-65   | Pl       | 9      | 428    | .06                             | .7119+ 3                            | .7128+ 3                            |          |      |
|                                         | AA74-65   | KF       | 146    | 296    | 1.43                            | .7128+ 3                            |                                     |          |      |
|                                         | AA74-65   | Bi       | 553    | 1.8    | 869.05                          | 1.0461+14                           |                                     |          |      |
| <u>Merano-Mules-Anterselva basement</u> |           |          |        |        |                                 |                                     |                                     |          |      |
| Pegmatite                               | KAW 302   | Mu       | 406.3  | 32.02  | 37.21                           | .84498                              |                                     | 257+30   | 30   |
| Pegmatitic orthogneiss                  | AA 12     | Bi       | 771    | 4.92   | 485.53                          | 1.4233                              | (.7200)                             | 101+ 3   | 8    |
| Pegmatitic orthogneiss                  | AA 13     | Mu       | 1095   | 4.35   | 991.26                          | 4.4086                              | (.7200)                             | 261+ 5   |      |
| Pegmatitic orthogneiss                  | AA 14     | Mu       | 555    | 10.32  | 164.06                          | 1.2635                              | (.7200)                             | 233+ 9   |      |
| Pegmatitic orthogneiss                  | AA 15     | Mu       | 513    | 13.02  | 118.89                          | 1.1493                              | (.7200)                             | 254+12   |      |
| Pegmatitic orthogneiss                  | AA 16     | Mu       | 527    | 10.03  | 160.70                          | 1.2959                              | (.7200)                             | 252+ 9   |      |
| Pegmatitic orthogneiss                  | AA73-17   | Mu       | 1108   | 4.07   | 1069.89                         | 4.3666                              | (.7200)                             | 239+ 3   |      |
| Pegmatitic orthogneiss                  | AA73-50   | Mu       | 1603   | 132.96 | 35.18                           | .7943                               | (.7200)                             | 148+30   |      |
| Pegmatite                               | KAW 1143  | WR       | 205.9  | 38.3   | 15.65                           | .7598                               |                                     |          | 33   |
|                                         |           | Mu       | 530.3  | 8.7    | 185.2                           | 1.184                               |                                     | 176+ 7   |      |
|                                         |           | Mu       | 707.7  | 9.2    | 229.9                           | 1.050                               |                                     | 95+ 4    |      |
| Pegmatitic orthogneiss                  | AA73-103  | Bi       | 2013   | 6.1    | 959.56                          | 1.1173+21                           | (.7100)                             | 30+ 1.4  | 10   |
|                                         |           | Mu       | 1029   | 40.0   | 74.52                           | .8851+16                            |                                     | 166+16   |      |
| Aplitic orthogneisses                   | AA73-32   | WR       | 206    | 47     | 12.7                            | .7647+ 4                            | .7157+ 4                            | 262+ 5   |      |
|                                         | AA73-33   | WR       | 247    | 14.7   | 49.7                            | .9038+ 8                            |                                     |          |      |
|                                         | AA73-34   | WR       | 210    | 35     | 17.7                            | .7798+ 4                            |                                     |          |      |
|                                         | AA73-55   | WR       | 260    | 16.7   | 45.8                            | .9071+ 7                            |                                     |          |      |
|                                         | AA78-43   | WR       | 86     | 210    | 1.2                             | .7207+ 4                            |                                     |          |      |
|                                         | AA78-46   | WR       | 101    | 219    | 1.3                             | .7208+ 3                            |                                     |          |      |
|                                         | AA78-47   | WR       | 286    | 80     | 10.3                            | .7520+ 2                            |                                     |          |      |
|                                         | AA78-48   | WR       | 69     | 171    | 1.2                             | .7260+ 4                            |                                     |          |      |
|                                         | AA78-53   | WR       | 149    | 114    | 3.8                             | .7288+ 5                            |                                     |          |      |
|                                         | AA78-54   | WR       | 145    | 61     | 6.9                             | .7422+ 4                            |                                     |          |      |
|                                         | AA78-55   | WR       | 120    | 54     | 6.4                             | .7379+ 4                            |                                     |          |      |
|                                         | AA78-56   | WR       | 162    | 47     | 10.0                            | .7554+ 8                            |                                     |          |      |
|                                         | AA78-57   | WR       | 151    | 28     | 15.9                            | .7739+12                            |                                     |          |      |
|                                         | AA73-56   | WR       | 241    | 13.2   | 53.8                            | .9228+ 5                            |                                     |          |      |
|                                         |           | Mu       | 1239   | 2.5    | 2294.9                          | 7.1046+284                          |                                     | 194+ 6   |      |
| Pegmatite                               | D 7558    | Mu       | 1187   | 3.09   | 1439                            | 3.705                               |                                     |          | 21   |
|                                         |           | KF       | 30.40  | 79.43  | 1.107                           | .7203                               |                                     | 146      |      |
| Pegmatitic orthogneiss                  | AA73-100  | KF       | 262    | 216    | 3.52                            | .7357+ 2                            |                                     | 242+ 4   | 15   |
|                                         |           | Mu       | 301    | 13.3   | 67.13                           | .9546+ 21                           |                                     |          |      |
| Aplitic orthogneiss                     | AA77-11   | WR       | 165    | 39.3   | 12.2                            | .7641+ 2                            |                                     | 218+ 3   |      |
|                                         |           | Mu       | 739    | 4.4    | 576.64                          | 2.5127+ 50                          |                                     |          |      |
| Pegmatitic orthogneiss                  | VD80-1    | WR       | 107    | 85     | 3.66                            | .7322+ 2                            |                                     |          |      |
|                                         |           | KF       | 263    | 138    | 5.52                            | .7322+ 5                            |                                     | 240+ 4   |      |
|                                         |           | Mu       | 517    | 92     | 177.7                           | 1.3199+ 9                           |                                     |          |      |
| <u>Detztal</u>                          |           |          |        |        |                                 |                                     |                                     |          |      |
| Muscovitic orthogneiss                  | KAW 149   | Mu       | 1343   | 8.66   | 548.91                          | 2.9907                              |                                     | 292+11   | 32   |
|                                         |           | WR       | 417    | 34.32  | 35.91                           | .9282                               |                                     | 429+35   |      |

TABLE 4 (continued)

Rb/Sr

| Rock type                             | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_{\text{in}}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_{\text{t}}$ | AGE Ma       | Ref. |
|---------------------------------------|-----------|----------|--------|--------|---------------------------------|-----------------------------------------------|----------------------------------------------|--------------|------|
| Tonalitic gneiss                      | B 3/4     | Bi       | 512.3  | 2.66   | 712.60                          | 3.5724                                        |                                              | 283 $\pm$ 11 | 34   |
| Two mica-granitic gneiss              | KAW 280   | Bi       | 1526.3 | 2.05   | 4371.14                         | 11.1873                                       |                                              | 169 $\pm$ 7  |      |
|                                       |           | Mu       | 766.7  | 5.67   | 469.78                          | 2.7576                                        |                                              | 307 $\pm$ 12 |      |
|                                       |           | WR       | 262.2  | 50.05  | 15.29                           | .7977                                         |                                              | 430 $\pm$ 83 |      |
| Biotite plagioclase gneiss            | TR 170    | WR       | 93.1   | 189.34 | 1.43 $\pm$ 2                    | .7274 $\pm$ 36                                |                                              |              | 29   |
| Biotite microcline plagioclase gneiss | TR 171    | WR       | 167.3  | 59.02  | 8.25 $\pm$ 14                   | .7662 $\pm$ 46                                |                                              |              |      |
| Biotite plagioclase gneiss            | TR 172    | WR       | 111.1  | 332.4  | .70 $\pm$ 10                    | .7213 $\pm$ 43                                | .7179 $\pm$ 24                               | 424 $\pm$ 9  |      |
| Muscovitic gneiss                     | TR 173    | WR       | 336.5  | 36.28  | 27.27 $\pm$ 38                  | .8744 $\pm$ 26                                |                                              |              |      |
| Augengneiss                           | TR 177    | WR       | 336.0  | 22.22  | 45.02 $\pm$ 59                  | 1.0020 $\pm$ 60                               |                                              |              |      |
| Augengneiss                           | TR 178    | WR       | 206.5  | 53.24  | 11.33 $\pm$ 15                  | .7909 $\pm$ 40                                |                                              |              |      |
| Muscovitic gneiss                     | 173       | WR       | 336.5  | 36.28  | 27.27 $\pm$ 38                  | .8744 $\pm$ 26                                |                                              |              |      |
|                                       |           | Mu       | 1240.8 | 7.7    | 582.7 $\pm$ 8.7                 | 3.27 $\pm$ 11                                 |                                              |              |      |
|                                       |           | Mu       | 1236.6 | --     | --                              | --                                            | .7573 $\pm$ 56                               | 302 $\pm$ 11 |      |
|                                       |           | Mu       | 1248.2 | 7.9    | 565.9 $\pm$ 9.6                 | 3.20 $\pm$ 9                                  |                                              |              |      |
|                                       |           | Mu       | --     | --     | 575.5 $\pm$ 8.0                 | 3.23 $\pm$ 9                                  |                                              |              |      |
| Granodiorite                          | 176       | Bi       | 532.8  | 6.4    | 267.5 $\pm$ 3.2                 | 1.810 $\pm$ 45                                |                                              |              |      |
|                                       |           | Bi       | 528.5  | --     | --                              | --                                            | .7204 $\pm$ 27                               | 287 $\pm$ 8  |      |
|                                       |           | Bi       | --     | 6.4    | 266.9 $\pm$ 2.7                 | 1.808 $\pm$ 45                                |                                              |              |      |
|                                       |           | Bi       | 533.5  | --     | 267.1 $\pm$ 2.0                 | 1.809 $\pm$ 32                                |                                              |              |      |
| Augengneiss                           | 177       | WR       | 336.0  | 22.22  | 45.02 $\pm$ 59                  | 1.0020 $\pm$ 60                               |                                              |              |      |
|                                       |           | Bi       | 2014.2 | 2.8    | 4316 $\pm$ 78                   | 11.63 $\pm$ 30                                |                                              |              |      |
|                                       |           | Bi       | 2017.2 | --     | --                              | --                                            | .8918 $\pm$ 68                               | 172 $\pm$ 4  |      |
|                                       |           | Bi       | --     | 2.6    | 4852 $\pm$ 97                   | 12.79 $\pm$ 36                                |                                              |              |      |
| Augengneiss                           | 177       | Bi       | 2029.4 | --     | 4584 $\pm$ 70                   | 12.11 $\pm$ 22                                |                                              |              | 29   |
| Augengneiss                           | 178       | Bi       | 1154.6 | 3.5    | 1519 $\pm$ 26                   | 6.88 $\pm$ 16                                 |                                              |              |      |
|                                       |           | Bi       | 1157.1 | --     | --                              | --                                            |                                              |              |      |
|                                       |           | Bi       | --     | 3.4    | 1584 $\pm$ 28                   | 7.08 $\pm$ 18                                 |                                              | 283 $\pm$ 7  |      |
|                                       |           | Bi       | 1150.4 | --     | 1150 $\pm$ 22                   | 6.97 $\pm$ 12                                 | .7439 $\pm$ 4                                | 293 $\pm$ 7  |      |
|                                       |           | WR       | 206.5  | 53.24  | 11.33 $\pm$ 15                  | .7909 $\pm$ 40                                |                                              |              |      |
|                                       |           | Mu       | 579.8  | 5.8    | 333 $\pm$ 8                     | 2.21 $\pm$ 6                                  |                                              | 310 $\pm$ 16 |      |
|                                       |           | Mu       | 581.9  | --     | --                              | --                                            |                                              |              |      |
| Merano-Mules-Anterselva basement      | AA1       | WR       | 218    | 71     | 8.86                            | .7662                                         |                                              |              | 8    |
|                                       | AA2       | WR       | 341    | 13.5   | 76.86                           | 1.1951                                        |                                              |              |      |
|                                       | AA3       | WR       | 204    | 85     | 6.99                            | .7572                                         |                                              |              |      |
| Anterselva Orthogneisses              | AA4       | WR       | 438    | 13.1   | 103.19                          | 1.3789                                        |                                              |              |      |
|                                       | AA5       | WR       | 331    | 18.6   | 53.30                           | 1.0534                                        |                                              |              |      |
|                                       | AA6       | WR       | 316    | 10.6   | 91.68                           | 1.3037                                        | .7080 $\pm$ 34                               | 449 $\pm$ 4  |      |
|                                       | AA7       | WR       | 469    | 18.5   | 78.75                           | 1.1951                                        |                                              |              |      |
|                                       | AA8       | WR       | 226    | 63     | 10.37                           | .7700                                         |                                              |              |      |
|                                       | AA9       | WR       | 144    | 85     | 4.94                            | .7404                                         |                                              |              |      |
| Casies Orthogneisses                  | AA10      | WR       | 107    | 204    | 1.51                            | .7175                                         |                                              |              |      |
|                                       | AA11      | WR       | 112    | 179    | 1.80                            | .7206                                         |                                              |              |      |
| Anterselva Orthogneiss                | AA1       | Bi       | 957    | 3.30   | 1328.75                         | 6.6509                                        |                                              | 310 $\pm$ 4  |      |
|                                       |           | Mu       | 586    | 7.26   | 262.87                          | 1.9810                                        |                                              | 319 $\pm$ 8  |      |
| Anterselva Orthogneiss                | AA2       | Bi       | 1701   | 3.54   | 3306.46                         | 14.7680                                       |                                              | 296 $\pm$ 4  |      |
|                                       |           | Mu       | 1125   | 3.14   | 1929.54                         | 9.4825                                        |                                              | 316 $\pm$ 4  |      |
| Anterselva Orthogneiss                | AA3       | Bi       | 1022   | 2.53   | 2292.23                         | 10.5059                                       |                                              | 303 $\pm$ 4  |      |
|                                       |           | Mu       | 582    | 7.93   | 235.69                          | 1.8381                                        |                                              | 313 $\pm$ 8  |      |
| Anterselva Orthogneiss                | AA4       | Bi       | 2578   | 4.70   | 4698.00                         | 20.7544                                       |                                              | 298 $\pm$ 3  |      |
|                                       |           | Mu       | 1524   | 4.78   | 1532.28                         | 7.4629                                        |                                              | 305 $\pm$ 4  |      |
| Anterselva Orthogneiss                | AA 8      | Bi       | 1196   | 5.36   | 894.16                          | 4.6248                                        |                                              | 301 $\pm$ 4  | 8    |
| Casies Orthogneiss                    | AA 10     | Bi       | 422    | 4.02   | 351.56                          | 2.3136                                        |                                              | 304 $\pm$ 6  |      |
|                                       | AA 20     | WR       | 159    | 68     | 6.84                            | .7513                                         |                                              |              |      |
|                                       | AA 21     | WR       | 96     | 241    | 1.16                            | .7187                                         |                                              |              |      |
|                                       | AA 22     | WR       | 120    | 248    | 1.40                            | .7207                                         |                                              |              |      |
| Augengneisses                         | AA 23     | WR       | 179    | 68     | 7.64                            | .7583                                         | .7121                                        | (409)        |      |
|                                       | AA 24     | WR       | 97     | 234    | 1.20                            | .7208                                         |                                              |              |      |
|                                       | AA 25     | WR       | 175    | 72     | 7.07                            | .7522                                         |                                              |              |      |
|                                       | AA 26     | WR       | 118    | 212    | 1.61                            | .7201                                         |                                              |              |      |
| Augengneiss                           | AA 21     | Bi       | 532    | 13.24  | 117.02                          | .7727                                         |                                              | 18 $\pm$ 8   |      |
| Augengneiss                           | AA 22     | Bi       | 605    | 5.16   | 344.42                          | .8577                                         |                                              | 24 $\pm$ 4   |      |

