

Are there vertical axis rotations associated with folded thrusts? Insights from a paleomagnetic study in the Nogueres Zone (Southern Pyrenees)

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Abstract: The transition between the Bielsa sheet and the Nogueres Zone (Axial Zone, southern Pyrenees) is an area of along-strike, strong structural change. From the western (Bielsa area, relative autochthonous) to the eastern area (Nogueres Zone), the antiformal stack of the Axial Zone leads to a highly imbricated thrust system, where hangingwall anticlines are completely overturned and crop out as synformal structures (the so-called *têtes plongeantes*, Séguret, 1972). In this complex structural setting, palaeomagnetic techniques are helpful to test the influence of vertical axis rotations on the alpine building of the area.

The Permo-Triassic units unconformably covering the Variscan rocks of the Axial Zone are the main structural markers of alpine deformation in the study area. They crop out as a continuous ENE-WSW-striking band. A total of 31 sites were sampled in these units. Thermal demagnetization was carried out using a 2G three-axis cryogenic magnetometer in the Palaeomagnetic Laboratory of Gams (University of Leoben, Austria). Magnetic mineralogy was evaluated by thermal demagnetization of orthogonal IRMs of 0.12, 0.4 and 1.5 T (Lowrie, 1990). The dominance of a high coercivity component, with unblocking temperatures mostly ranging between 620 and 680 °C, reveals that hematite is the main carrier of the remanence. A preliminary analysis of the site mean directions shows that after tectonic correction, a dominantly normal characteristic component, North-striking, with shallow to intermediate plunge appears in the front of the Bielsa unit

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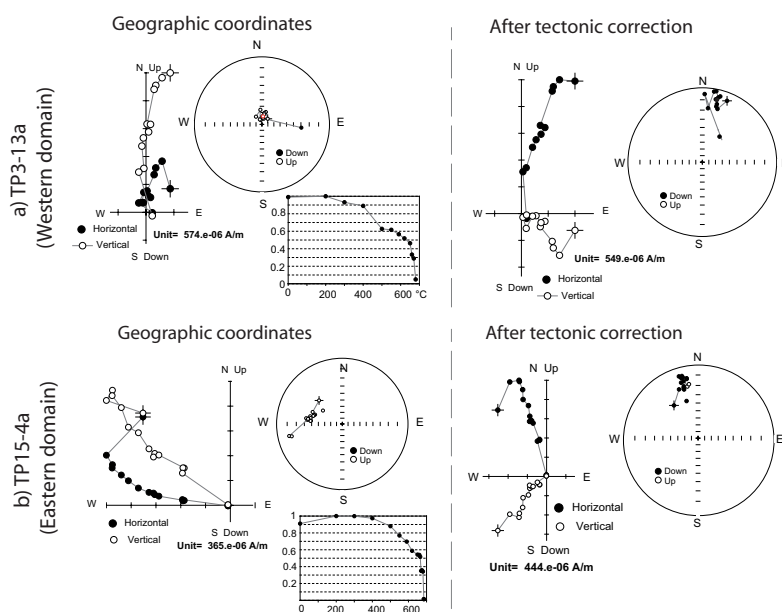


Fig 1. Orthogonal vector and stereographic projection of the remanent magnetization of two representative specimens from (a) western and (b) eastern structural domains, in stereographic coordinates (left) and tilted corrected (right).

(Fig 1a). In the Noguères domain, two different trends of characteristic components could be distinguished: (i) a normal and reverse, North-striking and shallowly plunging component and (ii) a normal, North-striking and intermediate plunging component, with a similar orientation as in the relative autochthonous (Fig 1b). The best grouping of these two components after bedding correction suggests a pre-folding acquisition. Their approximately regular direction insinuates the absence of important, systematic vertical axis rotations between the two domains, although strong local rotations can be inferred associated to the lateral ends of particular structures.

Key words: paleomagnetism, Noguères Zone, red beds, tête plongeante

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