For this reason, the aerosol composition is usually referred to average crustal values, specifically through Aluminium concentrations. An ecrichment factors (EF) is thus defined:

$$EF = \frac{(X/Al)\ sample}{(X/Al)\ av.crust}$$

The EF. measured for different trace metals are widely used for estimating volcanic fluxes of metals to the atmosphere.

However, not only are EF's variable one volcano to another, but they also vary whit time for a given volcano. Morever, the EF cannot be directly related to physical and/or chemical changes in the magma. For this reason, we have attempted to determine the partition coefficents, ε, between gaseous and condensed phases for different metals.

This is possible owing to 226-Ra radioactive decay products.

In a non-degassed magma, the last decay products of the 238-U series, 226-Ra, 210-Pb, 210-Bi and 210-Po are assumed to be in radioactive equilibrium. However, in every volcanic plume studied it is clear that the activities of these radionuclides were quite different from one another. Critically there was non 226-Ra in any plume. At the magma temperature many compounds of Lead and Bismuth are volatile (such as halides or sulfides). Metallic Polonium is gaseous at about 300°C, in contrast to Radium, which can be considered as non-volatile. By comparing the measured composition of lava to that of magmatic gases collected from Mount Etna volcano it was possible to determine the partition coefficients of Lead (1.5%), Bismuth (46%) and Polonium (100%).

Subsequently, we can refer to Pb in order to calculate ε for every other elements analized in volcanic emissions, by using the relation:

$$\epsilon_x = \frac{(X/Pb)\ aeros}{(X/Pb)\ lave} = \frac{\epsilon_x/\epsilon_{Pb}}{(1-\epsilon_x)/(1-\epsilon_{Pb})}$$

were ε is the degassed fraction and 1-ε is the fraction remaining in the lava.

Lavas from Mount Etna eruption of mars-july '85 were sampled. At the same time filter papers were collected from the Bocca Nuova crater. After dissolution samples were analyzed by atomics absorption spectroscopy.

The first results obtained for Cd (17%), Cu (0.4%), Zn (0.2%), K (0.1%), Ra (0.1%), Na (0.02%) and Mg (0.002%) agree rather well with classical data.

Additional analyses are currently being performed, in order to compare the values obtained for different erutions for which different values are expected.

* Centre des faibles radioactivites, Laboratoire mixte C.N.R.S./C.E.A., Avenue de la Terrasse, 91190 Gif-sur-Yvette, France.

MANNUCCI G.* - *Relazioni tra la cristallochimica delle allaniti e il chimismo delle rocce ospitanti*

Tra i minerali di terre rare l'allanite è uno dei più diffusi in rocce a composizione da acida ad intermedia con spiccato carattere alluminoso. I 92 campioni di allanite studiati provengono infatti da rocce intrusive (graniti, granodioriti, tonaliti, monzoniti, quarzo-dioriti), vulcaniche (daciti, porfiriti) e metamorfiche (ortogneiss, paragneiss, anfiboliti, cornubianiti) tutte caratterizzate da bassi valori dell'indice agpaitico: da 0.37 a 0.80.

La distribuzione delle REE, rispetto ai valori normalizzati per la crosta, non evidenzia significative variazioni e i rapporti tra gli elementi analizzati (La, Ce, Pr, Nd, Sm, Gd, Y) sono sostanzialmente costanti, anche quando il contenuto complessivo delle REE varia. È sempre evidente, infatti, una netta zonatura con decremento del contenuto di terre rare dal nucleo verso il bordo controbilanciato prevalentemente dall'aumento del calcio.

Molto più variabili sono invece i contenuti di U e Th. A differenza di altri minerali di terre rare (monazite, xenotime ecc.) la allanite sembra differenziare nettamente i due elementi: non tanto per motivi strutturali (carica e/o raggio ionico), quanto per le particolari condizioni chimico-fisiche di cristallizzazione, caratterizzate da tipici valori del potenziale di ossidazione.

Pur non disponendo di dati diretti sulla struttura dell'allanite è ipotizzabile un cambiamento di struttura in concomitanza di eventi metamorfici progradi. Le analisi alla microsonda indicano infatti un aumento sensibile del contenuto di alluminio nei bordi di accrescimento del minerale: in termini molari ciò corrisponderebbe ad una netta transizione allanite - Fe epidoto.

* Università degli Studi di Milano, Dipartimento Scienze della Terra, Sezione Mineralogia, Via Botticelli, 23 - 20133 Milano.

MATTEUCCI E.*, TOMALINO M.* - *Elements tendency to the geochemical differentiation: contribution to the search of a classification*

Literature data concerning the contents of 26 elements in 482 igneous rock samples have been considered to determine the values of the characteristical ratios for single lithotypes. These values result by comparing the elements two by two. The values pertaining to different lithotypes have been confronted pair by pair. A suitable index to characterize the pair elements tendency (the elements tendency of each pair) to their differentiation has been appointed.

The differentiation index has been calculated in two different ways and its maximum value has been arbitrarily limited. Consequently two separate, but comparable classifications have been achieved. These classifications have only shown a tendency to an increasing differentiation from the Al-Ga pair to Ca-Mn pair, but have not defined any systematic positions.

The pairs belonging to the classification are divided in four groups:

1) elements with the same valence and the same coordination number;

2) elements with the different valence and the equal coordination number;
3) elements with the equal valence and the different coordination mumber;
4) elements with the different valence and the different coordination number.

