

OVERTURNED MARBLE LAYERS IN BACKBONE RANGE OF TAIWAN MOUNTAIN BELT:AN EVIDENCE FOR EXTRUSION EXHUMATION

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The formation of the Taiwan Mountain Belt was due to the oblique collision between the Luzon arc and the Asian passive continental margin since Plio-Pleistocene to the present. Across the mountain belt, three conspicuous features have been noted: (1) the cleavage/foliation of the metamorphic rocks exhibits a fanning orientation, i.e., it dips to the east for rocks in the western part of the mountain belt, whereas it dips to the west for the eastern part; (2) down-dip stretching lineation with top-to-the-northwest shear sense was recorded in the east dipping rocks, but left-lateral sense of shear was observed in the east dipping rocks; (3) an inverted metamorphic zonation was noted in both the western and eastern parts of the mountain belt, although a normal metamorphic zonation is also present limitedly in the central part. In the present study, we measure O- and C-isotope compositions across thin, pure marble layers enclosed within slate or schist. Comparing the degree of isotopic depletion on top and bottom margins relative to the marble interior, it can be concluded that if the marble layers exhibit a normal or an overturned attitude after peak metamorphism. The results show that marble layers from rock sections with an inverted metamorphic zonation were all overturned during exhumation and that marble layers from a normal metamorphic zonation remained normal. A vertical extrusion exhumation model is therefore postulated as the main mechanism of Taiwan mountain building process.