

Generation of pseudotachylyte and interseismic plastic deformation in ancient crustal seismogenic fault zones, Yawatahama-Oshima, Ehime, Japan

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Three pseudotachylyte-producing fault zones develop in Yawatahama-Oshima, Ehime, Japan (Komatsu et al., 1997, 1998). The Yawatahama-Oshima pseudotachylytes and their related fault rocks were formed under greenschist-facies conditions (upper continental crustal conditions) (Komatsu et al., 1997, 1998; Komatsu, 2001). We illustrate generation of the Yawatahama-Oshima pseudotachylyte accompanied by plastic deformation, as an example of ancient seismogenic fault zones in upper crust.

Pressure solution-precipitation structures (pressure solution cleavage accompanied by quartz and feldspar veins) are characteristically abundant in the Yawatahama-Oshima pseudotachylyte-producing fault zones. Modes of occurrence of the Yawatahama-Oshima pseudotachylytes and pressure solution cleavage indicate that seismic slip with pseudotachylyte generation and slow plastic deformation (pressure solution with precipitation) alternated in the same fault zones and along the same fault surfaces. Therefore we can conclude that pressure solution-precipitation is likely one of the principal deformation mechanisms for interseismic plastic deformation and time-dependent strength recovery of the Yawatahama-Oshima pseudotachylyte-producing fault zones. Their strength recovery processes are explained by a solution-precipitation model, which was proposed for the Hidaka pseudotachylytes from the Hidaka metamorphic belt, Hokkaido, by Wada and Toyoshima (2007).

Keywords: pseudotachylyte, plastic deformation, pressure solution cleavage