TABLE 4 (continued)

Rb/Sr

| Rock type                           | Sample n. | Material     | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma     | Ref. |
|-------------------------------------|-----------|--------------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|------------|------|
| Augengneiss                         | AA 24     | Bi           | 441    | 6.43   | 200.06                          | .7907                               |                                     | 17± 5      |      |
| Augengneiss                         | AA 20     | Mu           | 503    | 9.94   | 149.02                          | .8861                               |                                     | 67± 9      |      |
| Augengneiss                         | AA 23     | Mu           | 568    | 10.15  | 164.91                          | .9004                               |                                     | 67± 8      |      |
| Augengneiss                         | AA 25     | Mu           | 537    | 10.12  | 155.91                          | .8616                               |                                     | 53± 8      |      |
| Augengneiss                         | KAW 421   | WR           | 291.3  | 27.7   | 31.01                           | .9083                               |                                     | 451±18     | 33   |
|                                     |           | Ph           | 1026.4 | 4.7    | 733.3                           | 2.399                               |                                     | 149± 5     |      |
|                                     |           | Bi           | 1646.4 | 2.3    | 2770                            | 3.927                               |                                     | 78± 3      |      |
| Orthogneiss                         | KAW 1138  | WR           | 238.3  | 47.8   | 14.56                           | .8047                               |                                     | 451±18     |      |
|                                     |           | Mu           | 767.0  | 5.7    | 474.1                           | 2.829                               |                                     | 310±12     |      |
|                                     |           | Mu           | 764.2  | 5.9    | 445.0                           | 2.690                               |                                     | 307±12     |      |
|                                     |           | Bi           | 1369.8 | 4.9    | 1037                            | 3.481                               |                                     | 184± 6     |      |
|                                     |           | Bi           | 1351.0 | 5.2    | 935.6                           | 3.266                               |                                     | 188± 7     |      |
| Orthogneiss                         | KAW 1141  | WR           | 174.4  | 158.7  | 3.186                           | .7280                               |                                     | 451±18     |      |
|                                     |           | Mu           | 439.9  | 15.3   | 84.40                           | .8601                               |                                     | 115±10     |      |
|                                     |           | Bi           | 809.8  | 2.6    | 979.7                           | 1.782                               |                                     | 76± 3      |      |
| Orthogneiss                         | KAW 1127  | WR           | 84.4   | 158.0  | 1.549                           | .7231                               |                                     | 451±18     |      |
| Orthogneiss                         | KAW 1127  | Mu           | 254.9  | 44.8   | 16.50                           | .7419                               |                                     | 88±47      | 33   |
|                                     |           | Bi           | 513.0  | 4.7    | 325.1                           | 1.080                               |                                     | 78± 3      |      |
|                                     | KAW 1135  | WR           | 305.4  | 32.5   | 27.63                           | .8869                               |                                     |            |      |
|                                     | KAW 421   | WR           | 291.3  | 27.7   | 31.01                           | .9083                               |                                     |            |      |
|                                     | KAW 1138  | WR           | 238.3  | 47.8   | 14.56                           | .8047                               |                                     |            |      |
| Orthogneisses                       | KAW 1141  | WR           | 174.4  | 158.7  | 3.186                           | .7280                               | .7102±14                            | 451±18     |      |
|                                     | KAW 1127  | WR           | 84.4   | 158.0  | 1.549                           | .7231                               |                                     |            |      |
| Orthogneiss                         | KAW 1317  | WR           | 460.7  | 11.6   | 123.7                           | 1.511                               |                                     |            |      |
|                                     |           | WR           | 460.7  | 11.6   | 123.7                           | 1.511                               |                                     | 451±18     |      |
|                                     |           | Mu           | 1545.7 | 4.0    | 2250                            | 11.17                               |                                     | 319±12     |      |
|                                     |           | Mu           | 1574.3 | 3.9    | 2413                            | 11.43                               |                                     | 304±12     |      |
|                                     |           | Bi           | 2639.5 | 4.2    | 8031                            | 35.94                               |                                     | 306±12     |      |
| Orthogneiss                         | KAW 1135  | WR           | 305.4  | 32.5   | 27.63                           | .8869                               |                                     | 451±18     |      |
|                                     |           | Ph           | 1140.8 | 5.1    | 725.6                           | 2.046                               |                                     | 117± 4     |      |
|                                     |           | Bi           | 1623.8 | 3.7    | 1489                            | 2.490                               |                                     | 78± 3      |      |
| Augengneiss                         | AA73-63   | WR           | 227    | 32.9   | 19.98                           | .8365± 18                           |                                     | 65± 1.4    | 10   |
|                                     |           | Mu           | 866    | 6.3    | 398                             | 1.1849± 35                          |                                     |            |      |
| Anterselva granitic<br>Orthogneiss  | AA 5      | WR           | 331    | 19     | 53.30                           | 1.0534± 54                          |                                     | 304±10     |      |
|                                     |           | Bi           | 1849   | .9     | 5898.13                         | 26.3400±520                         |                                     |            |      |
| Oetzal                              | AA74-34   | WR           | 269    | 23.6   | 33.77                           | .9236± 12                           |                                     |            | 13   |
|                                     | AA74-35   | WR           | 102    | 159    | 1.86                            | .7202± 4                            |                                     |            |      |
|                                     | AA74-37   | WR           | 91     | 191    | 1.43                            | .7152± 5                            |                                     |            |      |
| Orthogneisses                       | AA74-38   | WR           | 107    | 118    | 762.94                          | .7247± 4                            | .7073± 5                            | 448±14     |      |
|                                     | AA74-39   | WR           | 630    | 6.9    | 1.37                            | 2.6445± 49                          |                                     |            |      |
|                                     | AA74-40   | WR           | 89     | 125    | 2.63                            | .7208± 4                            |                                     |            |      |
|                                     | AA74-36   | WR           | 95     | 193    | 312.91                          | .7154± 5                            | .7076± 8                            | 434±12     |      |
|                                     |           | Bi           | 563    | 2.8    | 2.08                            | 3.9060±457                          |                                     | 294±10     |      |
| Stubai                              | AA76-21   | WR           | 256    | 38     | 19.70                           | .8098± 3                            |                                     |            | 13   |
|                                     | AA76-23   | WR           | 262    | 39     | 19.84                           | .8200± 4                            |                                     |            |      |
| Orthogneisses                       | AA76-24   | WR           | 419    | 11.3   | 114.61                          | 1.3909± 8                           | .7091±135                           | 425 ±43    |      |
|                                     | AA76-25   | WR           | 355    | 15     | 71.65                           | 1.1415± 7                           |                                     |            |      |
|                                     | AA76-2    | WR           | 287    | 48     | 17.55                           | .8259± 5                            |                                     |            |      |
|                                     | AA76-27   | WR           | 235    | 42     | 16.46                           | .8194± 4                            |                                     |            |      |
| Orthogneiss                         |           | Bi           | 1348   | 4.1    | 1084.94                         | 2.0751± 41                          |                                     | 82.7± 2.5  |      |
|                                     |           | Mu           | 811    | 5.6    | 504.25                          | 2.8838± 71                          |                                     | 297 ± 9    |      |
| Merano-Mules-Anterselva<br>basement | KAW 1554  | WR           | 145.4  | 62.89  | 6.716                           | .7494                               |                                     |            | 28   |
|                                     | KAW 1555  | WR           | 143.9  | 107.94 | 3.867                           | .7333                               |                                     |            |      |
|                                     | KAW 1556  | WR           | 158.4  | 142.55 | 3.220                           | .7278                               |                                     |            |      |
| Augengneisses                       | KAW 1796  | WR           | 109.5  | 132.65 | 2.381                           | .7215                               | .7078± 13                           | 445 ±24    |      |
|                                     | KAW 1799  | WR           | 127.5  | 170.81 | 2.162                           | .7224                               |                                     |            |      |
|                                     | KAW 1797  | WR           | 149.1  | 89.47  | 4.837                           | .7395                               |                                     |            |      |
|                                     | KAW 1798  | WR           | 163.8  | 58.35  | 8.157                           | .7561                               |                                     |            |      |
| Augengneiss                         | KAW 1554  | Wm (80-100)  | 476.1  | 9.02   | 155.3                           | .8903                               |                                     | 66.7± 2.0  |      |
|                                     |           | Wm (100-200) | 477.2  | 9.53   | 147.3                           | .8803                               |                                     | 65.4± 2.0  |      |
| Augengneiss                         | KAW 1555  | Wm (100-200) | 488.7  | 12.29  | 117.1                           | .8838                               |                                     | 93.6± 3.0  |      |
| Augengneiss                         | KAW 1556  | Wm (60-80)   | 469.3  | 15.17  | 91.86                           | .9828                               |                                     | 195.8± 5.0 |      |
|                                     |           | Wm (80-100)  | 462.3  | 13.86  | 98.44                           | .9117                               |                                     | 131.8± 4.0 |      |
|                                     |           | Wm (100-200) | 451.1  | 17.87  | 73.88                           | .8335                               |                                     | 101.1± 3.0 |      |

TABLE 4 (continued)

