ANISOTROPY OF MAGNETIC SUSCEPTIBILITY AND FAULT-SLIP DATA STUDY IN LATE CENOZOIC ROCKS EXPOSED IN THE SOUTHWEST BORDER OF PUNA PLATEAU (27°30´S)

Rodrigo Quiroga [1], Matías Peña [2,3], Guillermo Fuentes [4,5], Laura Giambiagi [1], Fernando Poblete [2], Manfred Strecker [6] y Fabián Wagner [3]

(1) Grupo de Tectónica, IANIGLA, CCT Mendoza, CONICET.
rquiroga@mendoza-conicet.gob.ar
(2) Departamento de Geología, Universidad de Chile, Plaza Ercilla 803, Santiago, Chile.
(3) Escuela de Geología, Universidad Mayor, Santiago, Chile.
(4) Escuela de Geología, Facultad de Ingeniería, Universidad Santo Tomás, Ejército 146, Santiago, Chile.
(5) Incaic Exploration Spa, Paseo Ahumada 236, Santiago, Chile.
(6) Institut für Geowissenschaften, Universität Potsdam, Potsdam, Germany.

We present new Anisotropy of Magnetic Susceptibility (AMS) analysis integrated with structural analysis of fault slip data to document a strain field change from syndepositional to post depositional deformation during the late Eocene to Pliocene times, in the southwest margin of Puna Plateau (SWPP) and north areas in the Argentine Precordillera (Pc, 27°30´S, Fig. 1). We obtained 10 AMS sites carried out in late Eocene-early

