Geophysical Research Abstracts,
Vol. 11, EGU2009-10879, 2009
EGU General Assembly 2009

Active mountain building in Taiwan in comparison to the early postcollisional evolution of the Alps

K. Ustaszewski (1), J. Suppe (1), Y.-M. Wu (1), and S.-T. Huang (2)

(1) National Taiwan University, Earth Sciences, Taipei, Taiwan (kamilu@ntu.edu.tw), (2) Chinese Petroleum Corporation, Miaoli, Taiwan

Taiwan represent the subaerial part of an active, bivergent thrust belt resulting from the oblique collision between the Luzon island arc of the Philippine Sea Plate and the passive margin of the Eurasian Plate since about 4 to 6.5 Ma. This collision followed the initially intraoceanic subduction of the South China Sea lithosphere below the Philippine Sea Plate, which commenced c. 15 Ma ago and which still prevails south of Taiwan in the Manila accretionary wedge. Considering the collision between Eurasia and the Luzon island arc as one between a large continental plate and a microplate, many analogies can be inferred between currently ongoing mountain building processes in Taiwan and those that occurred in the Alps following closure of the Alpine Tethys in the late Palaeogene. Based on new crustal-scale cross-sections and high-resolution earthquake tomography, we provide an overview of Taiwan's kinematics and compare this to the late Palaeogene evolution of the Alps, a time that marked its transition from an accretionary to a collisional, bivergent orogen.

The Taiwan fold-and thrust belt is characterised by actively growing topography, crustal accretion by thrust propagation towards the foreland, a subsiding foreland basin and ongoing tectonic exhumation of metamorphosed continental basement and cover in the retrowedge. Exhumation is controlled by the development of a crustal-scale backfold that overprints earlier fabrics related to foreland-facing transport. Backthrusts within the Eurasian basement that were active at greenschist-facies conditions facilitated exhumation. 40Ar/39Ar ages on synkinematically deformed biotites suggest that backthrusting started as early as between ca. 3-4 Ma, i.e. shortly after or concomitant with the onset of collision between Eurasian passive margin and Luzon island arc. At the internal side of the backfold, blueschist-facies units that likely represent subducted forearc lithosphere are preserved. This structural setting bears some surprising similarities to present-day transects across the Central and Western Alps, where backfolding and backthrusting above the Insubric Line, starting in the late Palaeogene, led to exhumation of eclogite-facies continental crust in the Dora Maira, Gran Paradiso and Monte Rosa massifs.