Rb/Sr

| Rock type            | Sample n. | Material (mesh)    | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_0$ | $(^{87}\text{Sr}/^{86}\text{Sr})_t$ | AGE Ma         | Ref. |
|----------------------|-----------|--------------------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|----------------|------|
| Augengneiss          | KAW 1796  | Bi (35-60)         | 532.3  | 13.23  | 116.9                           | .7639                               |                                     | 26 $\pm$ 1.1   |      |
|                      |           | Bi (80-100)        | 546.9  | 12.30  | 215                             | .8026                               |                                     | 26.8 $\pm$ .7  |      |
|                      |           | Wm (60-100)        | 289.7  | 19.80  | 42.50                           | .7503                               |                                     | 50.6 $\pm$ 2.9 |      |
| Augengneiss          | KAW 1799  | Bi (80-100)        | 652.7  | 12.20  | 155.6                           | .7709                               |                                     | 22.2 $\pm$ .8  |      |
|                      |           | Wm (100-150)       | 352.5  | 10.96  | 93.44                           | .7545                               |                                     | 24.7 $\pm$ 1.3 |      |
| Augengneiss          | KAN 1797  | Wm (35-60)         | 453.6  | 11.11  | 119.5                           | .8419                               |                                     | 62.8 $\pm$ 1.6 | 28   |
|                      |           | Wm (60-80)         | 438.4  | 19.27  | 66.35                           | .7886                               |                                     | 56 $\pm$ 2.2   |      |
|                      |           | Wm (80-100)        | 449.4  | 10.80  | 121.7                           | .8332                               |                                     | 56.4 $\pm$ 1.5 |      |
|                      |           | Wm (100-200)       | 438.8  | 11.49  | 111.5                           | .8082                               |                                     | 45.3 $\pm$ 1.4 |      |
|                      |           | Wm (200-270)       | 436.9  | 15.92  | 79.97                           | .7817                               |                                     | 39.5 $\pm$ 1.7 |      |
| Augengneiss          | KAW 1798  | Wm (60-80)         | 526.9  | 9.93   | 155.9                           | .8774                               |                                     | 57.7 $\pm$ 1.5 |      |
|                      |           | Wm (100-200)       | 619.2  | 9.39   | 193.4                           | .8543                               |                                     | 37.3 $\pm$ 1   |      |
| Augengneiss lamella  | KAW 1557  | WR                 | 178.1  | 66.96  | 7.7377                          | .7618                               |                                     |                |      |
|                      |           | Wm (35-60)         | 626.7  | 10.19  | 181.7                           | .9257                               |                                     | 66.3 $\pm$ 2.0 |      |
|                      |           | Wm (60-80)         | 634.3  | 9.26   | 202.4                           | .9305                               |                                     | 60.9 $\pm$ 1.3 |      |
|                      |           | Wm (80-100)        | 582.2  | 8.15   | 211.1                           | .9316                               |                                     | 58.7 $\pm$ 2.3 |      |
| Ötztal               |           | Wm (100-200)       | 630.5  | 10.43  | 178.2                           | .9058                               |                                     | 59.4 $\pm$ 2.4 |      |
| Orthogneiss          | AA80-18   | WR                 | 66     | 61     | 3.17                            | .7376 $\pm$ 2                       |                                     | 300 $\pm$ 5    | 25   |
|                      |           | Bi                 | 638    | 3.9    | 591.31                          | 3.2485 $\pm$ 57                     |                                     |                |      |
|                      |           | Mu                 | 213    | 195    | 3.16                            | .7381 $\pm$ 1                       |                                     |                |      |
| Orthogneiss          | AA80-19   | WR                 | 147    | 72     | 7.57                            | .7543 $\pm$ 4                       |                                     | 301 $\pm$ 5    |      |
|                      |           | Bi                 | 1001   | 2.6    | 2142.45                         | 9.9062 $\pm$ 287                    |                                     |                |      |
| Granitic Orthogneiss | AA74-10   | WR                 | 273    | 30     | 26.68                           | .9035 $\pm$ 4                       |                                     | 174 $\pm$ 3    | 15   |
|                      |           | Mu                 | 1032   | 4.7    | 766.6                           | 2.7365 $\pm$ 10                     |                                     |                |      |
| Granitic Orthogneiss | AA77-4    | WR                 | 244    | 30.5   | 23.44                           | .8334 $\pm$ 5                       |                                     | 69.1 $\pm$ 1   | 35   |
|                      |           | Mu                 | 816    | 5.3    | 469.2                           | 1.2713 $\pm$ 20                     |                                     |                |      |
| Leucogranitic gneiss | T 1023    | Mu                 | 1423.8 | 3.84   | 2169.8                          | 11.001                              |                                     | 328 $\pm$ 12   |      |
|                      |           | WR                 | 397.1  | 18.53  | 65.02                           | 1.1688                              |                                     | 495 $\pm$ 20   |      |
| Leucogranitic gneiss | T 1066    | Mu                 | 1784.2 | 6.73   | 1137.5                          | 5.555                               |                                     | 293 $\pm$ 12   |      |
|                      |           | WR                 | 476.6  | 29.89  | 47.69                           | 1.0162                              |                                     | 450 $\pm$ 25   |      |
| Granitoid gneiss     | T 1246    | Mu                 | 941.2  | 4.03   | 760.2                           | 1.9307                              |                                     | 95 $\pm$ 3.8   |      |
|                      |           | WR                 | 292.2  | 21.02  | 41.34                           | .9576                               |                                     | 420 $\pm$ 28   |      |
| Granitoid gneiss     | T 1246    | WR                 | 242.2  | 21.63  | 40.49                           | .9620                               |                                     | 437 $\pm$ 29   | 35   |
| Granitoid gneiss     | T 1247    | Mu                 | 978.7  | 3.82   | 832.7                           | 1.9075                              |                                     | 82.7 $\pm$ 3.3 |      |
|                      |           | WR                 | 293.6  | 20.83  | 42.01                           | .9758                               |                                     | 444 $\pm$ 29   |      |
| Granitoid gneiss     | T 1285    | Mu                 | 1310.8 | 5.88   | 718.6                           | 1.8207                              |                                     | 91.1 $\pm$ 3.6 |      |
|                      |           | WR                 | 403.1  | 34.04  | 35.15                           | .9368                               |                                     | 453 $\pm$ 33   |      |
| Granitoid gneiss     | T 1288    | WR                 | 405.2  | 34.10  | 35.26                           | .9349                               |                                     | 447 $\pm$ 33   |      |
|                      |           | Mu                 | 707.7  | 11.89  | 178.8                           | .9841                               |                                     | 82.3 $\pm$ 5.4 |      |
| Leucogranitic gneiss | T 1298    | WR                 | 200.3  | 38.15  | 15.36                           | .7929                               |                                     | 379 $\pm$ 70   |      |
|                      |           | Mu $\phi > .43$ mm | 1158.8 | 9.01   | 399.1                           | 1.3482                              |                                     | 90.7 $\pm$ 3.6 |      |
| Leucogranitic gneiss | T 1299    | Mu $\phi .15-.071$ | 1130.6 | 9.50   | 367.0                           | 1.3032                              |                                     | 90.5 $\pm$ 3.6 |      |
|                      |           | Feld+Qz            | 186.2  | 55.15  | 9.93                            | .8471                               |                                     | 86.8 $\pm$ 10  |      |
|                      |           | WR                 | 332.8  | 49.99  | 19.73                           | .8592                               |                                     | 531 $\pm$ 54   |      |
| Leucogranitic gneiss | T 1299    | Mu                 | 1127.0 | 4.97   | 725.9                           | 1.7561                              |                                     | 85.7 $\pm$ 3.4 |      |
|                      |           | Feld+Qz            | 157.2  | 28.26  | 16.46                           | .8925                               |                                     | 84.4 $\pm$ 7.4 |      |
| Leucogranitic gneiss | T 1307    | WR                 | 356.8  | 24.77  | 42.73                           | .9240                               |                                     | 352 $\pm$ 28   |      |
|                      |           | Mu                 | 1568.7 | 4.76   | 1639.2                          | 7.954                               |                                     | 305 $\pm$ 12   |      |
| Granitoid gneiss     | T 1311    | WR                 | 438.5  | 19.34  | 68.56                           | 1.1318                              |                                     | 432 $\pm$ 19   |      |
|                      |           | Mu                 | 1321.4 | 3.75   | 1429.1                          | 4.684                               |                                     | 184 $\pm$ 7.6  |      |
| Leucogranitic gneiss | T 1316    | WR                 | 362.8  | 17.82  | 61.38                           | 1.0966                              |                                     | 442 $\pm$ 21   |      |
|                      |           | Mu                 | 759.6  | 13.86  | 164.5                           | 1.045                               |                                     | 104 $\pm$ 4    |      |
| Granitoid gneiss     | T 1318    | WR                 | 246.6  | 69.23  | 10.45                           | .8163                               |                                     | 712 $\pm$ 102  |      |
|                      |           | Mu                 | 651.8  | 15.81  | 122.12                          | .9102                               |                                     | 98 $\pm$ 7.7   |      |
| Leucogranitic gneiss | T 1319    | WR                 | 196.1  | 96.80  | 5.91                            | .7483                               |                                     | 453 $\pm$ 73   |      |
|                      |           | WR                 | 196.1  | 99.61  | 5.79                            | .7483                               |                                     | 463 $\pm$ 77   |      |
| Leucogranitic gneiss | T 1319    | Mu                 | 1250.7 | 6.03   | 662.3                           | 1.7364                              |                                     | 92.5 $\pm$ 3.7 |      |
|                      |           | WR                 | 323.3  | 28.01  | 34.18                           | .9108                               |                                     | 412 $\pm$ 33   |      |
| Leucogranitic gneiss | T 1325    | Mu $\phi > .43$ mm | 957.5  | 51.73  | 54.44                           | .8371                               |                                     | 105 $\pm$ 13   |      |
| Leucogranitic gneiss | T 1325    | Mu $\phi .07-.15$  | 946.9  | 36.54  | 76.42                           | .8530                               |                                     | 84.7 $\pm$ 9   | 35   |
|                      |           | WR                 | 261.1  | 44.09  | 17.31                           | .7819                               |                                     | 291 $\pm$ 62   |      |
| Leucogranitic gneiss | T 1343    | Mu $\phi > .43$ mm | 1116.4 | 13.52  | 258.7                           | 1.4989                              |                                     | 189 $\pm$ 8    |      |
|                      |           | Mu $\phi < .15$ mm | 1095.2 | 11.78  | 288.0                           | 1.3027                              |                                     | 106 $\pm$ 4    |      |
|                      |           | WR                 | 287.9  | 14.70  | 58.25                           | .9565                               |                                     | 297 $\pm$ 21   |      |
|                      |           | WR                 | 286.9  | 15.12  | 56.45                           | .9593                               |                                     | 310 $\pm$ 22   |      |

TABLE 4 (continued)

Rb/Sr

| Rock type                          | Sample n. | Material           | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma         | Ref.        |
|------------------------------------|-----------|--------------------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|----------------|-------------|
| Granitic gneiss                    | T 1345    | Mu                 | 565.6  | 20.86  | 80.47                           | .8473                               |                                     | 104 $\pm$ 10   |             |
|                                    |           | WR                 | 190.1  | 133.02 | 4.16                            | .7348                               |                                     | 417 $\pm$ 245  |             |
| Granitic gneiss                    | T 1347    | Mu                 | 833.8  | 7.48   | 341.90                          | 1.2172                              |                                     | 90.2 $\pm$ 3.6 |             |
|                                    |           | WR                 | 242.4  | 51.88  | 13.67                           | .7966                               |                                     | 444 $\pm$ 78   |             |
| Granitic gneiss                    | T 1348    | Mu                 | 823.2  | 4.58   | 573.06                          | 1.6529                              |                                     | 99.1 $\pm$ 4   |             |
|                                    |           | WR                 | 268.2  | 30.98  | 25.56                           | .8822                               |                                     | 472 $\pm$ 44   |             |
| Granitic gneiss                    | T 1349    | Mu                 | 397.5  | 11.33  | 105.90                          | .8675                               |                                     | 91.7 $\pm$ 8.6 |             |
|                                    |           | Bi                 | 612.6  | 3.13   | 612.17                          | 1.4061                              |                                     | 77.5 $\pm$ 3.1 |             |
|                                    |           | KF                 | 176.7  | 211.1  | 2.45                            | .7322                               |                                     | 195 $\pm$ 126  |             |
|                                    |           | KF                 | 196.8  | 208.1  | 2.75                            | .7324                               |                                     | 230 $\pm$ 149  |             |
| Leucogranitic gneiss               | T 1356    | WR                 | 141.3  | 103.4  | 3.98                            | .7364                               |                                     | 464 $\pm$ 257  |             |
|                                    |           | Mu                 | 982.2  | 4.38   | 734.5                           | 2.0082                              |                                     | 112 $\pm$ 4.5  |             |
| Leucogranitic gneiss               | T 1357    | WR                 | 267.1  | 33.07  | 23.82                           | .8718                               |                                     | 476 $\pm$ 47   |             |
|                                    |           | Mu                 | 678.   | 7.46   | 279.1                           | 1.2797                              |                                     | 135 $\pm$ 5.4  |             |
| Leucocratic layer<br>in paragneiss | T 1359    | WR                 | 217.3  | 79.24  | 7.80                            | .7608                               |                                     | 445 $\pm$ 130  |             |
|                                    |           | Mu                 | 319.7  | 42.89  | 21.73                           | .7480                               |                                     | 83.1 $\pm$ 32  |             |
| Muscovite pegmatite                | T 1364    | WR                 | 87.3   | 251.6  | 1.01                            | .7235                               |                                     | 926 $\pm$ 996  |             |
|                                    |           | Mu                 | 1621.7 | 3.42   | 1874.8                          | 4.384                               |                                     | 135 $\pm$ 5.4  |             |
| Leucogranitic gneiss               | T 1366    | WR                 | 385.1  | 27.93  | 40.98                           | .8673                               |                                     | 270 $\pm$ 30   |             |
|                                    |           | Mu                 | 617.2  | 8.53   | 219.5                           | 1.0885                              |                                     | 100.4 $\pm$ 4  |             |
| Biotite granite gneiss             | T 1367    | WR                 | 225.8  | 43.83  | 15.08                           | .7967                               |                                     | 403 $\pm$ 71   |             |
|                                    |           | Mu                 | 392.9  | 16.08  | 71.64                           | .8154                               |                                     | 88 $\pm$ 13    | 35          |
| Leucogranitic gneiss               | T 1368    | Bi                 | 650.1  | 3.51   | 570.2                           | 1.3385                              |                                     | 75.6 $\pm$ 3   |             |
|                                    |           | WR                 | 161.1  | 179.3  | 2.61                            | .7292                               |                                     | 507 $\pm$ 386  |             |
| Leucogranitic gneiss               | T 1370    | Mu                 | 1091.7 | 7.98   | 421.7                           | 1.3440                              |                                     | 85.8 $\pm$ 3.4 |             |
|                                    |           | Feld+Qz            | 214.1  | 35.67  | 17.8                            | .8495                               |                                     | 106 $\pm$ 12   |             |
| Leucogranitic gneiss               | T 1370    | WR                 | 304.2  | 36.58  | 24.52                           | .8597                               |                                     | 428 $\pm$ 45   |             |
|                                    |           | Mu $\beta$ >.30 mm | 1056.4 | 5.73   | 593.4                           | 1.8213                              |                                     | 109 $\pm$ 4.4  |             |
| Leucogranitic gneiss               | T 1371    | Mu $\beta$ .15-.30 | 1070.5 | 5.77   | 602.1                           | 1.8345                              |                                     | 109 $\pm$ 4.4  |             |
|                                    |           | WR                 | 297.8  | 23.22  | 38.18                           | .9633                               |                                     | 465 $\pm$ 31   |             |
| Leucogranitic gneiss               | T 1371    | Mu                 | 961.0  | 7.18   | 418.2                           | 1.3925                              |                                     | 87.8 $\pm$ 3.5 |             |
|                                    |           | WR                 | 284.4  | 21.26  | 39.64                           | .9201                               |                                     | 372 $\pm$ 29   |             |
| Leucogranitic gneiss               | T 1373    | Mu $\beta$ >.30 mm | 1420.3 | 12.24  | 386.1                           | 2.1904                              |                                     | 255 $\pm$ 10   |             |
|                                    |           | Mu $\beta$ <.30 mm | 1215.4 | 19.16  | 195.7                           | 1.2501                              |                                     | 151 $\pm$ 6    |             |
| Leucogranitic gneiss               | T 1378    | WR                 | 259    | 29.16  | 26.23                           | .8855                               |                                     | 469 $\pm$ 43   |             |
|                                    |           | Mu $\beta$ >.30 mm | 1713.5 | 2.57   | 2932.2                          | 5.939                               |                                     | 118 $\pm$ 4.8  |             |
| Leucogranitic gneiss               | T 1378    | Mu $\beta$ .15-.30 | 1724.1 | 2.42   | 3081.4                          | 5.610                               |                                     | 105 $\pm$ 4.2  |             |
|                                    |           | WR                 | 461.1  | 21.10  | 66.06                           | 1.1267                              |                                     | 443 $\pm$ 20   |             |
| Leucogranitic gneiss               | T 1066    | WR                 | 476.6  | 29.89  | 47.69                           | 1.0162                              |                                     |                |             |
|                                    |           | T 1246             | WR     | 292.2  | 21.02                           | 41.34                               | .9576                               |                |             |
| Granitoid gneiss                   | T 1247    | WR                 | 293.6  | 20.83  | 42.01                           | .9758                               |                                     |                |             |
|                                    |           | T 1285             | WR     | 403.1  | 34.04                           | 35.15                               | .9368                               |                |             |
| Leucogranitic gneiss               | T 1288    | WR                 | 200.3  | 38.15  | 15.36                           | .7929                               |                                     |                |             |
|                                    |           | T 1307             | WR     | 438.5  | 19.34                           | 68.56                               | 1.1318                              |                |             |
| Granitoid gneiss                   | T 1311    | WR                 | 362.8  | 17.82  | 61.38                           | 1.0966                              |                                     |                |             |
| Granitoid gneiss                   | T 1318    | WR                 | 196.1  | 96.80  | 5.91                            | .7483                               |                                     |                |             |
| Leucogranitic gneiss               | T 1319    | WR                 | 323.3  | 28.01  | 34.18                           | .9108                               |                                     |                |             |
| Granitic gneiss                    | T 1345    | WR                 | 190.1  | 133.02 | 4.16                            | .7348                               |                                     |                |             |
| Granite gneisses                   | T 1347    | WR                 | 242.4  | 51.88  | 13.67                           | .7966                               |                                     |                |             |
|                                    |           | T 1348             | WR     | 268.2  | 30.98                           | 25.56                               | .8822                               | .7105 $\pm$ 3  | 441 $\pm$ 7 |
| Leucogranitic gneiss               | T 1349    | WR                 | 141.3  | 103.4  | 3.98                            | .7364                               |                                     |                |             |
|                                    |           | T 1356             | WR     | 267.1  | 33.07                           | 23.82                               | .8718                               |                |             |
| Granite gneiss                     | T 1357    | WR                 | 217.3  | 79.24  | 7.80                            | .7608                               |                                     |                |             |
| Leucogranitic gneiss               | T 1366    | WR                 | 225.8  | 43.83  | 15.08                           | .7967                               |                                     |                |             |
| Biotite granite gneiss             | T 1367    | WR                 | 161.1  | 179.3  | 2.61                            | .7292                               |                                     |                |             |
| Leucogranitic gneisses             | T 1368    | WR                 | 304.2  | 36.58  | 24.52                           | .8597                               |                                     |                |             |
|                                    |           | T 1370             | WR     | 297.8  | 23.22                           | 38.18                               | .9633                               |                |             |
| Leucogranitic gneisses             | T 1373    | WR                 | 259.0  | 29.16  | 26.23                           | .8855                               |                                     |                |             |
|                                    |           | T 1378             | WR     | 461.1  | 21.10                           | 66.06                               | 1.1267                              |                |             |
| Raibl Schist                       | KAW 420   | Bi                 | 392    | 1.89   | 644.51                          | 1.441                               |                                     | 80 $\pm$ 3     | 32          |
| Monteneve                          |           | Bi                 | 392    | 1.34   | 937.47                          | 1.774                               |                                     | 80 $\pm$ 3     |             |
| Two mica plagioclasic<br>gneiss    | KAW 303   | Bi                 | 392.2  | 3.51   | 335.51                          | 1.082                               |                                     | 80 $\pm$ 4     | 34          |
|                                    |           | Mu                 | 277    | --     | --                              | --                                  |                                     |                |             |

