

## Offshore active faults in the northern part off Noto Peninsula revealed by high-resolution seismic profiles

# Takahiko INOUE[1]; Fumitoshi Murakami[2]; Yukinobu Okamura[3]; Haruo Kimura[4]; Ken Ikehara[5]

[1] AIST, IGG; [2] AIST,IGG; [3] Active Fault Research Center, AIST, GSJ; [4] GSJ, AIST; [5] IGG, AIST

The 2007 Noto Hanto Earthquake occurred in coastal and shallow sea area off northwestern Noto Peninsula, however, there is not enough data in the source area. National Institute of Advanced Industrial Science and Technology (AIST) carried out high-resolution seismic survey using boomer as a seismic source and 12 channel streamer developed by AIST in the source area of the earthquake in 2007. In addition, shallow marine areas off the northern coast of the Noto Peninsula were investigated by the same seismic survey system in 2008, in order to clarify distribution and activities of active faults.

Study area in 2007 (in the source area of 2007 Noto Hanto earthquake)

Seismic profiles depicting geologic structure up to 100 meters deep under sea floor were obtained. The most remarkable reflection surfaces recognized in the seismic profiles are ravinment surface and erosion surface during the Last Glacial Maximum (LGM). Holocene sediments cover the erosion surface that is distributed under the shelf shallower than 100m in depth and the sediments thin toward offshore. Flexures like deformation in the sediments continue in the ENE-WSW direction along the faults shown by Okamura (2007b). The deformation has been growing by displacements of an underlying active fault but does not cut the reflections. The vertical offset of the flexure on the LGM erosion surface is larger than those on the reflections in the sediments covering the erosion surface and the offset decrease upward. Based on displacements of reflection surfaces in profiles and sedimentation rate obtained by core samples, we inferred the formation ages of the reflection surface and fault activities that occurred at least 4 times before 2007 earthquake during the last 13000 years.

In addition, other flexures in Holocene that had not been known up to now were found along the coastline of northwestern side of Noto Peninsula in shallower sea area. The activity frequency of this fault is not clear, however, the faulting occurred several times in the last 10000 years.

Study area in 2008 (shallow marine areas off the northern coast of the Noto Pen.)

The High-resolution seismic profiling survey was carried out in the shallow sea area from off Monzen to off Suzu Cape along the Noto Peninsula. The erosion surface during LGM and Holocene sediment covering this surface are distributed off Saruyama Misaki in western edge of study area. An unknown active fault were found in about 1.5 kilometers offing along the coastline. LGM erosion surface was deformed nine meters in the maximum by this fault. On the other hand, at eastern side of Saruyama Misaki, Holocene is thin, and the erosion surface during LGM or Pleistocene is widely exposed.

The faults were classified into three types, based on these deformations of Holocene, LGM erosion surface and sea bottom. The faults were classified into three type such as 'active fault', 'fault that have the possibility of the active fault' and 'not active fault', based on these deformations of Holocene, LGM erosion surface and sea bottom. Considerably large-scale earthquakes such as 1729 and 1993 earthquakes are also known in northeastern area of Noto Peninsula. We will clarify whether active faults caused old earthquakes and active faults with possibility of slipping in the future are included in faults recognized in this study.