

Imaging of heterogeneous crustal structure in and around the western part of the Atotsugawa fault, central Japan

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The Atotsugawa fault, which is located in the Niigata-Kobe tectonic zone, is one of the most active strike-slip faults in Japan and it is only the inland active fault in Japan that shows creep movements in its eastern part. Microseismicity is low at the shallow part below the creeping segment of the fault, while the western-adjacent locked segment is accompanied by high microseismicity. To understand active tectonics in these areas it is essential to clarify seismic velocity structures, deep structures of active faults, and micro-seismicity near the active faults. In the summer of 2004, we conducted a seismic array observation across the western part of the Atotsugawa fault corresponding to locked segment to obtain a structural image in and around the western part of the Atotsugawa fault. Fifty five portable seismographs were deployed in and around the Atotsugawa fault. Each seismograph system consisted of a 1-Hz, three components seismometer and a long-term, low-power digital recorder. In order to reveal the velocity structure of the uppermost crust, three explosives were fired as controlled seismic sources. Moreover, controlled seismic signals from explosives sources were recorded by single channel data logger, which were deployed on a 20-km-long line in the north-south direction with 125 m spacing to reveal the distribution of the reflector in and around the Atotsugawa fault. Each seismograph system consisted of a 4.5Hz, vertical component seismometer. Explosive data have high signal-to-noise ratios, from which we can recognize reflected phases. The seismic reflection method was applied to these data to obtain a detailed and clear image of crustal structure. The stacked image shows that the reflector is located at about 4 sec in two way travel time. This reflector is located at the base of the seismogenic layer.