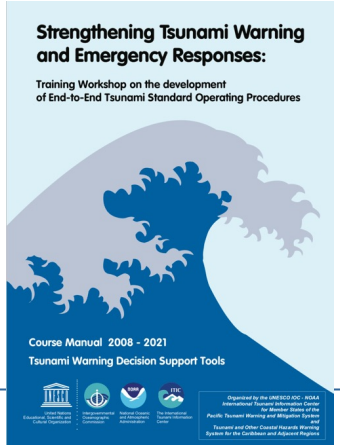
Keeping Authorities Informed:
Available TW Decision Support Tools
Earthquakes, Sea Level, Historical Events, Travel Times, Hazard Assessment



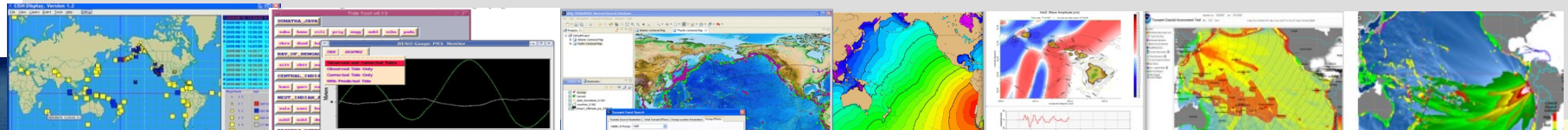
Laura Kong
UNESCO/IOC – NOAA International Tsunami Information Center

ITIC, IOC, USGS, PTWC, NCEI, WDS-Geophysics, PMEL/NCTR

Tsunami Warning Decision Support Tools

ITIC-distributed, supported

- **Tsunami Bull Board Listserv (ITIC, 1995) 464 science/tsu/govt** (Aug 2024)
  ADDR FOR POSTING: tsunami_bb@list.woc.noaa.gov
- **Real time EQ Display (CISN, USGS / NTHMP, 2005), 346+ v3.13.227** (Aug 2024)
  NO PTWS EQ Observatory message. NO registration code required so cannot track nbr users
- **Real-time Sea Level monitoring**
  - **Tide Tool – TWC operations monitoring (PTWC, 2005) v10.71**
  - **IOC Sea Level Monitoring web site (IOC, 2008)**
- **Tsunami Travel Time Software (ITIC, NGDC, 2007) – SDK4.0.1, with GUI for PC**
- **Tsunami Historical Database Online (WDS-NCEI), Offline (TsuDig, NCEI, ITIC, 2009)**
- **Tsunami Hazard Assessment Tools (2017) – PMEL, ITIC**
  - **ComMIT/MOST inundation modeling => OTGA TEMPP hybrid late 2025**
  - **Tsu Coastal Assessment Tool (TsuCAT v4.4, Aug 2024) => PTWC messages from multiple countries, with community exercise injects, near-real time USGS earthquake ingest**



Tsunami Bulletin Board

Email List-serve, Currently, ~464 (Aug 2024)

Membership: Scientists, Tsunami prof, govt, NO MEDIA - NO PUBLIC

Features

1. **Immediate delivery**
2. **No censureship**
3. **Forum for sharing science and early results - NOT peer-reviewed**
4. **PTWC, US NTWC tsunami messages**