Dealing with the pairs of the first group, it has been possibile to remark that some pairs have confirmed the requisite of the geochemical coherence, other have made it evident.

* Dipartimento Georisorse e Territorio, Politecnico di Torino.

OMENETTO O.*, MEGGIOLARO V.*, SPAGNA P.*, BRIGÒ L.**, FERLA P.***, GUION J.L.**** - *Scheelite-bearing metalliferous sequence of southeastern Peloritani Mountains (NE-Sicily)*

Polymetallic (Pb, Zn, Cu, Sb, Ni, As, F, Ag) and recently discovered (R & D programme EEC/Ente Minerario Sicialiano) tungsten ores are widespread in the Hercynian metamorphic series of Mandanici Unit, outcropping on the southeastern slope of the Peloritani Mountains (Fiumedinisi - Tripi area). The Mondanici Unit consists of low-grade micaschists, phyllites and marbles, with some intercalated metabasites, affected by two principal deformation/metamorphic events. In the Fiumedinisi area, phyllites prevail and ores are essentially confined horizontal, comprised between an upper and a lower marble levels and characterized by noticeable tnickness variations and lateral/vertical facies changes. At the base of this ore-bearing horizon, an ubiquitous marker is recognizable, in the form of a thick «crust» of Fe-Mn carbonates/oxides (wiht traces of galena, pyrite and barite) at the top of the lower marble. In the overlying sequence the minerlizations show different geochemical characterization and lithostratigraphic affinity:

— Pb, Zn, F (Ag) ores with locally increasing contents of Cu (Au) are linked to medium-thick ($\geqslant$ 50 m) series of graphitic phyllites and quartzites, with minor volcanogenic intercalations. The stratiform, pre-metamorphic character of the mineralization is preserved in the Tripi-Giampilieri area. In the Fiumedinisi region, severe polyphasical post-S_2 deformation induced transposition of stratiform layers, folding and fragmentation into individual, subvertical lenses.
Capping these lenses, tourmaline + arsenopyrite ± scheelite-bearing quartzites are observable, genetically related and subsequenty affected by the same above mentioned polyphasical deformation processes. Connected are also some «mobilized» fluorite + sulfides stockworks and particular scheelite-wolframite assemblage;
— Sb (Cu, Pb) ores, included within thick ($\geqslant$ 100 m) sequences of phyllites, quartz-phyllites, quartzites (graphitic *p.p.*) grading downwards to mineralized quartz-siderite calcshist facies and to iron carbonate phyllites;
— tungsten ores (with contents up to 50%) discoverd within several outoropping sequences of reduced thickness ($\leqslant$ 20 m). Main lithologies are «black schists», graphitic and ankeritic phyllites. Ore paragenesis is monotonous (quartz, carbonate (Fe), Ca-plagioclase, apatite with traces of pyrite, graphite) but the textural features are quite variable, because of intense deformation/lamination endured by the primary ore when coming into tectonic contact with the overthrust upper Aspromonte Nappe.

Some mineralizations are also observable below and above the principal ore horizon: in the basal part of the lower marble, limited quartz ± scheelite veinlets and karst cavities filled with Cu-Sb-sulphosalts and Fe-Mn oxides ± barite; above the upper marble, in the basal section of upper green phyllites with metabasite intercalations, stockworks with Ni-As (gersdorffite)-Cu-Sb (Ag) ores.

The geodynamic and metallogenic significance and role of the Mandanici Unit in the framework of Hercynian crystalline basament of Calabrian-Peloritan Arc are briefly discussed.

* Istituto di Mineralogia e Petrologia dell'Università di Padova. ** Istituto di Mineralogia, Università di Ferrara. *** Istituto di Mineralogia e Petrografia, Università di Palermo. **** Laboratoire de Minéralogie, Université Catholique de Louvain, Belgio.

PUGLISI D.* - *I minerali pesanti delle successioni arenacee cretacico-terziarie della catena marghrebide siciliana*

Il confronto delle associazioni di minerali pesanti riscontrate nelle arenarie di tutte le successioni torbiditiche della Sicilia nord-orientale evidenzia:

a) *una sostanziale omogeneità*, almeno sotto il profilo qualitativo, tra le associazioni di depositi eo-oligomiocenici delle unità strutturalmente più elevate della catena maghrebide siciliana (unità a falde di basamento riferite ad un dominio di sedimentazione interno, dominio «austroalpino» AUCT.), le associazioni delle torbiditi cretacico-terziarie facenti parte invece delle unità tettoniche più profonde (Unità Sicilidi AUCT., riferite ad aree di sedimentazione più esterne),
b) *una comune provenienza* dei materiali costitutivi di entrambi i depositi dai terreni cristallini ercinici che attualmente costituiscono il massiccio dei Monti Peloritani. Si tratta nel complesso di associazioni mediamente mature (Indice ZTR pari in media a 25%) con abbondante granato e con costante presenza di specie mineralogiche indicative di una provenienza da metamorfiti di vario grado (cloritoide e staurolite) e da plutoniti (monazite, xenotime e titanite).

Inoltre le differenze osservate nelle associazioni di minerali pesanti dei depositi sicilidi permettono di avanzare alcune ipotesi sulle caratteristiche paleogeografiche dei bacini di drenaggio: