Pacific Region Tsunami and Significant Earthquake Data Access

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Purpose

• **Quality review** and expand the Pacific basin NGDC Historical Tsunami and **Significant Earthquake** Hazards Databases

• **Integrate web-based GIS** and **forms-based access** to Pacific Basin tsunami events, tsunami runups, significant earthquakes, related imagery, and auxiliary geospatial data

• Develop **specific reports** for events based on criteria such as the number of deaths, damage information, water heights, and source event

• **Pilot study** of the **socio-economic impact of a scenario tsunami** for a specific location in the Pacific Basin. The location chosen will be based on the availability of data from past tsunami events, inundation models, population density, and the tsunami risk
Relevance

- **Integrated Pacific Regional Views** of the Tsunami and Significant Earthquake Databases will accelerate the production of NOAA Integrated Environmental Applications Information Center data products.

- Increased understanding of the Tsunami and Earthquake Risk in the Pacific Basin will **reduce loss of life and damage** from tsunamis and earthquakes.
Pacific Basin Tsunami Source Events
47 - 2005

1896 events in the Pacific Ocean
  145 caused runups in Hawai
  84 caused runups in Alaska
  123 caused runups in California
  17 caused runups in Oregon
  18 caused runups in Washington

1896 Tsunami Source Events from (79% of database)
Tsunami Sources Causing Runups in Hawaii

1837, Mag. 8.5, 16 deaths
1868, Mag. 7.5, 62 deaths
1875, Mag. 7.2, 2 deaths
1923, Mag. 8.5, 1 death
1946, Mag. 7.4, 154 deaths
1960, Mag. 9.5, 61 deaths
1877, Mag. 8.3, 5 deaths
1837, Mag. 8.5, 16 deaths
Tsunami Source and Runup Distribution

- Kamchatka, Kuril Islands: 113 events, 165 runups
- Indonesia, Malaysia: 269 events, 381 runups
- Japan: 443 events, 2583 runups
- China, N and S Korea, Philippines, Taiwan: 151 events, 142 runups
- West Coast USA: 107 events, 596 runups
- Japan: 57 events, 771 runups
- Alaska: 87 events, 267 runups
- Hawaii: 143 events, 185 runups
- New Caledonia, New Guinea, Solomon Is, Vanuatu: 128 events, 473 runups
- Central America: 108 events, 255 runups
- South America: 290 events, 527 runups
Project Description

- Identify current and new Source References
- Redefine Tsunami and Earthquake Oracle Databases
- Remove Duplicate Events
- Remove Incorrectly Related Earthquake and Tsunami Events
- QC and Expand Tsunami And Earthquake Events
- Add Tsunami Runup Latitude/Longitude
- Add Paleo Tsunami Data
- Identify Tide gauge, Water Height, Paleo, or DART
- Add References for all Tsunami Runups
- Improve Data Access and Display Forms and Maps
- Improve Download Options
Tsunami Source and Runup References

**Kamchatka, Kuril Islands**

*Japan*

Iida

Catalog of Tsunamis in Japan and its neighboring countries 684-1980

**Indonesia, Malaysia**

**China, N and S Korea, Philippines, Taiwan**

**Hawaii**

Lander, Lockridge

United States Tsunamis (Including United States Possessions) 1690-1988

**New Zealand, S Pacific Is**

**New Caledonia, New Guinea, Solomon Is, Vanuatu**

**West Coast USA**

Lander, Lockridge, Kozuch

Tsunamis affecting the West Coast of the United States 1806-1992

**Central America**

Catalog of Tsunamis on the Western Coast of Mexico 1537-1985

Devora, Sanz

**South America**

Lockridge

Tsunamis in Peru-Chile 1562-1985

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Soloviev and Go, 1984, A Catalogue of Tsunamis on the Western Shore of the Pacific Ocean 173-1968

Partners

- Lori Dengler and Graduate student – West Coast of U.S. and Alaska
- **NGDC Graduate student** – Oracle Database, IDB Forms-based Access, Interactive Maps
- **Paula Dunbar** – Rest of Pacific Basin
Tools

Fields added to track updates
QC – Current 1906 event
Consolidate Data into One Record
Consolidated Data Display
Current Tsunami Events Search

The NGDC Tsunami Database consists of two files:
- The Event (this search page) database contains information on the source of the tsunami.
- The Runup database contains information on locations where tsunami effects occurred.
Some events do not have runup information, while some events have many locations where a runup height was recorded.
The Introduction provides more information on the contents of this database.
The Tsunami databases can be displayed and extracted with the ACEMS Interactive Tool.