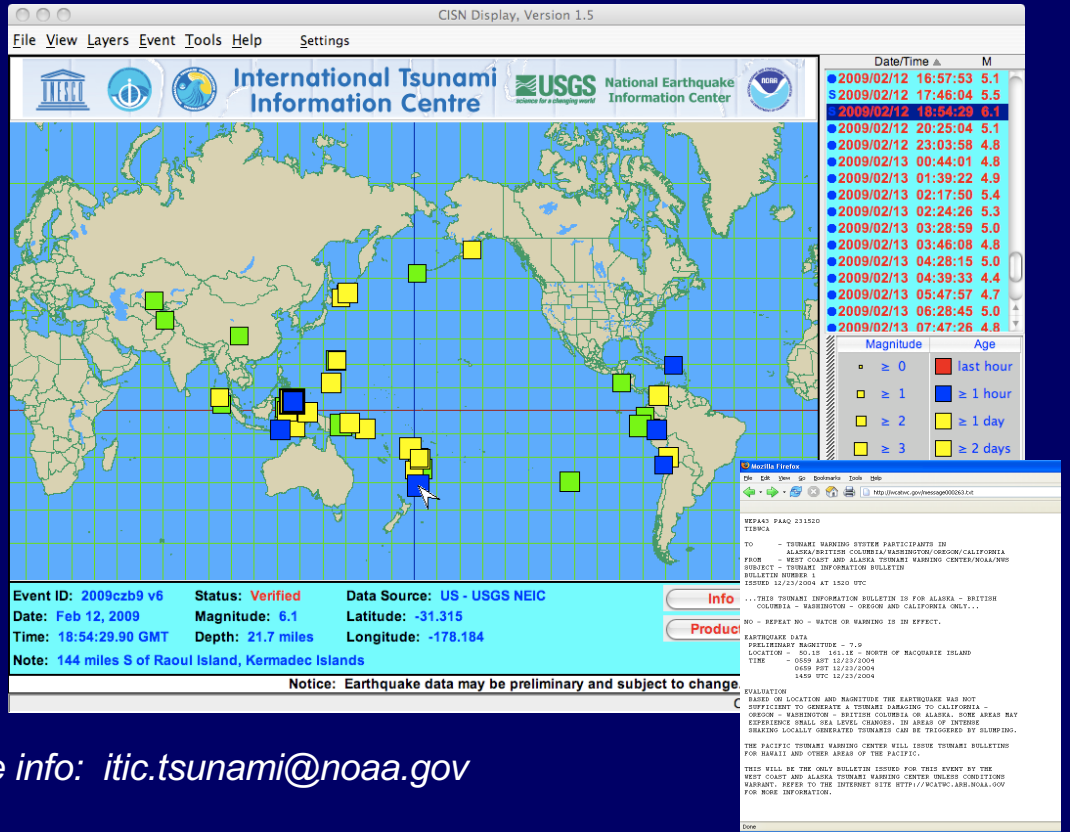
Contact: itic.tsunami@noaa.gov

CISN – Quick Info

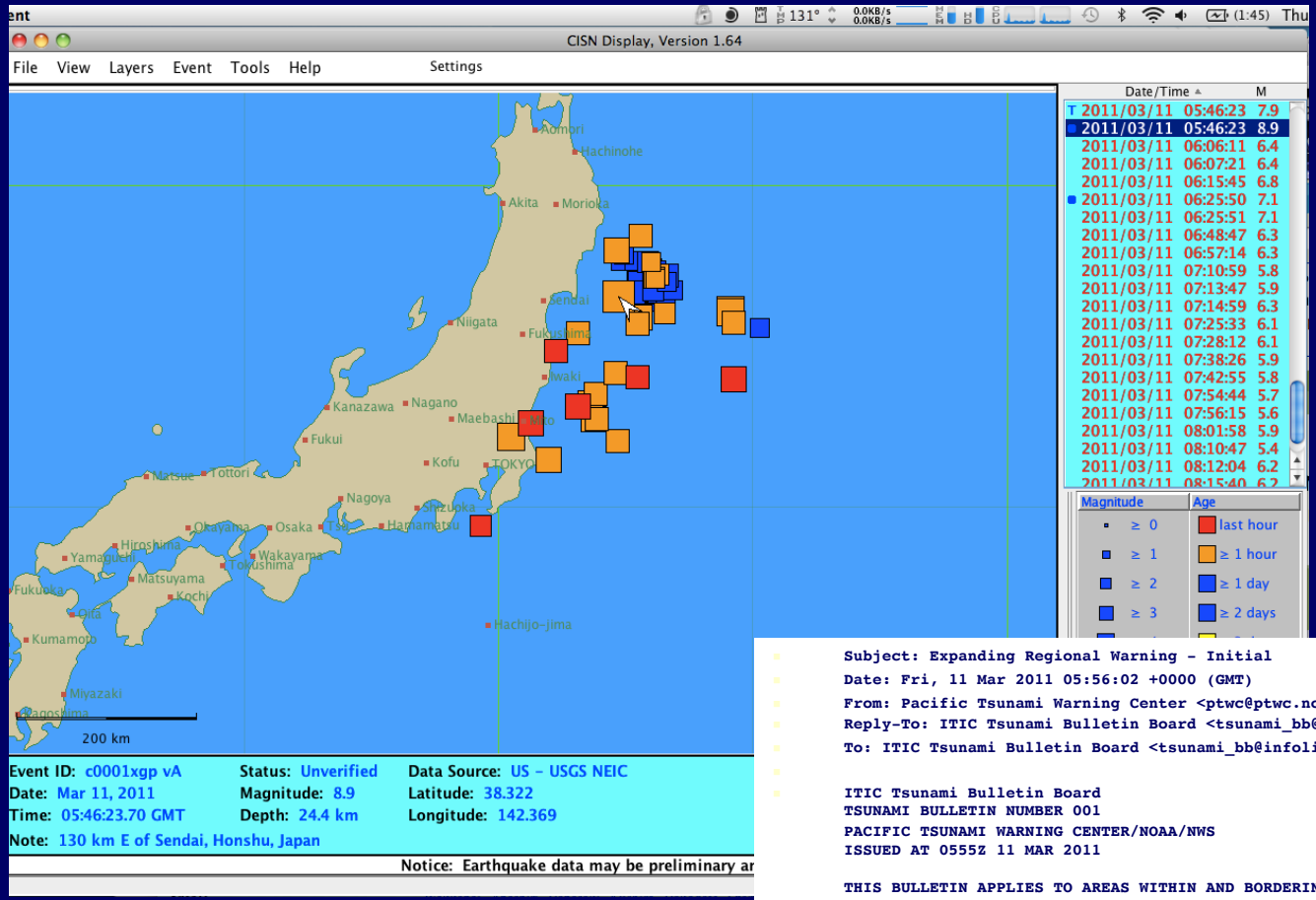
- **CISN earthquake information displayed is that of US Geological Survey**
  - Updates as more information received (iterates)
  - Authoritative agency for earthquakes in the US.
  - USGS hypocenter / magnitude will likely differ (by small amt) from PTWC / US NTWC.
  - During tsunami event, PTWC / US NTWC work together, but independently from USGS. PTWC / US NTWC use their own locations in their tsunami products.
- ***ITIC and PTWC recommend CISN for displaying real-time EQ info, and for alerting duty staff that PTWC has issued a tsunami message.***

