

## TIDE TOOL – QUICK INFO

For more information, refer to Tide Tool Manual.

### OVERVIEW:

The Tide Tool system downloads Pacific sea level data from the NWS Telecommunication Gateway (NWSTG), decodes the data, and displays it. Calculated tsunami travel time contours can also be overlain on the map client to graphically show the propagation of the tsunami from the earthquake epicenter. All stations that PTWC receives are available through Tide Tool. The system consists of 3 scripts (*get\_data.tcl*, *Tide.tcl*, *Client.tcl*) that run simultaneously on 1 PC. *Tide.tcl* and *Client.tcl* (*PACIFIC*) are softwares that PTWC uses in their operations.

For other oceans, please replace *PACIFIC* with *INDIAN* (IO), *CARIBBEAN* (CAR), or *ATLANTIC* (ATL) in the Quick Info text. Instructions refer to the generic names of scripts; in general, each script will include its version number in its file name (e.g., *Tide\_vX.XX.tcl*, *Client\_vX.X.tcl*, etc)

CISN may be run on the same PC to monitor seismicity and alert Duty Staff when large earthquakes occur and when Tsunami messages are sent by PTWC or US NTWC (WC/ATWC). However, it is recommended that CISN be run on a separate PC to enable continuous dedicated monitoring.

### USE:

1. Monitor stations for tsunami confirmation after a large earthquake has occurred. To determine the estimated arrival time, you may:
  - Use *ttd\_tidetool.bat* to calculate tsunami travel times using actual earthquake epicenter (this will enable overlay onto *Client.tcl* map)
  - Use PTWC bulletins will give estimated tsunami arrival time at different locations
  - Use *ttd\_auto.bat* or *TsuDig* to calculate tsunami travel time map (use either ‘bullseye map with your location (e.g., Pago Pago / Apia) as center’ or event map using actual earthquake epicenter)
2. Monitor state-of-health of your stations (e.g., Pago Pago/Apia/Upolu), or other gauges). Report if out of order.

### Notes:

1. Stations transmit data by satellite (generally GOES, MTSAT, EUMETSAT) at different intervals (every 3-60 min) and different times (in a given hour). Therefore, before deciding on the tsunami threat, sometimes you have to wait until the next transmission if only part of the tsunami wave has arrived.
2. Stations have sensors that ‘damp’ the signal (see Manual appendix for sensor types). Therefore, what you measure will probably underestimate the wave height reported by eyewitnesses. Coastal signals also depend on the gauge location, e.g., some stations always amplify signals.
3. DART stations are located in the deep ocean (not on land). Therefore, signals measured will be much smaller (few cm / 10s of cm) than signals on coastal (land) gauges. When DART waves hit shallow water (the coast), tsunami wave physics says that wave height increases – therefore, a small DART wave in the deep ocean could end up as a large wave when it hits land. Tsunami modeling must be used to forecast what is expected at the coast.

### IMPORTANT CHECKS DONE BY EACH DUTY SHIFT:

1. PC on GMT time. This is needed for correct time decoding.
2. *get\_data.tcl* is running. Check *WIZE* window to see if the last download is current. If not, then data are not being collected. Restart all programs.
  - a. Close the inactive *WIZE* and start the *get\_data.tcl* again. Refer to 1. STARTUP
  - b. Exit *Tide Tool* and *Tide Tool Client* window(s) (e.g., PACIFIC OCEAN). Start each program again (refer to 2. and 3. in STARTUP)

### TIPS FOR EFFICIENT USE:

1. View individual sea level stations using *Tide Tool* window (choose station using 4-letter station code, left mouse click), or *Tide Tool Client* window (choose the dot on the map, left mouse double click). Choices are
  - Sensor type (pressure gauge, encoder, aquatrak, bubbler, radar)
  - *Info* (station and transmission information)
  - *Mess* (actual data download, undecoded)
  - *MAP* showing station location
2. Measure wave height and wave period from an individual station by mouse-selecting (right) time window to expand time series, then mouse-select (left) points you want to measure – a time and height difference is automatically calculated if you select 2 points.
3. Fast viewing of stations in a region is done using the *Tide Tool Client* – mouse-outline (right click & drag) a box of interested stations, and then Show *Tile or Strip*, and all stations are displayed.

The *Strip* feature allows many stations to be displayed simultaneously, similar to a seismic record section.
4. Station locations and 4-letter station names are found using the hard-copy maps (*CaribbeanAtlantic\_SL\_Stations\_nov2013.pdf*, *Indian\_SL\_Stations\_2012.pdf*, *Pacific\_SL\_Stations\_nov2013.pdf*, in *TideTool* folder), or by *Disp/Find* button in *Tide Tool Client*
5. Estimated Tsunami Travel Times from the earthquake epicenter can be overlain on the map after running *ttt\_tidetool.bat*. Latitude and longitude are given at the location of mouse cursor.
6. To retain a picture of the screen, options are:
  - Use *Print Plot File Only* option in time series window (postscript plot files found in *TideTool\_data/PLOTS* directory, and viewed with Adobe Acrobat).
  - Use *Ctrl+Alt+Print Screen* (individual window) or *Print Screen* (entire display), and then paste in MS Word file

### STARTUP:

1. Start *get\_data.tcl*. This script downloads data every 200 seconds from the NWSTG. Data are accumulated in a file (in *TideTool\_data* (desktop icon) / *SR\_LOG* folder, file *srxxxyr.log*, where *xxx* is Julian day and *yr* equals year. To start: drop *get\_data.tcl* in *TideTool\_bin* folder (desktop icon) onto *WIZE* icon on desktop.
2. Start *Tide.tcl*. This script looks to see if there is new downloaded data in *srxxxyy.log* and if yes, decodes the new data and updates the sea level station data file/display. To start: drop *Tide.tcl* in *TideTool\_bin* folder (desktop icon) onto *WIZE* icon on desktop

3. Wait until *Tide.tcl* (Tide Tool) completes the decode of the initial file (may take up to 20-30 min if at the end of the Julian Day). Then start *Client.tcl* (*PACIFIC OCEAN*). To start: double click *PACIFIC* icon on desktop. To start *Client.tcl* for other regions do the same, double click on corresponding icon(s) (*ATLANTIC*, *CARIBBEAN*, *INDIAN*) on desktop.
4. When an event occurs, run *ttt\_tidetool.bat* to calculate a Tsunami Travel Time map and overlay on *Client.tcl* map (PLOT TTs and EPI to overlay). To start: double click *ttt\_tidetool.bat* in *TTT\_bin* folder (desktop icon).

#### **VIEWING ARCHIVED DATA:**

Tide Tool can be run in 'archive' mode to view past data (files in folder *SR\_LOG*).

1. Use the correct station metadata file to view archived data. This should be the *COMP\_META* file that was in use when the data was collected; it may not be the most current one.  
(Replace the current *COMP\_META* file with this file, but be sure to save the current *COMP\_META* file to another filename so you will have it for the real-time version)
2. Run *Tide.tcl*. To run: double click *wize.exe* in the *TideTool\_bin* folder on the desktop.
3. Type "wize Tide.tcl H"
4. Enter JD, YR (2 digit), SPAN (1 or 2 corresponding to number of days of SRLOG files)
5. *Tide.tcl* will decode and then display the SRLOG files specified
6. *Client.tcl* (for all regions) can be run