

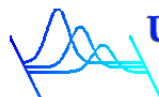
# U.S. National Sea Level Report

## Contributions to the Global Sea Level Observing System

### April 2019



NOAA NWLON Station in San Juan, Puerto Rico with both acoustic (in back) and microwave sensors installed



University of Hawai'i  
Sea Level Center

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## 1.0 Introduction

Sea Level observations in the United States are carried out by a number of organizations ranging from federal to academic in nature, this report focuses on four entities that comprise the U.S. contributions to GLOSS. These organizations are listed below and include website urls and Principal Leads identified.

### **The National Oceanic and Atmospheric Administration (NOAA) National Ocean Service (NOS)/ Center for Operational Oceanographic Products and Services (CO-OPS)**

CO-OPS operates the National Water Level Observation Network (NWLON), a network of 210 continuously operating real time water level stations that provides the national standards for tide and water level reference datums used for nautical charting, coastal engineering, international treaty regulation, and boundary determination. Twenty seven of the stations are in the GLOSS Core Network.

Director: Richard Edwing ([Richard.Edwing@noaa.gov](mailto:Richard.Edwing@noaa.gov))

Website: <https://tidesandcurrents.noaa.gov/>

Address: 1305 East West Highway  
Suite 6650  
Silver Spring, Maryland, USA 20910  
011-240-533-0482

### **The University of Hawaii Sea Level Center (UHSLC)**

The UHSLC collects, processes, and distributes sea level measurements from their network of 84 stations that span the world in support of various climate research activities.

Director: Philip Thompson ([philiprt@hawaii.edu](mailto:philiprt@hawaii.edu))

Website: <https://uhslc.soest.hawaii.edu/>

Address: 1000 Pope Road  
MSB 317  
Honolulu, HI 96822  
011-808-956-6574

### **NOAA Caribbean Tsunami Warning Center**

The NOAA Tsunami Program operates the Caribbean Tsunami Warning Program (CTWP) which works to improve tsunami observations, provides training and outreach and educational assistance and facilitates data exchange to regional partners in the Caribbean and adjacent regions. The CTWP supports activities of the IOC's Intergovernmental Coordination Group for Tsunamis and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions.

Manager: Christa Von Hillebrandt ([christa.vonh@noaa.gov](mailto:christa.vonh@noaa.gov))

Website: <http://iocaribe.ioc-unesco.org/>

Address: 259 Blvd. Alfonso Valdes  
Bldg. D  
Mayaguez, PR 00680  
011-787-832-4040 x5787

### **NOAA Laboratory for Satellite Altimetry**

The NOAA Laboratory for Satellite Altimetry (LSA) specializes in the application of satellite altimetry to a broad array of climate and weather related issues, including global and regional sea level rise, coastal and open-ocean circulation, weather prediction — from hurricane intensity forecasting to El Niño and La Niña events -- and monitoring the changing state of the Arctic Ocean.

Director: Eric Leuliette ([eric.leuliette@noaa.gov](mailto:eric.leuliette@noaa.gov))  
Website: <https://www.star.nesdis.noaa.gov/sod/lisa/>  
Address: 5830 University Research Court, E/RA3  
College Park MD 20740-3818  
011-301-683-3300

### **NOAA Ocean Observing and Monitoring Division**

The NOAA Ocean Observing and Monitoring Division (OOMB) supports the ocean component of the Global Climate Observing System (GCOS) and enables long-term, high quality, timely, global observational data, information and products. Stakeholders include climate, Arctic, weather, and ocean research communities, forecasters, and other service providers and users. OOMB supports the networks that make up the sustained ocean observing system for climate. These networks include: tide gauge stations, dedicated ships, ships of opportunity, ocean reference stations, Arctic observing systems, tropical moored buoys, surface drifting buoys, Argo profiling floats, data and assimilation subsystems, product delivery, and continuous satellite missions for sea surface temperature, sea surface height, surface vector winds, ocean color, and sea ice.

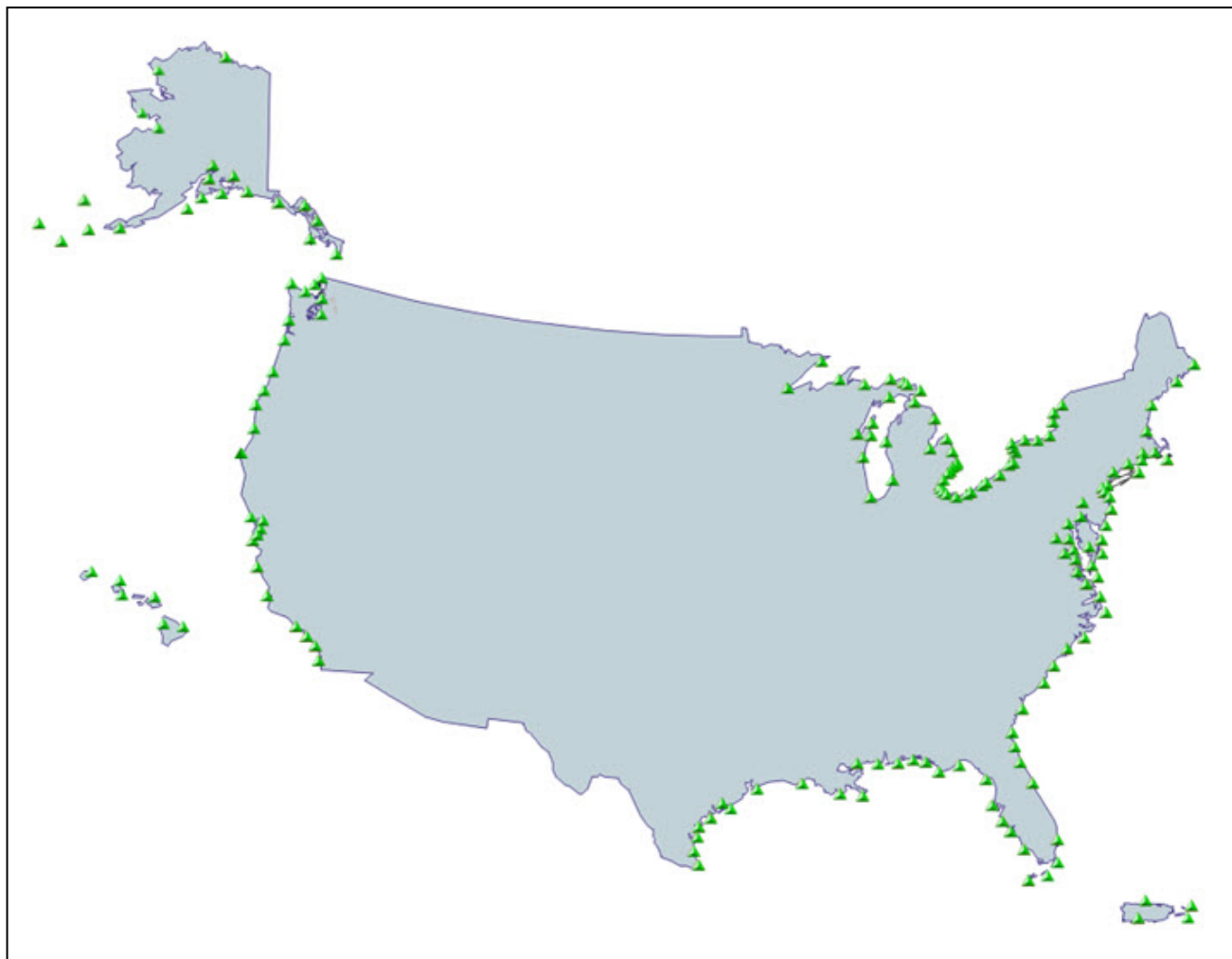
Director: David Legler ([david.legler@noaa.gov](mailto:david.legler@noaa.gov))  
Website: <https://cpo.noaa.gov/Meet-the-Divisions/Ocean-Observing-and-Monitoring>  
Address: 1315 East West Highway  
Suite 2824  
Silver Spring, Maryland, USA 20910  
011-301-427-2460

## **2.0 Sea Level Observing Network Maps & Tables**

### **2.1 Sea Level Networks**

#### **2.1.1 NOAA National Water Level Observation Network (NWLON)**

## NOAA National Water Level Observation Network (NWLON)



**Figure 1. Network Map for stations comprising NOAA's National Water Level Observation Network. The listing of stations can be found in Appendix 1.**

