



Paleostress Determination Based on Multiple-Inverse Method using Calcite Twins and Fault-Slip Data in the East Walanae Fault Zone South Sulawesi, Indonesia

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Paleostress reconstructions from calcite twin and fault-slip data were performed to constrain the activity of the East Walanae Fault (EWF) South Sulawesi, Indonesia. The multiple-inverse method, which has been widely used with fault-slip data, was applied to calcite twin data in this study. Both independent data sets yield consistent stress states and provides a reliable stress tensors (maximum and minimum principal stresses: σ_1 and σ_3 , and stress ratio: Φ), a predominance of NE-SW trending σ_1 and vertical to moderately-south-plunging σ_3 with generally low Φ . These stress states could have activated the EWF as a reverse fault with a dextral shear component and account for contractional deformation structures and landform around the trace of the fault. Most of the calcite twins and mesoscale faults were activated during the latest stage of folding or later. Based on the morphology and width of twin lamellae in the carbonate rocks, twinning of calcite in the deformation zone along the EWF may have occurred under the temperature of 200°C or lower. Inferred paleostress states around the EWF were most likely generated under the tectonic conditions influenced by the collision of Sulawesi with the Australian fragments since the Late Miocene. Radiocarbon dating from sheared soil collected from the outcrop along a major fault yielded ages between 3050 cal BP and 3990 cal BP suggesting a present activity of the EWF.