

## Delineation of a probable asperity area on the Atotsugawa fault, central Japan, by a dense temporary seismic observation

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We elucidated a velocity structure along the Atotsugawa fault by inverting arrival times from local earthquakes and explosive sources using double-difference tomography. The seismic array consists of 60 temporary stations and 66 permanent stations located less than 70 km from the studied area. The temporary stations were aligned nearly parallel to the fault strike, forming a linear array with a length of about 50 km. The spatial spacing of the stations is roughly 1 km.

High P-wave ( $V_p$ ) and high S-wave ( $V_s$ ) bodies are located at the western and eastern segments with depths greater than 2 km. Most of the hypocenters appear to be distributed at the periphery of the high-velocity bodies. At the western segment, high- $V_p$  body extends for 20 km along the fault strike and for 10 km in a direction perpendicular to the strike. We suggest that the high-velocity body imaged at the western segment is an asperity in the 1858 Hietsu Earthquake. In contrast, the central segment of the Atotsugawa fault is characterized by low- $V_p$  and low- $V_p/V_s$  values. The extremely low seismicity and the creep-like movements observed at the central segment are attributed to the local crustal heterogeneity associated with crustal fluids.