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Broadband back projection images of the Pacific coast of Tohoku Earthquake revealed from MeSO-net

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The most powerful earthquake after modern seismological network had been developed, hit eastern Japan and caused huge Tsunami damages. Strong ground motions from the 2011 off the Pacific coast of Tohoku Earthquake were recorded over such a long time extending 500 seconds or more by a dense and wide-span seismic network, Metropolitan Seismic Observation Network installed around Tokyo. We tried to reveal rupture process of the giant earthquake by performing semblance enhanced stacking analysis on the waveforms. By projecting the power of the stacked waveforms onto an assumed fault plane, asperities that generated significant pulses were successfully separated. Overall, strong seismic energy was found to have been generated from the areas off Miyagi and off Fukushima Prefectures. The shallow part of the fault plane off Miyagi prefecture released strong energy which caused gigantic tsunami, whereas contributions from those area off Ibaraki are not so large. Focal areas of the expected Miyagi-oki earthquake and those of historical earthquakes occurred off the coast of Fukushima Prefecture in 1938 are considered to have been broken.

Keywords: Broad band image, Source process, Back projection, MeSO-net