



Magnetic fabrics in Tertiary continental sediments from the Andes

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During the last 15 years, we have extensively sampled continental deposits in the Central Andes (Altiplano-Puna) to study tectonic rotations and the magnetic fabric recorded by these sediments was also systematically measured. At almost all sites, a well-defined magnetic lineation is recorded. At most localities, the orientation of the magnetic lineation correlates with the orientation of fold axes and tectonic rotations (counterclockwise in the northern central Andes and clockwise in the southern central Andes). Along the Central Andes from north to south, the orientation of magnetic lineations varies from NW-SE to NE-SW. Compaction and tectonic strain appear to be the two main factors controlling AMS in these continental red beds. The information related to the hydrodynamic conditions acting when the sediments were deposited appears to be fully overprinted. Incipient tectonic strain is recorded during the early stages of deformation and the magnetic lineation behaves like a passive marker recording tectonic rotations about vertical and horizontal axes. In most paleomagnetic studies applied to tectonics, tilted sedimentary beds are assumed to have been rotated around an horizontal axis. Without a detailed local structural study, the classic tilt correction leads to an apparent rotation when a possible plunge of the fold axis is not detected (MacDonald, 1980). Non-horizontal magnetic lineation suggests either non-cylindrical folding and/or interference of two phases of compressive deformation and tectonic rotation. In this study, we attempt to use the magnetic fabric to better constrain the deformation and the applied tilt correction. Exemples from the Andes show the interest of a joint study of characteristic directions of magnetization and AMS data to better constrain tectonic rotations around a vertical axis at regional scale.