Real-Time Earthquake Display and Alert System (CISN)

- Internet
- Passive (automatic receive)
- Multi-platform
- EQ broadcast
- Alert system (SMS, email)
- GIS layers
- Tsunami Warning msgs



For more info: itic.tsunami@noaa.gov



Subject: Expanding Regional Warning - Initial
Date: Fri, 11 Mar 2011 05:56:02 +0000 (GMT)
From: Pacific Tsunami Warning Center <ptwc@ptwc.noaa.gov>
Reply-To: ITIC Tsunami Bulletin Board <tsunami_bb@infolist.nws.noaa.gov>
To: ITIC Tsunami Bulletin Board <tsunami_bb@infolist.nws.noaa.gov>

ITIC Tsunami Bulletin Board
TSUNAMI BULLETIN NUMBER 001
PACIFIC TSUNAMI WARNING CENTER/NOAA/NWS
ISSUED AT 0555Z 11 MAR 2011

THIS BULLETIN APPLIES TO AREAS WITHIN AND BORDERING THE PACIFIC
OCEAN AND ADJACENT SEAS...EXCEPT ALASKA...BRITISH COLUMBIA...
WASHINGTON...OREGON AND CALIFORNIA.

... A TSUNAMI WARNING AND WATCH ARE IN EFFECT ...

