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Is the Gastre Fault System (Central Patagonia) a transcontinental strike-slip fault?

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Large scale intracontinental strike-slip faults and ductile shear zones constitute prominent crustal structures. Assessing the timing, geometry, length and kinematics of these deformation zones is of great tectonic interest since large displacements may be responsible for both the juxtaposition of terranes with contrasting histories and the development of localized zones of either extension or shortening. Recent paleogeographic models for Western Gondwana consider the Gastre Fault System (GFS) in central Patagonia as a major NW-SE intercontinental shear zone that accommodated *circa* 500 km of dextral motion between Patagonia and cratonic South America during Late Triassic-Jurassic times. Furthermore, it was proposed that the GFS has been the precursor of the Agulhas-Malvinas fracture zone in the South Atlantic Ocean, and that its activity was responsible for the large clockwise rotation paleomagnetically detected in *circa* 190 Ma dolerites from the Malvinas/Falkland Islands. Plutonic suites of the Triassic-Early Jurassic Central Patagonian Batholith (CPB) constitute the dominant outcrops in the Gastre area, where the GFS was defined and is assumed to have controlled the emplacement and distribution of the plutons.

However, the tectonic relevance attributed to the GFS in the paleogeographic and tectonic models is being questioned by the growing geological information in the area. As part of ongoing mapping and anisotropy of the magnetic susceptibility (AMS) sampling on the CPB for my Ph.D. study, two “classical” localities in Gastre showing green-schist facies mylonites and cataclasites were revised. Results from a western locality indicate the presence of subvertical, NW-SE foliation and subvertical lineation

in both a 272 Ma (U-Pb zircon conventional) megacrystic granite and its matavolcanic host rock. Aligned feldspar megacrystals in the granite define a magmatic foliation that parallels the mylonitic foliation, whereas microstructural analyses reveal the presence of a high-temperature deformation which is not observed in the host. These observations strongly suggest that magmatic foliation and high-temperature deformation in the granite record Permian strain, with late development of mylonites recording similar strain kinematics at lower temperatures. Further east, near Gastre, field observations and magnetic fabric in another "classical" locality allow finding the occurrence of N-S subvertical foliations and moderate to steep lineations in variably sized mylonite and cataclasite stripes.

Despite the presence of several high-strain localities as those mentioned above, most of the visited outcrops in the CPB reveal the predominance of magmatic structures with the subordinate occurrence of a slight subsolidus overprint. This, and the between-locality dispersion shown by both magmatic foliation and lineation at batholith scale, suggests that deformation in the bulk of the Gastre area could be ascribed to the emplacement history of the CPB.

Thus, the preliminary results of this study indicate the predominance of variably oriented magmatic fabrics at regional scale, steep lineations in high-strain localities, and the presence of Permian deformation, which taken together seem to diminish the paleogeographic significance attributed to the GFS as a major, transcontinental strike-slip deformation zone during breakup of Western Gondwana. As an alternative, the observations could be reconciled with a protracted history of pluton emplacement followed by development of high and low temperature deformation during the cooling process, the latter locally deriving in mylonites and cataclasites.