

TWO JADEITITE BELTS IN THE MOTAGUA VALLEY FAULT ZONE,
GUATEMALA: TWO SUBDUCTION EVENTS OR ONE SUBDUCTION EVENT
WITH RETROGRESSION?

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The Motagua Valley in Guatemala is underlain by a major fault zone that is the boundary between the Maya block of the North American plate and the Chortís block of the Caribbean plate. The geological evolution of the Maya block is quite different from that of the Chortís block. The Motagua fault zone is a serpentinite-matrix mélangé containing tectonic inclusions of High Pressure / Low Temperature (HP/LT) metamorphic rocks that were thrust both northward onto the Maya block, and southward upon the Chortís block. In the north, the HP/LT inclusions are omphacite metabasite, jadeitite, garnet amphibolite, and albitite, whereas the HP/LT rocks in the south are lawsonite eclogite, blueschist, and jadeitite.

The HP/LT rocks in the north are altered in contrast to those in the south.

Structural and geochronological data indicate that at least four tectonic events (T_1 to T_4) have occurred in the study area. The first event (T_1) occurred between 135 and 113 Ma; these $^{40}\text{Ar}/^{39}\text{Ar}$ ages have only been found in the southern Chortís block. The second event occurred between 77 and 53 Ma; these $^{40}\text{Ar}/^{39}\text{Ar}$ ages were found only in the Maya block in the north. The third event (T_3) took place in both blocks between 43 and 23 (?) Ma, as shown by $^{40}\text{Ar}/^{39}\text{Ar}$ and apatite fission-track analyses. The fourth event (T_4) is related to recent deformation.

Mega- and mesoscopic deformation structures suggest that during T_1 the SE moving Chortís block was subducted underneath and collided with western Mexico after which the HP/LT rocks were exhumed and emplaced. The Chortís block continued moving to the SE until a subduction reversal of the Central American arc occurred. Subsequently, the Chortís block as part of the Greater Antilles arc, migrated to the NE. During T_2 it collided and was thrust over Maya block (southern Mexico). It appears that a second group of HP/LT rocks were exhumed and thrust to the north. An alternative model is that these rocks are the same rocks formed during T_1 but were strongly deformed, altered, and metasomatized. The third and fourth events (T_3 and T_4) probably are related to changes in plate motions along the Caribbean - North American plate boundary.

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