Petrogenesis of basement rocks in the Southern Chiapas Massif: Implications on the tectonic evolution of the Maya Block

RENEÉ GONZÁLEZ-GUZMÁN[1]*, BODO WEBER[1], ROMÁN MANJARREZ-JUÁREZ[1], LUTZ HECHT[2] AND LUIGI SOLARI[3]

[1]División de Ciencias de la Tierra, CICESE, Baja California, México (*correspondence: rguzman@cicese.edu.mx)
[2]Leibniz-Institut für Evolutions-und Biodiversitätsforschung, Humboldt-Universität Berlin, Berlin, Deutschland
[3]Centro de Geociencias, Universidad Nacional Autónoma de México, Querétaro, México

Geological mapping, U-Pb zircon age dating, Lu-Hf and Sm-Nd isotopes, whole-rock geochemistry, and mineral chemistry was performed in samples from the Southern Chiapas Massif (SE Mexico), a medium- to high-grade metamorphic complex in the Southern Maya Block. U-Pb zircon geochronology implies exposed ~1.0 Ga basement including felsic orthogneiss (ƐHfi = -8, ƐNdi = -7, SiO2 = 67 %wt.) and metabasites (ƐHfi up to +10, ƐNdi +5, #Mg 28-60). The rocks underwent strong ductile deformation and upper amphibolite facies metamorphism locally with anatexis. The migmatites show transition from homogeneous diatexite to strongly foliated metatexite. U-Pb zircon ages indicate that neosome from amphibolites crystallized at ~450 Ma coeval with granitic plutons in the area [1]. Slightly older (~480-460 Ma) S–type granitic intrusions [2,3] are interpreted in terms of partial melting of metasedimentary rocks, prior to the anatexis of the mafic protoliths. A collisional tectonic setting is suggested for the resulting granitoids. In previous works, metabasites have been linked to an extensional tectonic setting related to the opening of the Rheic Ocean [1]. The new data presented here, require a reinterpretation of the tectonothermal history. Petrographic and electron microprobe analyses on metabasites revealed that the rocks underwent regional Barrovian metamorphism with peak P-T conditions of >8 kbar and up to 750 ºC, in the transition from amphibolite to granulite facies. The petrogenetic observations are explained with processes during Taconic-Salinic orogenies that involved accretion of arc-back-arc complexes to the Gondwanan margin or other peri-Gondwanan blocks in Ordovician times. A paleogeographic model is proposed that suggests a common evolution for the Maya Block and other allochthonous blocks from Northern South America.

[1] Estrada-Carmona *et al* (2012) *Int. Geol. Rev.*, **54**, 1918-1943. [2] Weber *et al* (2008) *J. Geol.*, **116**, 619-639. [3] Solari *et al* (2013) *J. Geol. Soc. Bull*, **125**, 625-639.