### 2.1.2 University of Hawaii Sea Level Center

#### University of Hawaii Sea Level Network

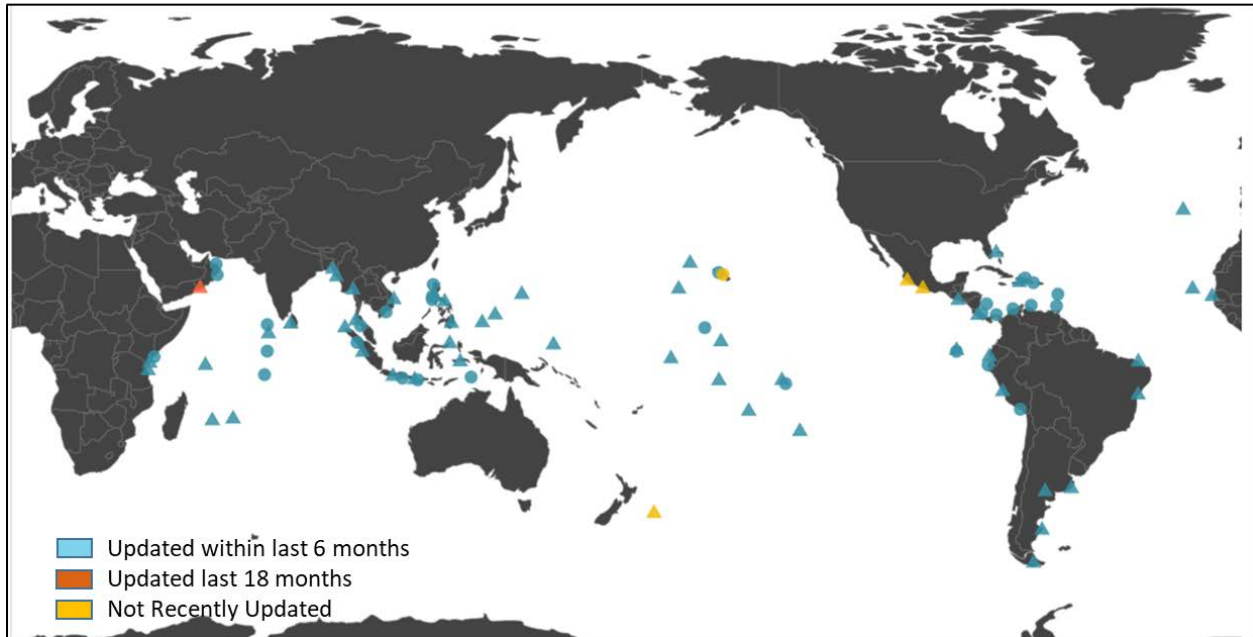


Figure 2. Water level stations comprising UHSLC's network. The listing of stations can be found in Appendix 2

### 2.1.3 Caribbean Regional Network

#### Caribbean Tsunami Warning Network



Figure 3. Station map for the Caribbean Tsunami Warning Network. The listing of stations can be found in Appendix 3

## 2.2 Satellite Altimeter Observations

Below is a map of the estimated sea level trend based on data from TOPEX/Poseidon (T/P), Jason-1, Jason-2, and Jason-3, which have monitored the same ground track since 1992.

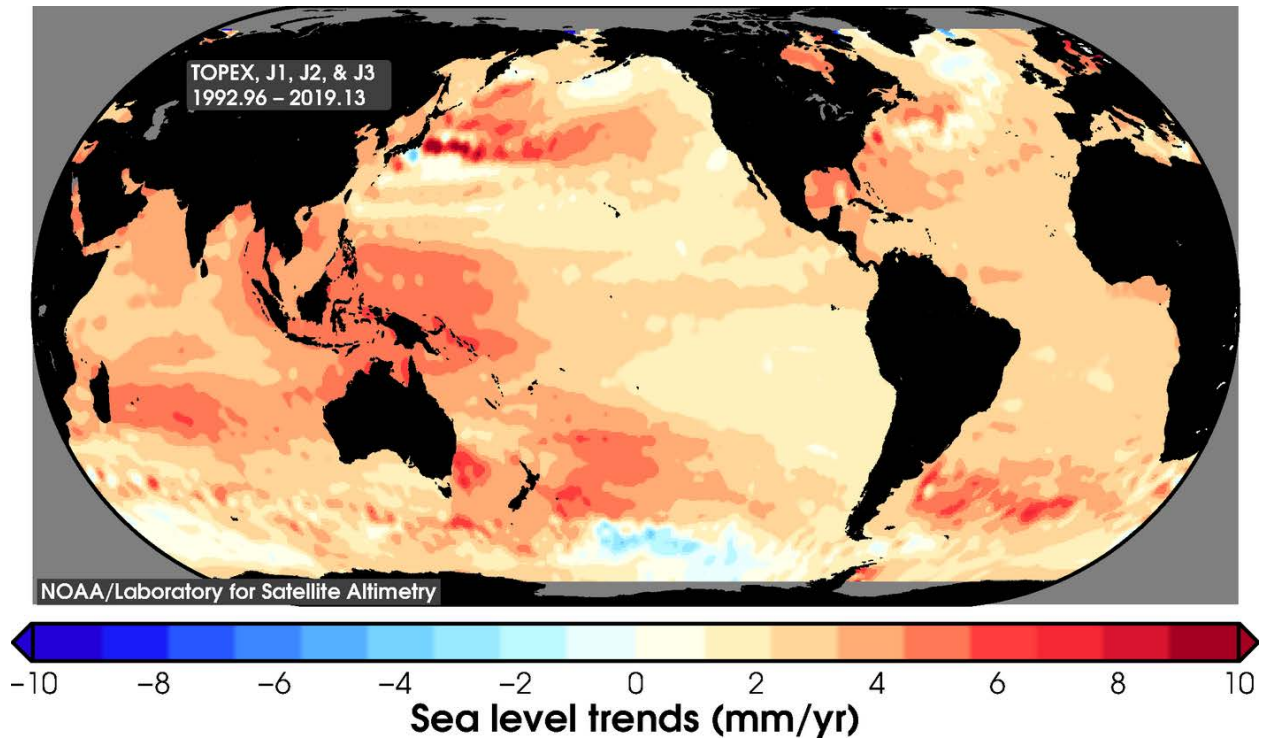


Figure 4. Sea level trends from satellite altimetry

The following graphic is a plot of the global mean sea level rise based on TOPEX/Poseidon (T/P), Jason-1, Jason-2, and Jason-3, data.

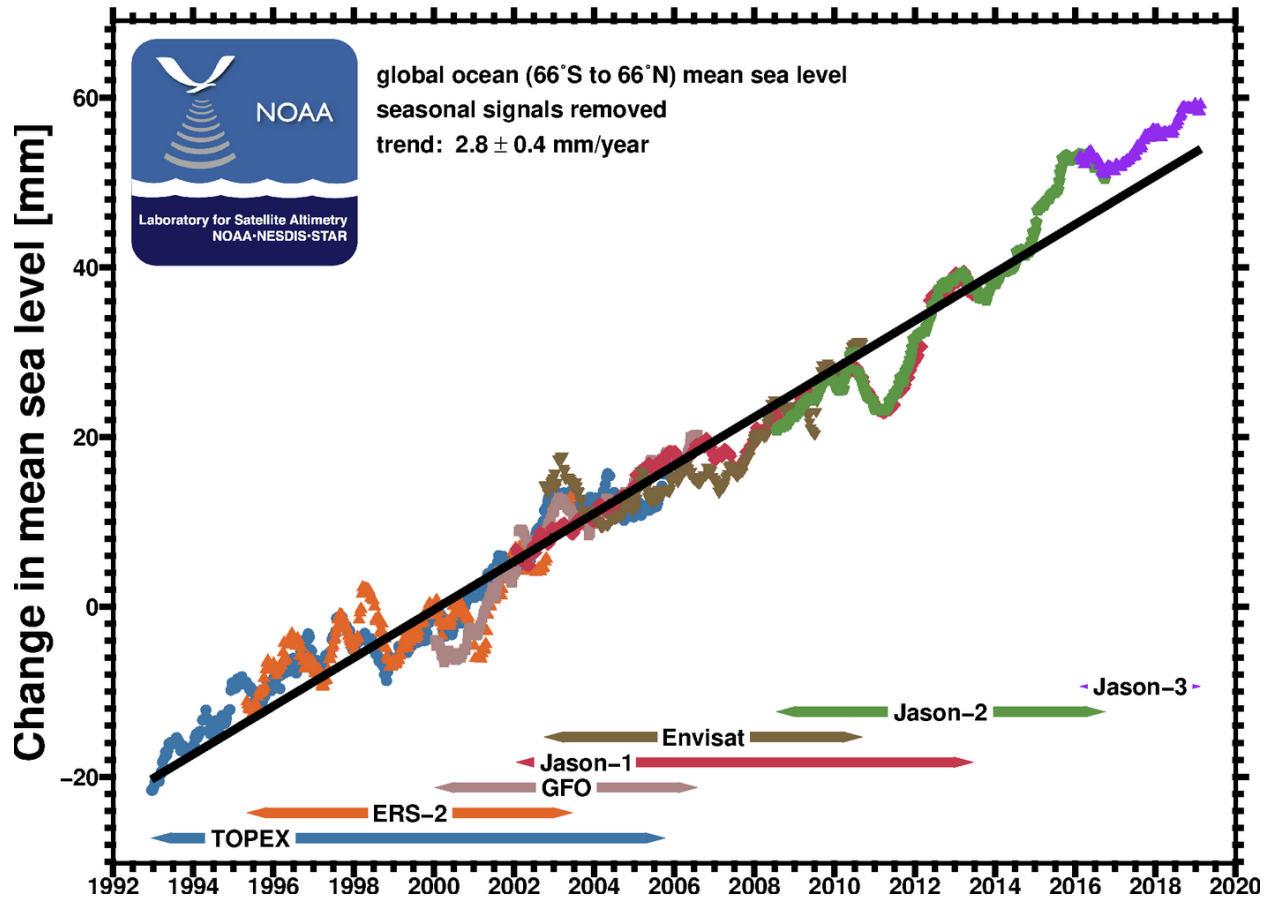


Figure 4. Global mean sea level trend from satellite altimetry



## 2.3 US GLOSS Sea Level Stations

The Table below lists the U.S. GLOSS stations along with the nearest GPS station as reported by [SONEL](#)

