Geophysical Research Abstracts
Vol. 13, EGU2011-6902, 2011
EGU General Assembly 2011


# An approach to the allocyclical factors controlling the sedimentary fill in the northern sector of the Neogene Teruel half-graben (Spain).

Lope Ezquerro, Aránzazu Luzón, Carlos Liesa, and Jose Luis Simón

Departamento de Ciencias de la Tierra, Universidad de Zaragoza, Zaragoza, Spain (lope@unizar.es, aluzon@unizar.es, carluis@unizar.es, jsimon@unizar.es)

Alluvial fan systems of different geological ages have been widely studied in tectonically active continental basins around the world as they are excellent registers of the interacting allocyclical factors: climate or tectonics. The northern sector of the Teruel Basin is an intramountain half-graben, about 15 km wide and 40 km long, bounded at the east by the N-S trending, west dipping, El Pobo normal fault, which was active during the Neogene. This basin was initially endorheic, but its fluvial drainage was captured somewhen during the latest Neogene or Quaternary times by Mediterranean streams.

The Neogene (Upper Miocene-Pliocene) syntectonic sedimentary fill (about 500 m in thickness) includes detrital and carbonate deposits laying unconformably on, or in tectonic contact with, Mesozoic-Oligocene rocks. Detrital facies were deposited in alluvial fans mainly coming from the eastern and western basin margins. Alluvial fans had very variable dimensions, from 2 to more than 25 km in length, being the shorter the eastern fed ones. Alluvial processes were mainly dominated by unconfined flows but shallow channels encased in overbank zones existed in the central basinal areas, where base level changes permitted the development of shallow lacustrine systems during some stages and made the development of the alluvial transport processes more difficult.

Because sudden or progressive increase of the grain/clast-size in a megasequential scale has been currently referred to allocyclical changes, a special attention has been paid to both the megasequential evolution of the stratigraphic series and the syn-tectonic features within the sedimentary record in order to precise peaks of tectonic activity.

Our study has allowed to define five megasequences separated by grain-size changes, including progressive increase/decrease (boundary B1) or abrupt increase (e.g. boundaries B2, B3, and B4) in grain-size. Several evidences of tectonics such us progressive unconformities in the eastern basin margin, changes in the geometry of sedimentary bodies as highly incised channels development, abrupt palaeocurrent direction changes coherent with fault movements, or syn-sedimentary faulting affecting to the correlative lacustrine facies are the most evident in the studied deposits. Such tectonic features show a good correlation for the two oldest megasequential boundaries (B1 and B2, Tortonian in age), so that tectonics could produced changes in the basin base level and be totally or partially responsible for the megasequential evolution. In contrast, no correlation exists with the younger (Pliocene in age), B3 and B4 boundaries. Taking into account that the last ones represent a sharp grain size clast increase due to the alluvial fan progradation, these changes could be associated with any of an allocyclical factor (tectonics or climate). Previous studies suggest the existence of tectonic activity in the basin during the Pliocene but also a change towards drier climate conditions, so that only a more detailed analysis of the late Neogene series will allow the discrimination between both factors.

Acknowledgments: This research constitutes a contribution for the “Geotransfer” and “Análisis de Cuencas sedimentarias continentales” research groups of the Gobierno de Aragón, and for the project CGL2009-13390 (Spanish Ministerio de Ciencia e Innovación).