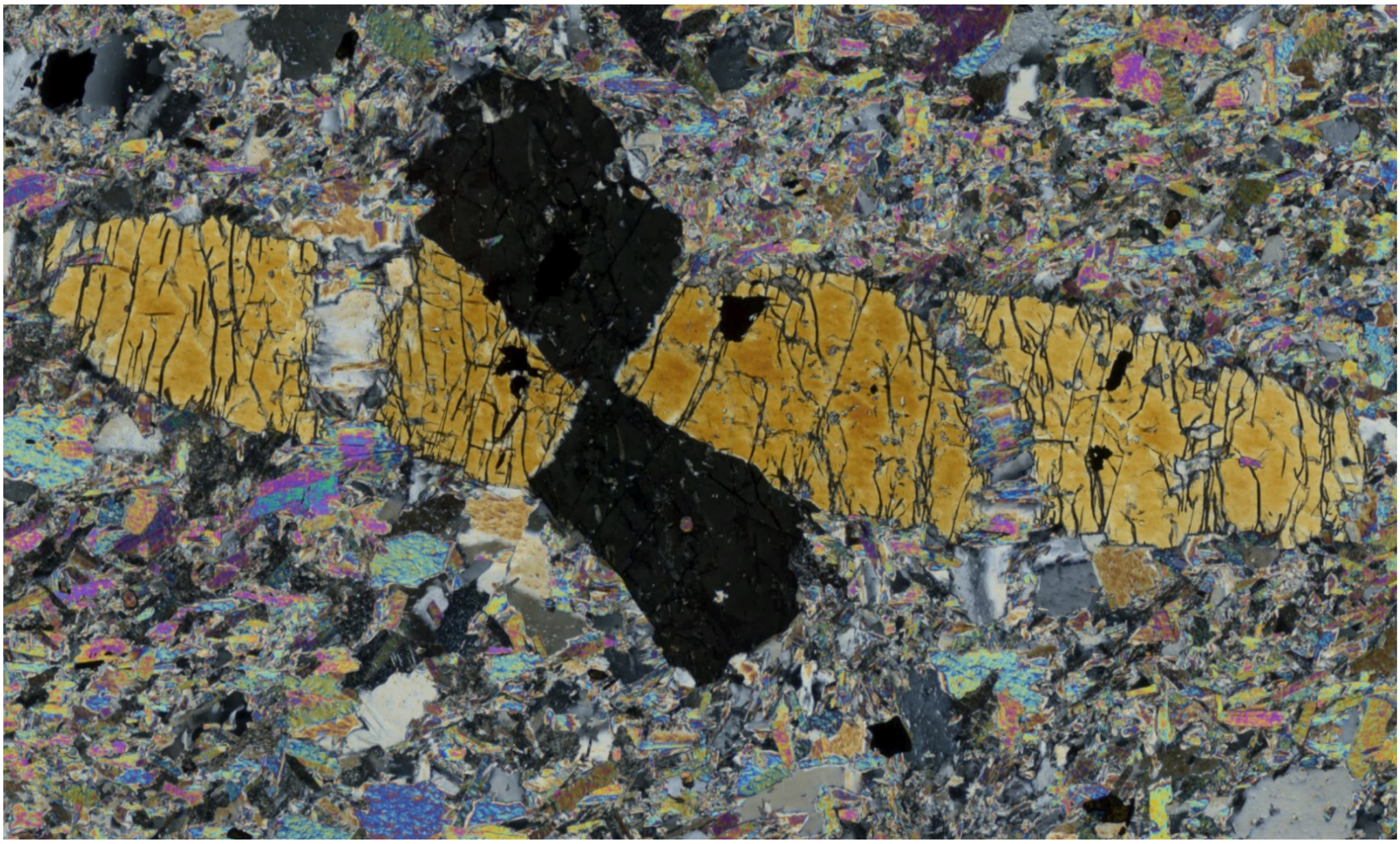
Mineralogical Society

Metamorphic Studies Group

40th anniversary
Research in Progress meeting



29–31 March 2021

MSG 2021 CONFERENCE - SCHEDULE

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Notes:

