Data Archive and Exchange
Through the World Data Center System

Paula.Dunbar@noaa.gov

Susan McLean, Director
WDC for Geophysics and Marine Geology
Susan.McLean@noaa.gov
ICSU World Data Center
Geophysics and Marine Geology

- Scientific data management of global and regional geophysics and marine geology data including natural hazards (tsunami, earthquake, volcanic eruptions)

- Hosted by the National Oceanic and Atmospheric Administration (NOAA) / National Geophysical Data Center (NGDC), Boulder, Colorado, USA
Comprehensive Data Types

- **Global Historical events**: destructive and tsunamigenic
- Tsunami **Deposits** database
- Tsunami **Reference** database
- Damage **Photographs**
- DART ® **BPR** database
- High resolution global **tide-gauge** data
- **Bathymetry/topography** for tsunami propagation and inundation modeling
Hazards Data Web Delivery

- Natural Hazards data accessible via Open Geospatial Consortium (OGC) **Web Map Services**
- DART data available via OGC **Web Feature Service**
- Historical tsunami event and runup data available via **KML** and auto-transfer via **XML** web services
- Interactive Maps, Forms
Tide Gauge and DART Data

• Improvements
  – Long-term tide gauge data archive:
    • U.S. 1-minute (CO-OPS)
    • 15-second (WCATWC & PTWC)
  – DART (U.S. operated) unprocessed and processed data archived

• Gaps in the Archive
  – Non-U.S. PTWS high resolution tide gauge data
  – Non-U.S. operated DART data

• Future Plans
  – NOS CO-OPS distribution interface will be redesigned with integrated coastal tide gauge and DART data

Sea level gauges and networks contributing to the Tsunami Warning System in the Pacific (TWSP)
Global Historical Events: Destructive or Tsunamigenic

Database Improvements

- 1257 Post Tsunami Field Surveys added
  - 2006 Indonesia: 161
  - 2007 Solomon Islands: 175
  - 2007 Peru: 67
  - 2009 Samoa: 358
  - 2010 Chile: 429
  - 2011 Japan: 67 (preliminary)

- Ongoing quality control
- Latest data used by TWCs for forecasts
Tsunami Travel Time Maps to Coastal Locations

- Maps for coastal cities in the Pacific Ocean, Indian Ocean & Caribbean Sea
- Reference layers: countries, cities, plate boundaries, historical tsunami events & runups
TsuDig
Offline GIS Tool

- Collaborative effort between WDC/NGDC & ITIC
- Uses WDC/NGDC tsunami events, tsunami runups, significant earthquakes, significant volcanic eruptions
- Auxiliary layers
- Atlantic or Pacific centered
- Multiple search criteria
- Results displayed on map and in table format
- Customizable map symbols
- TTT plugin

Latest data available online
ngdc.noaa.gov/hazard/data/h2/hazardsdb.zip
March 11, 2011 Tohoku, Japan Earthquake & Tsunami

- 4th largest earthquake ever
- Largest earthquake in Japan
- Japan - 14,728 deaths, $235 billion damage
  - 4th most fatal event in Japan (deaths & missing)
- Hawaii - $8 million damage
- California - 1 death, $40-50 million
- 1.08 m recording by DART® station
- Highest wave height - 38 m
Additional Tsunami Products

**Historic Events**

<table>
<thead>
<tr>
<th>Date</th>
<th>Tsunami Cause</th>
<th>Add'l Info</th>
<th>Deposits</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>664</td>
<td>11</td>
<td>20</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>761</td>
<td>5</td>
<td>12</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>704</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>744</td>
<td>6</td>
<td>30</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>745</td>
<td>6</td>
<td>9</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>765</td>
<td>7</td>
<td>30</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

**Near-field observations & effects**

March 11, 2011 Japan Earthquake and Tsunami

The 11 March 2011 magnitude 9.0 Honshu, Japan earthquake (M9.0) is the largest earthquake in the world and the largest in Japan since 1923. UNESCO reports that as of April 4, 2011, there are 13,017 deaths and 22,765 injured. This is the deadliest earthquake since the 2004 magnitude 9.1 Sumatra earthquake and $50 billion in damage. This is the most devastating earthquake to occur in Japan.

March 11, 2011 Eyewitness and Instrumental Recordings

The highest wave from the March 11, 2011 tsunami was 23 meters reported by a Sendai town. Tide gauge readings in Japan range from 1 to 7 meters. Three meters was reported at the Sendai town while the largest recorded wave was 40 meters, which is indicated on the eyewitness report.

**Up to date event reports**

(HTML & PDF)

**Historical Earthquakes and Tsunamis in Japan**

According to the NOAA National Geophysical Data Center / World Data Center for Geophysics (http://neic.na.gov/neic/), historic data on Tsunami databases, 2009.

**Hazards Viewer**

Damage photos
Summary

• NOAA / WDC manages the U.S. tsunami data archive
  – Global coverage
  – Essential for tsunami forecast and warning, inundation modeling, and hazard assessment
  – Required for tsunami research, preparedness, mitigation and education

• NOAA / WDC actively supports technology transfer
  – TsuDig, Web services
  – Incorporation of best available data for various mapping applications

• NOAA / WDC collaborates nationally and internationally in all aspects of tsunami activities