

## Structure of the San Miguel ultramafic body and its host rock, the Acatlan Complex, southern Mexico: a fragment of the Iapetus or Rheic oceans

D. Fox<sup>1</sup>, J.D. Keppie<sup>2</sup>, J. Dostal<sup>1</sup>, and F. Ortega-Gutierrez<sup>2</sup>

<sup>1</sup>*Department of Geology, Saint Mary's University, Halifax, Nova Scotia B3H 3C3, Canada*

<sup>2</sup>*Instituto de Geologia, Universidad Nacional Autonoma De Mexico, 04510 Mexico D.F., Mexico*

The San Miguel ultramafic body appears to represent a slice of oceanic lithosphere that was thrust onto a thick psammitic-pelitic sequence (Chazumba Formation) during the Paleozoic. These units form part of the Acatlan Complex that lies west of the 1 Ga Oaxacan Complex that is inferred to represent part of the Amazonian craton. The structural sequence consists of the following: (1) a foliation,  $S_E$ , defined by mica which appears to be associated with the thrust at the base of the ultramafic body; (2) a micaceous, crenulation cleavage axial planar to the main folds,  $F_M$ , which are generally isoclinal and recumbent with curvilinear fold axes that appear to represent segments of sheath folds with long limbs generally trending NNW-SSE –  $S_M$  is strongly developed at the base of the ultramafic body suggesting further thrust movement during this phase of deformation; (3) late, upright, open-tight, gently N-plunging, N-S (and some conjugate) folds,  $F_L$ , which vary from cylindrical to conical; (4) moderately NW-dipping, NE-trending kink bands; and (5) variably oriented faults.

The outcrop pattern is a mushroom-shaped interference pattern produced by superimposition of  $F_L$  on  $F_M$ . The general NNW-SSE orientation of the  $F_M$  fold axes is probably parallel to the direction of thrusting. The  $F_M$  and  $F_L$  structures are cut by granitic sheets that have been dated at  $172 \pm 1$  Ma (Sm-Nd

garnet-whole rock age) and  $175 \pm 3$  Ma (Rb-Sr muscovite-whole rock age). Several kilometres to the north, structures geometrically correlated with  $F_M$  show top-to-the-south kinematics during which the  $287 \pm 2$  Ma Totoltepec pluton was thrust over the (?)Devonian Tecomate Formation. The Totoltepec pluton is unconformably overlain by Middle Jurassic rocks. This appears to bracket the  $F_M$  and  $F_L$  deformation in the Permo-Triassic, however, elsewhere Mississippian rocks are reported to unconformably overlie N-S trending folds, suggesting that  $F_M$  and  $F_L$  fold are pre-Carboniferous, post-Devonian(?). Thus, the main and late structures may relate to the Permian amalgamation of Pangea and Triassic opening of the Gulf of Mexico. Alternatively, they may record the Devonian transpressive collision between Laurentia and Gondwana during the closure of Iapetus, or convergent tectonic events on the margin of Gondwana adjacent to the Rheic ocean. Correlatives of the  $F_E$  folds farther north do not affect the (?)Devonian Tecomate Formation and may be related to the Late Ordovician-Early Silurian Acatecan Orogeny, which is inferred to record either the collision between Laurentia and Gondwana or active tectonics on the southern, Amazonian margin of the Rheic Ocean.