**Table 1 – US GLOSS Water Level Stations**

GLOSS ID	Station Name	Lat.	Long.	Country/State	Organization	Nearest GPS	Distance to WL station (m)	GPS Latitude	GPS Longitude
<a href="#">26</a>	Diego Garcia Is.	-7.2833	72.4000	United Kingdom	U Hawaii	DGAR	2900	-7.2903	72.3938
<a href="#">27</a>	Gan	-0.7000	73.1667	Maldives	U Hawaii	ADDU	467	-0.6906	73.1501
<a href="#">28</a>	Male	4.1667	73.5000	Maldives	U Hawaii	HULE	1179	4.1927	75.5281
<a href="#">65</a>	Rabaul	-4.2000	152.1833	Papua New Guinea	U Hawaii	None			
<a href="#">74</a>	Nome	64.5000	-165.4400	Alaska	NOAA	AB11	8317	64.5645	-165.3734
<a href="#">100</a>	Sand Point	55.3333	-160.5000	Alaska	NOAA	AB07	2584	55.3493	-160.4768
<a href="#">102</a>	Unalaska	53.8833	-166.5333	Alaska	NOAA	AV09	950	53.8756	-166.5418
<a href="#">105</a>	Wake Is.	19.2833	166.6167	Marshall Is.	NOAA	WQSL	32	19.2905	166.6174
<a href="#">106</a>	Midway Is	28.2167	-177.3667	Hawaii	NOAA	MQSI	10	28.2150	-177.3609
<a href="#">107</a>	French Frigate Shoals	23.8667	-166.2833	Hawaii	U Hawaii	None			
<a href="#">108</a>	Honolulu	21.3000	-157.8667	Hawaii	NOAA	HNLC	1	21.3032	-157.8645
<a href="#">109</a>	Johnston Is.	16.7333	-169.5333	Hawaii	U Hawaii	None			
<a href="#">111</a>	Kwajalein	8.7333	167.7333	Marshall Is.	NOAA	KWJI	1175	8.7222	167.7302
<a href="#">112</a>	Majuro	7.1000	171.3667	Marshall Is.	U Hawaii	MAJU	1719	7.1191	171.3645
<a href="#">117</a>	Kapingamarangi, Caroline Is.	1.1000	154.7833	Fed. Micronesia	U Hawaii	None			
<a href="#">118</a>	Saipan	15.2333	145.7333	North Mariana Is.	U Hawaii	CNMR	600	15.2297	145.7431
<a href="#">119</a>	Yap, Caroline Is.	9.5167	138.1333	Fed. Micronesia	U Hawaii	None			
<a href="#">120</a>	Malakal	7.3333	134.4667	Belau	U Hawaii	PALA	3125	7.3409	134.4755
<a href="#">125</a>	Tongatapu	-21.1667	-175.2500	Tonga		TONG	779	-21.1450	-175.1790
<a href="#">0</a>	Penrhyn	-8.5900	-158.0667	Cook Islands	U Hawaii	None			
<a href="#">144</a>	Pago Pago, American Samoa	-14.2833	-170.6833	A. Samoa	NOAA	ASPA	7082	-14.3261	-170.7224
<a href="#">145</a>	Kanton Is., Phoenix Is.	-2.4900	-171.4300	Kiribati	U Hawaii	None			
<a href="#">146</a>	Christmas Is., Line Is.	1.9833	-157.4833	Kiribati	U Hawaii	None			
<a href="#">149</a>	Apra Hbr, Guam, Marianas	13.4333	144.6500	Marianas	NOAA	GUUG	16700	13.4332	144.8030
<a href="#">150</a>	Seward	60.1167	-149.4333	Alaska	NOAA	AKSE	1600	60.1325	-149.43654
<a href="#">151</a>	Prudhoe Bay	70.4000	-148.5267	Alaska	NOAA	DSL1	7684	70.3334	-148.4727
<a href="#">154</a>	Sitka	57.0500	-135.3333	Alaska	NOAA	AKSI	400	56.0486	-135.33889
<a href="#">157</a>	South Beach	44.3800	-124.0300	Oregon	NOAA	ORSB	450	44.6253	-124.0488
<a href="#">158</a>	San Francisco	37.8000	-122.4667	California	NOAA	TIBB	9551	37.8909	-122.4476
<a href="#">159</a>	La Jolla (Scripps Pier)	32.8667	-117.2667	California	NOAA	SIO5	2990	32.8406	-117.2497
<a href="#">206</a>	San Juan	18.4667	-66.1167	Puerto Rico	NOAA	BYSP	9472	18.4079	-66.1609

<a href="#">211</a>	Settlement Point	26.7167	-78.9833	Bahamas	U Hawaii	BHMA	3411	26.6899	-78.9670
<a href="#">216</a>	Key West	24.5500	-81.8000	Florida	NOAA	CHIN	400	24.5505	-81.8071
<a href="#">217</a>	Galveston (Pier 21)	29.3167	-94.8000	Texas	NOAA	Tbd	3	29.3168	-94.7995
<a href="#">219</a>	Duck	35.1833	-75.7500	North Carolina	NOAA	NCDU	190	36.1817	-75.7513
<a href="#">220</a>	Atlantic City	39.3500	-74.4167	New Jersey	NOAA	NJGT	16342	39.4745	-74.5308
<a href="#">221</a>	Bermuda, St. Georges Is.	32.3667	-64.7000	Bermuda	NOAA	BRMU	686	32.3704	-64.6963
<a href="#">287</a>	Hilo	19.7333	-155.0667	Hawaii	NOAA	HILR	2529	19.7174	-155.0494
<a href="#">288</a>	Pensacola	30.4000	-87.2167	Florida	NOAA	PCLA	7500	30.1894	-87.1893
<a href="#">289</a>	Fort Pulaski	32.0333	-80.9000	Georgia	NOAA	GASK	12470	31.9876	-81.0229
<a href="#">290</a>	Newport	41.5000	-71.3333	Rhode Island	NOAA	NPRI	500	41.5098	-71.3275
<a href="#">302</a>	Adak	51.8667	-176.6333	Alaska	NOAA	AB21	2034	51.8642	-176.6626
<a href="#">332</a>	Virginia Key	25.7317	-80.1617	Florida	NOAA	Tbd	1	25.7302	-80.1615

### 3.0 Effects of 2017 Caribbean hurricane season on water level observation networks

The Caribbean and U.S. Gulf coast were hit especially hard during the 2017 hurricane season with four major named storms impacting water level networks throughout the region. A full description of the 2017 hurricane season can be found at the following url:

<https://www.nhc.noaa.gov/data/tcr/index.php?season=2017&basin=atl>

Hurricane Harvey came ashore on the Texas coast and stalled shortly after making landfall staying 48 hours in the vicinity of Houston, Texas creating as high as a 10 foot storm tide and dumping as much as 1.5 meters of rain. Four NWLON stations were damaged and one station was totally lost due to this storm. Temporary repairs were made at all stations and permanent repairs should be completed by the end of 2019.

Most of the 16 coastal water-level stations in Puerto Rico and the U.S. Virgin Islands were rendered inoperable after the hurricanes Irma and Maria in 2017. As of March 1, 2019, all NOAA stations had been restored in PR and USVI with at least temporary installations and permanent repairs by end of 2019. The Puerto Rico Seismic Network continues its work to repair and reinstall stations (3 in Puerto Rico - Fajardo, Isla Caja de Muertos and Aguadilla) that are still out of service. Due to the impacts of the storms, the Puerto Rico Seismic Network (PRSN), with support from the US Geological Survey and NOAA, established a program to storm-harden all components of the regional tsunami monitoring and warning infrastructure.



Figure 6. Rockport, Texas NWLON station after Hurricane Harvey

## 4.0 Data Availability and Product Delivery

### 4.1 Sea Level Networks

#### 4.1.1 NOAA National Water Level Observation Network

CO-OPS maintains a comprehensive website, which allows users full access to all data and products on a 24 X 7 basis (<http://tidesandcurrents.noaa.gov>). All raw observed data (6-minute data with quality control flags attached) are automatically available over the website after the data collection systems receive each hourly transmission and after they undergo the quality control checks. Derived data products are made available through the website after verification.

#### 4.1.2 University of Hawaii Sea Level Center

The UHSLC website hosts a variety of products, in addition to providing access to raw sea level data. Products include: global sea level deviations, tide gauge- altimeter analysis (deviations and anomalies), upper ocean volume, current indices, and topography.

