Crustal structure in southern area of the 2004 Mid-Niigata earthquake by Double-Difference Tomography method

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The purpose of this study is to clarify what constrains the southern margin of the micro-seismic area of the 2004 Mid-Niigata earthquake. In order to find a characteristic structure at the southern margin, we applied the Double-Difference Tomography method (Zhang and Thurber, 2003), which is a suitable method for highly active seismic area, to our temporary seismic data and the centralized routine data in Japan. The initial model referred to Takeda et al. (2004). We could obtain a velocity structure in the southern area of the micro-seismic area. The travel-time residuals decreased from 284msec to 87msec. There is a high resolution between 6~15km in depth in the micro-seismic area. As a result, we found a low velocity area between 6~12km in depth, which continued from the western Nagaoka basin fault zone southward to the Tokamachi fault. The seismic distributions showed that the southern margin was located at the boundary of low velocity area. The low velocity area also fits the 'valley' of the negative Bouguer anomalies, which shows the existence of low velocity and low density area.