

# ***Structural evolution of the southern subalpine chains in SE France - A passive margin inverted on multiple detachments?***

Lise Salles<sup>1</sup> & Mary Ford<sup>1</sup>

<sup>1</sup>CRPG-CNRS, Nancy Université, 15 rue ND des Pauvres, 54501 Vandœuvre-lès-Nancy (France)  
(lsalles@crpg.cnrs-nancy.fr).

The Digne fold and thrust belt of the Southern Subalpine chains in SE France records SW to SSW directed shortening of Eocene to Miocene age. Published shortening estimates vary markedly from 65 km (>50%) to about 22 km (20-25%), depending on the implication or not of the basement in model deformation. This part of the Alps remains relatively unexplored by geophysical surveys.

A new cross section oriented SW-NE and 80km long, from the South Valensole Basin to the Tinée Valley (West of the Argentera Massif) is located a little south of previously published sections. Using this cross section we address four major issues related to the evolution of this fold and thrust belt.

***Inversion of a passive margin.*** The cross section crosses three paleo-domains of the Tethyan passive margin, each characterised by a different stratigraphy (facies and thickness). The western part of this transect cuts through a complex imbricate system involving the thinner stratigraphy of the provencal platform, while the deeper water and thicker facies of the Vocontian trough occupy the centre and NE parts of the transect. Detailed stratigraphic correlations across major faults identify them as inverted normal faults of the passive margin.

***Salt tectonics.*** A salt basin developed in SE France during the Triassic period (Muschelkalk and Keuper) as recorded by thick evaporite successions (300 m for the Keuper). The presence of a weak alpine detachment in these evaporites as well as complex local structures linked with long-lived diapirs had a profound influence on the deformation style, distribution and timing.

***Structural style: lateral evolution from a single weak basal detachment (West) to multi-detachments (East).*** The thrust belt is characterised by a major weak detachment level in the Triassic evaporites. In the eastern sector, a second detachment level occurs in the Albo-Cenomanian marls. Our detailed study of the evolution of the Tertiary depocentre in the Annot syncline showed that these two detachments were alternately active during Upper Eocene-Lower Oligocene Annot Sandstone deposition. The juxtaposition and the interference of different fold wavelengths records the activity on these two detachment levels.

***Timing of Deformation.*** Progressive restoration constrained by detailed structural analysis in the upper Cretaceous limestones and the Tertiary depocentres defines an evolution through time for the Digne thrust belt : from the Tethyan passive margin, through the N-S pyrénéo-provençal orogenesis and finally to the SW-NE Alpine shortening and foreland basin evolution. Normal faulting observed in the Tertiary basins, interpreted as generated locally within NE-SW strike-slip zones, was also developed at the same time.