Geophysical Research Abstracts
Vol. 19, EGU2017-19131, 2017
EGU General Assembly 2017

Slip events propagating along a ductile mid-crustal strike-slip shear zone (Malpica-Lamego line, Variscan Orogen, NW Iberia)

Sergio Llana-Fúnez (1), Nicola de Paola (2), Giacomo Pozzi (2), and Marco Antonio Lopez-Sanchez (1)

(1) Department of Geology, University of Oviedo, Spain (llanasergio@uniovi.es), (2) Earth Sciences Department, Durham University, UK

The current level of erosion in NW Iberian peninsula exposes Variscan mid-crustal depths, where widespread deformation during orogenesis produced dominantly ductile structures. It constitutes an adequate window for the observation of structures close to the brittle-plastic transition in the continental crust.
The shear zone object of this work is the Malpica-Lamego line (MLL), a major Variscan structure formed in the late stages of the Variscan collision. The MLL is a mostly strike-slip major structure that offsets laterally by several kilometres the assembly of allochthonous complexes, that contain a sub-horizontal suture zone, which are the remnants of the plate duplication during the Variscan convergence.
The shear zone is exposed along the northern coast of Galicia (NW Spain). It is characterized by phyllonites and quartz-mylonites in a zone which is tens of meters in thickness. Within the phyllonites, a few seams of cataclastic rocks have been found in bands along the main fabric. Their cohesive character, the parallelism between the different bands, the fact that host rocks maintain mineral assemblage and that no cross-cutting relations in the field were identified, are considered indicative of these brittle structures forming coetaneously with the ductile shearing producing the phyllonites.
Samples from the phyllonites, also from quartz-mylonites, were prepared and powdered to characterize friction properties in a rotary shear apparatus at high, seismic velocities (m/s). Preliminary experiments run at room temperature and effective normal stresses between 10 to 25 MPa, show that friction coefficients μ are relatively high and a limited drop in friction coefficient occurs after 10-20 cm of slip, with μ decreasing from 0.7 to 0.5.
Fracturing seems coetaneous with dominant ductile shearing within the shear zone, however, given the frictional properties of the phyllonites, it is unlikely that brittle deformation nucleates within these fault rocks. Instead, it seems that faulting originated in other sectors of the fault zone, and then propagated through the studied section.