Dear all,

Please consider submitting an abstract to the following session "Stress and strain patterns and mechanisms of micro-meso deformation in folded rocks" of the 2011 EGU meeting (details at:

http://meetingorganizer.copernicus.org/EGU2011/session/7155) .

Fold evolution is still to date mainly described in terms of geometry and kinematics; most studies rely upon analytic and numerical analyses that are based on the present-day geometry of folded strata and geometrical assumptions such as thickness and length preservation. However, the deformation mechanisms that accommodate internal strain within folded strata at the meso- to microscopic scales remain to be properly linked to such geometric/kinematic macroscopic evolution.

Comprehensive understanding of the relationships between the folding process and the development in time and space of fold-related structures is of great importance for both academic and industrial purposes since accurate description and simulation of hydrocarbon and water reservoirs require a good knowledge of mechanical behavior of rocks when they are folded and fractured. At the macroscale, deformation in a fold is mainly accommodated by flexural slip, localization of deformation along fault planes and formation of macroscopic fracture sets; at the microscale, several structural mechanisms are active, such as pressure-solution cleavage and grain-scale deformation (e.g., mechanical compaction, inter/intra grain fracturing, twinning in calcite grains); however, their spatial distribution in the different fold sectors, their succession through time, their relative importance in the deformation of folded strata and the relationship between the development of such structures and the evolution of orientations/magnitudes of tectonic stresses during the different deformation stages recognized during fold development remained poorly constrained.

A lot of work has been carried out on this topic during the two last decades and new exciting results are currently obtained about progressive internal deformation of folded strata, orientations and magnitudes of stresses sustained by folded rocks, the way stress and strain are inhomogeneously distributed in the different fold sectors with respect to fold type, how stresses are potentially affected by the interaction between deforming rock layers with different mechanical properties, occurrence of bed-parallel slip, reactivation of preexisting fractures or even slip along an underlying fault, the chronology of fracture activation, among others.

We think it is timely to put this information all together in order to improve our understanding of the folding process and our appraisal of the mechanical behavior of folded strata which is an essential aspect to understand and simulate the evolution of folded/faulted formations. One challenge is to bridge the gap between the microscopic scale and the fold scale, in order to check whether structural observations made at the microscopic scale in part of a fold may be relevant to the fold scale.

The session therefore aims at making the point about our understanding of the relationships between the folding process, the development in time and space of fold-related structures, the history of strain acquisition from the macroscopic to the microscopic scales in folded strata and the orientations and magnitudes of (local) stresses associated with fold evolution. We invite contributions covering the entire aspects described above, from field-based regional case studies reporting analysis of meso- and microstructures (fractures, cleavages, twins…) and other indicators of internal deformation (rock physical properties including AMS or anisotropy of wave velocity, Fry, ...) to mechanical modeling of fracture and microstructure development and stresses in folded sedimentary rocks.

We would also like to take the opportunity given by the conference to gather research papers in a focused, coherent thematic volume of Tectonophysics. We aim at rendering this volume a significant contribution of lasting use to the community interested in the mechanics of folding process. Although this volume will be the normal issue for papers submitted at the session, we also welcome the papers

by contributors who will not be able to attend the meeting or are simply interested in publishing their work on the topic in a coherent special issue.

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