

Stratigraphy, depositional environment and provenance of Xaltipa Formation in the Huayacocotla Anticlinorium, east central Mexico

***María de los Angeles Verde Ramírez¹, Gilberto Silva Romo¹,**

Claudia Cristina Mendoza Rosales², Elena Centeno García¹, Emiliano Campos Madrigal²

¹*Instituto de Geología, UNAM, Avenida Universidad # 3000, Ciudad Universitaria, Mexico City, 04510, Mexico*

²*Facultad de Ingeniería, UNAM, Avenida Universidad # 3000, Ciudad Universitaria, Mexico City, 04510, Mexico*
(*Email: angelesverde@gmail.com)

The Xaltipa Formation is exposed in the central part of the Sierra Madre Oriental fold-thrust belt in Mexico. This unit covers unconformably Jurassic sedimentary rocks of Huayacocotla Formation and the Proterozoic basement named Huiznopala Gneiss; and changes transitionally up section to Tithonian calcareous rocks of the San Andres Formation. The Xaltipa Formation comprises mostly: medium to coarse-grained, low-angle cross-bedded sandstones, interbedded with lens-shaped conglomerate strata, conglomerates with inverse grading, laminated siltstone, fine grained sandstones and breccias form the upper part of the column. Thickness is highly variable (100-1,500 m) in different localities. We measured two detailed stratigraphic columns and recorded sedimentary structures, composition and textures in order to propose a facies classification. Based on field information, we recognized nine sedimentary facies: matrix-supported massive gravel (Gmm), clast-supported gravel (Gci), clast-supported massive gravel (Gcm), clast-supported crudely bedded gravel (Gh), stratified gravel (Gp), massive sand (Sm), cross-bedded sand (Sp), laminated sand (Sh), laminated silt (Fl) (Miall 2006). Those were grouped in five facies

associations: channels, gravel bars, laminated sandstones, gravel strata and sediment gravity flows and are interpreted as alluvial fan deposits, dominated by a fluvial braided system and debris flows. The textures and structures suggest deposition in a transitional zone, from medium to proximal alluvial deposits. Clast composition of the conglomerates, descriptions and their modal analysis indicate at least four different sources for the rocks: 1) Quartz-rich sandstones from Huayacocotla Formation; 2) local metamorphic basement (Huiznopala Gneiss); 3) Andesites from the Paleozoic Tuzancoa Formation and 4) a non-identified source of granite. According to the modal analysis of sandstones plotted in Dickinson ternary diagrams, the sandstones fall mostly in the recycled orogen field. Thus, the Xaltipa Formation recorded extensional tectonics in the Late Jurassic time for the eastern part of Mexico, probably related to the opening of the Gulf of Mexico.

REFERENCE

Miall, A. D., 2006, *The Geology of Fluvial Deposit*. Berlin, 582 p.