

## **Developing Real-time Tsunami Forecast for US coasts**

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### **SUMMARY**

The NOAA Tsunami Research Center is developing an operational tool termed as Short-term Inundation Forecast (SIFT) that will be used by U.S. Tsunami Warning Centers to provide a quick and accurate tsunami forecasts. The SIFT operational tool is a two step process; first is data assimilation and inversion that combines both real-time earthquake data and tsunami data obtained from the Deep-ocean Assessment and Reporting of Tsunamis (DART) buoys with the pre-computed earthquake scenarios stored in a database to forecast offshore tsunami wave heights as it propagates into open ocean; second, is to use the information from the first step to forecast site-specific tsunami wave heights and inundation.

One of the key components for providing a quick forecast is the use of the forecast propagation database. The database contains pre-computed tsunami events based on a pre-defined earthquake sources, referred to as unit sources, defined along known and potential earthquake zones in the Pacific and Atlantic Basin. A total of 1258 unit sources have been developed in collaboration with USGS scientists. Tsunami propagation from all those sources have been simulated. The propagation database can simulate earthquake scenarios by combining unit sources. This is possible due to the linearity of the generation and propagation dynamics. This approach has been validated with historical tsunami events namely; 4 October 1994 Kuril Island tsunami (earthquake seismic magnitude,  $M_w$ , of 8.1) and 17 November 2003 Rat Island tsunami (earthquake seismic magnitude,  $M_w$ , of 7.8). Simulated tsunami time series for both events showed accurate comparison with the observed tsunami data obtained from DART buoys and coastal tide gages.