



## **Apatite Fission-Track Analysis of the Middle Jurassic Todos Santos Formation from Chiapas, Mexico.**

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The Sierra de Chiapas (SCH), located in the south of Mexico, is a complex geological province that can be divided on four different lithological or tectonic areas: (1) the Chiapas Massif Complex (CMC); (2) the Central Depression; (3) the Strike-slip Fault Province, and (4) the Chiapas Fold-and-thrust Belt. The CMC mostly consists of Permian granitoids and meta-granitoids, and represents the basement of the SCH. During the Jurassic period red beds and salt were deposited on this territory, related to the main pulse of rifting and opening of the Gulf of Mexico. Most of the Cretaceous stratigraphy contains limestones and dolomites deposited on a marine platform setting during the postrift stage of the Gulf of Mexico rift. During the Cenozoic Era took place the major clastic sedimentation along the SCH.

According the published low-temperature geochronology data (Witt et al., 2012), SCH has three main phases of thermo-tectonic history: (1) slow exhumation between 35 and 25 Ma, that affected mainly the basement (CMC) and is probably related to the migration of the Chortís block; (2) fast exhumation during the Middle-Late Miocene caused by strike-slip deformation that affects almost all Chiapas territory; (3) period of rapid cooling from 6 to 5 Ma, that affects the Chiapas Fold-and-thrust Belt, coincident with the landward migration of the Caribbean-North America plate boundaries. The two last events were the most significant on the formation of the present-day topography of the SCH.

However, the stratigraphy of the SCH shows traces of the existence of earlier tectonic events. This study presents preliminary results of apatite fission-track (AFT) dating of sandstones from the Todos Santos Formation (Middle Jurassic). The analyses are performed with in situ uranium determination using LA-ICP-MS (e.g., Hasebe et al., 2004). The AFT data indicate that this Formation has suffered high-grade diagenesis (probably over 150 °C) and the obtained cooling ages, about 70-60 Ma, correspond to a Late Cretaceous event. This tectonic event is contemporaneous with a startup of the Laramide Orogeny occurred in North America. The constructed time-temperature paths show the rapid cooling during the Middle-Late Miocene (15-10 Ma), like other published data.

### References:

- Hasebe et al. (2004) *Chemical Geology*, 207, 135-145  
Witt et al. (2012) *Tectonics*, 31, TC6001, doi:10.1029/2012TC003141