



Pre-lithification deformations inferred by anisotropy of magnetic susceptibility studies. An example from the Larres marls Formation (Eocene, Southern Pyrenees)

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There is a wide range of internal deformation patterns in unlithified sediments deformation related to the different cohesion and cementation degree. Submarine mass movements range from sand or marly avalanches to cemented block slides between them the degree of cohesion and lithification configures the nature of the generated structures. The style of these structures could be very similar to those generated in high pressure and temperature conditions, as in plastic deformation. Moreover this situation could be a little more complex when the sedimentation is syn-tectonic. The fabric in these kind of structures has been widespread studied but with contradictory conclusions.

Here we present a structural and magnetic fabric study of a metric slump fold in the Larres marls Formation, southern Pyrenees. This unit is part of a deltaic system, and represents the external platform sediments. The Larres Formation is composed by laminated blue marls, with a massive appearance. In detail this Formation is composed by marls with sandy slumpified levels with metric folds and isolated anticlinal hinges.

The AMS ellipsoid has been characterized from 32 cores (98 samples) taken in a metric-scale slump fold. The magnetic ellipsoid has been determined by a KLY-3S (AGICO). The obtained fabric shows a magnetic lineation parallel to the fold axis. The K3 axes are concentrated when the slump stratification is restored to horizontal, and besides, a symmetrical pattern of the shape parameters and degree of anisotropy is observed. These data demonstrate that the slumping process folds a previous magnetic fabric and there is a realignment of particles during the folding.

The regional AMS study shows tectonic magnetic fabrics with magnetic lineation parallel to the main local tectonic structures and with a magnetic foliation contained within the bedding surface. Nevertheless, while the non slumpized sites show tectonic features, the slumpized site does not show either tectonic shortening nor loading evidences. This could be due to inhomogeneous deformation within the slump level or that the blocking of the AMS fabric took place very early, even during pre-lithification stages. The later implies that the obtained magnetic fabrics in unslumpized rocks was mainly acquired during pre-lithification states.