

Is a big tsunami possible in Toyama Trough?

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In June, 2003, earthquake outbreak probabilities in some seismic gaps along the eastern margin of Japan Sea was announced on the basis of 'long-term evaluation of seismic activity' by the earthquake research head office for promotion Earthquake Research Committee, but it was assumed that it is out of an evaluation object about Toyama trough.

For the active fault which can cause a massive tsunami in the southern Toyama trough, there are the seaward extension of Mt. Kureha dislocation or Kita-torigakubi fault located off-Itoigawa and off-Naoetsu, for example. There are a few descriptions such as 'massive tsunami attacked on Kaifu-ura and Oyashirazu in 1092' and 'big earthquake and massive tsunami at Echigo-Takada in 1614' in historical materials.

A tsunami of about 60cm wave height in the former Himi City along the west coast of Toyama Bay just after the main shock of Ansei Hi-Etsu Earthquake in 1858 was described in 'Oukyō Documentations' written by Tanakaya Gon-uemon who acted as a senior town official of Ecchu Himi, They had observed abnormal water level and the description that it was it in Kamishou-gawa River. Since the focus of Ansei Hi-Etsu Earthquake had already been confirmed along the Atotsugawa Fault in the inland Hida mountainous district, this tsunami is probably caused by a slope collapse of local seabed by the strong shaking.

In addition, it is possible that a large scale of seabed landslide induced by liquefaction of the sea ground by an earthquake on land, due to the existence of natural gas-hydrate layer, lately confirmed in the Naoetsu offing, might generate a tsunami. The similar mechanism of tsunami caused by slope collapse of the steep shelf in Toyama Bay is triggered by an interlocking earthquake along the middle to northern segments of Itoigawa - Shizuoka tectonic line fault zone (M8). As for the earthquake of the fault zone, outbreak probability of less than 30 years is estimated as the highest 14% among the inland active faults in Japan.

A lot of turbidites due to coseismic slope collapses were inserted between the sedimentary layers of Toyama abyssal fan. According to the analysis based on comparison with historical studies there are ten several times as for the recent seismicity in 1000 years, and half of these are attributable to earthquakes on land area, and the rests are to submarine earthquakes in Toyama trough and neighborhood shelf. It will be necessary to inspect such events by detailed investigation on the mid-stream in Toyama trough and Yamato trough in future.