TABLE 4 (continued)

Rb/Sr

| Rock type                             | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_{\text{m}}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_{\text{i}}$ | AGE Ma         | Ref. |
|---------------------------------------|-----------|----------|--------|--------|---------------------------------|----------------------------------------------|----------------------------------------------|----------------|------|
| Garnet quartz micaschist              | KAW 304   | Bi       | 353.3  | 5.12   | 204.36                          | .941                                         |                                              | 82 $\pm$ 6     |      |
|                                       |           | Mu       | 255.1  | --     | --                              | --                                           |                                              |                |      |
| Ore dyke                              | KAW 109   | Bi       | 978.7  | 3.47   | 901.43                          | 1.780                                        |                                              | 84 $\pm$ 3     |      |
|                                       |           | Bi       | 975.1  | 3.38   | 924.67                          | 1.809                                        |                                              | 84 $\pm$ 3     |      |
| Garnet micaschist                     | KAW 305   | Bi       | 491.1  | 4.59   | 321.42                          | 1.094                                        |                                              | 85 $\pm$ 4     |      |
|                                       |           | Mu       | 112.4  | --     | --                              | --                                           |                                              |                |      |
| Biotitic porphyroblastic gneiss       | KAW 306   | Bi       | 345.9  | 2.94   | --                              | 1.1117                                       |                                              | 80 $\pm$ 4     |      |
| <u>Oetzta</u>                         |           | Mu       | 112.4  | --     | --                              | --                                           |                                              |                |      |
| Plagioclasic Biotite-Muscovite gneiss | KAW 307   | Bi       | 519.4  | 5.86   | 266.06                          | 1.082                                        |                                              | 98 $\pm$ 5     |      |
|                                       |           | Mu       | 187.3  | --     | --                              | --                                           |                                              |                |      |
|                                       | 169       | Bi       | 334.2  | --     | --                              | --                                           |                                              |                | 29   |
|                                       |           | Bi       | 332.8  | --     | --                              | --                                           |                                              |                |      |
|                                       |           | Bi       | 334.2  | 12.6   | --                              | --                                           |                                              | 85 $\pm$ 39    |      |
|                                       |           | Bi       | 335.3  | --     | 77 $\pm$ 85                     | .812 $\pm$ 28                                |                                              |                |      |
| Biotite plagioclase gneisses          | 170       | WR       | 93.1   | 189.34 | 1.43 $\pm$ 2                    | .727 $\pm$ 36                                |                                              |                |      |
|                                       |           | Bi       | 420.4  | 7.7    | 161.8 $\pm$ 1.4                 | .942 $\pm$ 44                                |                                              |                |      |
|                                       |           | Bi       | 424    | --     | --                              | --                                           |                                              |                |      |
|                                       |           | Bi       | 418    | 7.8    | 157.1 $\pm$ 1.90                | .902 $\pm$ 39                                | .7240 $\pm$ 30                               | 87 $\pm$ 11    |      |
|                                       |           | Bi       | --     | --     | 160.1 $\pm$ 1.25                | .923 $\pm$ 26                                |                                              |                |      |
|                                       |           | Mu       | 171    | 145.9  | 3.40 $\pm$ 7                    | .723 $\pm$ 6                                 |                                              |                |      |
|                                       |           | Mu       | 171    | --     | --                              | --                                           |                                              |                |      |
|                                       | 175       | Bi       | 466.7  | 13.4   | 102.2 $\pm$ 2                   | .879 $\pm$ 25                                |                                              |                | 29   |
|                                       |           | Bi       | 462.1  | --     | --                              | --                                           | .7242 $\pm$ 19                               | 89 $\pm$ 9     |      |
|                                       |           | Bi       | --     | 13.7   | 99.16 $\pm$ 1.15                | .853 $\pm$ 22                                |                                              | 98 $\pm$ 11    |      |
|                                       |           | Bi       | 462.1  | --     | 100.5 $\pm$ 1.4                 | .863 $\pm$ 14                                |                                              |                |      |
| Biotite plagioclase gneisses          | 172       | WR       | 111.1  | 332.4  | .699 $\pm$ 10                   | .721 $\pm$ 43                                |                                              |                |      |
|                                       |           | Bi       | 463.5  | 15.4   | 87.7 $\pm$ 9                    | .837 $\pm$ 19                                |                                              |                |      |
|                                       |           | Bi       | 462.1  | --     | --                              | --                                           |                                              |                |      |
|                                       |           | Bi       | 464.9  | 15.1   | 91.2 $\pm$ 1                    | .837 $\pm$ 20                                |                                              |                |      |
|                                       |           | Bi       | --     | --     | 89 $\pm$ 1.6                    | .837 $\pm$ 10                                | .7244 $\pm$ 25                               | 91 $\pm$ 16    |      |
|                                       |           | Mu       | 166.1  | 304.6  | 1.600 $\pm$ 32                  | .728 $\pm$ 29                                |                                              |                |      |
|                                       |           | Mu       | 171.4  | --     | --                              | --                                           |                                              |                |      |
|                                       |           | Mu       | 166.1  | 305.9  | 1.573 $\pm$ 25                  | .722 $\pm$ 29                                |                                              |                |      |
|                                       |           | Mu       | 168.2  | --     | 1.580 $\pm$ 20                  | .725 $\pm$ 10                                |                                              |                |      |
| Biotite microcline plagioclase gneiss | 171       | WR       | 167.3  | 59.02  | 8.25 $\pm$ 14                   | .766 $\pm$ 46                                |                                              |                |      |
|                                       |           | Bi       | 994.2  | 2.7    | 1463 $\pm$ 20                   | 4.65 $\pm$ 16                                |                                              |                |      |
|                                       |           | Bi       | 995.6  | --     | --                              | --                                           | .7443 $\pm$ 47                               | 187 $\pm$ 7    |      |
| Merano-Mules-Anterselva basement      |           | Bi       | 1002.7 | 2.6    | 1538 $\pm$ 40                   | 4.70 $\pm$ 16                                |                                              |                |      |
|                                       |           | Bi       | --     | --     | 1478 $\pm$ 40                   | 4.67 $\pm$ 11                                |                                              |                |      |
| Paragneiss                            | AA73 19   | WR       | 92     | 82     | 3.23                            | .7331                                        |                                              |                | 8    |
| Paragneiss                            | AA73 22   | WR       | 169    | 138    | 3.55                            | .7354                                        |                                              |                |      |
| Gneissic micaschist                   | AA73 23   | WR       | 186    | 144    | 3.74                            | .7366                                        |                                              |                |      |
| Gneissic micaschist                   | AA73 25   | WR       | 133    | 164    | 2.35                            | .7296                                        | .7099 $\pm$ 14                               | 514.5 $\pm$ 39 |      |
|                                       | AA73 26   | WR       | 55     | 218    | .73                             | .7148                                        |                                              |                |      |
| Paragneisses                          | AA73 27   | WR       | 71     | 253    | .81                             | .7154                                        |                                              |                |      |
|                                       | AA73 28   | WR       | 139    | 241    | 1.67                            | .7200                                        |                                              |                |      |
|                                       | AA73 24   | WR       | 72     | 102    | 2.05                            | .7274                                        |                                              |                |      |
| Gneissic micaschist                   | AA 40     | Bi       | 584    | 10.34  | 176.22                          | 1.5053                                       |                                              | 313 $\pm$ 9    | 8    |
|                                       | AA 41     | Bi       | 464    | 4.69   | 327.84                          | 2.1813                                       |                                              | 313 $\pm$ 7    |      |
|                                       | AA 42     | Bi       | 391    | 8.35   | 136.46                          | .7768                                        |                                              | 29 $\pm$ 9     |      |
| Paragneisses                          | AA 43     | Bi       | 482    | 9.06   | 155.14                          | .7849                                        |                                              | 29 $\pm$ 6     |      |
|                                       | AA 44     | Bi       | 461    | 2.95   | 460.49                          | .8929                                        |                                              | 26 $\pm$ 3     |      |
|                                       | AA 45     | Bi       | 720    | 17.08  | 124.15                          | .8930                                        |                                              | 98 $\pm$ 9     |      |
| Micaschist                            | AA 46     | Bi       | 597    | 3.70   | 494.12                          | 1.3151                                       |                                              | 85 $\pm$ 3     |      |
|                                       | AA 47     | Bi       | 630    | 9.78   | 198.37                          | 1.3600                                       |                                              | 227 $\pm$ 7    |      |
| Paragneisses                          | AA 48     | Bi       | 597    | 3.98   | 443.44                          | .9271                                        |                                              | 33 $\pm$ 3     |      |
|                                       | AA 49     | Bi       | 407    | 5.60   | 231.18                          | 1.7152                                       |                                              | 301 $\pm$ 8    |      |
| Monteneve Garnet micaschist           | KAW 1208  | WR       | 128.5  | 77.7   | 4.795                           | .7246                                        |                                              | --             | 33   |
|                                       |           | Mu       | 351.9  | 99.2   | 10.29                           | .7329                                        |                                              | 107 $\pm$ 75   |      |
| Garnet micaschist                     | KAW 1207  | WR       | 157.5  | 137.1  | 3.334                           | .7350                                        |                                              | --             |      |
|                                       |           | Mu       | 279    | 152.8  | 5.299                           | .7385                                        |                                              | 126 $\pm$ 146  |      |
|                                       |           | Bi       | 627.1  | 4.7    | 400.1                           | 1.184                                        |                                              | 80 $\pm$ 3     |      |

TABLE 4 (continued)