<http://uhslc.soest.hawaii.edu/>

UHSLC maintains three databases for global sea level data. They are:

[Joint Archive for Sea Level \(JASL\)](#)

JASL is a collaborative arrangement between NCEI, the World Data Center for Oceanography, Silver Spring, and the UHSLC. The JASL is responsible for the collaborative archive referred to as the Research Quality Data Set.

The JASL data set is designed to be user friendly, scientifically valid, well-documented, and standardized for archiving at international data banks. JASL data are provided internally by the UH Sea Level Network and by over 60 agencies representing over 70 countries.

### **Fast Delivery Database**

The Fast Delivery Database supports various international programs, in particular Climate variability and predictability (CLIVAR) and Global Climate Observing System (GCOS). The database has been designated by the IOC as a component of the GLOSS program. The fast delivery data are used extensively by the altimeter community for ongoing assessment and calibration of satellite altimeter datasets.

### **High Frequency Data**

Near Real-Time Data (collection + up to a three hour delay, H-3 delay) and daily filtered values (J-2 delay) are provided, primarily for stations that UHSLC directly operates and maintains. UHSLC has committed to hosting the GLOSS High Frequency database in collaboration with the Institute of Flanders (VLIZ).

### **4.1.3 Caribbean Tsunami Warning Network**

The CTWP has been providing monthly reports on the sea level data availability to the operators and stakeholders and has organized a bi-monthly conference call/webinars to review sea level data issues. With PTWC, it coordinates with NESDIS the assignment of GOES IDs for new stations in the region. CTWP also follows up with NOAA, PTWC and the IOC to ensure that stations that are transmitting over GOES are also made available to the IOC Sea Level Data Facility and to the U.S. Tsunami Warning Centers. As new stations have become available the PTWC updates the Tide Tool system which is used at many water and warning centers for the monitoring and reporting of tsunamis.

- The latest Tide Tool available at: [ftp://ftp.soest.hawaii.edu/ptwc/TideTool\\_ftp/](ftp://ftp.soest.hawaii.edu/ptwc/TideTool_ftp/)
- The PTWC with the International Tsunami Information Center has developed Tide Tool, which is a tool for monitoring and analyzing sea level data. [http://itic.ioc-unesco.org/index.php?option=com\\_content&view=article&id=1573:tsunami-warning-operations-sea-level-monitoring-tide-tool-and-ioc-sea-level-monitoring-facility&catid=2141&Itemid=2565](http://itic.ioc-unesco.org/index.php?option=com_content&view=article&id=1573:tsunami-warning-operations-sea-level-monitoring-tide-tool-and-ioc-sea-level-monitoring-facility&catid=2141&Itemid=2565)
- The CTWP provides a KML file that customers can download and extract to review the inventory of the Sea Level Stations in the Caribbean. The interactive map uses the Google Earth platform: <http://www.weather.gov/source/ctwp/stations.zip>
- The monthly sea level station reports, as well as sea level operators meeting reports can be accessed on the CTWP website at <http://www.weather.gov/ctwp/stations>

- The IOC Sea Level Monitoring Facility has an interactive map of most of the sea level stations operational in the Caribbean with remote communication systems (GOES, FTP, etc.): <http://www.ioc-sealevelmonitoring.org/>
- The followings links provide a connection to an interactive map (with time series) of the tide stations in the NOS system: <http://tidesonline.nos.noaa.gov/monitor.html> and <http://co-ops.nos.noaa.gov/>
- The NDBC provides a map of the tsunameter (DART) stations: <http://www.ndbc.noaa.gov/dart.shtml>
- The following link provides information on the sea level stations operated by the PRSN or regional stations received via GOES: <http://redsismica.uprm.edu>

## 4.2 Satellite Altimetry

The LSA website includes resources and links to a variety of satellite altimeter products. Projects on the site include: satellite altimeter sea level rise data, near real-time processed analysis, historical sea level, sea-ice research, geophysics research, and sea floor topography. It also provides updates on new research and access to partner agency websites (<https://www.star.nesdis.noaa.gov/sod/lisa/>).

Monthly, the LSA produces global and regional time series and maps of mean sea level. The altimetry data is from the joint NOAA/EUMETSAT Radar Altimeter Database System (<https://github.com/remkos/rads>), which includes data from the reference series of TOPEX/POSEIDON, Jason-1, Jason-2, Jason-3 and other missions suitable for sea level change studies (Geosat, Geosat Follow-On, ERS-1, ERS-2, Envisat, CryoSat-2, SARAL/AltiKa, and Sentinel-3A). At LSA, the data are used with GRACE and Argo observations to monitor the sea level rise budget. For operational users, LSA produces daily near-real time maps of sea level anomalies from an optimal interpolation from multiple altimeter missions, which is distributed through NOAA CoastWatch.

([https://coastwatch.noaa.gov/cw\\_html/SSH\\_SeaLevelAnomaly.html](https://coastwatch.noaa.gov/cw_html/SSH_SeaLevelAnomaly.html))

## APPENDIX 1: NOAA NWLON Stations in the United States

The table below lists all currently installed NOAA NWLON water level stations along with their GLOSS, PSMSL, and JASL IDs. For completeness, this list includes NWLON stations installed in the U.S. portion of the Great Lakes and St. Lawrence River. Below this table is a second table containing NOAA stations that are not part of the NWLON but are transmitted to one of sea level data archive centers. More information on these stations can be obtained at the following website: <https://tidesandcurrents.noaa.gov/>

Active NOAA NWLON Water Level Stations							
Station ID	Station Name	Year Installed	Latitude	Longitude	GLOSS ID	PSMSL ID	JASL ID
1611400	Nawiliwili, HI	1954	21.9544	-159.3561		756	058a
1612340	Honolulu, HI	1905	21.3067	-157.867	108	155	057b
1612480	Mokuoloe, HI	1957	21.4331	-157.79		823	061a
1615680	Kahului, Kahului Harbor, HI	1946	20.895	-156.4767		521	059a
1617433	Kawaihae, HI	1988	20.0366	-155.8294		2128	552a
1617760	Hilo, Hilo Bay, Kuhio Bay, HI	1946	19.7303	-155.0556	287	300	060a
1619910	Sand Island, Midway Islands	1947	28.2117	-177.36	106	523	050a
1630000	Apra Harbor, Guam	1948	13.4431	144.6556	149	540	053a
1770000	Pago Pago, American Samoa	1948	-14.2767	-170.6894	144	539	056a
1820000	Kwajalein, Marshall Islands	1946	8.7317	167.7361	111	513	055a
1890000	Wake Island	1950	19.2907	166.6176	105	595	051a
8311030	Ogdensburg, NY	1900	44.7017	-75.494			
8311062	Alexandria Bay, NY	1983	44.331	-75.9345			
8410140	Eastport, ME	1929	44.9033	-66.985		332	740a
8411060	Cutler Farris Wharf, ME	1963	44.657	-67.2047		1524	
8413320	Bar Harbor, ME	1947	44.3922	-68.2043		525	
8418150	Portland, ME	1910	43.6567	-70.2467		183	252a
8443970	Boston, MA	1921	42.355	-71.0517		235	741a
8447930	Woods Hole, MA	1932	41.5236	-70.6711		367	742a
8449130	Nantucket Island, MA	1963	41.2853	-70.0964		1111	743a
8452660	Newport, RI	1930	41.5044	-71.3261	290	351	253a
8454000	Providence, RI	1938	41.8067	-71.4006		430	
8461490	New London, Thames River, CT	1938	41.355	-72.0867		429	744a
8467150	Bridgeport, CT	1932	41.1758	-73.184		1068	
8510560	Montauk, NY	1947	41.0483	-71.9594		519	279a
8516945	Kings Point, NY	1998	40.8103	-73.765		2322	

