New $^{40}Ar/^{39}Ar$ ages for Central Atlantic Magmatic Province in French Guyana: a younger volcanism?

S. NOMADE [1], G. FÉRAUD[2], P. RENNE[1], Y. CHEN[3]

[1]Berkeley Geochronology Center, 2455 Ridge Road, Berkeley, CA 94709 USA. snomade@bgc.org, prenne@bgc.org
[2]Géosciences Azur, CNRS-UNSA, Parc de Valrose, 06108 Nice Cedex @, France. Gilbert.Feraud@unice.fr
[3]ISTO, UMR 6113 Université d'Orléans, 45067 Orléans cedex 2, France. Yan.Chen@univ-orleans.fr

This study presents new $^{40}Ar/^{39}Ar$ ages on French Guyana's dykes related to the earliest Jurassic Central Atlantic Magmatic Province (CAMP). To limit the spurious effects of younger K-rich alteration phases we have carefully selected 150 to 250 μm unaltered plagioclases. Multigrain samples (10 mg to 30 mg) were heated incrementally with a CO_2 laser and in a induction furnace. All spectra are characterized by saddle-shaped spectra which are due to none non- atmospheric initial (excess) argon. Four specimens yielded a flat segment comprising 6 to 8 concordant steps and 35 to 50 % of ^{39}Ar released with weighted-mean ages ranging from 195.4 ± 1.6 Ma to 197.2 ± 2.2 Ma (FCs = 28.02Ma). One specimen seems to be less affected by excess argon and displays a very flat spectrum over more than 80% (weighted-mean age of 196.4 ± 0.7 Ma). Due to the presence of excess argon our new ages are interpreted as maximum ages of the dolerites; nevertheless, these ages are younger than most of the CAMP (ca. 199 ± 2 Ma) and further supports the trend of younger magmatic activity near the coastline of South America and West Africa. We propose that this younger magmatism could correspond to secondary magmatism pulses (197-194Ma) with high-Ti chemical signature (asthenospheric upwelling?) located in the center of the CAMP.

$^{240}Pu/^{239}Pu$ isotopic ratio in the western northwest Pacific Ocean

K. NORISUYE[1], K. OKAMURA[1], Y. SOHRIN[1], H. HASEGAWA[2] AND T. NAKANISHI[3]

[1] Institute for Chemical Research, Kyoto University, Uji, Kyoto 611-0011, Japan (knorisue@inter3.kuicr.kyoto-u.ac.jp)
[2] Faculty of Technology, Kanazawa University, Kanazawa, Ishikawa, Japan (hhiroshi@t.kanazawa-u.ac.jp)
[3] Faculty of Science, Kanazawa University, Kanazawa, Ishikawa, Japan (nakanisi@cacheibm.s.kanazawa-u.ac.jp)

Plutonium is one of the long-lived anthropogenic radioelements and is a useful chemical tracer in the ocean. It has been introduced into the ocean via stratospheric fallout from nuclear tests that peaked in 1962, but it is suggested that plutonium in the Pacific Ocean has also been derived from close-in tropospheric fallout (Bowen et al., 1980). Isotopic analysis using high sensitive mass spectrometry is a powerful tool to specify these origins in the ocean. However, few studies for plutonium isotopic analysis have been made (Bartine et al., 1986; Buesseler, 1997). Here we report $^{240}Pu/^{239}Pu$ isotopic ratio in the western northwest Pacific Ocean.

Large volumes of seawater samples (800~4,200 l) were collected from the Sea of Japan, Okhotsk Sea, and northwest Pacific during the KH98-3 cruise of R/V Hakuho-Maru in July-August, 1998. Plutonium was extracted from seawater using MnO_2-impregnated fibers and separated from uranium by solvent extraction. $^{240}Pu/^{239}Pu$ isotopic ratio in the final sample solution was determined by ICP-MS (Norisuye et al., 2001).

The isotopic ratios at CM6 (45˚25'N 145˚05'E), CM12 (41˚21'N 137˚20'E), CM20 (37˚44'N 135˚14'E) and CM22 (40˚00'N 145˚00'E) were found to be in the range of 0.20-0.23, which were not so different from the average global fallout ratio of 0.18. However, these isotopic ratios and previously measured $^{240}Pu/^{239}Pu$ ratios in the North Pacific except for locally contaminated regions, seem to be slightly higher than the global fallout ratio, suggesting possibility of plutonium from close-in tropospheric fallout in 1950s. Determination of ^{238}Pu and ^{241}Pu activity by alpha spectrometry and precise measurement of $^{240}Pu/^{239}Pu$ isotopic ratio by multi-collector (MC) ICP-MS are the further works to clarify the matter.

References

Bowen V. T. et al., (1980), Earth and Planet. Sci. Lett. **49**, 411-434
Bertine K. K. , (1986), J. Environ. Radioact. **3**, 189-201
Buesseler K. O., (1997), J. Environ. Radioact. **36**, 69-83
Norisuye K. et al., (2001), Anal. Sci. Suppl. **17**, i29-i32