Rb/Sr

| Rock type                | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma | Ref. |
|--------------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|--------|------|
| Garnet micaschist        | KAW 1150  | WR       | 109.3  | 174    | 1.820                           | .7217                               | --                                  |        |      |
|                          |           | Mu       | 253.4  | 294.3  | 2.495                           | .7228                               | 122+305                             |        |      |
|                          |           | Bi       | 478.7  | 4.6    | 313.5                           | 1.080                               | 81+ 3                               |        |      |
| Garnet micaschist        | KAW 1151  | WR       | 75.9   | 137.9  | 1.596                           | .7220                               | --                                  |        |      |
|                          |           | Mu       | 211.7  | 145.3  | 4.223                           | .7251                               | 82+181                              |        |      |
|                          |           | Bi       | 365.7  | 4      | 269.4                           | 1.015                               | 77+ 3                               |        |      |
| Paragneiss               | KAW 1136  | WR       | 149.3  | 112.9  | 3.835                           | .7322                               | --                                  |        |      |
|                          |           | Mu       | 214.5  | 93.9   | 6.625                           | .7383                               | 155+117                             |        |      |
|                          |           | Bi       | 389.3  | 9.1    | 125.9                           | .8704                               | 80+ 7                               |        |      |
| Biotite Muscovite schist | KAW 1134  | WR       | 140.8  | 82.4   | 4.961                           | .7393                               | --                                  |        |      |
|                          |           | Bi       | 717.6  | 3      | 743.1                           | 1.537                               | 76+ 3                               |        |      |
| Paragneiss               | KAW 1126  | WR       | 159.3  | 141.5  | 3.265                           | .7293                               | --                                  |        | 33   |
|                          |           | Mu       | 164.1  | 86.1   | 5.533                           | .7380                               | 271 +140                            |        |      |
|                          |           | Bi       | 399.2  | 4      | 300.5                           | 1.057                               | 78 + 3                              |        |      |
| Paragneiss               | KAW 1320  | WR       | 90.2   | 321.4  | 0.81                            | .7095                               | --                                  |        |      |
|                          |           | Bi       | 442    | 21.8   | 59.09                           | .7724                               | 76 + 13                             |        |      |
| Paragneiss               | AA73-66   | WR       |        | 148    | 2.83                            | .7298+ 6                            | 287 + 1                             |        | 8    |
|                          |           | Bi       | 523    | 3.6    | 418.83                          | 2.4279+30                           |                                     |        |      |
| Paragneiss               | AA73-67   | WR       | 96     | 218    | 1.28                            | .7161+ 4                            | 269+ + 2                            |        |      |
|                          |           | Bi       | 440    | 9.8    | 129.71                          | 1.2081+24                           |                                     |        |      |
| Paragneiss               | AA73-70   | WR       | 109    | 112    | 2.82                            | .7237+ 5                            | 21.9 4.3                            |        |      |
|                          |           | Bi       | 505    | 3.7    | 390.18                          | .8447+99                            |                                     |        |      |
| Paragneiss               | AA73-71   | WR       | 98     | 164    | 1.73                            | .7227+ 6                            | 19.9+ 8.6                           |        |      |
|                          |           | Bi       | 453    | 16.3   | 80.58                           | .7450+36                            |                                     |        |      |
| Gneissic micaschist      | AA73-77   | WR       | 171    | 107    | 4.63                            | .7436+22                            | 42.9+ 11.9                          |        |      |
|                          |           | Bi       | 752    | 34.4   | 63.61                           | .7795+30                            |                                     |        |      |
|                          |           | Mu       | 193    | 195    | 2.86                            | .7398+ 6                            |                                     |        |      |
| Paragneiss               | AA73-85   | Bi       | 757    | 6.8    | 331.51                          | 1.0047+30                           | 57.7+ 1.7                           |        |      |
|                          |           | WR       | 182    | 91     | 5.79                            | .7381+21                            |                                     |        |      |
|                          |           | Mu       | 323    | 25.4   | 37.28                           | .8315+38                            | 208 + 23                            |        |      |
| Paragneiss               | AA73-91   | Bi       | 611    | 12.3   | 152.21                          | 1.3244+40                           | 278 + 4                             |        |      |
|                          |           | WR       | 136    | 123    | 3.22                            | .7351+22                            | 313 + 69                            |        |      |
|                          |           | Mu       | 315    | 96     | 9.59                            | .7635+ 8                            |                                     |        |      |
| Paragneiss               | AA73-92   | WR       | 173    | 159    | 3.15                            | .7306+22                            | 293 + 3                             |        |      |
|                          |           | Bi       | 513    | 8      | 200.26                          | 1.5517+45                           |                                     |        |      |
| Paragneiss               | AA73-93   | WR       | 160    | 335    | 1.38                            | .7192+ 5                            | 298 + 1                             |        |      |
|                          |           | Bi       | 499    | 5.5    | 262.52                          | 1.8287+45                           |                                     |        |      |
| Paragneiss               | AA73-94   | WR       | 130    | 229    | 1.31                            | .7181+ 5                            | 289 + 2                             |        |      |
| Paragneiss               | AA73-94   | Bi       | 501    | 5.4    | 270.96                          | 1.8270+ 70                          |                                     |        | 8    |
| Paragneiss               | A773-95   | WR       | 120    | 192    | 1.81                            | .7202+ 4                            | 304 + 2                             |        |      |
|                          |           | Bi       | 452    | 2.9    | 454.37                          | 2.6785+135                          |                                     |        |      |
| Paragneiss               | AA74-1    | WR       | 145    | 131    | 3.18                            | .7308+ 8                            | 267 + 1                             |        |      |
|                          |           | Bi       | 573    | 2.1    | 800.59                          | 3.7665+145                          |                                     |        |      |
| Paragneiss               | AA74-2    | WR       | 107    | 179    | 1.72                            | .7189+ 2                            | 275 + 2                             |        |      |
|                          |           | Bi       | 404    | 9      | 129.51                          | 1.2190+ 24                          |                                     |        |      |
| Paragneiss               | AA74-7    | WR       | 124    | 149    | 2.40                            | .7298+ 3                            | 293 + 1                             |        |      |
|                          |           | Bi       | 606    | 4.4    | 400.06                          | 2.3896+ 10                          |                                     |        |      |
| Paragneiss               | AA74-8    | WR       | 81     | 175    | 1.34                            | .7229+ 6                            | 307 + 2                             |        |      |
|                          |           | Bi       | 513    | 15.1   | 103.95                          | 1.1713+ 9                           |                                     |        |      |
| Paragneiss               | AA74-13   | Bi       | 605    | 3.8    | 481.84                          | 1.1552+ 14                          | 61.4+ .3                            |        |      |
|                          |           | WR       | 177    | 123    | 4.18                            | .7388+ 2                            |                                     |        |      |
|                          |           | Mu       | 169    | 115    | 4.27                            | .7412+ 2                            |                                     |        |      |
| Paragneiss               | AA74-18   | WR       | 95     | 19     | 14.74                           | .7589+ 30                           | 199 + 7                             |        |      |
|                          |           | Bi       | 380    | 12.3   | 91.70                           | .9765+ 20                           |                                     |        |      |
| Paragneiss               | AA74-19   | WR       | 169    | 116    | 4.23                            | .7372+ 22                           | 203 + 2                             |        |      |
|                          |           | Bi       | 578    | 6.7    | 271.01                          | 1.5082+ 45                          |                                     |        |      |
| Paragneiss               | AA74-21   | Bi       | 590    | 4.6    | 368                             | .8766+ 20                           | 27.8+ 1.2                           |        |      |
|                          |           | WR       | 148    | 124    | 3.46                            | .7326+ 5                            | 95 +34                              |        |      |
|                          |           | Mu       | 304    | 124    | 7.10                            | .7375+ 4                            |                                     |        |      |
| Gneissic micaschist      | AA74-23   | WR       | 116    | 30     | 11.27                           | .7214+ 6                            | 49.9+ 1                             |        |      |
| Paragneiss               | AA74-26   | Bi       | 532    | 4.8    | 321.84                          | .9417+ 19                           |                                     |        |      |
|                          |           | WR       | 48     | 84     | 1.64                            | .7255+ 5                            | 48.4+ 1.8                           |        |      |
|                          |           | Bi       | 428    | 4.8    | 256.47                          | .9008+ 29                           |                                     |        |      |

TABLE 4 (continued)

Rb/Sr

| Rock type                          | Sample n. | Material (mesh) | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_{\text{m}}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_{\text{f}}$ | AGE Ma         | Ref. |
|------------------------------------|-----------|-----------------|--------|--------|---------------------------------|----------------------------------------------|----------------------------------------------|----------------|------|
| Paragneiss                         | AA74-27   | WR              | 196    | 204    | 2.78                            | .7297+ 3                                     |                                              | 297 $\pm$ 3    |      |
|                                    |           | Bi              | 735    | 5      | 427.72                          | 2.5251+208                                   |                                              |                |      |
| Paragneiss                         | AA74-29   | WR              | 124    | 212    | 1.69                            | .7263+ 6                                     |                                              | 180 $\pm$ 1    | 8    |
|                                    |           | Bi              | 625    | 5.2    | 347.29                          | 1.6120+50                                    |                                              |                |      |
| Paragneiss                         | AA74-30   | WR              | 191    | 317    | 1.74                            | .7303+ 2                                     |                                              | 144 $\pm$ 1    |      |
|                                    |           | Bi              | 727    | 7.3    | 287.52                          | 1.3134+40                                    |                                              |                |      |
| Hornblend-Garnet gneiss            | KAW 1794  | WR              | 82.4   | 218.24 | 1.092                           | .7169                                        |                                              | 24.3 $\pm$ 0.8 | 28   |
|                                    |           | Bi (100-200)    | 380.7  | 5.82   | 190.7                           | .7823                                        |                                              | 247 $\pm$ 50   |      |
|                                    |           | WM (80-100)     | 188.3  | 167.04 | 3.266                           | .7245                                        |                                              |                |      |
| Paragneiss                         | AA79-9    | WR              | 81     | 481    | .48                             | .7129+ 1                                     |                                              |                | 25   |
| Detztal                            |           | Bi              | 479    | 12.7   | 110.06                          | .7761+ 6                                     |                                              | 41 $\pm$ 1     |      |
| Gneissic micaschist                | AA80-1    | WR              | 113    | 257    | 1.28                            | .7192+ 1                                     |                                              |                |      |
|                                    |           | Bi              | 402    | 6      | 196.72                          | .9397+10                                     |                                              | 79 $\pm$ 1     |      |
|                                    |           | Mu              | 259    | 192    | 3.90                            | .7224+ 1                                     |                                              | 86 $\pm$ 6     |      |
| Gneissic micaschist                | AA80-2    | WR              | 103    | 122    | 2.44                            | .7302+ 2                                     |                                              |                |      |
|                                    |           | Bi              | 635    | 6.2    | 328.51                          | 1.8501+32                                    |                                              | 241 $\pm$ 4    |      |
|                                    |           | Mu              | 232    | 176    | 3.82                            | .7366+ 2                                     |                                              | 326 $\pm$ 23   |      |
| Gneissic micaschist                | AA80-3    | WR              | 120    | 321    | 1.08                            | .7185+ 2                                     |                                              |                |      |
|                                    |           | Bi              | 419    | 4.8    | 260.71                          | 1.0074+19                                    |                                              | 78 $\pm$ 1     |      |
|                                    |           | Mu              | 196    | 127    | 4.48                            | .7230+ 5                                     |                                              | 93 $\pm$ 12    |      |
| Gneissic micaschist                | AA80-4    | WR              | 125    | 79     | 4.61                            | .7464+ 1                                     |                                              |                |      |
|                                    |           | Bi              | 627    | 4.8    | 392.75                          | 1.1871+36                                    |                                              | 80 $\pm$ 1     |      |
|                                    |           | Mu              | 191    | 202    | 2.74                            | .7444+ 4                                     |                                              | 75 $\pm$ 18    |      |
| Gneissic micaschist                | AA80-6    | WR              | 68     | 374    | .53                             | .7174+ 1                                     |                                              |                |      |
|                                    |           | Bi              | 387    | 3.1    | 375.71                          | 1.1420+49                                    |                                              | 80 $\pm$ 2     |      |
| Gneiss                             | AA80-8    | WR              | 140    | 267    | 1.52                            | .7160+ 4                                     |                                              |                |      |
|                                    |           | Bi              | 619    | 2.7    | 803.37                          | 3.0842+89                                    |                                              | 208 $\pm$ 3    |      |
| Gneiss                             | AA80-9    | WR              | 134    | 186    | 2.09                            | .7189+ 4                                     |                                              |                |      |
|                                    |           | Bi              | 670    | 3.5    | 647.96                          | 2.4588+15                                    |                                              | 189 $\pm$ 3    |      |
| Micaschist                         | AA80-16   | WR              | 179    | 118    | 4.40                            | .7441+ 3                                     |                                              |                | 25   |
|                                    |           | Bi              | 740    | 3      | 782.33                          | 1.6359+54                                    |                                              | 81 $\pm$ 1     |      |
|                                    |           | Mu              | 226    | 203    | 3.23                            | .7429+ 4                                     |                                              | 72 $\pm$ 33    |      |
| Micaschist                         | AA80-17   | WR              | 152    | 112    | 3.94                            | .7394+ 3                                     |                                              |                |      |
|                                    |           | Bi              | 616    | 2.9    | 652.88                          | 1.4851+40                                    |                                              | 81 $\pm$ 1     |      |
|                                    |           | Mu              | 277    | 252    | 2.61                            | .7381+ 6                                     |                                              | 69 $\pm$ 35    |      |
| Paragneiss                         | AA80-20   | WR              | 152    | 228    | 1.93                            | .7227+ 9                                     |                                              |                |      |
|                                    |           | Bi              | 477    | 6.5    | 218.91                          | 1.0421+ 5                                    |                                              | 104 $\pm$ 2    |      |
| Micaschist                         | AA80-28   | WR              | 120    | 215    | 1.62                            | .7206+ 2                                     |                                              |                |      |
|                                    |           | Bi              | 430    | 4.3    | 303.76                          | 1.1702+41                                    |                                              | 105 $\pm$ 2    |      |
|                                    |           | Mu              | 159    | 208    | 2.21                            | .7232+10                                     |                                              | 310 $\pm$ 125  |      |
| Gneissic micaschist                | AA80-30   | WR              | 146    | 284    | 1.49                            | .7194+ 3                                     |                                              |                |      |
|                                    |           | Bi              | 503    | 4.7    | 318.68                          | 1.0927+25                                    |                                              | 83 $\pm$ 1     |      |
|                                    |           | Mu              | 220    | 228    | 2.80                            | .7245+ 2                                     |                                              | 274 $\pm$ 22   |      |
| Paragneiss                         | AA80-34   | WR              | 42     | 162    | .75                             | .7168+ 1                                     |                                              |                |      |
|                                    |           | Bi              | 363    | 12.9   | 82.41                           | .8122+ 8                                     |                                              | 82 $\pm$ 1     |      |
| Paragneiss                         | AA73-70   | WR              | 109    | 112    | 2.82                            | .7237+ 5                                     |                                              |                |      |
|                                    |           | Mu              | 236    | 248    | 2.76                            | .7251+ 4                                     |                                              |                |      |
| Paragneiss                         | AA73-95   | WR              | 120    | 192    | 1.81                            | .7202+ 4                                     |                                              | 394 $\pm$ 174  |      |
|                                    |           | Mu              | 174    | 198    | 2.54                            | .7243+18                                     |                                              |                |      |
| Paragneiss                         | AA74-8    | WR              | 81     | 17.5   | 1.34                            | .7229+ 6                                     |                                              | 321 $\pm$ 8    |      |
|                                    |           | Mu              | 303    | 94.7   | 9.32                            | .7594+ 3                                     |                                              |                |      |
| Paragneiss                         | AA74-12   | WR              | 138    | 214    | 1.87                            | .7255+ 2                                     |                                              | 218 $\pm$ 81   |      |
|                                    |           | Mu              | 195    | 262    | 2.16                            | .7264+ 2                                     |                                              |                |      |
| Paragneiss                         | AA74-27   | WR              | 196    | 204    | 2.78                            | .7297+ 3                                     |                                              | 325.5 $\pm$ 15 |      |
|                                    |           | Mu              | 288    | 156    | 5.37                            | .7417+ 2                                     |                                              |                |      |
| Micaschist                         | AA78-19   | WR              | 160    | 107    | 4.34                            | .7449+2                                      |                                              | 112 $\pm$ 8    | 25   |
|                                    |           | Mu              | 328    | 122    | 7.8                             | .7504+3                                      |                                              |                |      |
| Micaschist                         | AA78-27   | WR              | 126    | 203    | 1.8                             | .7220+3                                      |                                              | 90.8 $\pm$ 78  |      |
|                                    |           | Mu              | 265    | 363    | 2.11                            | .7224+2                                      |                                              |                |      |
| Paragneiss                         | AA78-32   | WR              | 92.4   | 187    | 1.43                            | .7221+5                                      |                                              | 50 $\pm$ 36    |      |
|                                    |           | Mu              | 240    | 214    | 3.26                            | .7234+8                                      |                                              |                |      |
| Micaschist                         | AA78-37   | WR              | 183    | 116    | 4.57                            | .7432+3                                      |                                              | 136 $\pm$ 17   |      |
|                                    |           | Mu              | 188    | 201    | 2.71                            | .7396+2                                      |                                              |                |      |
| Calcareous biotite phengite schist | T 749     | WR              | 566.1  | 30.43  | 54.67                           | .7822                                        |                                              | 92.7 $\pm$ 19  | 35   |

