5.2.P02

Geodynamic implications of the Deseado Massif volcanism (Patagonia, Argentina)

T. BUSÀ[1], G. FANTAUZZI[2], G. BELLIENI[1,3], H. ECHEVESTE[4], R. FERNANDEZ[4] AND E.M. PICCIRILLO[5]

[1] University of Padova, Italy (tiziana@dmp.unipd.it)
[2] University of Udine, Italy (fantauzzi@dgt.uniud.it)
[3] Instituto di Geoscienze e Georisorse, CNR, Italy (giuliano@dmp.unipd.it)
[4] Instituto de Recursos Minerales, UNLP, Argentina (rfernand@inremi.unlp.edu.ar; hecheves@inremi.unlp.edu.ar)
[5] University of Trieste, Italy (piccirill@univ.trieste.it)

The Deseado Massif covers the center-east portion of the Santa Cruz Province (Argentina), in extra-Andean Patagonia. Although the Deseado Massif is mainly composed of silicic volcanic rocks (Chon Aike Formation, CA; 151.5 ±0.5 to 177.8 ±0.4 Ma), mafic and intermediate volcanic rocks (Bajo Pobre Formation, BP; 152.7 ±0.5 and 164 ±0.3 Ma) crop out largely in the central part of the massif. The magmas of the two main formations are not linked by fractional crystallization which, however, can explain the evolution within the CA and BP.

A negative Nb and positive Pb anomaly in whole-rocks, and negative Nb anomaly as well as B/Be and B/Nb in quartz-trapped melt inclusions indicate contamination of the source with melts coming from a subducted slab.

Mass balance results indicate that it is possible to obtain the observed magma compositions by partial melting of a source contaminated by silicic slab-derived melt.

$(^{87}Sr/^{86}Sr)_{160}$ for the BP and $(^{87}Sr/^{86}Sr)_{150}$ for the CA range from 0.70514 to 0.70775. These values are similar to those of Jurassic samples from the Antarctic Peninsula. This confirms the hypothesis that the Jurassic Volcanic Province of Patagonia is part of a larger magmatic province represented in Antarctica (Ferrar, Droning Maud Land and Antarctic Peninsula), Australia (Tasmanian Dolerites) and South Africa (Karoo), related to the break-up of Gondwana and the opening of the South Atlantic Ocean.

In this geodynamic context, Patagonia was located on the SW border of Gondwana and subduction processes were active along the Patagonian border from the Paleozoic to Triassic, associated with upwelling of a thermal anomaly (mantle plume?). Such a thermal anomaly is believed to be responsible for melting in the oceanic slab and contamination of the overlying mantle source by slab-derived silicic melts.

5.2.P04

A precise U-Pb zircon age for the Skaergaard intrusion

M.A. HAMILTON[1] AND C.K. BROOKS[2]

[1] Jack Satterly Geochronology Lab, Department of Geology, University of Toronto, Toronto, ON, Canada, M5S 3B1 (mahamilton@geology.utoronto.ca)
[2] Danish Lithosphere Center & Geological Institute, University of Copenhagen, DK-1350 Copenhagen, Denmark

A cooling curve for the Skaergaard intrusion was established by Norton & Taylor [4] using oxygen isotopes and transport theory. Subsequently, Hirschmann et al [3] located their curve in absolute time using $^{40}Ar/^{39}Ar$ ages on biotite and hornblende. We present new, high-precision U-Pb results for zircon recovered from the Sandwich Horizon on Basistoppen. Our age of 55.59±0.13 Ma is fully consistent with these earlier results, thereby confirming the validity of both the cooling model and the standardization used in the ^{40}Ar-^{39}Ar system. It is, however, at variance with a recent Lu-Hf age on apatite (Barfod et al. [2]).

Lavas corresponding closely in composition with the deduced Skaergaard magmas are found rather high up in the adjacent lava plateau (Andreasen et al. [1]). The new age thus allows us to precisely date this level; a result in general agreement with the $^{40}Ar/^{39}Ar$ stratigraphy (Storey et al. [5]). Knowing the thickness of lava overburden at the time of intrusion constrains also the pressure in the cooling intrusion and this is in turn consistent with existing estimates of 60±15 MPa.

References

[1] Andreasen, R., Peate, D.W. & Brooks, C.K. (in press) *J. Petrol.*
[2] Barfod, G.H., Otero, O. & Albaréde, F. (2003) *Chem. Geol.* **200**, 241.
[3] Hirschmann, M.M., Renne, P.R. & McBirney, A.R. (1997) *Earth Planet. Sci. Lett.* **146**, 645.
[4] Norton, D. & Taylor, H. P. (1979) *J. Petrology* **20**, 421-486.
[5] Storey, M. et al. (1996) *Trans. Am. Geophys. Un.* **77** (Fall Meeting), 839.