Tectonomagmatic origin of the Late Jurassic volcanism in the Patagonia Province, Argentina

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A thick sequence of the Late Jurassic magmatic rocks in Patagonia (Argentina) extendes over 1x10^6 km^2 from the Atlantic to the Andes [1]. Although bimodal in composition, the Patagonia Province (PP) is one the largest silicic (felsic) LIPs on Earth. It consists of rhyolites and ignimbrites of the Marifil (~187-177Ma) [2,4] and Chon Aike (~168-151Ma) [2,3] Formations (Fm), with a minor andesitic component represented by the Bajo Pobre (BP) (~164-153Ma) [2,3] and Locontrapial Fm. Thus the total duration of magmatism is ~36 Ma. Our new U-Pb ages on zircons for the Marifil Fm confirm that the first felsic pulse coincided with the Karoo-Ferrar magmatic event (~184-178Ma) [4]. However, the main peak activity in the PP is ~10 Ma younger. Basaltic volcanism of the Cañadon Asfalto (CA) Fm fills an extensional basin contemporaneous with the volcanism of the PP. This magmatism was associated with a complex geodynamic evolution during the Gondwana break-up. The setting comprised continental rifts and a subduction zone in the western continental margin, possibly accompanied by back-arc rifting. Andesites from the BP Fm and basalts from CA Fm are Opx rich rocks with occasional anhedral olivine crystals with Cr-spinel inclusions (Mg# 0.48-0.25; Cr# 0.47-0.37). The most primitive Cr-spinel grains from the BP and CA have contrasting compositions in terms of Al_2O_3 (25-28 and 10-12 wt%) and TiO_2 (1.3-1.4 and 0.4-1.3 wt%, respectively). Accordingly, parental melt compositions can be correlated with MORB for BP and island-arc magmas for CA [5]. Compositions of the Late Jurassic volcanic rocks combined with quartz- and pyroxene-hosted melt inclusion and Cr-spinel study will be discussed and applied to understanding the tectono-magmatic environment of this LIP.

[1] Pankhurst & Rapela (1995) *EPSL* 134, 23-26. [2] Feraud *et al* (1999) *EPSL* 172, 83-96. [3] Pankhurst *et al (*2000) *J. Pet*. 41, 602-625. [4] Jourdan *et al* (2005) *Geology 33, 745-748.* [5] Kamenetsky *et al* (2001) *J. Pet*. 42, 655-671.

Natural and synthetic plagioclases for the interpretation of planetary surfaces

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Plagioclase, pl, is an important constituent of planetary surfaces, e.g. Moon and Mercury. Spectrometers detected crystalline pl on the lunar surface [1], with composition of ~An90 and variable FeO content. New data from XRS and GRS on the Hermean surface show contents of Na [2] that are compatible with low-An (<90) pl.

Natural and synthetic plagioclase spectroscopy

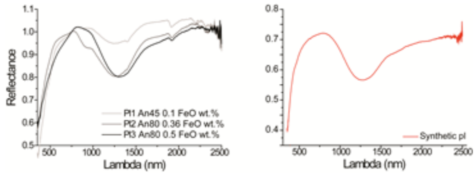

Fig. 1 Natural (left) and synthetic (right) spectra of pl.

Visible and near-infrared reflectance (VNIR) spectroscopy is the most used technique to map the surface of Solar System bodies. Pl, often considered a spectrally neutral phase, shows a clear absorption at ~1.25 μm, even for very low FeO contents (Fig. 1, left); furthermore, an increase of this component, causes an increase of the absorption band depth, while its position moves to the IR region. We synthesized pl with different An and FeO content, in order to investigate how these parameters control the absorption band in the VNIR. A Pl, An90 with 0.5 wt% FeO, was synthesized from oxides and carbonate at logfO_2= -9; the mixture was first heated at 1600 °C for 15 minutes, quenched and then re-heated at 1400 °C for 24 hours. XRD and EPMA confirmed both the presence of a crystalline phase and its compositional homogeneity. The spectrum is reported in Fig. 1, right.

The synthesys of different pl will allow to create a VNIR spectra database wich will be invaluable to better constrain the composition of the crust of Solar System bodies.

[1] Ohtake M. *et al*. (2009) *Nature, 461,* 236-241. [2] Evans *et al*. (2013) *LPSC XLIV*, Abstract #2033.

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