TABLE 5  
Rb/Sr analytical data - PENNIDES

| Rock type                     | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma     | Ref. |
|-------------------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|------------|------|
| <u>S.W. Tauern Window</u>     |           |          |        |        |                                 |                                     |                                     |            |      |
| Tonalitic granite             | 76        | WR       | 84.8   | 270    | .91                             | .7099+32                            |                                     |            | 2    |
| Tonalitic granite             | 77        | WR       | 219    | 293    | 2.2                             | .7073+24                            |                                     |            |      |
|                               | 84        | WR       | 66.8   | 338.2  | .572                            | .7117+19                            |                                     |            |      |
| Augengneisses                 | 86        | WR       | 134.3  | 154    | 2.522                           | .7184+19                            |                                     |            |      |
|                               | 87        | WR       | 147.7  | 199.7  | 2.138                           | .7141+14                            |                                     |            |      |
|                               | 80        | WR       | 225.4  | 41.9   | 15.57                           | .7789+23                            |                                     |            |      |
| Aplitic granites              | 80a       | WR       | 222.9  | 42.1   | 15.31                           | .7808+23                            |                                     |            |      |
|                               | 81        | WR       | 61.8   | 56.8   | 3.15                            | .7304+14                            | .7170+15                            | 292 ± 6    |      |
|                               | 85        | WR       | 282.3  | 23     | 35.46                           | .8650+16                            |                                     |            |      |
| Tonalitic granite             | 76        | Bi       | 432    | 8.3    | 150.8                           | .7772+38                            | .7095                               | 31.6 ± .9  |      |
| Tonalitic granite             | 77        | Bi       | 425    | 8.7    | 143                             | .7814+72                            | .7061                               | 37.1 ± 3.7 |      |
| Tonalitic granite             | 78        | Bi       | 650    | 7.8    | 243.5                           | .7997+56                            |                                     | 26.7 ± 1.8 |      |
| Tonalitic granite             | 79        | Bi       | 39     | 7.4    | 153                             | .7694+50                            |                                     | 28 ± 2.8   |      |
| Tonalitic granite             | 82        | Bi       | 542    | 6      | 262.3                           | .8016+56                            |                                     | 25.1 ± 1.6 |      |
| Tonalitic granite             | 83        | Bi       | 418    | 20.6   | 58.9                            | .7371+37                            |                                     | 35.1 ± 5.1 |      |
| Augengneiss                   | 84        | Bi       | 563    | 13.6   | 120.6                           | .7438+48                            | .7115                               | 18.8 ± 3   |      |
| Augengneiss                   | 86        | Bi       | 860    | 17.6   | 142.5                           | .7611+33                            | .7176                               | 21.4 ± 1.9 |      |
| Augengneiss                   | 87        | Bi       | 779    | 19.3   | 117.3                           | .7506+34                            | .7134                               | 22.3 ± 2.3 |      |
| Aplitic granite               | 80        | Bi       | 1672   | 7.8    | 637.3                           | .9466+59                            | .7747                               | 19 ± .7    |      |
| Aplitic granite               | 80a       | Bi       | 1663   | 7      | 707.3                           | .9622+90                            | .7768                               | 18.4 ± .9  |      |
| Aplitic granite               | 85        | Bi       | 1622   | 13.3   | 363.8                           | .9946+54                            | .8510                               | 27.8 ± 1.2 |      |
| Porphyritic granite gneiss    | KAW 111   | WR       | 157.2  | 147.15 | 3.113                           | .7198                               |                                     |            | 31   |
| Biotite muscovite augengneiss | KAW 110   | WR       | 266.4  | 57.87  | 13.47                           | .7575                               |                                     |            |      |
|                               |           | WR       |        | 57.77  |                                 |                                     | .7086                               | 255        |      |
| Phengite gneiss               | KAW 113   | WR       | 108.8  | 153.11 | 2.066                           | .7162                               |                                     |            |      |
| Biotite phengite gneiss       | KAW 114   | WR       | 71.4   | --     | .753                            | .7106                               |                                     |            |      |
| Porphyritic granite gneiss    | KAW 111   | Bi       | 851.5  | 3.82   | 662.9                           | .9318                               |                                     | 22.7 ± 1.7 | 31   |
|                               |           | Bi       | 844.4  | 3.75   | 669.5                           | .9358                               |                                     | 22.9 ± 1.7 |      |
| Biotite muscovite augengneiss | KAW 110   | Bi       | 1374.4 | 3.04   | 1377                            | 1.1116                              |                                     | 18.3 ± .9  |      |
|                               |           | Bi       |        | 2.99   |                                 |                                     |                                     |            |      |
| Phengite gneiss               | KAW 113   | Bi       | 692.5  | 3.44   | 596.7                           | .8808                               |                                     | 19.5 ± 1.9 |      |
|                               |           | Bi       | 688.9  | 3.52   | 579.2                           | .8771                               |                                     | 19.7 ± 1.9 |      |
|                               |           | Ph       | 455.8  | 8.30   | 160.8                           | .7734                               |                                     | 25.4 ± 5.5 |      |
| Biotite phengite gneiss       | KAW 114   | Bi       | 515.8  | 3.25   | 467.7                           | .8378                               |                                     | 19.2 ± 2.3 |      |
|                               |           | Ph       | 309.8  | 20.24  | 44.71                           | .7294                               |                                     | 30 ± 19.7  |      |
|                               |           | Ph       | 311.3  | 20.34  | 44.68                           | .7292                               |                                     | 30 ± 17.6  |      |
| <u>S.E. Tauern Window</u>     |           |          |        |        |                                 |                                     |                                     |            |      |
|                               | 6702      | WR       | 186.6  | 6.28   | 88.6                            | 1.0220+ 1                           |                                     |            | 16   |
|                               | 6701      | WR       | 163.8  | 5.74   | 85                              | 1.0080+ 2                           |                                     |            |      |
|                               | 6703      | WR       | 173.1  | 6.86   | 75.1                            | .9922+14                            |                                     |            |      |
|                               |           | WR       | --     | --     | --                              | .9932+ 9                            |                                     |            |      |
|                               |           | WR       | 168.7  | 6.91   | 72.6                            | .9883+18                            |                                     |            |      |
|                               | 6712      | WR       | --     | --     | --                              | .8466+ 2                            | .7141+33                            | 253 ± 6    |      |
|                               |           | WR       | 144.5  | 11     | 38.4                            | .8497+16                            |                                     |            |      |
|                               |           | WR       | --     | --     | --                              | .8467+17                            |                                     |            |      |
|                               |           | WR       | 139.2  | --     | 37.6                            | --                                  |                                     |            |      |
|                               | 6707      | WR       | 125.7  | 15.08  | 24.3                            | .8053+16                            |                                     |            |      |
|                               | 6706      | WR       | 159.2  | 29.08  | 15.9                            | .7700+19                            |                                     |            |      |
| Coarse leucogranites          |           | WR       | --     | --     | --                              | .7697+ 9                            |                                     |            |      |
|                               | 6713      | WR       | 129.8  | 43     | 8.60                            | .7406+14                            |                                     |            |      |
|                               |           | WR       | --     | --     | --                              | .7402+ 9                            |                                     |            |      |
|                               | 6709      | WR       | 152.5  | 67.93  | 6.52                            | .7316+14                            |                                     |            |      |
|                               |           | WR       | --     | --     | --                              | .7320+ 7                            |                                     |            |      |
|                               | 6711      | WR       | 125.4  | 64.78  | 5.61                            | .7280+14                            |                                     |            |      |
|                               | 6711      | WR       | --     | --     | --                              | .7295+10                            |                                     |            | 16   |
|                               |           | WR       | 115.3  | --     | --                              | .7275+ 7                            |                                     |            |      |
|                               |           | WR       | 120.5  | --     | --                              | --                                  |                                     |            |      |
|                               | 6708 L4   | WR       | --     | --     | --                              | --                                  |                                     |            |      |
|                               | 6708 L1   | WR       | 185    | 163.88 | 3.28                            | .7230+16                            |                                     |            |      |
|                               |           | WR       | --     | --     | --                              | .7209+ 7                            |                                     |            |      |

TABLE 5 (continued)

Rb/Sr

| Rock type                                 | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma         | Ref. |
|-------------------------------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|----------------|------|
| Fine grained leucocratic granite-gneisses | A 310     | WR       | 270.5  | 102.54 | 7.67                            | .7344+36                            |                                     |                |      |
|                                           | A 312     | WR       | 246.5  | 105.14 | 6.77                            | .7271+36                            |                                     |                |      |
|                                           | A 341     | WR       | 211.2  | 162.04 | 3.77                            | .7190+36                            |                                     | 215 $\pm$ 64   |      |
|                                           | A 337     | WR       | 143.2  | 539.15 | .75                             | .7116+35                            |                                     |                |      |
| Fine leucogranites                        | A 414     | WR       | 4.9    | 321.12 | .04                             | .7097+10                            |                                     |                |      |
|                                           | A 417     | WR       | 213    | 197.27 | 3.2                             | .7169+10                            |                                     |                |      |
| Pegmatite                                 | A 379     | Mu       | 1832   | .89    | 5932                            | 21.5                                |                                     | 213 $\pm$ 16   |      |
| Leucogranite                              | C 6712    | Mu       | 542    | 5.07   | 310                             | .8932                               |                                     | 15.6 $\pm$ 2.1 |      |
|                                           |           | Al1      | --     | --     | --                              | .8244                               |                                     |                |      |
|                                           |           | WR       | 142    | 10.8   | 38                              | .8474                               |                                     |                |      |
| Leucogranite                              | C 6711    | Mu       | 393    | 17.9   | 63.5                            | .7447                               |                                     | 18 $\pm$ 4     |      |
|                                           |           | Bi       | 644    | 14     | 132.7                           | .7564                               |                                     | 14 $\pm$ 3     |      |
|                                           |           | Pl       | 17.7   | 55.9   | .9                              | .7250                               |                                     |                |      |
|                                           |           | WR       | 120    | 64.6   | 5.61                            | .7284                               |                                     |                |      |
| Tonalite                                  | C 6710    | Bi       | 418    | 37.2   | 32.5                            | .7169                               |                                     |                |      |
|                                           |           | Ap       | .7     | 739    | .002                            | .7105                               |                                     | 15 $\pm$ 3.7   |      |
|                                           |           | Pl       | 17.7   | 55.9   | .15                             | .7086                               |                                     |                |      |
| Tonalite                                  | C 6716    | Bi       | 339    | 62.3   | 15.8                            | .7125                               |                                     |                |      |
|                                           |           | Ap       | --     | 143    | --                              | .7094                               |                                     | 16.5 $\pm$ 8   |      |
|                                           |           | Ep       | 3.9    | 2201   | .005                            | .7074                               |                                     |                |      |
|                                           |           | Pl       | 11     | 323    | .1                              | .7096                               |                                     |                |      |
| <u>W Tauern Window</u>                    |           |          |        |        |                                 |                                     |                                     |                |      |
| Porphyroblastic gneiss                    | KAW 913   | WR       | 202.7  | 198.2  | 2.962                           | .7218                               |                                     |                | 33   |
|                                           |           | Ph       | 556.5  | 56.1   | 28.74                           | .7274                               |                                     | 27 $\pm$ 16    |      |
|                                           |           | Bi       | 1008   | 17.1   | 171.6                           | .7556                               |                                     | 14 $\pm$ 4     |      |
| Micaceous gneiss                          | KAW 878   | WR       | 135.6  | 104.3  | 3.765                           | .7198                               |                                     | --             |      |
|                                           |           | Bi       | 1027.1 | 4.2    | 709.7                           | .8511                               |                                     | 13 $\pm$ 1     |      |
| Spotted granite                           | KAW 817   | WR       | 132.1  | 275.2  | 1.386                           | .7122                               |                                     | --             |      |
|                                           |           | Ph       | 516.9  | 27.7   | 54.50                           | .7517                               |                                     | 53 $\pm$ 14    |      |
|                                           |           | Bi       | 1014   | 6.2    | 475.7                           | .7391                               |                                     | 4 $\pm$ 2      |      |
| Phengite arcose gneiss                    | KAW 974   | WR       | 199.5  | 805.1  | .7177                           | .7144                               |                                     | --             |      |
|                                           |           | Ph       | 646.5  | 86.4   | 21.67                           | .7214                               |                                     | 24 $\pm$ 35    |      |
|                                           |           | Bi       | 781.5  | 47.3   | 47.90                           | .7226                               |                                     | 12 $\pm$ 16    |      |
| Meta-tonalite                             | KAW 1131  | WR       | 106.1  | 282.3  | 1.088                           | .7113                               |                                     | --             |      |
|                                           |           | Bi       | 466.4  | 18.3   | 73.99                           | .7280                               |                                     | 14 $\pm$ 10    |      |
| Meta-tonalite                             | KAW 1314  | WR       | 68.1   | 360.4  | .5593                           | .7084                               |                                     | --             |      |
|                                           |           | Bi       | 405.2  | 16.5   | 71.12                           | .7233                               |                                     | 14 $\pm$ 10    |      |
| Granitic gneiss                           | KAW 422   | WR       | 132.5  | 579.2  | .6612                           | .7083                               |                                     | --             |      |
|                                           |           | Bi       | 886.4  | 26.9   | 95.52                           | .7269                               |                                     | 13 $\pm$ 7     |      |
| Biotite schist                            | KAW 1142  | WR       | 161.2  | 217.6  | 2.145                           | .7131                               |                                     | --             |      |
|                                           |           | Bi       | 556.5  | 12.3   | 131                             | .7385                               |                                     | 13 $\pm$ 6     |      |
| Qz-biotite schist                         | KAW 1139  | WR       | 164.1  | 48.6   | 9.782                           | .7128                               |                                     | --             |      |
|                                           |           | Ph       | 302.8  | 21.6   | 40.69                           | .7273                               |                                     | 33 $\pm$ 19    |      |
|                                           |           | Bi       | 429.3  | 2.9    | 433.1                           | .7868                               |                                     | 12 $\pm$ 2     |      |
| Calc-micaschist                           | KAW 1128  | WR       | 77.6   | 168.7  | 1.331                           | .7120                               |                                     | --             |      |
|                                           |           | Ph       | 347.8  | 3.1    | 327.5                           | .8067                               |                                     | 21 $\pm$ 2     |      |
| Calc-micaschist                           | KAW 1147  | Bi       | 604.2  | 1.4    | 1247                            | .9638                               |                                     | 14 $\pm$ 1     |      |
|                                           |           | WR       | 103.3  | 188.8  | 1.535                           | .7129                               |                                     | --             |      |
|                                           |           | Bi       | 619.3  | 11.8   | 152.6                           | .7454                               |                                     | 16 $\pm$ 5     |      |
| Granitic gneisses                         | KAW 1179  | WR       | 144    | 27.1   | 15.46                           | .7656                               |                                     |                | 33   |
|                                           | KAW 816   | WR       | 122.1  | 64.8   | 5.50                            | .7329                               |                                     |                |      |
|                                           |           | WR       | --     | --     | 5.50                            | .7315                               |                                     |                |      |
|                                           | KAW 818   | WR       | 157.2  | 32.5   | 14.15                           | .7617                               |                                     |                |      |
|                                           |           | WR       | --     | --     | 14.15                           | .7618                               |                                     |                |      |
|                                           | KAW 1178  | WR       | 171.7  | 25.3   | 19.74                           | .7818                               |                                     |                |      |
|                                           | KAW 856   | WR       | 110.6  | 48.9   | 6.59                            | .7383                               | .7143 $\pm$ 23                      | 244 $\pm$ 27   |      |
|                                           |           | WR       | --     | --     | 6.59                            | .7406                               |                                     |                |      |
|                                           | KAW 1176  | WR       | 138.6  | 40.1   | 10.04                           | .7508                               |                                     |                |      |
|                                           | KAW 811   | WR       | 163.9  | 24.4   | 19.70                           | .7867                               |                                     |                |      |
|                                           |           | WR       | --     | --     | 19.70                           | .7845                               |                                     |                |      |
|                                           | KAW 824   | WR       | 173.6  | 30.3   | 16.78                           | .7728                               |                                     |                |      |
|                                           |           | WR       | --     | --     | 16.78                           | .7715                               |                                     |                |      |

