



## **Abnormal amplification of tsunami waves at special bottom geometries**

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It occurs in tsunami practice that tsunami waves experience abnormal amplification at some locations. One of the most recent and bright examples is the 2009 tsunami in American Samoa island, where the maximum wave height reached 17.6 m in the village of Poloa, Tutuila island and in the city of Leone the inundation reached an impressive 500 m along the bed of the Leafu River (Okal et al., 2010). Both locations can be schematically presented as narrow bays with a gradual decrease in the water depth along the bay.

Here we study the nonlinear wave dynamics of tsunami waves in narrow bays and use the schematic model of an inclined bay of a parabolic cross-section. Wave regimes, corresponding to problems of evolution and runup of tsunami waves, are considered and analyzed. Special attention is paid to the wave breaking criterion.

Finally estimates of American Samoa 2009 tsunami are given and compared to the observations.