5.3.P26

Geochemistry, radiogenic and U-series isotopes in Andean magmas: Crustal assimilation and adakite-like magmatism in the Central and Southern Andes

G. WÖRNER[1], M. MAMANI[1], R. MERCIER[1] AND R. KILIAN[2]

[1] Abt. Geochemie, GZG, Goldschmidtstr. 1, 37077 Göttingen, Germany (Gwoerner@gwdg.de)
[2] Fachbereich VI Universität Trier, 54286 Trier

Holocene to Tertiary Central Andean volcanism (CVZ: 12°40'S to 27°S) formed on continental crust that changed thickness from less than 40 to > 70 km. We analyzed close to 1000 major and trace elements and a large number of samples for Sr-Nd-, and Pb isotopes in CVZ samples over more than 1600 km along the arc. Holocene lavas from the CVZ as well as the Southern Volcanic and Austral Volcanic Zones in Southern Chile (SVZ, AVZ) were analyzed for U-Th- and Ra-isotopes.

At any given location Sr-Nd-Pb isotopic compositions are similar and independent of age and delineate distinct crustal domains. Boundaries between regions are abrupt and correlate with changing isotopic composition of the assimilated basement.

Geochemical signatures suggesting garnet in the residue during magma genesis (either deep crustal assimilation or slab melting) are expressed as Sm/Yb ratios. In the CVZ, this signature is generally restricted to young (< 5 Ma) and intermediate rocks whereas more mafic or more evolved (and older) rocks do not show this signature. CVZ magmas are thus strongly crustally contaminated where recent Th/U-enrichment is expressed as (238U/230Th) < 1.

SVZ magmas are contaminated by crust of variable thickness but generally show a slab fluid signature expressed as (238U/230Th) > 1.

In the AVZ, the garnet signatures increases from N to S where the subducted oceanic plate becomes progressively younger and a slab melt component may be expected. Here, the garnet signature is derived from partial melting of the down-going oceanic slab and it is related to (238U/230Th) < 1 and MORB-like Sr- and Nd- isotopes.

U-series data combined with geochemical and isotopic systematics can thus distinguish between slab fluids and garnet signatures either caused by slab melting or deep crustal assimilation.

5.3.P27

Petrogenesis of post-collision related Yengi-Spiran intrusives in the Nw of Iran (NW of Tabriz)

A. JAHANGIRI AND Z. KHODAYARZADEH

Dept of Geology, University of Tabriz, Tabriz 51665, Iran (A.jahangiri@tabrizu.ac.ir)

Nw of Iran is an important component of Alpine-Himalayan system that comprises voluminous volcanic and plutonic rocks from Eocene to pliocene age related to subduction and closure of Neo-Tethyan ocean and its branches. In the NW of Tabriz late-Miocene Yengi-Spiran plutonic rocks intrude flysch-type cretaceous rocks and metamorphosed these rocks in the epidote-hornfels facies.

The intrusive roks ranging from gabbro-diorite to diorite and quartz-diorite, which exhibit meta-aluminous and calc-alkaline characters and plots in the Sio_2-K_2O diagram in the medium potassium field. All intrusive rocks display enrichment in LILE (Ba, Th, U)and LREE relative to HFSE. Incompatible elements such as U, Ba, Th indicate high enrichment compared to K and Rb. Meanwhile high Mg numbers (51-79) of studied samples with relatively high content of Cr (53-499 ppm), Ni (47-287ppm), Co can be attributed to significant input of mantle derived magma in genesis of these plutons. Enrichment of U, Ba, Th, and LREE in compared with Rb and K could be explained by enrichment of mantle source due to fluids released from subducted slab with pelagic sediments. Geochemical data indicate minor contribution of crustal material in the genesis of these rocks either recycled with subducted slab or through assimilation process.