Analysis of magnetofabrics applied to the study of neotectonic deformation in the Central Andes of Argentina. Can they be used as a kinematical tool?

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Abstract: Analysis of the anisotropy of magnetic susceptibility (AMS) has been highlighted as a tool for providing insights into incipient deformation conditions (e.g. Kissel et al. 1986, Mattei et al. 1997, Parés et al. 1999). However, this methodology is, up to the moment, not extensively applied and developed for such kind of studies. We accomplished a study on the magnetic fabric properties of Pleistocene to Holocene unconsolidated or poorly consolidated sediments of the Precordillera, in the Central Andes of Argentina. We used the method of AMS with the aim of evaluating it as a tool to characterize the neotectonic deformation in terms of its kinematic behavior, as a complement of structural and geomorphological information.

Sampling sites covered a wide range of lithologies and grain sizes, from silts related to bog deposits to sands in fluvial settings or alluvial fans. In all the cases the samples were spatially related to neotectonic features, although the deformation of the deposits was not always macroscopically distinguishable. The anisotropy of low-field AC magnetic susceptibility (Hpeak= 200 Am^{-1}; f=976 Hz) of 10 localities (39 sites) was studied with an AGICO Multi-function Kappabridge susceptibility-meter (MFK1-FA) by operating in the fifteen-position protocol. Magnitudes of mean susceptibility (between $1x10^{-4}$ and $2.0x10^{-2}$ SI, approximately, with average values around $5x10^{-3}$ SI) indicate that the contribution of ferromagnetic minerals is significant. These preliminary results based on the magnetic fabrics show a broad range of patterns, from purely sedimentary to more advanced stages of tectonic fabrics. Many sites revealed magnetic fabrics with tectonic overprint, even though they were mostly collected from subhorizontal strata with no macroscopic evidence of internal deformation. Furthermore, principal directions of the anisotropy of magnetic susceptibility ellipsoids agree in many cases with the kinematical directions expected from the tectonic setting. Further studies on magnetic properties, such as acquisition of isothermal

remanent magnetization (IRM), back-field demagnetization of saturation of IRM, thermomagnetic curves, frequency dependence and field variation of magnetic susceptibility are in progress in order to find out the type and size of the grains that control the magnetic fabric.

Keywords: Anisotropy of Magnetic Susceptibility (AMS), Magnetic fabrics, Neotectonics, Kinematics, Precordillera of Argentina

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