Polyphase deformation history of the "Tibetan Sedimentary Sequence" in the Himalayan chain (South-East Tibet)

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Meso and microstructural analyses performed on the Triassic flysch belonging to the Tibetan Sedimentary Sequence cropping out in SE Tibet led to recognize a polyphase deformation history linked to the evolution of continental collision. The study area is located SE of Lhasa, from Tsedong and Gyatsa to the southern Yala Xiangbo dome.

In the southern analized sectors the main deformation event is a D1 tectonic phase. During D1 metric to chilometric asymmetric F1 folds developed. The folds, facing to the South and striking ENE-WSW are associated to an axial plane foliation (S1). S1 is a low grade foliation and varies from a disjunctive spaced stylolitic cleavage with no dynamic recrystallization to a fine continous foliation. In the first case pressure solution is the dominant deformation mechanism while dynamic recrystallization of illite, quartz, calcite, oxides is associated to the continuous foliation.

Object lineations, trending NW-SE, are well represented by strain fringes, mainly composed by quartz, around pyrite crystals.

A later D2 deformation phase is superimposed to D1 structures. The D2 is represented by a faible crenulation cleavage in the southern portions, but moving towards the northernmost sectors, it becomes the predominant tectonic phase. Moving towards the Yarlung Tsampo Suture zone (YTSZ) we detected the development of E-W trending F2 folds, from decimetric to decametric in size, verging to the North.

A synkinematic recrystallization of illite-sericite has been observed along S2 foliation that, in more strained areas, becomes a fine continuous foliation

The further tectonic evolution is characterized by the development of brittle-ductile shear zones. The shear zones are often localized on the inverted limbs of F2 folds.

Kinematic indicators are mainly represented by S-C structures and point to a top-to-the-north sense of movement.

D1 tectonic phase is linked to continental collision; the continuation of shortening gave rise to the back-verging D2 tectonic phase with a strain increase in the more internal areas (moving towards the YTSZ) related also to the development of Renbu-Zedong Thrust (Yin et al. 2000), bringing the TSS over the mélange complex (Harrison et al. 2000).

References

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