



What goes on in a Collision Factory: Accretion Tectonics and Orogenic Buildup in SE Asia

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Modern SE Asia between the converging Australia and Eurasia continental plates is a collision factory, where basin collapse, ophiolite emplacement, arc collisions, microcontinental accretion and subduction, and crustal shortening have been taking place during the last 45 m.y. as a complex orogenic prelude to a final continent-continent collision event in the future. The mechanisms of these discrete geological phenomena, their imprint on the rock record, the subduction zone geodynamics involved, and the tectonic settings of different crustal and lithospheric entities can still be determined because of the wealth of geophysical, geological, and marine geology data, well-known present relative motions of the major plates in the region, ten years of accumulated GPS observations, and detailed tomographic images and models available. Therefore, this collision factory provides a natural laboratory to examine various crustal and mantle processes involved in the evolution of accretionary-type orogenic belts and a real-time snapshot image of different stages of orogenic buildup.

This paper presents a close look at different stages all controlled by the consequence of a long lasting subduction which creates marginal basins floored with oceanic crust, and later closes these basins when it is perturbed. The processes of shortening are all illustrated in SE Asia, from the subduction blocking to reversal (e.g. Philippines or Timor), subduction of the back arc basin (e.g. Celebes), transfer to the opposite margin (Makassar) and subduction of the entire basin (NW Borneo). These examples displays progressively more advanced phases of collision tectonics with characteristic structural, metamorphic, and magmatic features, prior to the impending Australia-Eurasia continental collision in the future.