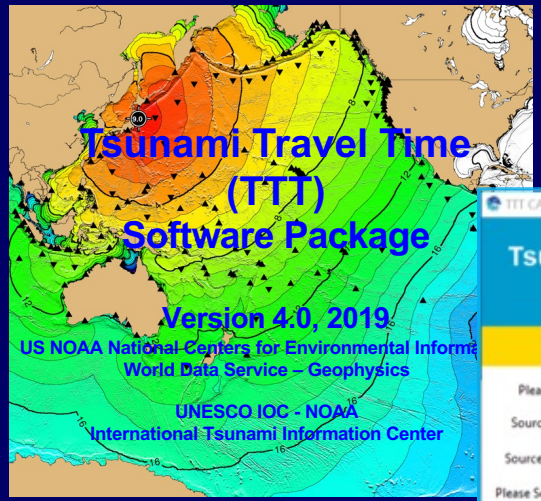
A TSUNAMI WARNING IS IN EFFECT FOR

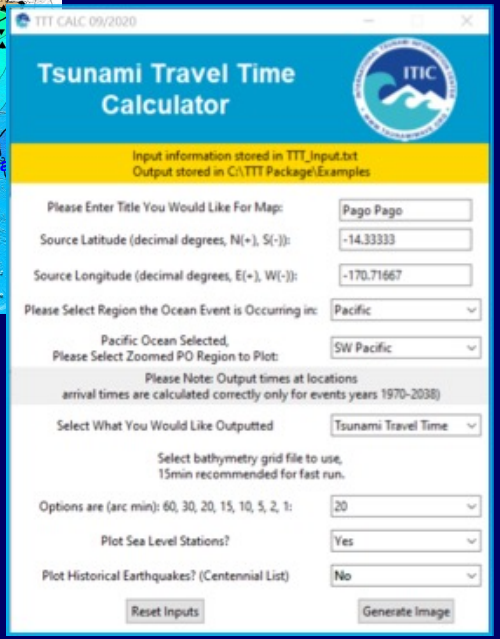
JAPAN / RUSSIA / MARCUS IS. / N. MARIANAS

CISN: 11 March 2011

Tsunami Travel Time Calculation and Map Display

- PC-Windows, Linux, Unix, Mac OSX
- Calculation
- Map display (GMT)
- Used by PTWC
- Examples, Simple scripts
- Accuracy on bathymetry Etopo1 (1-min) and coarser grids
- Available to TWFP / govt agencies
- TTT GUI for easy use (2021)

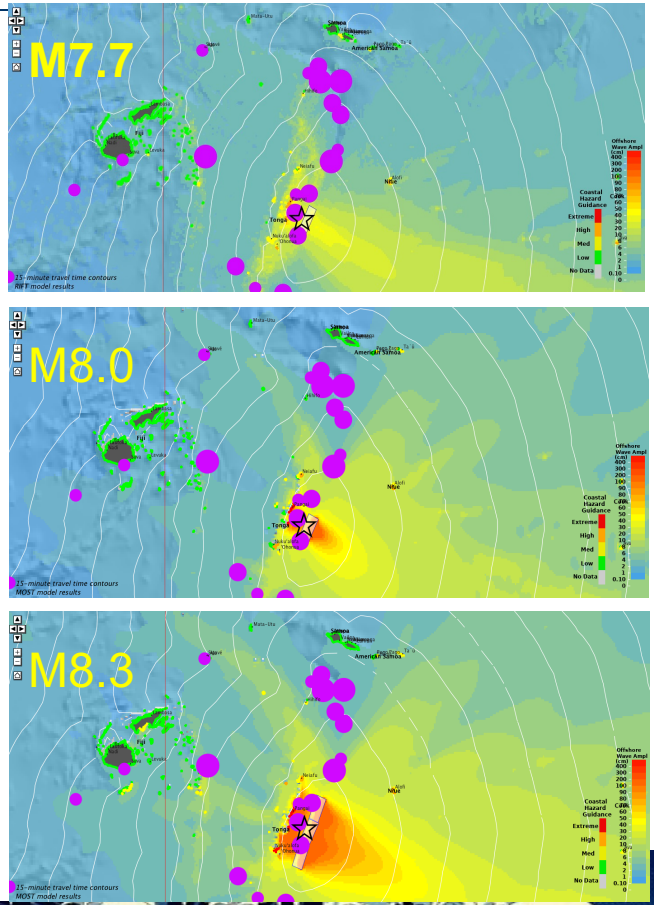




Contact: itic.tsunami@noaa.gov

Tsunami Coastal Assessment Tool (TsuCAT) - Uses

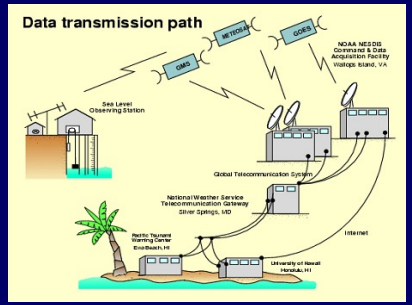
- **Hazard Assessment -** worst case, likely impact
- **Exercise development –** scenario development, PTWC exercise messages
- **Response Planning –** use scenarios to develop tsunami response plans, procedures (SOPs)
- **Warning decision making –** estimate tsunami impact with nearest similar scenario (early assessment prior to receiving PTWC forecast)
- **Features:**
  - Database: ~5400 earthquake scenarios from active subduction zones - Pacific, Caribbean, Indian Ocean (M6.5-9.5)
  - NOAA models (MOST/SIFT (M8+), RIFT (M6.5-7.9)

