



Mountain Building Mechanisms in the Southern Central Range of the Taiwan Orogenic Belt - from Accretionary Wedge Deformation to Arc-Continental Collision

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Most researches consider the Taiwan Orogeny to be the result of an oblique arc-continental collision between the Philippine Sea Plate and Eurasia Plate. According to kinematic modeling, the mountains started to build from the north and progressively propagated southward at a rate of 60-90 km/my. Because of the oblique nature of the collision, the influence of the collision on mountain building resulted in the southern Central Range experiencing orogenic processes more recently than in the north. In order to test this model, we studied a critical area using zircon and apatite fission-track data to reveal the early exhumation history of the southern Central Range. We find that exhumation started about 6 Ma, which is earlier than the previously predicted timing of mountain building. We also find that the exhumation history can be separated into two stages: an initial stage starting at ca. 6 Ma and continuing to ca. 1 Ma with a slow uplift rate of <1mm/yr; and a second stage starting at ca. 1 Ma until the present with a high uplift rate of 4-10 mm/yr. The initial stage of mountain building is considered to be related to accretionary wedge deformation as the South China Sea Plate subducted beneath the Philippine Sea Plate whereas the second stage mountain building resulted from the arc-continental collision. Combining the ages of isotopic dating and fission-track dating in the northern Central Range, we find that the northern Central Range

also could start exhumation at ca. 6 Ma and that its exhumation history can also be separated into two stages with similar exhumation patterns and mechanisms to that of the southern Central Range. The most notable difference between the exhumation history of the northern and southern areas of the range is the more extensive degree of exhumation in the north; this could be attributed to the northern Central Range having experienced a longer collision history.