

Cause of the tsunami of the Aitape Earthquake of 17th, July, 1998, Papua New Guinea

Yoshinobu Tsuji[1]

[1] ERI, Univ. Tokyo

The Aitape Earthquake (Mw 7.1) occurred in the sea area off the north coast of Sissano Lagoon at 8h49min, 17th July, 1998 (UT). After the earthquake a huge tsunami hit the several villages near the mouth of Sissano Lagoon, and about 2000 people were killed. We made a field survey on the damaged coast and gathered eyewitnesses' accounts of survivors living in the villages around the lagoon. Survivors of Warapu and Arop, villages on the western and the eastern sandspits of the lagoon testified that they felt eminent shakings three times, the second one was the strongest, and that the huge tsunami came just after (or at the same time of) the third shaking. The board band seismograph at Jayapura, about 155km west of the hypocenter of the main shock, recorded the main shock (M7.1) at 8h 49min and the maximum aftershock at 20.3 minutes after it (9h 09min). No another eminent shock was recorded, but a shock of not a seismic origin was recorded between 8.6 and 9.5 minutes after the main shock (around 8h 58min).

We also made an aftershock observation at three points (Aitape, Vanimo, and Lumi) on the coastal region from the beginning of August to the end of September, 1998. Locations of hypocenters of 49 aftershocks were decided. The distribution of those aftershocks shows that the location of the main shock is distributed in the sea area just in front of Sissano Lagoon between the coastline to the trench axis (depth: about 4000m) which runs about 50 km apart from the coastline in parallel to it. Running time of a long water wave (tsunami) is estimated to be 12 minutes from trench area to the coast.

JAMSTEC made marine survey researchs for four times by the vessels Natsushima and Kairei from December 1998 to February 2001, and detailed sea bottom topography was clarified, sea bottom observations, and echo-sounding profiling were made. We found out a round shaped crater, called 'Amphitheater', with diameter 7-8km in the sea area just the front of the lagoon, 25km apart from the shoreline. We found out several fresh cracks on the south slope of the crater, and folding on the foot of the slope, and a trace of a slumping with debris. Many traces of surface layer sliding were found out on the sound profiling charts generally at almost all slopes including those in the Amphitheater.

Considering all those results, together with eyewitnesses' accounts, the following scenario could be assumed;

1. The tsunami, which hit the coastal villages was not caused by the main shock.
2. The tsunami was supposed to be formed by a sliding of surface sediment layer on a slope in or near the Amphitheater. It occurred at 9 minutes after the main