8518750	The Battery, NY	1920	40.7006	-74.0142		12	745a
8531680	Sandy Hook, NJ	1910	40.4669	-74.0094		366	
8534720	Atlantic City, NJ	1911	39.3567	-74.4181	220	180	264a
8536110	Cape May, NJ	1965	38.968	-74.9597		1153	746a
8545240	Philadelphia, PA	1989	39.93	-75.1417		135	
8551910	Reedy Point, DE	1956	39.5583	-75.5733		786	
8557380	Lewes, DE	1919	38.7828	-75.1192		224	747a
8570283	Ocean City Inlet, MD	1978	38.3283	-75.0911		2292	
8571421	Bishops Head, MD	2005	38.2206	-76.0386			
8571892	Cambridge, MD	1980	38.5742	-76.0722		481	
8574680	Baltimore, MD	1902	39.2669	-76.5793		148	
8575512	Annapolis, MD	1978	38.9833	-76.4816		311	
8577330	Solomons Island, MD	1937	38.3172	-76.4508		412	
8594900	Washington, DC	1924	38.873	-77.0217		360	
8631044	Wachapreague, VA	1978	37.608	-75.6858		2293	
8632200	Kiptopeke, VA	1951	37.1652	-75.9884		636	
8635027	Dahlgren, VA	1970	38.3198	-77.0366			
8635750	Lewisetta, VA	1970	37.9954	-76.4646		2324	
8637689	Yorktown USCG Training Center, VA	2004	37.2265	-76.4788			
8638610	Sewells Point, VA	1927	36.947	-76.33		299	
8638863	Chesapeake Bay Bridge Tunnel, VA	1975	36.9667	-76.1133		1635	749a
8651370	Duck, NC	1977	36.1833	-75.7467	219	1636	260a
8652587	Oregon Inlet Marina, NC	1974	35.795	-75.5481		2325	
8654467	USCG Station Hatteras, NC	2010	35.2086	-75.7042		2294	
8656483	Beaufort, NC	1964	34.72	-76.67		2295	
8658120	Wilmington, NC	1908	34.2275	-77.9536		396	750a
8658163	Wrightsville Beach, NC	2004	34.2133	-77.7867			
8661070	Springmaid Pier, SC	1976	33.655	-78.9183		1444	
8665530	Charleston, Cooper River Entrance, SC	1899	32.7808	-79.9236		234	261a
8670870	Fort Pulaski, GA	1935	32.0367	-80.9017	289	395	752a
8720030	Fernandina Beach, FL	1898	30.6714	-81.4658		112	240a
8720218	Mayport (Bar Pilots Dock), FL	1995	30.3982	-81.4279		316	753a
8721604	Trident Pier, FL	1994	28.4158	-80.5931		2123	774a
8722670	Lake Worth Pier, FL	1970	26.6128	-80.0342		1696	
8723214	Virginia Key, FL	1994	25.7317	-80.1617	332	1858	755a
8723970	Vaca Key, FL	1970	24.711	-81.1065		1701	
8724580	Key West, FL	1913	24.6	-81.8079	216	188	242a
8725110	Naples, FL	1965	26.1317	-81.8075		1107	757a
8725520	Fort Myers, FL	1965	26.648	-81.871		1106	
8726520	St Petersburg, Tampa Bay, FL	1946	27.7606	-82.6269		520	759a

8726724	Clearwater Beach, FL	1973	27.9783	-82.8317		1638	773a
8727520	Cedar Key, FL	1914	29.1336	-83.0309		428	
8728690	Apalachicola, FL	1967	29.7244	-84.9806		1193	760a
8729108	Panama City, FL	1973	30.1523	-85.7		1641	
8729210	Panama City Beach, FL	1989	30.2133	-85.8783			761a
8729840	Pensacola, FL	1923	30.4044	-87.21	288	246	762a
8735180	Dauphin Island, AL	1966	30.25	-88.075		1156	763a
8737048	Mobile State Docks, AL	1980	30.7046	-88.0396		2327	
8741533	Pascagoula NOAA Lab, MS	2005	30.368	-88.5631			
8747437	Bay Waveland Yacht Club, MS	1978	30.325	-89.325		2215	
8760922	Pilots Station East, SW Pass, LA	2004	28.932	-89.4075			
8761305	Shell Beach, LA	1979	29.8683	-89.673		2296	
8761724	Grand Isle, LA	1979	29.263	-89.957		526	765a
8761927	New Canal Station, LA	1982	30.0272	-90.113		2328	
8762482	West Bank 1, Bayou Gauche, LA	2003	29.7886	-90.4203			
8764044	Berwick, Atchafalaya River, LA	2003	29.6675	-91.2376			
8764227	LAWMA, Amerada Pass, LA	2005	29.4496	-91.3381			
8766072	Freshwater Canal Locks, LA	2005	29.5517	-92.3052			
8767816	Lake Charles, LA	1932	30.2236	-93.2217			
8768094	Calcasieu Pass, LA	1933	29.7682	-93.3429			
8770570	Sabine Pass North, TX	1985	29.7284	-93.8701		1835	766a
8771341	Galveston Bay Entrance, North Jetty, TX	2000	29.3573	-94.7248			
8771450	Galveston Pier 21, TX	1904	29.31	-94.7933	217	161	775a
8772447	Freeport, TX	2006	28.9433	-95.3025		2297	
8773146	Matagorda City, TX	2012	28.71	-95.9139			
8774770	Rockport, TX	1937	28.0217	-97.0467		538	769a
8775870	Bob Hall Pier, Corpus Christi, TX	1983	27.5808	-97.2164		1903	770a
8779770	Port Isabel, TX	1944	26.0612	-97.2155		497	772a
9014070	Algonac, MI	1926	42.621	-82.527			
9014080	St Clair State Police, MI	1971	42.812	-82.486			
9014087	Dry Dock, MI	1899	42.9453	-82.443			
9014090	Mouth of the Black River, MI	1900	42.9747	-82.4189			
9014096	Dunn Paper, MI	1955	43.0033	-82.4217			
9014098	Fort Gratiot, MI	1970	43.0069	-82.4225			
9034052	St Clair Shores, MI	1968	42.4732	-82.8792			
9044020	Gibraltar, MI	1989	42.0917	-83.1867			
9044030	Wyandotte, MI	1930	42.2023	-83.1475			



9044036	Fort Wayne, MI	1970	42.2983	-83.0933			
9044049	Windmill Point, MI	1897	42.3575	-82.93			
9052000	Cape Vincent, NY	1916	44.1303	-76.332			
9052030	Oswego, NY	1990	43.4642	-76.5118			
9052058	Rochester, NY	1860	43.269	-77.6258			
9052076	Olcott, NY	1967	43.3384	-78.7273			
9063007	Ashland Ave, NY	1957	43.1	-79.0599			
9063009	American Falls, NY	1900	43.0811	-79.0614			
9063012	Niagara Intake, NY	1963	43.0769	-79.0139			
9063020	Buffalo, NY	1860	42.8774	-78.8905			
9063028	Sturgeon Point, NY	1989	42.6913	-79.0473			
9063038	Erie, PA	1959	42.1539	-80.0925			
9063053	Fairport, OH	1935	41.7598	-81.2811			
9063063	Cleveland, OH	1860	41.5409	-81.6355			
9063079	Marblehead, OH	1959	41.5436	-82.7314			
9063085	Toledo, OH	1904	41.6936	-83.4723			
9063090	Fermi Power Plant, MI	1963	41.96	-83.257			
9075002	Lakeport, MI	1955	43.1417	-82.4933			
9075014	Harbor Beach, MI	1860	43.8464	-82.6431			
9075035	Essexville, MI	1977	43.6404	-83.8468			
9075065	Alpena, MI	2006	45.063	-83.4286			
9075080	Mackinaw City, MI	1900	45.8	-84.7211			
9075099	De Tour Village, MI	1977	45.9925	-83.8982			
9076024	Rock Cut, MI	2001	46.2648	-84.1912			
9076027	West Neebish Island, MI	2006	46.2833	-84.205			
9076033	Little Rapids, MI	2008	46.4858	-84.3017			
9087023	Ludington, MI	1895	43.9474	-86.4416			
9087031	Holland, MI	1894	42.773	-86.2128			
9087044	Calumet Harbor, IL	1905	41.7297	-87.5383			
9087057	Milwaukee, WI	1989	43.002	-87.8876			
9087068	Kewaunee, WI	1974	44.464	-87.501			
9087072	Sturgeon Bay Canal, WI	1905	44.7956	-87.3143			
9087079	Green Bay, WI	1980	44.541	-88.0072			
9087088	Menominee, MI	2005	45.0959	-87.5899			
9087096	Port Inland, MI	1964	45.9699	-85.8715			
9099004	Point Iroquois, MI	1930	46.4845	-84.6309			
9099018	Marquette C.G., MI	1991	46.546	-87.3786			
9099044	Ontonagon, MI	1959	46.874	-89.3242			
9099064	Duluth, MN	1860	46.7758	-92.092			
9099090	Grand Marais, MN	1966	47.7486	-90.3413			
9410170	San Diego, CA	1906	32.7142	-117.1736		158	569a
9410230	La Jolla, CA	1924	32.8669	-117.2571	159	256	554a
9410660	Los Angeles, CA	1923	33.7199	-118.2729		245	567a

