

## Brittle fracturing during the closure of the Maizuru back-arc basin

\*Larissa NGOMBI MAVOUNGOU<sup>1</sup>, Kaushik DAS<sup>1,2</sup>, Dyuti Prakash SARKAR<sup>1,2</sup>, Jun-ichi ANDO<sup>1,2</sup>, Yasutaka HAYASAKA<sup>1,2</sup>

1. Hiroshima Univ., 2. HiPeR, Hiroshima

The Maizuru basin is a Permian paleo back-arc basin that opened during Early Permian with the deposition of a massive mudstone-dominated cover, the Maizuru Group lying on the Yakuno ophiolitic rocks that constitute the basement of the basin. During the Permo-Triassic boundary, the Maizuru back-arc basin closed with the deposition of the breccia-dominated Tonoshiki Formation. This closure occurred in a tectonically active environment generating two pulses of debris flow events and the formation of two types of the Tonoshiki breccia. Field investigation and microscopic observations revealed the presence of an intensive fracture network in the Tonoshiki breccia. A considerable amount of calcite veins is present in the breccia. The fracture analysis conducted on the Tonoshiki breccia allowed a tentative reconstruction of the paleostress. The results showed a general NW-SE compression, which is supported on a microscopic scale by the presence of stylolites in a sample of a quartz-rich block showing similar compression direction. The microstructural analysis of calcite veins revealed the presence of three different types of twins, Type I, Type II, and Type III, with Type II being the most dominant twin pattern. In the quartz-rich block, mostly cataclastic deformation is observed, with an extensive network of calcite veins. Some quartz grains are highly strained and show undulose extinction, which indicates high temperature and high stress conditions. This extensive fracturing that probably occurred as a result of the closure of the Maizuru back-arc basin, affected not only the Tonoshiki Formation, which is the topmost unit of the basin, but also the underlying units, namely, the Maizuru Group and the Yakuno ophiolitic basement rocks.

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