TABLE 5 (continued)

Rb/Sr

| Rock type            | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_{\text{m}}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_{\text{f}}$ | AGE Ma         | Ref. |
|----------------------|-----------|----------|--------|--------|---------------------------------|----------------------------------------------|----------------------------------------------|----------------|------|
| Granitic gneiss      | KAW 1179  | WR       | 144    | 27.1   | 15.46                           | .7656                                        |                                              | 244 $\pm$ 27   |      |
|                      |           | Ph       | 540.2  | 3      | 536.9                           | .9352                                        |                                              | 23 $\pm$ 1.7   |      |
|                      |           | Bi       | 573.8  | 1.3    | 1280                            | .9754                                        |                                              | 11 $\pm$ .7    |      |
| Granitic gneiss      | KAW 816   | WR       | 122.1  | 64.8   | 5.50                            | .7329                                        |                                              | 244 $\pm$ 27   |      |
|                      |           | WR       | --     | --     | 5.50                            | .7315                                        |                                              | --             |      |
|                      |           | Ph       | 520.4  | 20.6   | 73.64                           | .7872                                        |                                              | 56 $\pm$ 11    |      |
| Granitic gneiss      | KAW 818   | WR       | 157.2  | 32.5   | 14.15                           | .7617                                        |                                              | 244 $\pm$ 27   |      |
|                      |           | WR       | --     | --     | 14.15                           | .7618                                        |                                              | --             |      |
|                      |           | Ph       | 682.6  | 3.8    | 532.4                           | .9071                                        |                                              | 20 $\pm$ 1.7   |      |
|                      |           | Bi       | 902.7  | 5.4    | 492.5                           | .8141                                        |                                              | 7 $\pm$ 1.7    |      |
| Granitic gneiss      | KAW 1178  | WR       | 171.7  | 25.3   | 19.74                           | .7818                                        |                                              | 244 $\pm$ 27   |      |
|                      |           | Ph       | 703.8  | 3.4    | 625.4                           | 1.037                                        |                                              | 30 $\pm$ 1.6   |      |
|                      |           | Bi       | 355.4  | 5.9    | 176.2                           | .8079                                        |                                              | 11 $\pm$ 4.8   |      |
| Granitic gneiss      | KAW 856   | WR       | 110.6  | 48.9   | 6.59                            | .7383                                        |                                              | 244 $\pm$ 27   |      |
| Granitic gneiss      | KAW 856   | WR       | --     | --     | 6.59                            | .7406                                        |                                              | --             | 33   |
|                      |           | Ph       | 659.6  | 8.3    | 234.6                           | .8138                                        |                                              | 24 $\pm$ 3     |      |
|                      |           | Bi       | 820.4  | 2.6    | 961.2                           | .9018                                        |                                              | 12 $\pm$ 1     |      |
| Granitic gneiss      | KAW 1176  | WR       | 138.6  | 40.1   | 10.04                           | .7508                                        |                                              | 244 $\pm$ 27   |      |
|                      |           | Ph       | 608.4  | 6.4    | 275.9                           | .8183                                        |                                              | 18 $\pm$ 3     |      |
|                      |           | Bi       | 884.7  | 3.3    | 800.6                           | .8769                                        |                                              | 11 $\pm$ 1     |      |
| Granitic gneiss      | KAW 811   | WR       | 163.9  | 24.4   | 19.7                            | .7867                                        |                                              | 244 $\pm$ 27   |      |
|                      |           | WR       | --     | --     | 19.7                            | .7845                                        |                                              | --             |      |
|                      |           | Ph       | 735.9  | 3.4    | 644.2                           | .9443                                        |                                              | 18 $\pm$ 1.4   |      |
|                      |           | Bi       | 1109.7 | 7.4    | 442.4                           | .8128                                        |                                              | 4 $\pm$ 1.9    |      |
|                      |           | Bi       | 1155.3 | --     | 454.5                           | .8171                                        |                                              | 4              |      |
|                      |           | Ch       | 135.7  | 5.4    | 73.26                           | .7645                                        |                                              | -29 $\pm$ 10   |      |
|                      |           | Ch       | 17.7   | --     | 9.93                            | .7589                                        |                                              | 59             |      |
|                      |           | P1       | 21.8   | 12.9   | 4.94                            | .7810                                        |                                              | 27 $\pm$ 41    |      |
|                      |           | KF       | 455.4  | 53.8   | 24.67                           | .7863                                        |                                              | -6 $\pm$ 41    |      |
|                      |           | Gr       | 15.3   | 18.1   | 2.46                            | .7744                                        |                                              | 50 $\pm$ 41    |      |
| Granitic gneiss      | KAW 824   | WR       | 173.6  | 30.3   | 16.78                           | .7728                                        |                                              | 244 $\pm$ 27   |      |
|                      |           | WR       | --     | --     | 16.78                           | .7715                                        |                                              | --             |      |
|                      |           | Ph       | 714.4  | 4.6    | 488.6                           | 1.036                                        |                                              | 39 $\pm$ 2     |      |
|                      |           | Bi       | 904.8  | 23.1   | 113.9                           | .7487                                        |                                              | -18 $\pm$ 7    |      |
| Pegmatite            | KAW 827   | WR       | 142.7  | 175.6  | 2.36                            | .7189                                        |                                              | --             |      |
|                      |           | Mu       | 1532.6 | 9.4    | 575.7                           | 2.950                                        |                                              | 273 $\pm$ 4    |      |
| E Tauern Window      |           | Ph       | 714.4  | 14     | 150.3                           | .9077                                        |                                              | 90 $\pm$ 6     |      |
|                      | FT 1      | WR       | 271    | 61     | 12.88                           | .7646                                        | .7058 $\pm$ 50                               | 325 $\pm$ 33   | 17   |
|                      | FT 2      | WR       | 281    | 64     | 12.71                           | .7642                                        |                                              |                |      |
|                      | FT 2      | WR       | 279    | 64     | 12.70                           | .7632                                        |                                              |                |      |
|                      | FT 6      | WR       | 265    | 69     | 11.14                           | .7579                                        |                                              |                |      |
| Granitic gneisses    | FT 7      | WR       | 249    | 94     | 7.65                            | .7405                                        | .7188 $\pm$ 25                               | 227 $\pm$ 26   | 17   |
|                      | FT 8      | WR       | 247    | 83     | 8.63                            | .7456                                        |                                              |                |      |
|                      | FT 5      | WR       | 251    | 70     | 10.47                           | .7581                                        |                                              |                |      |
|                      | FT 3      | WR       | 253    | 70     | 10.47                           | .7524                                        |                                              |                |      |
|                      | FT 4      | WR       | 229    | 87     | 7.64                            | .7438                                        |                                              |                |      |
|                      | FT 9      | WR       | 218    | 141    | 4.50                            | .7328                                        |                                              |                |      |
| S-W Tauern Window    |           | WR       | 216    | 139    | 4.51                            | .7338                                        |                                              |                |      |
| Granitic orthogneiss | AT 1      | WR       | 144    | 205    | 2.03                            | .7126 $\pm$ 11                               |                                              | 16.8 $\pm$ .8  | 10   |
|                      |           | Bi       | 880    | 5.5    | 462.34                          | .8225 $\pm$ 21                               |                                              |                |      |
| Granitic orthogneiss | AT 2      | WR       | 105    | 232    | 1.31                            | .7117 $\pm$ 7                                |                                              | 14.8 $\pm$ 1.2 |      |
|                      |           | Bi       | 591    | 7.4    | 230.06                          | .7597 $\pm$ 14                               |                                              |                |      |
| Granitic orthogneiss | AT 4      | WR       | 108    | 274    | 1.15                            | .7128 $\pm$ 4                                |                                              | 16.3 $\pm$ .3  |      |
|                      |           | Bi       | 494    | 1.3    | 1139.07                         | .9753 $\pm$ 21                               |                                              |                |      |
| Granitic orthogneiss | AT 5      | WR       | 80     | 223    | 1.04                            | .7108 $\pm$ 7                                |                                              | 16.9 $\pm$ .3  |      |
|                      |           | Bi       | 629    | 3.3    | 553.20                          | .8435 $\pm$ 12                               |                                              |                |      |
| Granitic orthogneiss | AT 6      | WR       | 137    | 143    | 2.77                            | .7192 $\pm$ 8                                |                                              | 15 $\pm$ .8    |      |
|                      |           | Bi       | 976    | 3      | 951.95                          | .9219 $\pm$ 49                               |                                              |                |      |
| Granitic orthogneiss | AT 9      | WR       | 115    | 246    | 1.35                            | .7124 $\pm$ 5                                |                                              | 16.3 $\pm$ .4  |      |
|                      |           | Bi       | 535    | 1.4    | 1077.86                         | .9612 $\pm$ 30                               |                                              |                |      |

TABLE 5 (continued)

Rb/Sr

| Rock type                          | Sample n. | Material | Rb ppm | Sr ppm | $^{87}\text{Rb}/^{86}\text{Sr}$ | $(^{87}\text{Sr}/^{86}\text{Sr})_m$ | $(^{87}\text{Sr}/^{86}\text{Sr})_i$ | AGE Ma         | Ref. |
|------------------------------------|-----------|----------|--------|--------|---------------------------------|-------------------------------------|-------------------------------------|----------------|------|
| Granitic orthogneiss               | AT 10     | WR       | 135    | 262    | 1.48                            | .7119 $\pm$ 7                       |                                     | 17.2 $\pm$ 2.0 |      |
|                                    |           | Bi       | 593    | 3.5    | 488.12                          | .8310 $\pm$ 56                      |                                     |                |      |
| Calcschist                         | AA73-48   | WR       | 40     | 239    | .48                             | .7095 $\pm$ 5                       |                                     | 13 $\pm$ 4.3   |      |
|                                    |           | Bi       | 704    | 15.5   | 131.71                          | .7338 $\pm$ 29                      |                                     |                |      |
| S-E Tauern Window<br>Banded gneiss | MS 3520   | Wm       | 539    | 54     | 29                              | .79498                              |                                     | 214 $\pm$ 8    | 18   |
|                                    |           | Bi       | 892    | 28.5   | 90                              | .72978                              |                                     |                |      |
| Banded gneiss                      | MS 4000   | Feld     | 66     | 812    | .24                             | .70737                              |                                     | 226 $\pm$ 8    |      |
|                                    |           | Wm       | 340    | 53.8   | 18.4                            | .76756                              |                                     |                |      |
|                                    |           | Bi       | 643    | 21.9   | 84.4                            | .72077                              |                                     |                |      |
|                                    |           | Feld     | 60     | 548    | .32                             | .70962                              |                                     | 16 $\pm$ .3    |      |

## TABLE REFERENCES

- 1 - BARBIERI et al., 1978
- 2 - BESANG et al., 1968
- 3 - BORSI & FERRARA, 1967
- 4 - BORSI et al., 1966
- 5 - BORSI et al., 1968
- 6 - BORSI et al., 1969
- 7 - BORSI et al., 1972
- 8 - BORSI et al., 1973
- 9 - BORSI et al., 1974
- 10 - BORSI et al., 1978 a
- 11 - BORSI et al., 1978 b
- 12 - BORSI et al., 1979
- 13 - BORSI et al., 1980 a
- 14 - BORSI et al., 1980 b
- 15 - CAVAZZINI, 1983
- 16 - CLIFF, 1971
- 17 - CLIFF, 1977
- 18 - CLIFF, 1981
- 19 - CLIFF & COHEN, 1980
- 20 - CLIFF & OXBURGH, 1971
- 21 - CLIFF & REX, 1976
- 22 - D'AMICO et al., 1980
- 23 - DEL MORO & VISONÀ, 1982
- 24 - DEL MORO et al., 1980
- 25 - DEL MORO et al., 1982
- 26 - DEL MORO et al., 1984
- 27 - FERRARA et al., 1962
- 28 - HAMMERSCHMIDT, 1981
- 29 - HARRE et al., 1968
- 30 - JÄGER & METZ, 1971
- 31 - JÄGER et al., 1969
- 32 - MILLER et al., 1967
- 33 - SATIR, 1975
- 34 - SCHMIDT et al., 1967
- 35 - THÖNI, 1983

## REFERENCES

- BARBIERI M., TURI B., DE PIERI R., DE VECCHI G., PICCIRILLO E.M., GREGNANIN A. (1978) - Oxygen and strontium isotope variations in the igneous rocks from Euganean Hills, Venetian Tertiary Province, Northern Italy. In: ROBINSON B.W. (comp. and ed.) (1978) - *Stable isotopes in the Earth Sciences*. DSIR Bulletin, 220, 130-148.
- BELLIENI G., SASSI F.P. (1981) - New chemical data and a review on the South-Alpine «Pre-Hercynian Rhyolitic Plateau» in the Eastern Alps. In: KARAMATA S. & SASSI F.P. (Eds.), IGCP No. 5 Newsletter, 3, 22-27.
- BESANG C., HARRE W., KARL F., KREUZER H., LENZ H., MÜLLER P., WENDT I. (1968) - Radiometrische Altersbestimmungen (Rb/Sr und K/Ar) an Gesteinen des Venediger-Gebietes (Hohe Tauern, Österreich). Geol. Jb., 86, 835-844.
- BORSI S., FERRARA G. (1967) - Determinazione dell'età delle rocce intrusive di Predazzo con i metodi del Rb/Sr e K/Ar. Min. Petr. Acta, 13, 45-65.
- BORSI S., FERRARA G., TONGIORGI E. (1966) - Rb/Sr and K/Ar ages of intrusive rocks of Adamello and Sabion (Trentino, Italy). Earth Planet. Sci. Lett., 1, 54-57.