9410840	Santa Monica, CA	1932	34.0083	-118.5		377	578a
9411340	Santa Barbara, CA	1974	34.4031	-119.6928		2126	
9412110	Port San Luis, CA	1933	35.1688	-120.7542		508	565a
9413450	Monterey, CA	1973	36.605	-121.8881		1352	555a
9414290	San Francisco, CA	1854	37.8063	-122.4659	158	10	551a
9414750	Alameda, CA	1939	37.7717	-122.3		437	
9415020	Point Reyes, CA	1975	37.9961	-122.9767		1394	
9415144	Port Chicago, CA	1976	38.056	-122.0395		2330	
9416841	Arena Cove, CA	1978	38.9146	-123.7111		2125	573a
9418767	North Spit, CA	1977	40.7663	-124.2172		1639	576a
9419750	Crescent City, CA	1933	41.7456	-124.1844		378	556a
9431647	Port Orford, OR	1924	42.739	-124.4983		1640	557a
9432780	Charleston, OR	1964	43.345	-124.322		1269	575a
9435380	South Beach, OR	1967	44.6254	-124.0449	157	1196	592a
9437540	Garibaldi, OR	1866	45.5545	-123.9189		1285	
9439040	Astoria, OR	1853	46.2073	-123.7683		265	572
9440422	Longview, WA	1985	46.1061	-122.9542			
9440910	Toke Point, WA	1922	46.7075	-123.9669		1354	564a
9441102	Westport, WA	1982	46.9043	-124.1051			
9442396	La Push, WA	1924	47.9133	-124.637		2298	
9443090	Neah Bay, WA	1934	48.3703	-124.6019		385	558a
9444090	Port Angeles, WA	1975	48.1247	-123.4411		2127	
9444900	Port Townsend, WA	1971	48.1129	-122.7595		1325	
9447130	Seattle, WA	1899	47.6026	-122.3393		127	
9449424	Cherry Point, WA	1971	48.8633	-122.758		1633	
9449880	Friday Harbor, WA	1932	48.5453	-123.0129		384	
9450460	Ketchikan, AK	1919	55.3319	-131.6261		225	571a
9451054	Port Alexander, AK	1924	56.2466	-134.6477		2299	
9451600	Sitka, AK	1938	57.0517	-135.3417	154	426	559a
9452210	Juneau, AK	1936	58.2988	-134.4106		405	
9452400	Skagway, AK	1943	59.4508	-135.328		495	
9452634	Elfin Cove, AK	1938	58.1947	-136.3469		2300	
9453220	Yakutat, Yakutat Bay, AK	1940	59.5483	-139.733		445	570a
9454050	Cordova, AK	1949	60.5583	-145.755		566	583a
9454240	Valdez, AK	1964	61.1242	-146.3631		1353	562a
9455090	Seward, AK	1925	60.12	-149.4267	150	266	560a
9455500	Seldovia, AK	1964	59.4405	-151.7199		1070	561a
9455760	Nikiski, AK	1971	60.6833	-151.398		1350	
9455920	Anchorage, AK	1964	61.2375	-149.8904		1067	
9457292	Kodiak Island, AK	1984	57.7303	-152.5139		567	039a
9457804	Alitak, AK	1929	56.8974	-154.248		2301	
9459450	Sand Point, AK	1972	55.3317	-160.5043	100	1634	574a
9459881	King Cove, AK	1917	55.0599	-162.3261		2302	

9461380	Adak Island, AK	1943	51.8633	-176.632	302	487	040a
9461710	Atka, AK	2006	52.232	-174.1726		2303	
9462450	Nikolski, AK	2006	52.9406	-168.8713			
9462620	Unalaska, AK	1955	53.8792	-166.5403	102	757	041b
9463502	Port Moller, AK	1960	55.9857	-160.5739			
9464212	Village Cove, St Paul Island, AK	1977	57.1253	-170.2852		2304	
9468333	Unalakleet, AK	1977	63.8714	-160.7843			
9468756	Nome, Norton Sound, AK	1944	64.4946	-165.4396	74	1800	595a
9491094	Red Dog Dock, AK	2003	67.5758	-164.0644			
9497645	Prudhoe Bay, AK	1990	70.4114	-148.5318	151	1857	579a
9751364	Christiansted Harbor, St Croix, VI	1981	17.7477	-64.6984		2118	
9751381	Lameshur Bay, St John, VI	1983	18.3182	-64.7242		2119	
9751401	Lime Tree Bay, St. Croix, VI	1977	17.6947	-64.7538		1447	254a
9751639	Charlotte Amalie, VI	1975	18.3358	-64.92		1393	255a
9752235	Culebra, PR	2005	18.3009	-65.3025		2120	
9752695	Esperanza, Vieques Island, PR	2005	18.0939	-65.4714		2209	
9755371	San Juan, La Puntilla, San Juan Bay, PR	1962	18.4592	-66.1164	206	1001	245a
9759110	Magueyes Island, PR	1954	17.97	-67.0464		759	246a
9759394	Mayaguez, PR	1975	18.2176	-67.1588			
9759938	Mona Island, PR	2006	18.0899	-67.9385		2122	

Additional Active NOAA Water Level Stations							
Station ID	Station Name	Year Installed	Latitude	Longitude	GLOSS ID	PSMSL ID	JASL ID
1631428	Pago Bay, Guam	2004	13.4283	144.7967		2130	037a
2695540	Bermuda, St. Georges Island	1988	32.3733	-64.7033	221	363	259b
2695535	Bermuda, Bermuda Biological Station	2016	32.3700	-64.6950			
9411406	Platform Harvest, CA	1992	34.4683	-120.6817			594a

## APPENDIX 2: University of Hawaii Sea Level Center GLOSS Stations

The stations listed are GLOSS Stations operated by or in collaboration with UHSLC. More information on these stations can be found at the following website: <http://uhslc.soest.hawaii.edu/>

GLOSS	STATION	COUNTRY	LAT	LONG	GPS?
182	Acajutla	El Salvador	13° 35'N	089° 50'W	
068	Ambon	Indonesia	03° 41'S	128° 11'E	
169	Baltra	Ecuador	00° 26'S	090° 17'W	GLPS
049	Benoa	Indonesia	08° 46'S	115° 13'E	BNOA
069	Bitung	Indonesia	00° 27'N	125° 12'E	BTNG
173	Callao	Peru	12° 03'S	077° 09'W	CALL
036	Chittagong	Bangladesh	22° 20'N	091° 38'E	
146	Christmas	Rep. of Kiribati	01° 59'N	157° 28'W	
291	Cilacap	Indonesia	07° 45'S	109° 00'E	CLCP
033	Colombo	Sri Lanka	06° 57'N	079° 51'E	SGOC
253	Dakar	Sénégal	14° 41'N	017° 25'W	DAKA
071	Davao	Philippines	07° 50'N	125° 38'E	
026	Diego Garcia	United Kingdom	07° 17'S	072° 24'E	DGAR
245	Fortaleza	Brazil	03° 43'S	38° 28'W	CEFT
107	French Frigate S	USA	23° 52'N	166° 17'W	
027	Gan	Rep. of Maldives	00° 41'S	073° 09'E	ADDU
109	Johnston	USA Trust	16° 44'N	169° 32'W	
145	Kanton	Rep. of Kiribati	02° 49'S	171° 43'W	
117	Kapingamarangi	Fd St Micronesia	01° 06'N	154° 47'E	
042	Ko Taphao Noi	Thailand	07° 49'N	098° 25'E	
172	La Libertad	Ecuador	02° 12'S	080° 55'W	
072	Legaspi	Philippines	13° 09'N	123° 45'E	
120	Malakal	Rep. of Belau	07° 20'N	134° 28'E	PALA
028	Male (Hulhule)	Rep. of Maldives	04° 11'N	073° 32'E	HULE
073	Manila	Philippines	14° 38'N	121° 05'E	MANL
163	Manzanillo	Mexico	19° 03'N	104° 20'W	MANZ
192	Mar Del Plata	Argentina	38° 02'S	057° 32'W	MPL2
008	Mombasa	Kenya	04° 04'S	039° 39'E	
141	Moulmein	Myanmar	16° 29'N	097° 37'E	
142	Nuku Hiva	French Polynesia	08° 55'S	140° 06'W	
045	Padang	Indonesia	00° 57'S	100° 22'E	IPAO
329	Palmeira	Cape Verde	16° 45'N	022° 59'W	TGCV
140	Papeete	French Polynesia	17° 32'S	149° 34'W	PAPE
143	Penrhyn	Cook Islands	08° 59'S	158° 03'W	
245	Ponta Delgada	Portugal	37° 44'N	025° 40'W	PDEL
018	Port Louis	Mauritius	20° 09'S	057° 30'E	
273	Pt. LaRue	Seychelles	04° 40'S	055° 32'E	SEY1
190	Puerto Deseado	Argentina	47° 45'S	065° 55'W	PDES
191	Puerto Madryn	Argentina	42° 46'S	065° 02'W	
167	Quepos	Costa Rica	09° 24'N	084° 10'W	
075	Qui Nhon	Vietnam	13° 47'N	109° 15'E	
138	Rikitea	French Polynesia	23° 08'S	134° 57'W	RKTG
019	Rodrigues	Mauritius	19° 40'S	063° 25'E	RDRG
347	Sabang	Indonesia	05° 50'N	095° 20'E	

118	Saipan	USA	15° 14'N	145° 45'E	CNMR
004	Salalah	Oman	16° 56'N	054° 00'E	
334	Salvador	Brazil	12° 58'S	038° 31'W	SALV
211	Settlement Pnt.	Bahamas	26° 41'N	078° 59'W	BHMA
037	Sittwe	Myanmar	20° 09'N	092° 54'E	
181	Ushuaia	Argentina	54° 48'S	068° 18'W	AUTF
119	Yap	Fd St Micronesia	09° 31'N	138° 08'E	
297	Zanzibar	Tanzania	06° 09'S	039° 11'E	ZNZB

### APPENDIX 3: CARIBE-EWE Sea Level Stations

Additional information on these stations can be found at the following website:

