4.5.P11

Silicon isotope measurements using MC-ICP-MS: Early results from weathering studies

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Mass Spectrometry

We report silicon isotope data obtained using a multi-collector inductively coupled plasma mass spectrometer (MC-ICP-MS), Micromass Isoprobe. Measurements of an in-house standard show that the external precision is better than 0.2 ‰/amu (2σ). An example of standard measurements performed during one day is shown in figure 1. These data compare well with results obtained using other types of MC-ICP-MS [1,2].

Weathering studies

The present study cover silicon isotope measurements on soil mineral matter and biogenic matter as well as on soil water and stream water. Soils developed from a granodioritic parent material in different climatic regimes have been analysed in order to study climatic effects on the extent of isotopic fractionation. The climatic conditions range from equatorial to subarctic. Differences in the extent of isotopic fractionation between different climatic conditions may result from (i) a temperature effect, (ii) formation of different secondary weathering products, and (iii) different biologic activity.

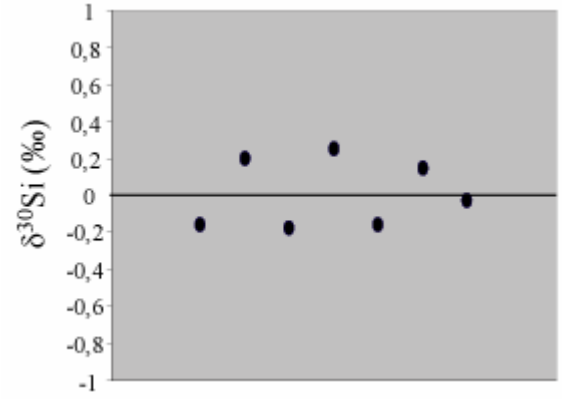

Figure 1. Measurements of an in-house standard during one day. The $\delta^{30}Si$ values are calculated from measured $^{29}Si/^{28}Si$ ratios according to De La Rocha (2002) [1].

References

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4.5.P12

Geochemistry and mineralogy of the Triassic to Early Jurassic pelite layers continental redbeds from the Calabria-Peloritan Arc, Italy

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Triassic to early Liassic mudrocks from continental redbeds of the Calabria-Peloritani Arc have been petrographically (XRD) and chemically (XRF, INAA) analyzed for their provenance and diagenesis, as a part of a larger project developed at a regional scale including redbeds along the internal domains of the Mediterranean chains from the Gibraltar Arc (Spain and Morocco) to the Calabrian Arc (Italy).

The chemical index of Alteration ranges between 68 and 71 suggesting moderate weathering at the source-area. The samples, in the A-CN-K plot, fall close to the A-K side, showing a dominant illite composition, and form an homogeneous array in a limited region, indicating steady state weathering conditions, where material removal rate matches the production of mineralogically uniform secondary products generated in the upper zone of soil development [1]. It has to be stressed that K-rich samples may have been affected by K remobilization during diagenesis and burial history. However the PIA index [2] also indicate moderate weathering at the source-area and only few samples have values of the illite cristallinity index (from 0.42° to 0.25° Δ 2θ) typical of anchizone.

The size of the (La/Yb)ch is generally lower (average= 8.24±0.87) than that of the PAAS (9.2) whereas the Eu anomaly is higher (0.73±0.04) than that of the PAAS (0.66). Thus both indices suggest a provenance from a source-area having less felsic features relatively to the average composition of the upper continental crust. In few cases the (La/Yb) ratio of the redbed's level is lower than 6 and the Eu anomaly is higher than 0.8. These "outlayers" may record a provenance associated to an important metabasites supply since this lithology occurs in the basement covered by the redbeds.

References

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