

Duration of igneous events in the Torres del Paine – zoning of feldspar, quartz, and zircon

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Context

The Torres del Paine is a well-studied mafic-granitic intrusion of roughly 90km³ volume. It was emplaced over a time span of 150Ka. It is located East of the Patagonian Andes (Chile, South America). The granites were intruded in at least 3 major pulses over a period of ca. 90Ka. Thermal modelling revealed very high intrusion temperatures (e.g. 1000°C). Abundant cryptic zoning in outcrops suggests that the youngest granite batch is indeed intruded in several pulses (maybe up to 30 some?). The crystallization history and detailed mineral composition might provide the key to unlock these pulses. Here a systematic zoning study is proposed on minerals of the youngest granite, to establish crystallization history and duration. It will be complemented by the study of chlorine and fluorine in biotite, as well as the zoning of mafic clasts in the granitic rocks

Objectives and Methods

- The samples are available from our previous studies, so that very limited field work (2 weeks max) is required
- samples will be cut, following x-ray tomography analysis to identify quartz and feldspar crystals for study
- feldspars, quartz and zircon will be imaged (BSE, x-ray element maps) and CL images obtained
- zoning features in each individual sample will be classified statistically.
- trace element zoning of feldspar (and quartz if found) will be used to model residence times
- the new FEG electron microprobe will be used for these studies

Literature

- Leuthold J, Müntener O, Baumgartner LP, et al (2013) A Detailed Geochemical Study of a Shallow Arc-related Laccolith; the Torres del Paine Mafic Complex (Patagonia). *Journal of Petrology* 54:273–303. doi: 10.1093/petrology/egs069
- Leuthold J, Müntener O, Baumgartner LP, et al (2012) Time resolved construction of a bimodal laccolith (Torres del Paine, Patagonia). *Earth and Planetary Science Letters* 325-326:85–92. doi: 10.1016/j.epsl.2012.01.032
- Leuthold J, Müntener O, Baumgartner LP, Putlitz B (2014) Petrological Constraints on the Recycling of Mafic Crystal Mushes and Intrusion of Braided Sills in the Torres del Paine Mafic Complex (Patagonia). *Journal of Petrology* 55:917–949. doi: 10.1093/petrology/egu011
- Seitz S, Putlitz B, Baumgartner LP, et al (2016) Short magmatic residence times of quartz phenocrysts in Patagonian rhyolites associated with Gondwana breakup. *Geology* 44:67–70.

1 photo dimension H5.5cm x L8.5cm



WEB sites

Choice of orientation :

Geochemistry, Alpine tectonics, Ore Deposits