



From subduction to collision: constraining the early history of the Taiwan Mountain Belt by plate tectonic reconstructions

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Understanding formation of the Taiwan orogen is important, because it is an active case-example to test geodynamic theories of mountain building processes, such as the critical wedge model, or of subduction zone reversal. Nevertheless, large uncertainties exist regarding the pre-collisional architecture of the orogen, timing of collision, as well as peak metamorphic conditions of the Cenozoic orogeny. The goal of this contribution is to re-evaluate existing models in the light of recent geophysical datasets, and constrain the evolution towards the present day plate tectonic configuration with a comprehensive reconstruction of plate movements since the Late Cretaceous. To this end, we present a revised analysis of the plate tectonic framework of Southeast Asia since the Late Cretaceous, a time when subduction polarity was still opposite to what is observed at present (westward subduction of the Pacific Plate, as opposed to eastward subduction of Eurasia at present). This is independent of the subduction zone reversal thought to occur at present in the northern part of the Taiwan orogen. We place our reconstructions within a global plate tectonic frame, and discuss (1) the consequences of subduction zone reversal for the evolving passive margin, (2) the influence of opening on the (proto-) South China Sea on the pre-collisional architecture. This yields a new model for the collisional history of Taiwan, which reconciles the pre-collisional architecture with the metamorphic conditions of the Cenozoic orogeny, and makes predictions about timing of peak-pressures, as well as the timing of collision and present subduction zone reversal.