

## Exhumation of Triassic HP-LT rocks by upright extrusional domes and overlying detachment faults, Ishigaki-jima

OSOZAWA, Soichi<sup>1\*</sup>, John Wakabayashi<sup>2</sup>

<sup>1</sup>Department of Earth Sciences, Graduate School of Science, Tohoku University, <sup>2</sup>Department of Earth and Environmental Sciences, California State University, Fresno

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The Tomuru Formation of Ishigaki-jima in the southernmost part of the Ryukyu arc, comprises blueschist facies subduction complex rocks metamorphosed in Triassic time. D1 structures related to subduction, blueschist facies mineral growth, and possibly early stages of exhumation, are deformed by D2 structures that appear to reflect the last stage of exhumation. D2 structures define several anticlines with parasitic overturned folds verging away from anticlinal axes. The shortening recorded by this deformation appears to reflect upward extrusion relative to flanking material. The anticlines are flanked by detachment faults with normal sense-of-shear parallel to D2 vergence. Hanging wall rocks that include the Fusaki Formation, an accretionary prism with early Cretaceous metamorphic ages, and late Eocene limestone, conglomerate, and andesitic volcanics. The Eocene strata contain metamorphic detritus derived from the Tomuru and Fusaki Formations indicating pre-late Eocene surface exposure of these units. Ultramafic rocks and gabbro blocks of the Tomuru Formation were incorporated by sedimentary sliding into the trench prior to subduction and high-pressure metamorphism rather than being emplaced as diapirs along a post-metamorphic fault as previously proposed. Geochronologic, metamorphic, and thermal considerations suggest exhumation of the Tomuru Formation to relatively shallow crustal depths prior to or concurrent with early Cretaceous metamorphism of the Fusaki Formation. Arcward-vergent thrusting may have placed the younger, and formerly structurally lower, subduction complex (Fusaki Formation) over the older one (Tomuru Formation). D2 extrusional doming began after the emplacement of the Fusaki Formation at high structural levels. The D2 transport directions are subparallel to the strike of the orogen suggesting that the upright extrusion may have occurred along a forearc strike-slip fault system. This final stage of exhumation concluded in the late Eocene with extensional collapse and the development of detachment faults. The progression from initial exposure of the Tomuru and Fusaki Formations, deposition of late Eocene strata, extrusional doming and late detachment faulting may have been associated with migrating step-overs rather than changes in regional tectonics.

Keywords: Tomuru HP-LT metamorphic rocks, Jurassic Fusaki accretionary prism, Eocene Miyara limestone and conglomerate, Nosoko volcanic rocks, Upright extrusional domes, syn-subduction strike-slip faulting