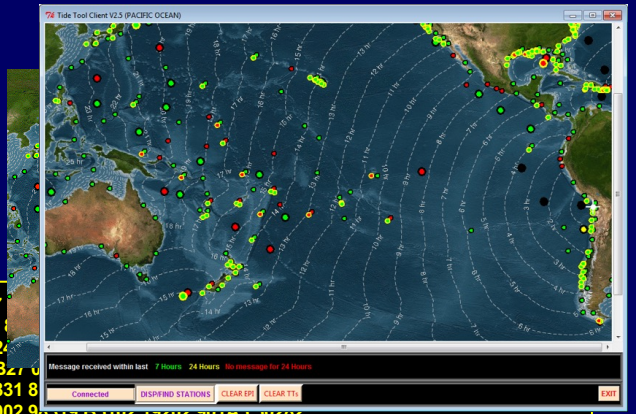


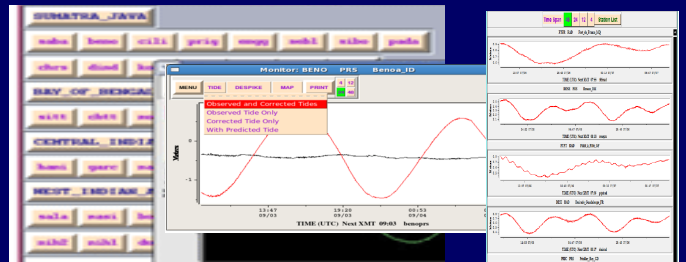
TideTool - Interactive Sea Level Monitoring

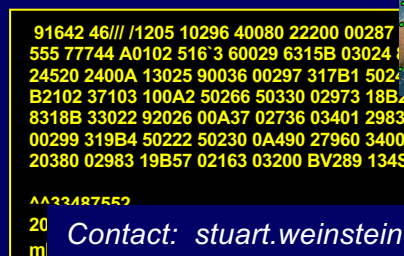
(OPERATIONAL Tool for Tsunami Warning Centres)

- **PTWC-received sea level stations** (GLOSS, non-GLOSS)
- **Decode, Display, Manipulate** (expand, measure period/amplitude) satellite-transmitted sea level data
- **Open-source** shell programming, graphics (Tcl/Tk, BLT extension), PC, Linux, Unix
- **Continuously decodes:** expand time series, remove tide, pick amplitude, metadata, msg
  Downloads data from GTS (Met Svc)
  Also by ftp from NOAA NWS gateway
- **Runs locally (data, software)**
- **Dynamic, interactive, customize**

