

March 11, 2011 Japanese Earthquake and Tsunami. Image Credit: Shunichi Kosimura

Tsunami Resiliency

Data for improved forecasts, warnings, research, and risk assessments

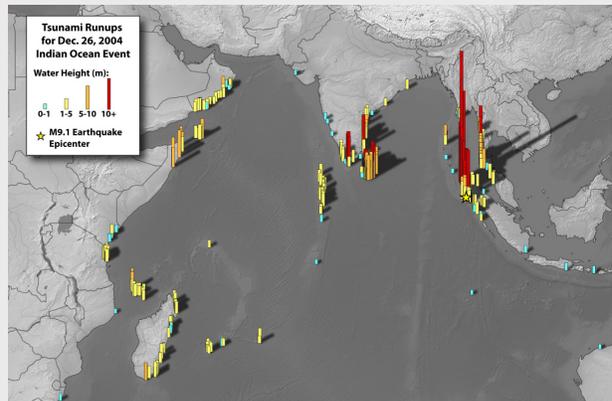
The National Centers for Environmental Information (NCEI), and colocated World Data Service for Geophysics, provides a unique collection of data, enabling communities to ensure preparedness and resilience to coastal hazards. NCEI maintains global historical tsunami, earthquake, and volcanic eruption databases that include reliable economic impacts, number of deaths, and extent of damages. Digital elevation models from the global to community scale support real-time forecasts and warnings, inundation mapping, and research. NCEI archives and processes Deep-ocean Assessment and Reporting of Tsunamis (DART®) and coastal tide-gauge data, which provide evidence of sea level fluctuation and inundation events.



2009 September tsunami wave carrying vehicle in Pago Pago, American Samoa. (Credit: R. Madsen)

TSUNAMI EVENTS

Since the 19th century, tsunami events have caused more than 700 deaths and nearly \$500 million in economic losses (over \$2 billion when inflation-adjusted for 2017) to the U.S. coastal states and territories.



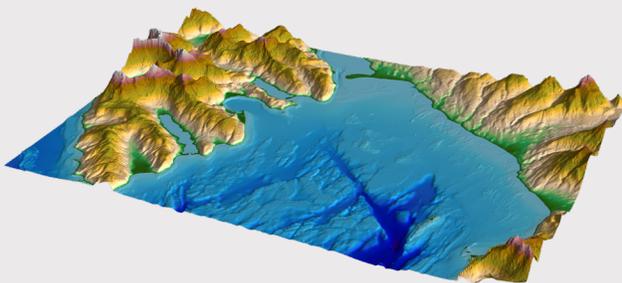
December 26, 2004, Sumatra tsunami observed water heights. (Credit NOAA/NCEI)

Examine the Record

The first step in understanding coastal vulnerability is to examine the past record of natural hazard occurrences. Long-term data from these events, including photographs of damage, provide clues to what might happen in the future. NCEI catalogs information on global historical tsunamis and uses these data to produce qualitative tsunami hazard assessments at regional levels. These assessments are based on the distribution and frequency of runups (maximum wave height) and deaths due to tsunamis. These data are important for planning, responding, and mitigating future events, and they are used by the NOAA Tsunami Warning Centers, NOAA Center for Tsunami Research (NCTR), NOAA Outreach, and the International Tsunami Information Center.

Model the Coast

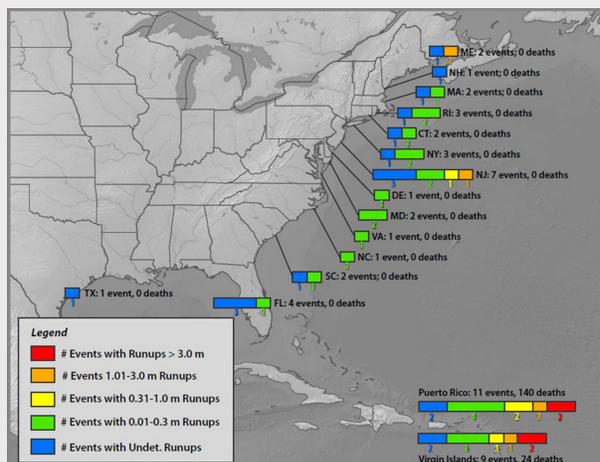
NCEI builds and distributes high-resolution, coastal digital elevation models (DEMs) integrating bathymetry and topography. DEMs are an essential element for coastal process modeling (tsunami inundation, storm surge, sea level rise, contaminant dispersal, etc.), which supports ecosystem management and habitat research, coastal and marine spatial planning, hazard mitigation, and community preparedness.



DEM of Chignik, Alaska. (Credit NOAA/NCEI)

TOGETHER THESE DATA

- Improve tsunami FORECASTS and WARNINGS
- Support hazard and risk ASSESSMENT
- Strengthen MITIGATION and EDUCATION
- Advance RESEARCH



U.S. East Coast historical tsunami statistics. (Credit NOAA/NCEI)

Process the Data

Water level data along the U.S. coasts and in the deep ocean are critical for early warnings and forecasting of tsunami inundation. These data support informed decision making to minimize risk to life and property along the coasts. NCEI works with the Center for Operational Oceanographic Products and Services, National Data Buoy Center (NDBC), NOAA Tsunami Warning Centers, and NCTR to produce research-quality data to isolate seismic waves and the tsunami signal. The 15-second to 1-minute coastal tide-gauge data for nearly 200 U.S. sites and 15-second data from the network of 39 U.S.-operated DART® stations are processed and archived at NCEI. These data are also essential to coastal hazard risk assessment and sea level change research.



DART® Buoy deployed. (Credit NOAA/NDBC)