***Keynote/invited/prize talk (30 minutes)**

All times = British Summer Time = BST = GMT+1

All sessions hosted on Zoom except for the poster sessions, which will be on Gather.Town

The metamorphic architecture of the transpressional Gondwanide Orogen in southern South America: Insights from P-T-D-t paths

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The Gondwanide Orogeny represents a major late Palaeozoic tectonometamorphic event along southern Gondwana, roughly coeval with the Variscan collision recorded along the northern Gondwana margin. In South America it is nearly ubiquitous along the proto-Pacific margin, being intimately associated with protracted subduction. Most relics of the Gondwanide Orogen were upper crustal rocks, but lower to middle crustal remnants are well-exposed in Patagonia (Argentina & Chile). Since robust P-T-D-t constraints are still scarce for the region, the aim of this contribution is to present a regional evaluation of integrated structural, petrological and petrochronological data, in order to evaluate the spatial and temporal evolution at the orogeny scale.

The orogen core comprises medium- to high-grade metamorphic complexes exposed between the North Patagonian Andes and the western North Patagonian Massif, recording dominantly high-T/high- to medium-P metamorphic conditions between the middle Carboniferous and the early Permian [1, 2, 3]. They are spatially associated with coeval calc-alkaline granitoids with continental arc affinity [4, 5, 6]. Further northeast, regional medium- to high-grade metamorphism is documented by the middle to late Permian in the eastern North Patagonian Massif, yielding comparable high-T/high- to medium-P metamorphic conditions. In a similar way, these metamorphic rocks are intruded by middle to late Permian granitoids [e.g., 4]. Finally, Permian low- and very low-grade metamorphism is documented in the Ventania System to the northeast of the North Patagonian Massif as part of the Gondwanide foreland. Permian felsic magmatic rocks are also present, but mainly restricted to tuffs within the sedimentary sequence and a small syenitic-granitic intrusion. In all these areas the Gondwanide Orogen is dominated by WNW-ESE- to NNW-SSE-striking fabrics, mainly associated with a regional metamorphic foliation and, locally, late shear zones. Deformation fabrics and kinematic data suggest a dextral-transpressive regional deformation regime. The marked contrast between metamorphic conditions in northern Patagonia and the Ventania System seems to result from different crustal-scale geodynamic controls. In Patagonia the pre-Gondwanide evolution was related to protracted Palaeozoic subduction and basin evolution along an accretionary margin [7]. In contrast, in the Ventania System there was reactivation of a crustal discontinuity between its Neoproterozoic basement and the adjacent Río de la Plata Craton (RPC) [8]. In this context, widespread crustal thickening during the Gondwanide Orogeny in northern Patagonia might have favoured stabilization of the Palaeozoic accretionary margin [1]. In contrast, the RPC had already attained a high thermal stability during Late Paleoproterozoic cratonization, thus resulting in a thick lithospheric mantle that behaved as a relatively rigid keel. Consequently, the RPC only recorded limited far-field Gondwanide deformation and exhumation [9].

References:

[1] Oriolo S et al. (2019) Tectonics 38:2378-2400; [2] Marcos P et al. (2020) Lithos 376:105801; [3] Renda E et al. (2020) J S Am Earth Sci 106:103045; [4] Pankhurst R et al. (2006) Earth-Sci Rev 76:235-257; [5] Varela R et al. (2015) Rev Asoc Geol Arg 72:419-432; [6] Renda E et al. (2019) Tectonophysics 772:228232; [7] Suárez R et al. (2019) J S Am Earth Sci 95:102256; [8] Christiansen R et al. Precambrian Res, under review; [9] Zalba PE et al. (2007) J Sediment Res 77:528-538