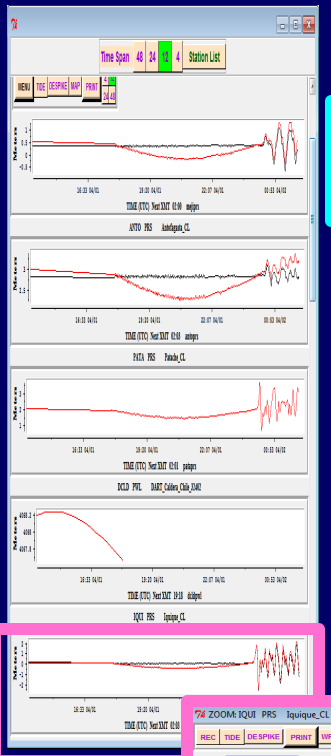


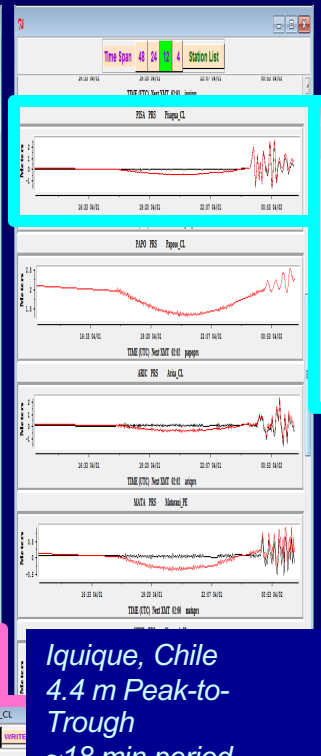




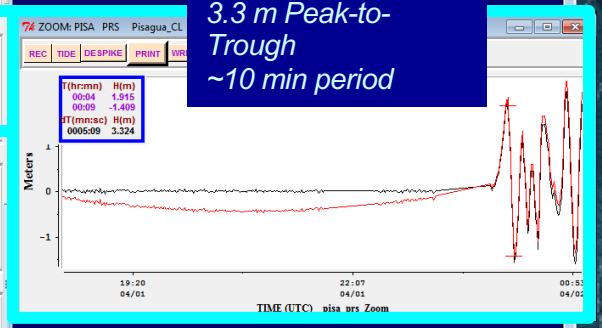


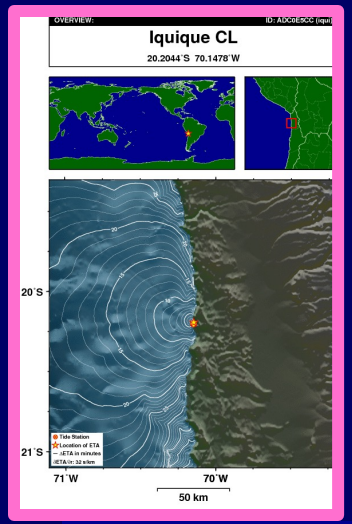
Contact: stuart.weinstein@noaa.gov, laura.kong@noaa.gov



