Geophysical Research Abstracts
Vol. 13, EGU2011-9421-3, 2011
EGU General Assembly 2011

Pleistocene sinkholes and subsidence at the confluence of the Ebro and Jalón Rivers (central Ebro Basin, NE Spain).

Héctor Gil, Aránzazu Luzón, María Asunción Soriano, Óscar Pueyo, Antonio Pérez, and Andrés Pocoví
Departamento de Ciencias de la Tierra, Universidad de Zaragoza, Zaragoza, Spain (hecgilgarbi@gmail.com/976761106)

Karstification is a very active process in the central Ebro Basin (NE Spain). In this zone a thick series of evaporites deposited in wide lacustrine systems during the Miocene. Lately in the Quaternary those evaporites were partially eroded and covered by detrital deposits (mainly fluvial). In this context, dissolution of Tertiary beds generates numerous sinkholes both by sudden collapse and by slow subsidence. Sinkhole development is causing important damages in buildings and infrastructures in the whole area. In the last years, some studies of the characteristics of the detrital sediments of the terraces of the Ebro River (close to the city of Zaragoza) indicate that those karstic processes are not limited to present-day time, but were acting throughout the Pleistocene.

This study focuses in the confluence area between the Ebro and the Jalón rivers (central Ebro Basin) where karst studies have not been carried out yet. More specifically, the deposits studied in this work have been previously attributed to the fluvial terrace T3 defined by different authors. In order to analyse the role played by karst in this area, the work has been focused on the main sedimentological features of the detrital deposits, their structural analysis, as well as in the integration and modelling of drill data (to determine thickness) from the area.

The sedimentological analysis permits to associate the detrital deposits in this zone with a main southeast flowing braided gravel fluvial system (ancient Ebro River) receiving lateral supplies (east-directed) from an alluvial fan located on the current position of the Jalón River. Moreover synsedimentary depressions have been found in the area that in some cases were clearly included in a wide subsiding area as the presence of depocentres and thresholds indicate. Such depressions acted as small ponds where lutites deposited. Different morphologies of sinkhole have been observed. OSL dating (three samples) indicates that the studied deposits are comprised between 149,081$\pm$12,678 yr B.P. and 103,783$\pm$7096 yr B.P.

The structural analysis of the fractures and faults in the zone show variable trends (dominating NE-SW), which is not consistent with the regional stress field in this region. This fact can indicate that the generation of fractures were, almost partially, conditioned by the dissolution of the Tertiary evaporites and the later development of sinkholes.

Drills achieved in the area permit elaborate a spatial distribution map of the thickness of the studied terrace. Thickness shows important, and even in some cases, sharp variations. This, together with the aforementioned data could be conditioned by the karstification that took place during the sedimentation of this terrace level.

Acknowledgements: This work has been partially supported by the research projects GA-LC-026/2009 (DGA-CAIXA) and 2008-CIE-21 (UZ). It is part of the investigations carried on by Geotransfer and the Continental Sedimentary Basin Analysis D.G.A. Research Groups.