Geophysical Research Abstracts
Vol. 17, EGU2015-9635-1, 2015
EGU General Assembly 2015

Pre-orogenic structural inheritances control on the Provence thrust system, SE France

Lucie Bestani (1), Nicolas Espurt (1), Juliette Lamarche (1), Fabrice Hollender (2), and Olivier Bellier (1)

(1) Aix-Marseille Université, CNRS, IRD, CEREGE UMR 34,Technopôle Environnement Arbois-Méditerranée, B.P. 80, 13545 Aix-en-Provence Cedex 04, France (bestani@cerege.fr), (2) CEA, French Alternative Energies and Atomic Energy Commission. F-13108, Saint Paul lez Durance Cedex, France

The Provence thrust system located to the southeast of France corresponds to the foreland of the Pyrenean and Alps belts, characteristic of the late Cretaceous-Eocene and Miocene to present-day compressions respectively. Paleozoic-Mesozoic pre-orogenic substratum geometry still raise questions and the shortening of Provence and associated partitioning among these two compressional events, which are responsible for the present Provence foreland structure has never been precisely quantified. The Provence foreland is divided into two parts by the Middle-Durance and Aix-en-Provence faults system: the western and eastern Provence. The Middle Durance/Aix-en-Provence faults system is inherited from Paleozoic times and is responsible for strong thickness variations in the Mesozoic sedimentary pile ranging from 3 (easternpart) to ∼10 km (western part). N-S balanced cross sections (∼130 km) between the Baronnies to the north and the Mediterranean Sea to the south reveal that the Provence foreland structure results of 91% of the Pyrenean shortening. The Alpine compression led to minor reactivation of Pyrenean-Provence structures with a Miocene shortening of ∼650 m (0.5%). Cross-section balancing shows an along-strike heterogeneous total horizontal shortening from ∼7.6 km (6%) in the west to ∼51 km (27%) in the east. These results show that during the Pyrenean-Provence compression, the Middle Durance/Aix-en-Provence faults system played the role of an oblique transfer zone between the western and eastern Provence domains and separated two contrasted structural domains. Eastward where the sedimentary pile is thin (<4 km), the inversion of deep-seated late Paleozoic-Triassic extensional structures induced a thick-skin style. On the contrary, westward where the sedimentary pile is thick (>7km), the reactivation of basement structures is not necessary involved in the accommodation of the shortening, leading to a thin-skinned tectonics above Triassic series. Paleozoic basement structured by Hercynian tectonics induced perennial structural trends during Mesozoic. We proposed that the long-lasting reactivation of these inherited faults gave rise to thickness, lithological and, therefore, mechanical and structural style variations in Provence.