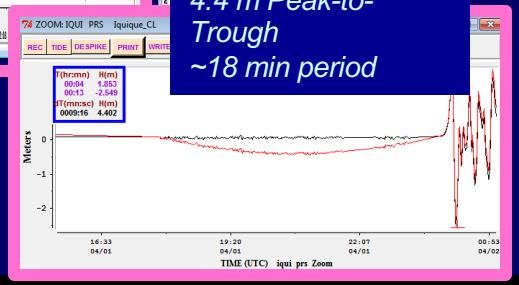


Pisagua, Chile
3.3 m Peak-to-Trough
~10 min period



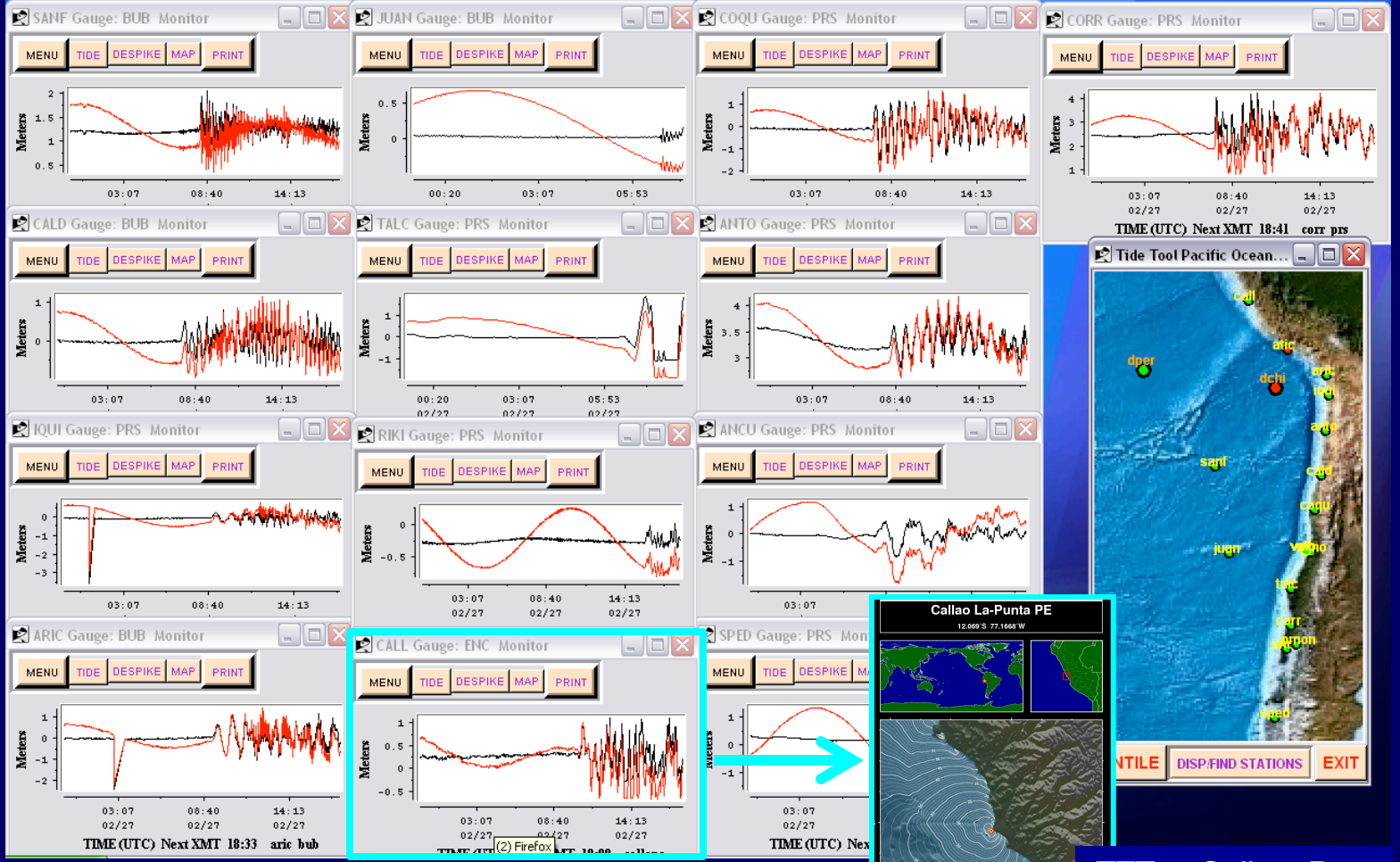


Iquique, Chile
4.4 m Peak-to-Trough
~18 min period



TTT to Iquique, Chile

Tide Tool: 1 April 2014



TTT to Callao, Peru

Tide Tool: 27 February 2010

Tide Tool Quick Info

Update Widget

Tide Tool Update Widget
To facilitate the easy update of Tide Tool, a Widget is available.

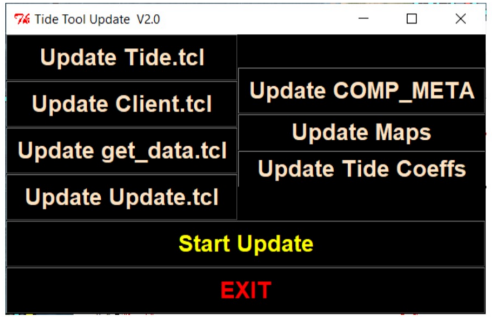
The Update folder must be placed in the directoryC:\Tcl\TideTool\

Steps:

1. Open the Update folder and create a shortcut to the Update_Tide_Tool.vbs file and move it to the Desktop.

2. Before performing an Update, stop Tide Tool and any of the Map Clients that are running.
   The get_data.tcl process does not need to be stopped unless it is being updated.

3. After the Tide Tool processes have been killed, you can start updating
   Click the shortcut to start the Update widget:



4. To update the software, click the button with the name of the file that is to be updated. It will turn green.

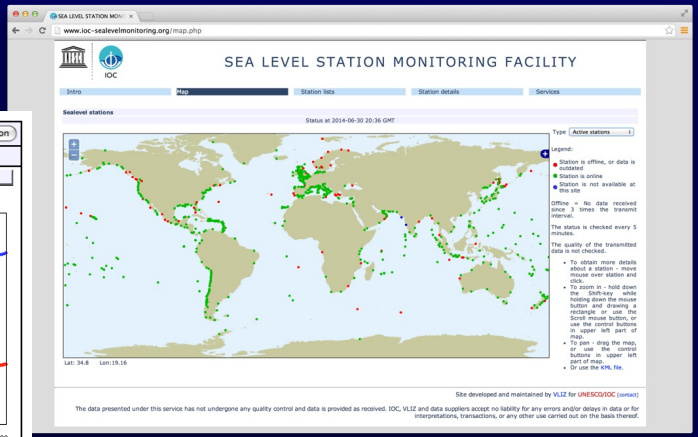
   Tide.tcl – script that decodes binary data
   Client.tcl – script that enables maps
   get_data.tcl – script the retrieves binary data
   Update.tcl – script retrieves latest Update widge
   COMP_META – station data
   Maps – sea level station travel time maps
   Tide Coeffs – Tide coefficients for detiding sea leve stations

