

The Tectonic Evolution of The Banda Orogen, East Timor

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The tectonic evolution of the Banda Orogen, East Timor, has long been an issue of conjecture, due to the complexity of the geology and paucity of field data. Reconnaissance structural mapping of two metamorphic complexes (the Lolotoi and Aileu Complexes), thought to be allochthonous, was undertaken in addition to apatite (U-Th)/He dating of samples from the Aileu Complex. Pervasive deformation of the metamorphic complexes was related to uplift rates to establish a model for the tectonic evolution of the orogen.

The Lolotoi Complex is a greenschist-facies metamorphic package of interlayered meta-sediments and volcanogenics. Structural fabrics include a pervasive, flat-lying foliation with indications of layer-parallel shear and a second steeply-dipping localised crenulation cleavage. Late normal faults were widespread and overprinted by strike-slip faulting. The Aileu Complex comprises meta-sediments interleaved with amphibolite and Iherzolite, which range in grade from greenschist to upper amphibolite facies. A pervasive layer-parallel fabric is indicative of north-verging tectonic transport, overprinted by a fabric associated with regional shear zones with a south-verging sense of transport. Late normal and strike-slip faults are present in the Aileu Complex.

It is proposed here that the Aileu Complex experienced early thickening during D_{1-2} associated with accretion onto the Eurasian plate during the Eocene. Later, during Pliocene arc-continent collision, both the Aileu and Lolotoi Complexes were thrust southwards onto the Australian continental margin during D_{3-4} . Topographic collapse gave rise to extensional faults (D_5), while ongoing convergence was accommodated by strike-slip faulting (D_6). Apatite (U-Th)/He data recording the final stages of erosional equilibration of the orogen suggest that D_{1-2} thickening occurred during the Eocene-Oligocene, well before the Pliocene arc-continent collision that has previously been considered the major tectonic event responsible for the evolution of the Banda Orogen. ■

