



High-temperature normal shear zones in a transpressive system of the Variscan belt of Sardinia: evidence of extrusion?

R. Carosi, (1), D. Iacopini (1), C. Montomoli (1), C. W. Passchier (2)

(1) Dipartimento di Scienze della Terra, via S. Maria, 53, 56126 Pisa, Italy
(carosi@dst.unipi.it), (iacopini@dst.unipi.it), (montomoli@dst.unipi.it), (2) Institut für Geowissenschaften, University of Mainz, Mainz, Germany

A field example of strain partitioning in a transpressive context can be observed along a transect of the Variscan belt in NW Sardinia. The Nurra – Asinara section shows a continuous sequence of tectono-metamorphic complexes from low- to high- grade metamorphic rocks affected by a polyphase tectonic history. The D1 deformation phase related to the collisional stage at nearly 340 Ma with tectonic transport to the SW, perpendicular to the trend of the belt, has been overprinted by a D2 deformation phase at 315-320 Ma characterized by a tectonic transport parallel to the belt. The main fabric in the study area is related to the D2 progressive deformation phase in which the strain is partitioned into folds and shear zone domains. The D2 stretching lineation and shear sense show a clear change from south to north from parallel to the strike of the S2 foliation to a down dip attitude, respectively. In the domain where lineations are down dip we observe a “thrusting” kinematics with a top to the SW sense of shear. The meso - and micro- structures, vorticity gauges and a quantitative kinematic analysis of local strain suggests that the D2 kinematic history is related to an oblique heterogeneous deformation similar to transpressive systems described in ancient and modern settings elsewhere.

In the high-grade metamorphic complex of the northernmost part of the Asinara island deformation is complicated by the activity of late D2 high-temperature normal shear zones with a top-down to the north sense of movement. The geometry and kinematics of this complex suggests an exhumation mechanism similar to the extrusion during the progressive development of D2 deformation in a general transpressive system.

The extrusion of the northern sector could be explained in two ways: by a transpressive system followed by thrusting or by a partitioned transpressive system in which pure shear dominated in the northern portion.