

Offshore active faults in the source area of the 2007 Noto Hanto Earthquake revealed by high-resolution seismic profiles

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The Noto Hanto Earthquake (M_{JMA} 6.9) occurred on 25 March 2007, under the northwestern coast of Noto Peninsula, Ishikawa Prefecture. Its source area is located in coastal and shallow sea area in which seismic profiling survey was technically difficult up to now. National Institute of Advanced Industrial Science and Technology (AIST) carried out a high-resolution multi-channel seismic survey using Boomer and a 12 channel streamer cable (developed in cooperation with SOGO Geophysical Exploration Co. Ltd.) in the source area, in order to clarify distribution and activity of active fault.

Seismic profiles depicting geologic structure up to 100 meters deep under sea floor were obtained. Several remarkable reflections are recognized in the seismic profiles and the most remarkable reflection surface is erosional surface at the Last Glacial Maximum (LGM). Flexures like deformation in Holocene sediments continue in the ENE-WSW direction from Monzen-cho for more than 18 kilometers. These flexures are located along the northern margin of the aftershock area of the 2007 earthquake. The deformation in the Holocene sediments has been growing by displacements of an underlying active fault but does not cut the sediments. Comparison between profiles obtained in 1988 and twelve channel seismic profiles after the earthquake shows the difference of seafloor profile that is interpreted to be seafloor deformation due to the 2007 earthquake. In shallower sea area, other flexures in Holocene were found along the coastline of western side of Noto Peninsula. These flexures continue in the NNE-SSW direction for more than 15 kilometers.