Indosinian tectonics in Vietnam

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Abstract: In Vietnam, the Triassic Indosinian collision affected coevally the Truong Son belt and the Kontum Massif,which were not independent tectonic units, but parts of the same Gondwana-derived Indochina continental block. This thermotectonic event took place synchronously throughout Vietnam, during the Lower Triassic 250-240-Ma time interval, as demonstrated by numerous geochronological data, combining Ar-Ar and U-Pb dating methods. Structural and kinematic investigations, in the Indosinian metamorphic rocks, reveal that the collisional process resulted from a consistent northwest-striking convergence of Indochina with respect to the adjacent blocks. It is suggested that this motion was taken up by a pair of opposite subduction zones: to the north, beneath South China, and to the west, beneath western Indochina, along the Song Ma and Po Ko sutures, respectively. Tectonic markers, calc-alkaline subduction-related volcanism and granitic intrusions and the generation of high-pressure rocks that have been recently discovered support this geodynamic setting, at least along Po Ko. Along the northwest-trending Song Ma zone, the obliquity of the convergence during subduction and subsequent collision resulted in the development, within the Truong Son Belt, of a set of subparallel dextral mylonitic shear zones, under amphibolite-facies metamorphism. The intermediate segments remained weakly metamorphic or even almost devoid of metamorphism. Along Po Ko, the convergence was near-orthogonal, with a left-lateral strike-slip component; the ongoing continental subduction resulted in the reworking of the Kontum granulitic basement and the development of Indosinian HP granulitic conditions; the subsequent extension-related exhumation operated approximately in the same northwestwards direction. This Indosinian evolution, applied on a continental crust that had been probably affected, as in South China, by a Caledonian-related event, as judged by the general unconformity of the Lower Devonian sediments, the widespread occurrence of magmatic crystallisation ages of ca 450 Ma (Ordovician-Silurian), and by the approximately similar age of the primary granulitic episode in the Kontum Massif. The similarities of the Devonian facies over central, northern Vietnam and South China imply a land connection, possibly as a consequence of a Caledonian collision along Song Ma, but this does not preclude a further oceanic opening and a closure during the Indosinian.
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