<http://www.weather.gov/ctwp/#>

Station location	Station Code (IOC - PTWC)	Type of Sensors	Country	Latitude	Longitude	Status	Operator	GLOSS ID
Blowing Point			Anguilla	18.4569	-67.1649	Planned	Anguilla DDM	
Barbuda	barb	pwl	Antigua and Barbuda	17.5900	-61.8200	<u>Contributing RTX</u>	Antigua & Barbuda Meteorological Services	
	barb2							
Parham (Camp Blizard), Antigua	parh		Antigua and Barbuda	17.1500	-61.7833	<u>Contributing RTX???</u>	Antigua & Barbuda Meteorological Services CPACC/MACC	
Oranjestad	oran	prs	Aruba	12.5167	-70.0333	<u>Contributing RTX</u>	Aruba Department of Meteorology	
		rad						
DART 44D01			Atlantic NE Connecticut, USA - Northeast Castle Rock Seamount	37.5610	-50.0010	<u>Contributing RTX</u>	NOAA NDBC	
DART 44402			Atlantic off New York, USA - Southeast Block Canyon, NY	39.2980	-70.6590	<u>Contributing RTX</u>	NOAA NDBC	
DART 41424			Atlantic off South Carolina, USA - East Charleston, SC	32.9530	-72.4990	<u>Contributing RTX</u>	NOAA NDBC	
Settlement Point	stpt/setp1	prs	Bahamas	26.4200	-79.0100	<u>Contributing RTX</u>	University of Hawaii Sea Level Center	211
		rad						
		ra2						
		ecs						

Lee Stocking Island, Exuma			Bahamas	23.4600	-76.0600	Existing	Bahamas Department of Meteorology CPACC	12
Matthew Town, Inagua			Bahamas	20.0500	-77.2200	Existing (Not Transmitting)	Bahamas Department of Meteorology CPACC	
Nassau Harbour, New Providence			Bahamas	25.0500	-77.2200	Existing	Bahamas Department of Meteorology CPACC/MACC	
Treasure Cay, Abaco			Bahamas	26.6739	-77.2833	Existing	Bahamas Department of Meteorology CPACC	
Bridgetown Port	brid		Barbados	13.1000	-59.6166	Non-operational	Caribbean Institute of Meterology and Hydrology, CPACC/MACC.	
Port St. Charles	ptsc	rad	Barbados	13.2630	-59.6449	<u>Contributing RTX</u>	Coastal Zone Management Unit with ICSECA Funds	
Pelican Fort			Barbados	13.1115	-59.6310	Existing	Coastal Zone Management Unit	
Conset Bay			Barbados	13.2000	-59.5000	Removed CARIBE EWS Implementation Plan Non operational-CZMU	Coastal Zone Management Unit	
Speightstown			Barbados	13.3000	-59.6000	Removed CARIBE EWS Implementation Plan Non operational-CZMU	Coastal Zone Management Unit	
Carrie Bow Cay	cabc	rad	Belize	16.8028	-88.0820	<u>Contributing RTX</u>	Smithsonian Institute	
		prs						
Belize			Belize	17.5000	-88.2000	Non-operational	Belize Dept. Meterology - CPACC/MACC	
St. Georges Island / Esso Pier	bmda	pwl	Bermuda	32.3744	-64.7019	<u>Contributing RTX</u>	NOS/NOAA Station ID: 2695540	221

Road Harbor, Tortola	tort		British Virgin Islands	18.4248	-64.6081	Off line	BVI Dept. of Disaster Management as of 2011, previously Dept. Lands and Survey	
DART 42407			Caribbean Sea	15.2520	-68.2170	<u>Contributing RTX</u>	NOAA NDBC	
George Town	geor	rad	Cayman Islands	19.2951	-81.3835	<u>Contributing RTX</u>	UNESCO/Hazard Management Cayman Islands	
		prs						
Cartagena	cart	rad	Colombia	10.3900	-75.5333	Operational	Instituto de Hidrología, Meteorología y Estudios Ambientales de Colombia (IDEAM)	207
San Andres	sana	prs	Colombia	12.5500	-81.7667	<u>Contributing RTX</u>	DIMAR/UHSLC/P RSN	
		rad						
		bub						
Santa Marta	sama	prs	Colombia	11.2352	-74.2216	<u>Contributing RTX</u>	DIMAR/UHSLC/P RSN	
		rad						
		bub						
Capurganá			Colombia	8.5162	-77.3283	Non operational	Instituto de Hidrología, Meteorología y Estudios Ambientales de Colombia (IDEAM)	
Sapzurro	sapz	prs	Colombia	8.6603	-77.3653	<u>Contributing RTX</u>	Dirección General Marítma (DIMAR)	
		rad						
	sapz2	bub						
		prs						
		rad						
Islas del Rosario			Colombia	10.1834	-75.6667	Non operational	Instituto de Hidrología, Meteorología y Estudios Ambientales de Colombia (IDEAM)	
Isla Naval	inav2	bub	Colombia	10.1806	-75.7503	<u>Contributing RTX</u>	DIMAR	
		rad						



	inav	bub						
		prs						
		rad						
Coveñas	cove	bub	Colombia	9.4145	-75.6911	<u>Contributing RTX</u>	DIMAR	
		prs						
		rad						
Puerto Estrella	estr	prs	Colombia	12.3553	-71.3136	<u>Contributing RTX</u>	DIMAR	
		rad						
Limón	limon / limn	prs	Costa Rica	9.9886	-83.0202	<u>Contributing RTX</u>	RONMAC; Upgraded in 2010 NOAA/UHSLC/PR SN	
		rad						
		ra2						
Cabo Cruz			Cuba	19.8400	-77.7283	Existing	Oficina Nacional de Hidrografía y Geodesia	
Cabo San Antonio - Morros de Piedra			Cuba	21.9000	-84.9067	Existing	Oficina Nacional de Hidrografía y Geodesia	214
Gibara			Cuba	21.1083	-76.1250	Existing	Oficina Nacional de Hidrografía y Geodesia	276
Isabela de Sagua			Cuba	22.9400	-80.0133	Existing	Oficina Nacional de Hidrografía y Geodesia	
Manzanillo			Cuba	20.3400	-77.1467	Non- operational	Oficina Nacional de Hidrografía y Geodesia	
Guantanamo			Cuba	19.9103	-75.1900	Gap	National Ocean Service	
Casilda			Cuba	21.7500	-79.9833	Exisitng	Oficina Nacional de Hidrografía y Geodesia	
Maisí			Cuba	20.2333	-74.1333	Non- operational	Oficina Nacional de Hidrografía y Geodesia	
Mariel Boca			Cuba	23.0205	-82.7561	Existing	Oficina Nacional de Hidrografía y Geodesia	
Bahia de la Habana			Cuba	23.1379	-82.3459	Existing	Oficina Nacional de Hidrografía y Geodesia	
Nuevitas Punta de Practicos			Cuba	21.6056	-77.0989	Existing	Oficina Nacional de Hidrografía y Geodesia	

Puerto Padre			Cuba	21.2033	-76.6012	Existing	Oficina Nacional de Hidrografía y Geodesia	
Nuevitas Bufaderos			Cuba	21.5609	-77.2350	Non-operational	Oficina Nacional de Hidrografía y Geodesia	
Siboney			Cuba	23.1000	-82.4667	Planned	Oficina Nacional de Hidrografía y Geodesia	215
Santiago de Cuba			Cuba	20.0196	-75.8383	Non-operational	Oficina Nacional de Hidrografía y Geodesia	
Santa Cruz del Sur			Cuba	20.7025	-77.9823	Existing	Oficina Nacional de Hidrografía y Geodesia	
Carapachibey			Cuba	21.4429	-82.9005	Non-operational	Oficina Nacional de Hidrografía y Geodesia	
Cayo Loco			Cuba	23.1000	-82.4667	Existing	Oficina Nacional de Hidrografía y Geodesia	
Cayo Largo			Cuba	21.6229	-81.5456	Non-operational	Oficina Nacional de Hidrografía y Geodesia	
La Coloma			Cuba	23.1000	-82.4667	Existing	Oficina Nacional de Hidrografía y Geodesia	
Willemstad			Curacao	12.1043	-68.9416	Removed	Meteorological Dept. Curacao NOAA/UHSLC/PR SN	
Bullen Bay (Replaces Willemstad)	bull	prs	Curacao	12.1043	-68.9416	<u>Contributing RTX</u>	Meteorological Dept. Curacao/UHSLC/PRSN	
		rad						
		bub						
Roseau	rose	prs	Dominica	15.3000	-61.4000	<u>Contributing RTX</u>	UHSLC/PRSN replaced sea level CPACC/MACC;	
		rad						
		bub						
Barahona	bara	prs	Dominican Republic	18.2081	-71.0922	<u>Contributing RTX</u>	ONAMET/PRSN	
		ra2						
Puerto Caucedo/San Andres/Santo	sdom / sdrd	pwl	Dominican Republic	18.4208	-69.6294	<u>Contributing RTX</u>	ONAMET/PRSN	