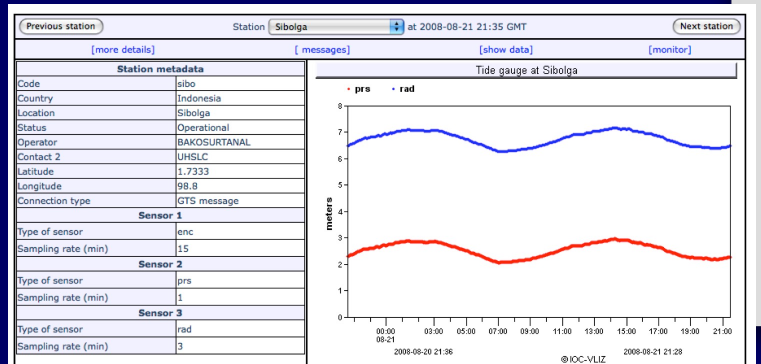
5. Click the “Start Update” button and the update will commence.
   The “Start Update” will change to “Update Starting.”
   When it is finished, that will change to “Update Finished.”
   At this point, the Update(s) is complete.
   Click the “EXIT” button to quit the Update widget and then restart Tide Tool.

IOC Sea Level Monitoring Facility

http://www.ioc-sealevelmonitoring.org/map.php

- **Global Monitoring** of satellite-transmitted data (Station health)
- **Easy-to-use Web tool (runs in Belgium, not locally)**
  Uses Internet (could become clogged during real event)
- **Continuously downloads to site:** from GTS and other sites
- **Continuously decodes:** displays / expand time series, station metadata, messages
- **Data download** manually



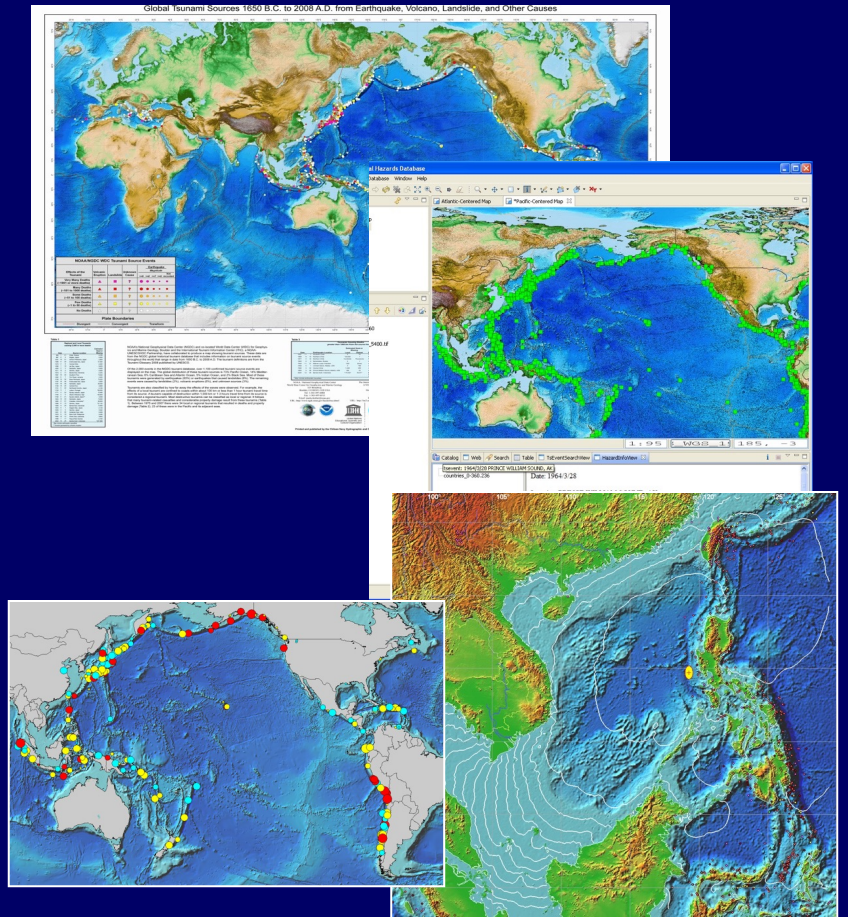


Global Historical Databases

- **WDS-Geophysics/NCEI**
  online - Web online
  offline – TsuDig (2009)
- **ITDB** – Russia
  offline (1990s)

Features:

- GIS display
- EQ, Tsunamis, Run-ups
- Seismic, Sea Level networks
- Event sorting
- Travel Times



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