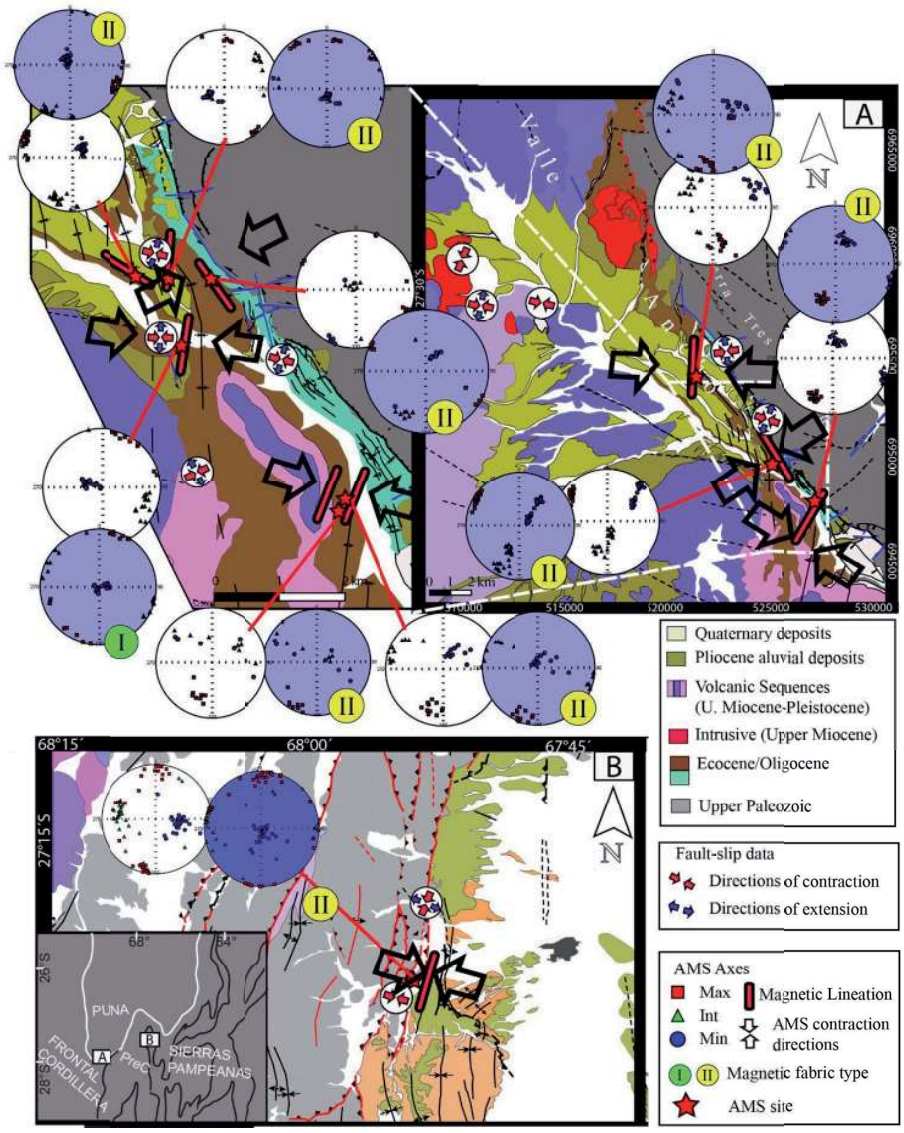

Figure 1. A) Geological map of the southwestern margin between Puna Plateau. Equal-area projection of the AMS axes. B) Geological map of the North area of Fiambalá basin in the margin between Puna Plateau and Precordillera. Equal-area projection of the AMS tensorial mean for each site (Jelinek 1978), obtained in the area. White and blue stereographs show In-situ and Tilt-corrected data, respectively. Yellow circles correspond to the type of magnetic fabric, according to Robion *et al.* (2007).

Oligocene sedimentary rocks in the SWPP and 6 AMS sites in early Pliocene sedimentary and volcaniclastic rocks exposed in Pc (Figs. 1A and 1B, respectively). The measurements show low to high values of anisotropy degree (P= 1,00-1,16) in the deformation zones, and low and high values of bulk susceptibility (with an average of 11.9x10-3 SI). The magnetic fabric is the type I and II, according to Robion *et al*. (2007), in most of the sites, with a shape parameter whose values show an oblate to prolate shape (T=-0,8 to 0,9), with a weak to well-developed magnetic lineation in some sites. We estimate two main orientations of magnetic lineation, a ~N-S and E-W, in the SWPP, and a NS orientation in the Pc area (Figure 1). We compare the orientation of magnetic lineation with the structural features and with maximum horizontal stress directions (SHmax) obtained from fault-slip inversion (FSI) data obtained using the Wintensor software (Delvaux and Sperner 2003) (Quiroga *et al.*, in prep.). In the west area of SWPP the NS-oriented magnetic lineation is parallel to the orientation of folds and reverse faults that affect the early Oligocene sequences, and orthogonal to the E-W compression direction estimated from the FSI obtained from mesoscale reverse fault measured in these rocks, and strike-slip faults affecting the Pliocene volcanic rocks exposed in the area (Fig. 1A) (Quiroga *et al*. in prep.). In the East sector of this area (SWPP), the magnetic lineation is NW oriented, parallel to the main strike of structures that conform a strike-slip fault system, and reverse faults with N-S and NNE compression directions. The activity of these structures started after the middle Miocene times (Quiroga *et al*. in prep). In the North Pc, the magnetic foliation is parallel with the restored bedding plane orientation of Pliocene sequences. The incipient magnetic lineation is NS-oriented, parallel to the NS-strike of folds and faults that are affecting the Pliocene sequences (Fig. 1B), parallel to paleocurrents documented in the same sequences, and orthogonal to the E-W compression documented between the upper Miocene and lower Pliocene (Quiroga *et al*. 2021).

We interpret a tectonic origin for magnetic lineation in the SWPP, documenting an E-W contraction, parallel to the regional SHmax that affected the Central Andes during the Eocene Incaic orogeny. In the Pc area, the magnetic fabric was developed in a sedimentary setting whose incipient magnetic lineation may document an E-W syndepositiontal contraction direction, parallel to the regional Incaic E-W compression. Since ~5 Ma, a shift in the compression direction towards a N-S orientation is interpreted to be related to the local-third-order stress field that affects the entire south margin of the Puna Plateau along its transition to the Frontal Cordillera and Sierras Pampeanas (Quiroga *et al*. 2021). This shifting could be a consequence of the Pliocene uplift of the southern Puna, generating a juxtaposition of an area under N-S extension, in the topographically-higher Puna, with the lower areas outside of the limit of this plateau under N-S compression.

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