

## Tsunami Peculiar Points and Disaster Prevention

- Advice to Ooura Peninsula Coast, Maizuru City and Gobo City, Wakayama Prefecture as Examples

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#### 1. Tsunami peculiar points

On a coast in a district where large tsunamis hit several times in its history, if there appears such a point that tsunami height locally larger than its adjacent areas for almost all tsunamis, we want to propose to call the point as "tsunami peculiar point". We can point out such examples as; (A) Akamae area which located at the innermost coast of Miyako Bay, (B) Iioka area, Asahi city on the coast of Boso Peninsula, Wajima city on the tip coast of Noto peninsula, and Oki archipelago, (C) Aonae area at the southern tip of Okushiri Island, Hokkaido, and cape Hajiki at the north tip of Sado Island, (D) Shimoda Port on Izu peninsula, (E) Kata area in Owase city, Mie prefecture, and Osaka (F) Hawaii island and Nautopotapu Island, Tonga. The reasons why such peculiar points appear are;

Points (A) are situated at an innermost point of V-shaped bays, (B) are points situated at the roots of sea sea bottom ridges, (C), (D) are the same reason as (B), (E) is an anti-node of the fundamental mode of the eigenvalue oscillation of a inner bay, and (F) is due to concentration of the incoming energy of a tsunami. We recently found such peculiar points at two places; one is on the coast of Ooura peninsula, and the other is at the coast of Gobo city, Wakayama.

Fig.1 shows the distribution of the heights of three tsunamis in Wakasa Bay - for the 1983 Nihonkai Chubu earthquake tsunami and the 1993 SW Hokkaido earthquake tsunami. We should notice that peaks of tsunami height distribution appear at the same place; on the coast of Ooura Peninsula, Maizuru city, Kyoto prefecture. This peculiar point is considered due to the reason of the category (C). This particularity is not considered for disaster prevention measure by the local government. No sea wall was constructed between shore line and the residential areas of Nobara and Obase.

In the front sea region of the coast of Gobo city, Wakayama prefecture, there is a submarine spur, and the tsunami energy are apt to concentrate towards the front coast of Gobo city, and the result of a numerical calculation of the tsunami of the 1854 Ansei Nankai Earthquake shows that the tsunami height reach 9 meters there. But old documents shows that the damage of the Ansei Nankai Earthquake was slight, and seawater rose up to the height of only 2.5 meters above mean sea level. To tell the truth, there had been a sand dune existed in front of the central part of Gobo city up to the end of 19th century. This dune had blockaded the incident tsunami waves and had protected the city. But in the beginning of 20th century, the course of the river was made straight line at the river mouth, at that time the dune was removed. Now there is no sand dune in front of the central part of Gobo city. Effective counter measurement should be made in considering this fact.

Keywords: tsunami peculiar point, the 1983 Nihonkai-Chubu earthquake-tsunami, the 1993 Hokkaido SW earthquake-tsunami, the 1854 Ansei Nankai earthquake, Wakasa Bay, Gobo city