- Select one of the following to display subsets of the global tsunami database:
  - EAST COAST of the UNITED STATES and CANADA
  - INDIAN OCEAN
  - PILIPINES

- Or, enter the information from one or more of the following search options and then click the Select Data button.
  - Click the Clear Form button for each additional search.
  - To retrieve the entire database, click the Clear Form button and the Select Data button at the bottom of this page.
  - The entire database contains over 2000 events and is approximately 1 MB.
  - NOTE: Do not use commas when entering numbers into the form.

- To import the resulting search into an MS Excel spreadsheet:
  - In the Browser, select Edit→Select All then Edit→Copy
  - In Excel, select Edit→Paste Special→as HTML.
Current Tsunami Runups Search
# Current Event Search Display

The Current Event Search Display is a tool for searching and displaying information about tsunami events. It provides a comprehensive view of various tsunami events, including details such as date, location, parameters, and additional notes. The display is divided into several sections, each providing specific information:

## Tsunami Events

This section displays a list of tsunami events, including their dates, locations, and parameters. Each entry includes the date of the event, the location details (such as city and state), the magnitude of the earthquake, and the tsunami parameters. The display also includes a column for additional notes, which can provide context or additional details about the event.

## Tsunami Runcups

This section shows graphical representations of tsunami runcups, which are used to simulate the height and speed of the tsunami waves as they approach a particular location. These visual aids help in understanding the potential impact of a tsunami on a given area.

## References for the Tsunami Event

This section lists references related to the tsunami event, which can include academic papers, reports, and other resources. These references provide further reading and information about the event and its causes.

## Comments for the Tsunami Event

This section contains comments and additional notes about the tsunami event. These comments can be made by experts or affected individuals and provide a more personal and detailed perspective on the event.

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**Aug 9, 2005**

Dunbar, Clark, Dengler
Current Runup Search Display

No Runup References
New Data Access - Tsunamis

A Tsunami is a series of waves generated by an impulsive disturbance in the ocean or in a body of water. These waves sometimes inflict severe damage to property and pose a threat to communities. NGDC and thecollocated World Data Center for Solid-Earth Geophysics have compiled tsunami-related products as part of a continuing program to support the interests of engineers, geologists, and the general public. These datasets include historic tsunami data, technical and photographic information. Please see the Copyright Notice if you plan to use data from this web site or agency.

Tsunami Database
This database provides information on tsunami source events and locations where effects were observed. It includes events from 2000 B.C. to the present in the Pacific, Indian, and Atlantic Oceans; and the Mediterranean and Caribbean Seas.

Interactive Maps
The NGDC Tsunami Event and Runup databases can be displayed and extracted with the Map.

Tsunami Video Sets
These video sets are collections of 360° videos, depicting tsunami events and damage.

The NGDC Tsunami Database contains information on tsunami events from 2000 B.C. to the present in the Atlantic, Indian, and Pacific Oceans; and the Mediterranean and Caribbean Seas.

The Database consists of two related files:
- The Tsunami Source Event file contains information on the source of the tsunami. These data include source location, date, and time, event magnitude, maximum water height, total number of deaths, injuries, and damage for the event.
- The Tsunami Runup file contains data on locations where tsunami effects occurred. These data include arrival date and time, travel time, maximum water heights, horizontal inundation distances, deaths, injuries, and damage for specific locations.

Some events do not have runup information; other events have many locations where a runup height was recorded.

The Introduction provides more information on the contents of this database.

The Tsunami database files can also be displayed and extracted with the ArcGIS Interactive Map.
New Searches

New Display Options added
New Event Search Display

For additional information about the earthquake source, tsunami and links to damage photos, click on the links in the Cause Earthquake Map, Name of Runup and Add Info columns.

References for the Tsunami Event:

New Runup Search Display

Field added to identify questionable runups
Socio-Economic Impact for Scenario Tsunami

- **Crescent City, California** - most tsunami damage on the U.S. West Coast (other than AK)
- **11 people were killed** - 1964 Alaska event
- **Source areas** – California, Alaska, Chile, Peru, Japan, Kamchatka, Kuril Islands
- **Tide gauge** installed in 1930s – 20 tsunamis recorded
- **Scenario Tsunami** – **Cascadia** type event
- Complete **HAZUS** scenario for the earthquake impacts of a Cascadia earthquake in the Crescent City area
- Examine paleotsunami data, numerical modeling and Cascadia tsunami hazard assessments to determine likely **inundation zones**
- Identify, collect and integrate other **geospatial data layers**, eg population density, infrastructure
- Define possible **economic variables**
Problems

• Some areas in the Pacific (e.g., Japan, South Pacific) will require careful examination of several historical tsunami publications – QC will require more time in these areas

• Identification and acquisition of new Source Documents is also time consuming
Future Opportunities

• Socio-economic Impact – work with Linda Lent, an independent economist who studies beach and coastal economics. She is currently working on socio-economic impact of tsunamis in Crescent City

• Add plugin to interactive maps for travel time chart

• Integrate tide gauge and dart buoy data into the tsunami data access