Geophysical Research Abstracts, Vol. 8, 09123, 2006
SRef-ID: 1607-7962/gra/EGU06-A-09123

Tectonic evolution of the Fortuna basin - interaction between strike-slip and dip-slip faults

I. Rohrmoser and K. Pelz

Institute of Geology and Palaeontology, University of Stuttgart
(ina.rohrmoser@geologie.uni-stuttgart.de)

The intramontane Fortuna basin in the Eastern Betic Cordillera underwent several phases of extension and shortening. The basin fill starts with Early Tortonian bioclastic marine sediments, followed by Late Tortonian evaporites. In the Messinian and Pliocene sedimentation is predominantly continental interrupted only by a local marine ingression. Deposition was controlled by the interaction of two major fault zones (i.e.: Crevillente Fault Zone and Alhama de Murcia Fault). Through synoptic integration of remote sensing and outcrop data we are able to detect structural domains using the concept of dip domains in map view. Cross-sections were generated through areas of high data density to constrain the basinal architecture. Plausible fault geometries were obtained from hanging wall structural data using trishear and inclined shear. We conclude that the master fault possesses a listric shape with a low-angle detachment dipping towards SSE to depths of 2 to 3 km. Calculated extension across the basin amounts to approximately 10%, which is consistent with measured strain values in well-exposed field sections. During the Early Tortonian the Fortuna basin opened as a NE-SW trending pull-apart structure. At the end of this stage the Crevillente Fault Zone acted as a dextral strike-slip fault dividing the basin into two subbasins. Subsequent sedimentation and faulting was restricted to the southern part. Sedimentation of evaporites in the Late Tortonian and structural confinement during the Messinian can be explained by flexural isostatic rebound of the footwall. Our modelling shows that footwall uplift occurs at low values of effective elastic thickness. Pliocene anticlockwise vertical-axis rotations in the area of Molina de Segura are connected to sinistral movements along the Alhama de Murcia Fault separating the Fortuna basin from the Guadalentin Corridor. Transpression at a northeastern branch of the Alhama de Murcia Fault caused shortening of the Las Llanas anticline. We conclude that the

establishment of the Fortuna basin and the southerly shift of its depocenter is controlled by several faults starting as basin short-cut strike-slip faults but accommodate space later on as dip-slip faults.