Partial melting of subducted oceanic crust is a phenomenon generally accounted for to explain aspects of magmatism triggered by subduction, but it is rarely observed in subducted rocks bodies exhumed to the surface of the Earth (e.g., the exotic blocks within the Catalina Schists, California; Sorensen, 1988). Recent evidence for the partial melting of subducted oceanic crust has been found in the Sierra del Convento serpentinite-mélange (Eastern Cuba). The mélange contains a variety of exotic blocks metamorphosed to high pressure and low and high temperature, but the most typical type of block is MORB-derived epidote±garnet (rarely + Na-rich diopsidic clinopyroxene, see ACF diagram of Fig. 1) but Pl-lacking amphibolite that is intimately associated with leucocratic low-K trondhjemitic material. The structure of the trondhjemites varies from crosscutting veins to concordant layers, and from stromatic (Fig. 1) to agmatitic bodies, in all cases within the amphibolites. The primary (magmatic) assemblage of the trondhjemites is formed by plagioclase (oligoclase), quartz, epidote, ±paragasitic amphibole, ±paragonite, ±rutile, ±phengitic muscovite. The crystallization of epidote and, most importantly, paragonite from the trondhjemitic melts suggests formation and crystallization at high pressure. Indeed, the peak metamorphic conditions (700-750 °C, 14-18 kbar) of the amphibolites are well above the H₂O-saturated solidus, and overlap the H₂O-free solidus, of the basaltic system (Fig. 1), supporting that the leucocratic material formed after partial melting of the subducted oceanic crust. The geochemistry of the rocks, the analysis of phase assemblages, and the results of partial melting experiments of appropriate rocks indicate, however, H₂O-present melting and that the fluid was externally-derived, most likely after the dehydration of associated subducted metasediments. The infiltration at moderate temperature caused melting that progressed upon eutectic-like reactions, explaining the scarcity of clinopyroxene and the systematic lack of primary plagioclase in the amphibolites, as compared to other high grade metabasite complexes formed at subduction zones (Catalina Schists) or the roots of volcanic arcs (e.g., Fjordland, Cascades). Partial melting of subducted oceanic crust seems unique within the high-pressure mélanges of the Caribbean realm, and has important consequences for the plate tectonic interpretation of the region during Mesozoic times because it permits characterizing these rocks as the result of hot subduction. For the studied complex, high geothermal gradient during subduction can be conceptualized within the tectonic scenario of onset of subduction and/or subduction of young oceanic lithosphere. Plate-tectonic reconstructions for the region would support both scenarios, though the onset of subduction is preferred. Thermal models developed for onset of subduction are consistent with the observed prograde P-T path. Furthermore, the analysis of retrograde overprints (made of combinations of omphacite, glaucophane, paragonite, lawsonite, albite, (clino)zoisite, chlorite, and pumpellylite; ACF diagram of Fig. 1) indicates that the blocks followed counterclockwise P-T paths (Fig. 1) interpreted as the result of continuous refrigeration of the subduction system, as predicted by thermal models. The available age data suggest an Early Cretaceous (ca. 110 Ma) age for the process, when plate tectonic reconstructions identify polarity flip of subduction. The petrological analysis argues against genetic correlations between the high-pressure serpentinite-mélanges of Eastern and West-Central Cuba, the former formed at a nascent subduction zone and the latter probably at a demising subduction zone.

References:


**Figures**

Figure 1.- Migmatitic structure in amphibolite from the Sierra del Convento mélange, ACF plot showing the prograde (pargasite-epidote-garnet-Na-bearing diopsidic clinopyroxene, apatite) and retrograde (omphacite, glaucophane, actinolite, albite, sphene, serpentine-amesite) assemblages of amphibolite sample CV273J, and P-T diagram showing the prograde and retrograde paths of selected samples of amphibolite. The ACF diagram is constructed with software *DWIMAGER* (Torres-Roldán and Garcia-Casco, unpublished) using the XR signals (Kα) of the elements obtained after scanning the sample with an electron microprobe CAMECA SX50. The P-T paths are based on calculations using version 3.21 of *THERMOCALC* software (Powell and Holland, 1994). The P-T diagram includes the grid for the basaltic system of Vielzeuf and Schmidt (2001) to show the P-T conditions attained above the H2O-saturated solidus, and representative reactions among pure jadeite, albite, lawsonite, paragonite, zoisite, αQuartz and H2O-fluid calculated using software *TWEEQU* (Berman, 1991; 1996 upgrade) to show conditions of formation of retrograde lawsonite in the trondhjemitic segregates.