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Abstract

Along-strike variations in orogenic development can be difficult to constrain. Resulting assumptions projecting similarity or variability along strike can lead to erroneous conclusions at the orogen scale. Young orogens provide opportunities to document limits of along-strike projection and test factors that may control lateral variability. Here we present new constraints on the history of uplift, exhumation and shortening in the Timor orogen from West Timor, Indonesia. Structural mapping documents a foreland thrust stack of Jurassic-Miocene Australian margin strata and a hinterland antiformal stack of Permo-Triassic Australian continental units duplexed below Banda Arc lithosphere. Biostratigraphy within the piggyback Central Basin reveals earliest deepwater synorogenic deposition at 5.57 – 5.53 Ma, uplift from lower to middle bathyal depths at 3.35 – 2.58 Ma, and uplift from middle to upper bathyal depths at 2.58 – 1.30 Ma. Hinterland Permo-Triassic strata yield apatite (U-Th)/He ages of 0.33 – 2.76 Ma, apatite fission track ages of 2.19 – 3.53 Ma and partially reset zircon (U-Th)/He ages. These thermochronology ages are youngest or most strongly reset in the center of the antiformal stack and yield modeled exhumation rates of 0.45 – 3.31 km/Myr. A balanced cross section reveals a minimum of 300 km of shortening including 210 km of Australian continental subduction below the Banda forearc. When compared to published results from Timor-Leste, these data show that