

Fault rock distributions along the Median Tectonic Line, SW Japan, toward spatial forecasts of inland earthquakes

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The presence of fault-generated pseudotachylytes is commonly interpreted as the fossil remnant of seismic faulting (e.g., Sibson, 1975; Lin, 1996). A pseudotachylyte in the granitic (continental) crust, therefore, can be used as an indicator of ancient inland earthquakes. To clarify the reason why a pseudotachylyte occurred at a specific locality seems to be an important subject for the earthquake-forecast with especially the place- and size-information. This paper presents hypothetical tectonic control on the site of pseudotachylyte generations on the basis of fault rock petrologic study in the Seiwa-Taki area where the pseudotachylyte was firstly detected along the Median Tectonic Line (MTL), SW Japan (Shimada et al., 2001). Pervasive review on fault rocks distribution along the MTL is also carried out.

In the Seiwa-Taki area, the MTL transects the high-strain granitic mylonite zone clockwise, and the pseudotachylyte cuts microstructures of the protomylonite near the MTL. Microstructures in the host mylonitic rocks suggest east-west shortening sub-parallel to the MTL after or later stage of mylonitization with sinistral sense of shear. The east-west shortening, the absence of high-strain mylonite zone resulted from the clockwise obliquity of the MTL, and the occurrence of the pseudotachylyte can be integrated in one deformation sequence controlled by the development and rupture of the compressional jog within the high-strain zone. This hypothetical model suggests that the flow (mylonitization) preceding the inland earthquake evidently occur in or under the seismogenic zone and the three-dimensional fluctuation such as jog constraint the site of inland earthquake in the case of the study area.

A scientific drilling shallower than 1km depths in the Seiwa-Taki area or investigations of other pseudotachylyte examples will verify the model in the future. The successive protomylonite, mylonite, cataclasites along the MTL (i.e., likely no or little pseudotachylytes) and footwall pelitic schist should be recovered from the site of the drilling near the outcrop of the pseudotachylyte (lacking mylonite zone). It will give a great progress in understanding of the real inland seismogenic region with fault geometry, kinematics and physics toward spatial forecast of inland earthquakes.

References (with references for Japanese abstract)

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