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Microtectonic and magnetic study of a cover-basement interaction, example of the 'Dôme de Barrot' (S-E of France).

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In the south-east of France, the two southernmost External Basement Massifs (EBM) of Argentera and Barrot located south of the sinistral-transpressive border of the Apulia indenter display respectively NW-SE and E-W structural trends. Both are interpreted as exhumed metamorphic unit bordered by a foreland sedimentary cover made of fold and thrust belts. In the 70-80's the Barrot massif had attracted some international interests for paleomagnetic and structural geology studies in order to, (1) study the magnetic properties of Permian red-beds rocks; (2) explain the eastward increasing strain gradient by finite strain analysis; (3) attempt to interpret the original position of the Barrot and Argentera massifs from the directions of magnetization; (4) study the importance of the inheritance normal faults frame in the current major structures.

Structural observations of the Barrot massif (south-east France) reveal an important contrast in term of strain between the thick Permian red beds partly affected by the Alpine compressionnal phase and the Cenozoic sedimentary cover strongly affected by the same phase. Two hypotheses have been formulated. The first one interprets the exhumation of the massif as the main event affecting the cover which pulled out and slid by gravity on a gypsum layer known in this area as a décollement level. For the second interpretation, the tectonic horizontal stress can be responsible of the actual deformation of basement-cover complex.

With the intention to bring new answers, we carry out a microtectonic, AMS and paleomagnetic analyses on both the Permian basement and the surrounding sedimentary cover. The new aspects of this study are to determine the stress regime from fault slip data and especially to establish the magnetic properties of the sedimentary cover where data has not been yet available. Our results reveal clearly huge contrast in terms of both strain (from AMS) and stress (from fault slip data) between the basement and the sedimentary cover. AMS analysis highlights two different shortening directions trending NW-SE and N-S between the basement and the cover respectively. In the same manner, the faults slip analysis show a rigorously N-S trending maximum compressive stress in the cover although the basement shows both a NE-SW and a vertical trending maximum stress.

Regarding the different directions in strain and stress given by two different analyses from AMS and fault slip data, is these results complementary and how can we reconstruct the history of deformation of the Barrot massif and its cover? The paleomagnetic analysis is in progress and would bring some proofs for considering rotation or not of the basement and the cover. We hope to obtain some reliable directions of magnetizations in the cover in contrast to the Permian red beds which did not give any pertinent results in the past.