Products and Services Available from NOAA NCEI Archive of Water Level Data

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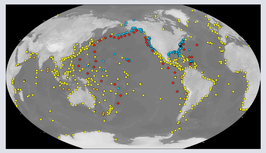
Introduction

NOAA's National Centers for Environmental Information (NCEI) operates the World Data Service (WDS) for Geophysics (including tsunamis). The NCEI/WDS provides the long-term archive, data management, and access to national and global tsunami data for research and mitigation of tsunami hazards. Archive responsibilities include the global historic tsunami event and run-up database, the bottom pressure recorder data collected by the Deep-ocean Assessment and Reporting of Tsunami (DART®) Program, coastal tide gauge data (analog and digital marigrams) from US-operated sites, and event-specific data from international gauges. These high-resolution data are used by national warning centers and researchers to increase our understanding and ability to forecast the magnitude, direction, and speed of tsunami events.

The Data

Data essential for tsunami detection and warning from the Deep-ocean Assessment and Reporting of Tsunamis (DART®) stations and the coastal tide gauges.

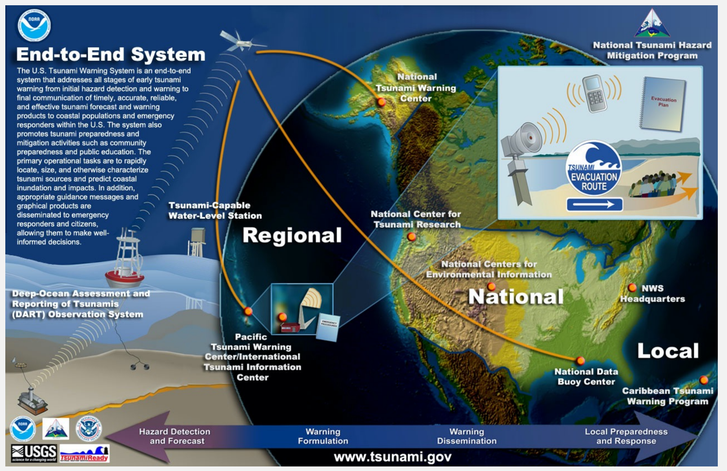


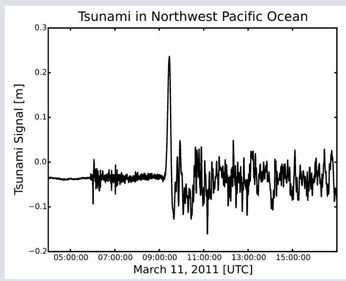
Deep-Ocean Assessment and Reporting of Tsunamis (DART)

The DART system, operated by the NOAA National Data Buoy Center (NDBC) and other international partners, is a global array of 62 offshore bottom pressure recorders (BPRs) which detect the tsunami by increased pressure from the wave passing over. Data are transmitted to a nearby surface buoy, which relays the message to tsunami warning centers via satellite that a tsunami is on the way.

Coastal Tide Gauge

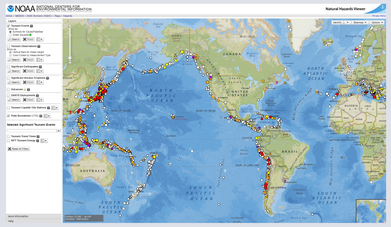
Traditionally measuring tide levels, coastal tide gauges can also detect tsunamis. As a consequence of the 2004 Indian Ocean tsunami event, over 200 U.S. tide gauge stations, operated by NOAA NOS Center for Operational Products and Services (CO-OPS) were upgraded to sample every minute and transmit real-time water levels to tsunami warning centers via satellite. The Tsunami Warning Centers also operate their own tide gauges to augment the CO-OPS array. Tide gauges confirm the arrival, size, and direction of travel along the coast.

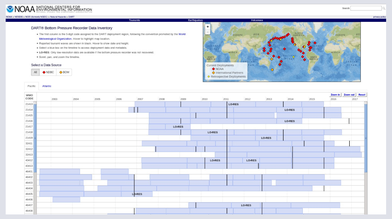




NCEI's Role

High resolution delayed-mode DART data are stored onboard the BPR, and, after recovery, are sent to NCEI for archive and processing. Tide gauge data is delivered to NCEI directly through NOS CO-OPS and Tsunami Warning Centers. Upon receipt, NCEI's role is to ensure the data are available for use and reuse by the community.



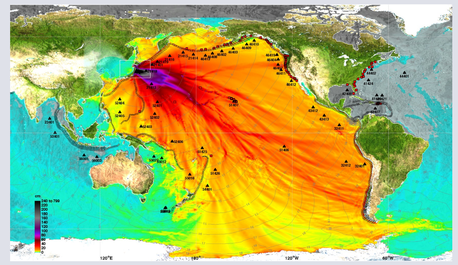


More than just an archive. NCEI:

- Quality controls the data and models the tides to isolate the tsunami waves
- Ensures meaningful documentation for data re-use
- Creates standard metadata to enable search and discovery
- Converts data into standard formats (netCDF) to ease data re-use
- Digitizes marigrams
- Adds data to inventory timeline to ensure no gaps in data
- Allows for data discovery through search portals and interactive maps

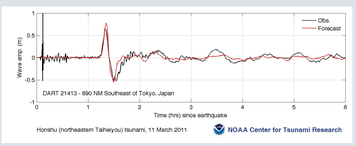
How are the data used?

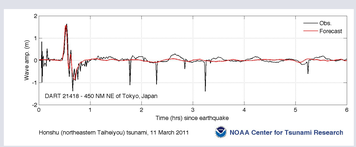
DART® observations confirm the existence or absence of a tsunami far from the coast. The high-resolution data are used by national warning centers and researchers to increase our understanding and ability to forecast the magnitude, direction and speed of tsunami events. Preserving and sharing these data improve the forecasts and models necessary for sound management and planning of coastal communities. Water level data are also used for monitoring and improving our understanding of coastal storm surge and nuisance flooding and for studying long-term sea-level change.



Why is this important for tsunami hazard assessment and warning?

The DART® and tide gauge networks are an essential component in the provision of timely warnings to U.S. coastal communities. DART® data support the NOAA Tsunami Program observation requirements for Tsunami Offshore Real-Time and Post-event observations, as well as Global Water Level Observations. The internally recorded 15-second DART data are critical for tsunami modeling and research activities. Data from sea level stations around the Pacific are the basis for the detection and evaluation of tsunami waves. Forecasting a tsunami is based on all sea level data available at the time as well as any historical data. The data are essential in developing a coordinated tsunami hazard and risk assessments for all coastal regions. Therefore, this data needs to be archived and available for monitoring and forecasting of future events.





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