- BORSI S., FERRARA G., PAGANELLI L., SIMBOLI G. (1968) - Isotopic age measurement of the M. Monzoni intrusive complex. *Miner. Petrogr. Acta*, 14, 171-183.
- BORSI S., FERRARA G., PICCOLI G. (1969) - Determinazione col metodo K/Ar dell'età delle eruzioni euganee. *Rend. Soc. It. Min. Petr.*, 25, 3-10.
- BORSI S., DEL MORO A., FERRARA G. (1972) - Età radiometriche delle rocce intrusive del massiccio di Bressanone-Ivigna-Monte Croce (Alto Adige). *Boll. Soc. Geol. Ital.*, 91, 387-406.
- BORSI S., DEL MORO A., SASSI F.P., ZIRPOLI G. (1973) - Metamorphic evolution of the Austroalpine rocks to the south of the Tauern Window (Eastern Alps): radiometric and geopetrological data. *Mem. Soc. Geol. Ital.*, 12, 549-571.
- BORSI S., D'AMICO C., DEL MORO A. (1974) - Studio radiometrico delle rocce intrusive del massiccio di Cima d'Asta (Trentino). *Mem. Soc. Geol. Ital.*, 13, 145-159.
- BORSI S., DEL MORO A., SASSI F.P., ZANFERRARI A., ZIRPOLI G. (1975) - Evento « Caledoniano » nelle Alpi. Risposta ad un intervento critico. *Boll. Soc. Geol. Ital.*, 94, 275-280.
- BORSI S., DEL MORO A., SASSI F.P., ZANFERRARI G., ZIRPOLI G. (1978 a) - New geopetrological and radiometric data on the Alpine history of the Austroalpine continental margin South of the Tauern Window (Eastern Alps). *Mem. Sci. Geol. Univ. Padova*, 32, 1-20.
- BORSI S., DEL MORO A., SASSI F.P., ZIRPOLI G. (1978 b) - On the age of the periadriatic Rensen massif (Eastern Alps). *N. Jb. Geol. Paläont. Mh.*, 5, 267-272.
- BORSI S., DEL MORO A., SASSI F.P., ZIRPOLI G. (1979) - On the age of the Vedrette di Ries (Rieserferner) massif and its geodynamic significance. *Geol. Rdsch.*, 68, 41-60.
- BORSI S., DEL MORO A., SASSI F.P., ZIRPOLI G. (1980 a) - New petrographic and radiometric data on the Oetzal and Stubai orthogneisses (Eastern Alps). *N. Jb. Miner. Mh.*, 75-87.
- BORSI S., DEL MORO A., SASSI F.P., VISONÀ D., ZIRPOLI G. (1980 b) - On the existence of Hercynian aplites and pegmatites in the lower Aurina valley (Ahrntal, Austrides, Eastern Alps). *N. Jb. Miner. Mh.*, 501-514.
- BRACK W. (1977) - *Geochronologische Untersuchungen an Gesteinen des Altkristallins in der Schobergruppe/Österr.* Diss. Fakultät für Geowiss. Univ. München, 1-97.
- CAVAZZINI G. (1983) - Nuovi dati radiometrici nell'area fra Mules e la Valle dell'Isel (Alpi Orientali). *Mem. Acc. Patavina SS.LL.AA., Cl. Sc. Mat. Nat.*, 95, 85-99.
- CLIFF R.A. (1971) - Strontium isotope distribution in a regionally metamorphosed granite from the Zentralgneiss, Southeast Tauernfenster, Austria. *Contrib. Mineral. Petrol.*, 32, 274-288.
- CLIFF R.A. (1977) - Rb-Sr isotopic measurements on granite-gneisses from the Granatspitzkern, Hobe Tauern, Austria. *Verh. Geol. B.A.*, 2, 101-104.
- CLIFF R.A. (1981) - Pre-Alpine history of the Pennine Zone in the Tauern Window, Austria: U-Pb and Rb-Sr Geochronology. *Contr. Mineral. Petrol.*, 77, 262-266.
- CLIFF R.A., COHEN A. (1980) - Uranium-lead isotope systematics in a regionally metamorphosed tonalite from the Eastern Alps. *Earth. Planet. Sci. Lett.*, 50, 211-218.
- CLIFF R.A., OXBURG E.R. (1971) - Geochronology, pp. 235-247. In: E.R. OXBURG (ed.), « Structural metamorphic and geochronological studies in the Reisseck and Southern Ankogel Groups, the Eastern Alps ». *Jahrb. Geol. B.A.*, 114, 121-272.
- CLIFF R.A., REX D.C. (1976) - Mineral ages from the Austroalpine nappes in the Deferegger Mountains, East Tyrol, Austria. 20th Ann. rept. Res. Inst. Afr. Geol., Univ. Leeds.
- CONTINI R., SASSI F.P. (1980) - Su alcuni effetti metamorfici alpini nel basamento austroalpine in Pusteria (Alpi Orientali). *Mem. Sci. Geol.*, 34, 187-194.
- DAL PIAZ G.B. (1936) - La struttura delle Austridi. Nota 2. Il sistema austroalpino a sud della finestra tettonica degli Alti Tauri. *Rend. R. Acc. Lincei*, 23, 269-273.
- DAL PIAZ G.B. (1942) - Geologia della bassa Valle d'Ultimo e del Massiccio granitico di Monte Croce. *Mem. Mus. St. Nat. Ven. Trid.*, 5, 186 pp.
- D'AMICO C., DEL MORO A., FREDDO A., PARDINI G. (1980) - Studio radiometrico delle ignimbriti riolitiche atesine, Gruppo Superiore. *Rend. Soc. It. Miner. Petr.*, 36, 703-716.
- DEL MORO A., VISONÀ D. (1982) - The epiplutonic Hercynian complex of Bressanone (Brixen, Eastern Alps, Italy). Petrologic and radiometric data. *N. Jb. Miner. Abh.*, 145, 66-85.
- DEL MORO A., SASSI F.P., ZIRPOLI G. (1980) - Preliminary results on the radiometric age of the Hercynian metamorphism in the South Alpine basement of the Eastern Alps. *N. Jb. Geol. Paläont. Mh.*, 12, 707-718.
- DEL MORO A., DAL PIAZ G.V., MARTIN S., VENTURELLI G. (1981) - Dati radiometrici e geochimici preliminari su magmatiti oligoceniche del settore meridionale del massiccio Ortles-Cevedale. *Rend. Soc. Geol. It.*, 4, 265-266.
- DEL MORO A., SASSI F.P., ZIRPOLI G. (1982) - New radiometric data on the Alpine thermal history in the Oetzal-Merano area (Eastern Alps). *Mem. Ist. Geol. Miner. Univ. Padova*, 35, 319-325.
- DEL MORO A., SASSI F.P., ZIRPOLI G. (1984) - Acidic gneisses from Plan de Coronas area, and chronological data on South-Alpine basement in Pusteria (Eastern Alps). *Mem. Ist. Geol. Miner. Univ. Padova*, 36, 403-412.
- DORNSIEPEN U.F. (1979) - Rb/Sr whole rock ages within the European Hercynian. A review. *Kristallinikum*, 14, 33-49.
- FERRARA G., INNOCENTI F. (1974) - Radiometric age evidences of a Triassic thermal event in the Southern Alps. *Geol. Rundsch.*, 63, 572-581.
- FERRARA G., HIRT B., LEONARDI P., LONGINELLI A. (1962) - Datazione assoluta di alcune rocce del massiccio intrusivo di Cima d'Asta. *Atti Soc. Tosc. Sc. Nat., Serie A*, fasc. 2, 1-15.
- FLAJS G., SCHÖNLAUB H.P. (1976) - Die biostratigraphische Gliederung des Altpaläozoikums al Polster bei Eisenerz. *Verh. Geol. B. A.*, 2, 257-303.
- FRANK W., KLEIN P., NOWY W., SCHARBERT S. (1976) - Die Datierung geologischer Ereignisse

- im Altkristallin der Gleinalpe mit der Rb-Sr Methode. *Tschermaks Min. Petr. Mitt.*, 23, 191-203.
- GRAUERT B. (1969) - Die Entwicklungsgeschichte des Silvretta-Kristallins aufgrund radiometrischer Altersbestimmungen. Ph. D. Thesis Univ. Bern, 1-166.
- HAMMERSCHMIDT K. (1981) - Isotopengeologische Untersuchungen am Augengneis vom Typ Campo Tures bei Rain in Taufers, Südtirol. *Mem. Ist. Geol. Min. Univ. Padova*, 34, 273-300.
- HARRE W., KREUZER H., LENZ H., MÜLLER P., WENDT I., SCHMIDT K. (1968) - Rb-Sr- und K-Ar-Altersbestimmungen an Gesteinen des Ötztal-kristallins (Ostalpen). *Geol. Jb.*, 86, 797-826.
- HEINISCH H. (1981) - Preliminary report on early Paleozoic acid volcanism in the Eastern and Southern Alps. A review. In: KARAMATA S. & SASSI F.P. (Eds.), IGCP No. 5 Newsletter 3, 80-88.
- HEINISCH H., SCHMIDT K. (1976) - Zur kaledonischen Orogenese in den Ostalpen. *Geol. Rdsch.*, 65 (2), 159-482.
- HEINISCH H., SCHMIDT K. (1982) - Zur Genese der Augengneise im Altkristallin in den Ostalpen. *N. Jb. Geol. Paläont. Mh.*, 211-239.
- HERITSCH H., TEICH T. (1976) - Zur Genese des Augengneiszuges von der östlichen Gleinalpe in die westliche Stubai. *Anz. Österr. Akad. Wiss. Wien, math. naturw. Kl.*, 112, 115-119.
- JÄGER E., METZ K. (1971) - Das Alter der Pegmatite des Raumes Bretstein-Pusterwald (Wolzer Tauern, Steiermark). *Schweiz. Min. Petr. Mitt.*, 51, 411-414.
- JÄGER E., KARL F., SCHMIDEGG O. (1969) - Rubidium-Strontium-Altersbestimmungen an Biotit-Muskovit-Granitgneisen (Typus Augen- und Flasergneise) aus dem nördlichen Grossvenedigerbereich (Hohe Tauern). *Tschermaks Min. Petr. Mitt.*, 13, 251-272.
- KREUZER H., HARRE W., MÜLLER P., RAASE P., RAITH M. (1973) - ECOG-3. Abstracts of Geochron. and Isotope Geol., 9.
- MILLER D.S., JÄGER E., SCHMIDT K. (1967) - Rb-Sr-Altersbestimmungen an Biotiten der Raibler Schichten des Brenner Mesozoikums und am Muskovitgranitgneis von Vent (Ötztal Alpen). *Eclogae Geol. Helv.*, 60, 537-541.
- ODIN G.S. (1982) - The Phanerozoic time scale revised. *Episodes*, 1982/3, 3-9.
- PURTSCHALLER F., SASSI F.P. (1975) - Some thoughts on the Pre-Alpine metamorphic history of the Austroalpine basement of the Eastern Alps. *Tschermaks Min. Petr. Mitt.*, 28, 175-199.
- SANDER B. (1929) *Erläuterungen zur geologischen Karte Meran-Brixen*. Schlernschriften, 16.
- SASSI F.P., SCHMIDT K. (1982) - The «Caledonian» event in the Eastern Alps: guide-lines for its geodynamic interpretation. In: SASSI F.P. & VARGA I. (Eds.), IGCP No. 5 Newsletter 4, 78-82.
- SASSI F.P., ZANFERRARI A. (1972) - Il significato geologico del complesso del Turtaler (Pusteria) con particolare riguardo alla successione di eventi metamorfici alpini nel basamento austroalpino delle Alpi Orientali. *bol. Soc. Geol. Ital.*, 91, 533-557.
- SASSI F.P., ZIRPOLI G. (1968) - Il basamento cristallino di Recoaro: studio petrografico. *Mem. Soc. Geol. Ital.*, 7, 227-245.
- SASSI F.P., ZIRPOLI G. (1979) - Pre-Variscan acidic magmatism in the Eastern Alps. In: SASSI F.P. & VISONÀ D. (Eds.), IGCP No. 5, Newsletter 1, 111-121.
- SASSI F.P., ZANFERRARI A., ZIRPOLI G. (1974) - Aspetti dinamici dell'evento «Caledoniano» nell'Austroalpino a sud della Finestra dei Tauri. *Mem. Mus. Trid. Sci. Nat.*, 20, 3-32.
- SASSI F.P., ZANETTIN B., ZIRPOLI G. (1980) - Quadro della storia termica alpina nelle Alpi Orientali. *Rend. Soc. It. Miner. Petrol.*, 36, 19-33.
- SATIR M. (1975) - Die Entwicklungsgeschichte der westlichen Höhen Tauern und der südlichen Ötztalmasse aufgrund radiometrischer Altersbestimmungen. *Mem. Ist. Geol. Min. Univ. Padova*, 30, 1-82.
- SATIR M., MORTEANI J. (1979) - Kaledonische, herzynische und alpidische Ereignisse im Mittelostalpin nördlich der westlichen Höhen Tauern, abgeleitet aus petrographischen und geochronologischen Untersuchungen. *Geol. Rdsch.*, 68 (1), 1-41.
- SCHMIDT K. (1977) - Der alpaläozoische Magmatismus und seine Stellung in der tektonischen Geoschichte Mittel- und Südwesteuropas. *Z. dt. geol. Ges.*, 128, 121-141.
- SCHMIDT K., SÖLLNER F. (1982) - Proposals for the geodynamic interpretation of the «Caledonian Event» in Central and Southern Europe, with special reference to the Eastern Alps. In: SASSI F.P. & VARGA I. (Eds.), IGCP No. 5, Newsletter 4, 82-93.
- SCHMIDT K., JÄGER E., GRÜNENFELDER M., GRÖGLER N. (1967) Rb/Sr- und U/Pb-Altersbestimmungen an Proben des Ötztalkristallins und des Schneeberger Zuges. *Eclogae Geol. Helv.*, 60, 529-536.
- SÖLLNER F., SCHMIDT K. (1981) - Rb/Rs- und U/Pb-Datierungen am Winnebach-Migmatit (Ötztal Alpen, Österreich). *Fortschr. Mineral.*, 59, 1, 188.
- SÖLLNER F., SCHMIDT K., BAUMANN A., HANSEN B.T., JERBTI - Zur Altersstellung des Winnebach-Migmatits in Ötztal (Ostalpen). *Verh. Geol. B.A.*, 95-106.
- STEIGER R.H., JÄGER E. (1977) - Subcommission on Geochronology. Convention on the use of decay constants in Geo- and Cosmochronology. *Earth Planet. Sci. Lett.*, 36, 359-362.
- THÖNI M. (1983) - The thermal climax of the early Alpine metamorphism in the Austroalpine Thrust sheet. *Mem. Ist. Geol. Min. Univ. Padova*, 36, 211-238.
- VAI G.B. (1975) - Evento «Caledonico» nelle Alpi. Discussione sui rapporti tra radiocronometria e stratigrafia. *Boll. Soc. Geol. Ital.*, 94, 269-273.