

The features and seismicity assessment of faults in the offshore extension of the Miura-Peninsula Fault Group

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The present work is to implement a case study on the seismicity assessment of sea bottom strike-slip faults in the offshore extension of the Miura-Peninsula Fault Group, which is categorized into an active fault group with a higher probability for rupturing expected in 30 years by the Earthquake Research Committee, Headquarters for Earthquake Research Promotion.

It has been considered to be difficult to apply the reflection method to strike-slip faults which have too small vertical displacement to reveal their features. However, it is so unlikely for strike-slip faults to consist exclusively of horizontal components, that their repeated activation is expected to lead to the accumulation of vertical components as well. The present study implemented seismic surveys targeting the deeper part of the faults. Thus, displacement and deformation have been detected in the basement to allow grasping the location and features of a probable extension of the on-land Takeyama Fault.

In connection with the Kaneda-wan Fault described by Imaizumi et al. (1987), seismic surveys in the present study succeeded in confirming similar structures at several points in the alluvial deposits filling a submarine valley, but failed to detect any remarkable dislocation or deformation in the basement structure. Thus, these structures are presumably originated from sedimentary deformation in the submarine valley fills rather than tectonic deformation related to the offshore extension of the Miura-Peninsula Fault Group or the associated tectonic movements.

Further, high-resolution reflection surveys with a planar deployment of profile lines have disclosed a belt of basement uplifts in echelon. This structure is geometrically very close to a 'positive flower structure', which forms a horst-like uplift like parts of restraining bends or restraining stepovers associated with strike-slip faulting. It is one of the most important subjects for seismicity assessment of offshore strike-slip faults to grasp these subsurface structural forms typical of them.

The fault group detected in the eastern part of survey area on the Sagami Bay side is continuing in the same direction as on-land Miura-Peninsula Fault Group. But the fault group recognized in the western part of this survey area has different strike from on-land Miura-Peninsula Fault Group. This remarkable change of fault strike shows structural fault end of the Miura-Peninsula Fault Group.

By comparing the on-land Miura-Peninsula Fault Group, particularly the Takeyama Fault, with the offshore faults found in the present survey area from a viewpoint of their seismicity, it is indicated that the Takeyama Fault has been ruptured three times since about 5,300 years BP, whereas the displacement and deformation by faults and folds confirmed in the present offshore area have been detected only in the formations deposited before the formation of the erosion surface by a maximum regression during the final glacial age on the Tokyo Bay side and the Sagami Bay side. Therefore, it is appropriate to interpret that none of the fault segments confirmed on land extends to the present offshore area.