High grade metamorphism in central Patagonia (Argentina) associated with an accretionary orogeny

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Here we discuss the crustal growth processes which occurred in central Patagonia (Argentina) as documented by magmatism and metamorphism. It is known that crustal growth is related to subduction or occurs in accretionary or collisional tectonic settings. The Pacific margin of South America represents an excellent example of crustal growth, since it was an active margin throughout Late Neoproterozoic and Phanerozoic times, involving different proposed crustal formation mechanisms (González *et al.*, 2020; Marcos *et al.*, 2020; Oriolo *et al.*, 2021). The Terra Australis Orogen was located in the southwestern margin of Gondwana, though the occurrence of these events and the crustal growth history of this area is not yet fully understood.

In this work, we study a Middle-Late Paleozoic basement block (Taquetren Range, Chubut Province, Argentina) located in the central part of Patagonia, South America (~43°00'S-69°20´W) to unravel various magmatic and metamorphic events. This hundreds of kilometers-long orogen represents an accretionary margin (Rapela *et al.*, 2021) with widespread regional metamorphism and magmatism which is relatively unexplored.

The metamorphic basement includes pelitic lithologies with evidence of migmatization, intruded by a series syn- and post-tectonic intrusions. The metapelites are characterized by bt-grt-plg-qz-rt-ilm±sill paragneisses. We present traditional geo-thermobarometry, as well as phase equilibrium diagrams (MADs). Preliminary results indicate P-T conditions of ~8 kbar and 750°C in the feldspar-biotite-sillimanite zone. The associated syntectonic granitoids have a strongly peraluminous, high-K (shoshonitic) geochemical imprint. Our new U-Pb zircon age indicate a ~360 Ma crystallization age for a coeval granite. Previous age determinations using monazites from the high-grade rock of this region yield metamorphic ages (Renda *et al.*, 2021) in the range of 390-370 Ma.

We will present more arguments from our ongoing work to support our suggestion that the studied high-grade metamorphic terrane was subjected to prograde melting after a period of regional crustal thickening. In a geochronological-regional perspective, such an event would be coincident with the recently proposed accretion/collision of an island arc (i.e., the Chaitenia island arc, see Hervé *et al.*, 2016; Rapela et al., 2021) or a more complex terrane represented in part by this postulated island arc.

References

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