

PROGRESS ON REAL-TIME, OPERATIONAL TSUNAMI FORECASTING TOOLS FOR NOAA TSUNAMI WARNING CENTERS

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An important goal of the U.S. National Tsunami Hazard Mitigation Program is to increase the accuracy and reliability of tsunami warnings issued by the NOAA Tsunami Warning Centers. To this end, Project DART (Deep-ocean Assessment and Reporting of Tsunamis) has developed a Pacific tsunameter (soo-NAH-meter; by analogy with seismometer) network capable of detecting tsunamis as small as 0.5 cm and transmitting the data to warning centers in real time. Six stations are currently operational, and an expansion is planned to approximately 20 stations by 2010. But even the expanded network will be so sparse as to make interpretation of the real-time data difficult. For this reason, a forecast system known as SIFT (Short-term Inundation Forecasting for Tsunamis) is under development that exploits tsunami numerical models for real-time assimilation and data inversion. A linear combination of pre-computed generation/propagation model solutions is first constructed that best matches the observations. This best-fit solution then provides a forecast of offshore tsunami characteristics at a particular coastal site; the offshore forecast is then used to initialize a nonlinear inundation model that computes the inundation forecast. A prototype, web-based version, SIFT 0.5, was released in February 2004, and is currently being tested by both NOAA Tsunami Warning Centers. This version provides only offshore forecasts and, for a few select locations, a forecast of the coastal tsunami time series. The first real-time, quasi-operational, test of SIFT 0.5 occurred during the 17 November 2003 Amchitka event, during which one of the co-authors (Titov) produced a highly accurate forecast of the tsunami time series that was later recorded by the coastal tide gage station at Hilo, Hawaii. The importance of this achievement is that, though unofficial, the successful forecast proves the feasibility of the concept and dramatically demonstrates the potential accuracy and value of the forecast system. Future plans include the addition of inundation forecast capabilities at five selected sites as part of SIFT 1.0, to be released in late 2004.