Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10517, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10517
EGU General Assembly 2008

^{230}Th-^{238}U disequilibria lavas from the Colima volcano (Mexico): Constraints on melting and mantle source of an exotic calcalkaline volcano

Ch. Hémond (1), Ch. Galerne (2), A. Aguillon-Robles (3) and C. Pallares (3)

(1) Domaines Océaniques IUEM Place Nicolas Copernic, F-29280 Plouzané, France; chhemond@univ-brest.fr

(2) Physics of Geological Processes, University of Oslo, PO BOX 1048, Oslo, 0316, Norway

(3) Instituto de Geologia, UASLP, San Luis Potosi, SLP, CP 78250 Mexico.

The Colima volcano is the westernmost edifice of the transmexican volcanic belt. It is a very active stratovolcano essentially made of andesitic lavas. Previous works have established that eruptive cycles are becoming shorter with time. Trace elements have also revealed that magmatic melts underwent AFC processes within the magma chamber.

We present here ^{230}Th-^{238}U data determined on a dozen of modern samples coming from the volcano itself and from distal volcanic fields around the main edifice within a radius of 20km. All samples present significant disequilibria involving enrichment in Th relative to U quite similar to those reported for MORB. Actually both the nature of the Th-U fractionation and the low Th/U ratios resemble more Mid Ocean Ridge Basalts than andesites. Classically, subduction related magmas show either a U enrichment relative to Th with variable Th/U ratios or almost no fractionation at all and higher Th/U ratios. There are very few examples of subduction related melts showing MORB like properties with respect to U-Th series systematics.

Water is thought to enhance U mobility relative to Th. The presence of water in the mantle derived from the subducting slab would therefore increase U with respect to Th. Our results, which show an opposite fractionation, classically require melting of

an anhydrous mantle source.

Comparable Th isotope signatures were reported in the Cascades range and were associated to the subduction of an active ridge resulting in to an asthenospheric window. A comparison of our data with those from Baja California, suggests that the Colima data sit at one end of the Bajaites trend. Therefore, this may reveal that in terms of Th-U systematics the Colima lavas may be of bajaitic affinity and were therefore produced by a similarly complex mechanism implying partial melting of a mantle that was metasomatised by melts derived from the subducted very young oceanic crust.