Domingo								
Puerto Plata	ptpl / ppl	prs	Dominican Republic	19.7988	-70.7020	Contributing RTX	UHSLC/PRSN/ON AMET	
		rad						
		ra2						
Punta Cana	ptca / pcan	prs	Dominican Republic	18.5046	-68.3755	Contributing RTX	UHSLC/PRSN/ON AMET	
		rad						
		ra2						
Bahía de Luperón			Dominican Republic			Gap	ONAMET	
Bahía de Samaná			Dominican Republic	19.2000	-69.2190	Gap	ONAMET	
Bayahibe			Dominican Republic			Gap	INDRHI	
Pedernales			Dominican Republic	17.9264	-71.6551	Gap	INDRHI	
Puerto de Santo Domingo			Dominican Republic	18.4579	-69.9134	Removed CARIBE EWS Implementation Plan; Originally Planned	INDRHI	
Ile Royale	iler	rad	French Guiana	5.2798	-52.8939	Contributing RTX	SHOM / DDE, RONIM	
	iler2							
Prickly Bay	pric	prs	Grenada	12, 05	-61.7333	Contributing RTX	UHSLC/PRSN replaced sea level CPACC/ MACC;	
		rad						
		bub						
Sauteurs			Grenada	12.1000	-61.7500	Planned	Seismic Research Center	
The Sisters Island,			Grenada	12.3000	-61.7000	Planned	Seismic Research Center	
Deshaies Harbour	desh	rad	Guadeloupe	16.3053	-61.7959	Contributing RTX	IPGP	
La Désirade Island, Grande Anse Marina Harbour	desi	rad	Guadeloupe	16.3029	-61.0725	Contributing RTX	IPGPFR	

Puerto Barrios	prba	prs rad	Guatemala	15.6946	-88.6220	Contributing RTX	INSIVUMEH	
DART 42409			Gulf of Mexico	26.6570	-85.7910	Planned re- instalation between 27 Sep through 14 Oct by NOAA (relocation 25,9166 - 89,2833)	NOAA NDBC	
DART 42429			Gulf of Mexico			Out of Service	NOAA NDBC	
Harbour Master Boathouse	HMB		Guyana	6.8100	-58.1683	Existing	Maritime Administration Department	
Market Place Georgetown			Guyana	6.7667	-58.1667	Existing	MACC/Hydromet Dept.	
Rosignol			Guyana	6.2667	-57.5333	Non- operational	CPACC	
Parika			Guyana	6.8500	-58.4167	Unknown	CPACC	
Cap Haitien	caph	prs bub ra2	Haiti	19.7593	-72.1933	Contributing RTX	UNESCO/SEMAN AH/PRSN	
Jacmel	jaca	prs rad	Haiti	18.2310	-72.5354	Contributing RTX	UNESCO/SEMAN AH/PRSN	
Port au Prince	ptpr	prs rad	Haiti	18.5345	-72.3800	Contributing RTX	UNESCO/SEMAN AH/PRSN	209
Gonaives			Haiti	19.4500	-72.0700	Planned	SEMANAH	
Mole Saint Nicolas			Haiti	19.0800	-73.3667	Planned	SEMANAH	
Les Cayes			Haiti	18.1833	-73.7333	Planned	SEMANAH	
Guanaja Island			Honduras	16.4553	-85.8761	Existing?	COPECO	
Omoa			Honduras	15.7776	-88.0470	Existing?	COPECO	
Puerto Cortes	pcor	prs	Honduras	15.8433	-87.9587	Contributing RTX	COPECO	
Puerto De Castilla, Trujillo			Honduras	15.9231	-85.9508	Existing	COPECO	
Roatan N			Honduras	16.3333	-87.4500	Existing	COPECO	

Punta Gorda Harbor, Roatan S	rtas	prs	Honduras	16.3455	-86.5404	Contributing RTX	COPECO	
Tela Harbor	tela	prs	Honduras	15.7841	-87.4531	Contributing RTX	COPECO	
Utila Island			Honduras	16.0957	-86.8947	Existing	COPECO	
Cabotaje Harbor, La Ceiba	ceib	prs	Honduras	15.7899	-86.7604	Contributing RTX	COPECO	
Cochino Pequeño			Honduras	15.9500	-86.5000	Gap		
Swan Island			Honduras	17.4000	-83.8000	Gap		
Port Royal	ptro	prs	Jamaica	17.9258	-76.8458	Contributing RTX	Jamaica Meteorological Service UNAVCO	210
		rad						
Montego Bay			Jamaica	18.4601	-77.9417	Existing	Meteorological Service P.R. China	
Port Antonio			Jamaica	18.1828	-76.4537	Existing	Meteorological Service P.R. China	
Discovery Bay, Jamaica			Jamaica	18.4500	-77.4000	Gap	Meteorological Service CPACC/MACC	
Alligator Pond			Jamaica	17.8500	-77.6000	Non-operational		
Fort de France Harbour	ftfr2	rad	Martinique	14.6017	-61.0636	Contributing RTX	SHOM, RONIM, Meteo-France	338
	ftfr							
Le Precheur Harbour	prec	prs	Martinique	14.8076	-61.2266	Contributing RTX	local authorities	
Le Robert	lero	prs	Martinique	14.6833	-60.9333	Contributing RTX	General Council of Martinique	
		rad						
Celestun	clst	flt	Mexico	20.8487	-90.4034	Contributing RTX	UNAM	
Ciudad del Carmen	ccar	flt	Mexico	18.6167	-91.8167	Contributing RTX	UNAM	
Frontera	frtr	flt	Mexico	18.1574	-94.4059	Contributing RTX	UNAM	
Isla Mujeres	imuj		Mexico	21.2167	-86.7167	Contributing RTX	UNAM	

Progreso	prog/prog2	rad	Mexico	21.3033	-89.6667	Contributing RTX	UNAM	213
Puerto Morelos, Q. R.	pumo	flt	Mexico	20.8300	-86.8700	Contributing RTX	UNAM	
	pumo2 / pum	prs						
		rad						
Tuxpan	tuxp	flt	Mexico	20.9700	-97.4000	Contributing RTX	UNAM	
Veracruz	vera	rad	Mexico	19.1921	-96.1236	Contributing RTX	UNAM	212
	vera2	flt						
Montserrat			Montserrat	16.7420	-62.1900	Gap		
Corn Island	cois	prs	Nicaragua	12.2849	-82.9800	Contributing RTX	INETER	
Blue Fields			Nicaragua	11.8910	-83.8570	Gap/Non operational	RONMAC/INETER	
Puerto Cabezas			Nicaragua	14.0200	-83.3800	Gap/Non operational	RONMAC/INETER	
El Porvenir	elpo	prs	Panama	9.5589	-78.9680	Contributing RTX	U. Panama, NOAA/UHSLC/PR SN2009-2012 project	
		rad						
		bub						
Bocas del Toro	bdto	prs	Panama	9.3352	-82.2455	Contributing RTX	Smithsonian Tropical Research Institute	
		rad						
Galeta Point			Panama	9.4021	-79.8609	Existing	UHSLC/IG-UPA	
Limon Bay (replaced Coco Solo which replaces Portobelo, recommended initially by IAS, given close location)			Panama	9.3667	-79.8833	Existing		208
Aguadilla	agua	pwl	Puerto Rico	18.4566	-67.1646	Contributing RTX	NOS/NOAA/PRSN	
Arecibo	arac	pwl	Puerto Rico	18.4805	-66.7024	Contributing RTX	PRSN	
	aracS							
Culebra Island	cule	pwl	Puerto Rico	18.3011	-65.3024	Contributing RTX	NOS/NOAA	
	cule2	pwl						

Fajardo	faja	pwl	Puerto Rico	18.3350	-65.6309	Contributing RTX	PRSN	
Isabel II, Vieques	isab/viqu	pwl	Puerto Rico	18.1525	-65.4438	Contributing RTX	PRSN	
La Esperanza, Vieques	vieq	pwl	Puerto Rico	18.0939	-65.4714	Contributing RTX	NOS/NOAA	
	vieq2							
Magueyes Island	magi	pwl	Puerto Rico	17.9701	-67.0464	Contributing RTX	NOS/NOAA	
	magi2							
Mayagüez	maya	pwl	Puerto Rico	18.2176	-67.1589	Contributing RTX	PRSN	
Mona Island	mona	pwl	Puerto Rico	18.0899	-67.9385	Contributing RTX	NOS/NOAA	
	mona2							
San Juan	sanj	wls	Puerto Rico	18.4589	-66.1164	Contributing RTX	NOS/NOAA	206
	sanj2	pws						
Yabucoa	yabu	wls	Puerto Rico	18.0551	-65.8330	Contributing RTX	PRSN	
Peñuelas	penu		Puerto Rico	17.9725	-66.7618	Removed, relocated equipment to Caja de Muertos (2014)	PRSN	
Caja de Muertos	camu	pwl	Puerto Rico	17.8876	-66.5286	Contributing RTX	PRSN	
DART 41421			Puerto Rico Trench East - North St Thomas	23.4090	-63.8880	Contributing RTX	NOAA NDBC	
DART 41420			Puerto Rico Trench West - North Santo Domingo	23.4840	-67.3510	Contributing RTX	NOAA NDBC	
Baseterre (Coast Guard Base)	bass	prs	St. Kitts & Nevis	17.2900	-62.7097	Contributing RTX	CPACC/MACC; Upgraded by UNESCO/ NEMA	
		rad						
Castries			St. Lucia	14.1666	-61.0000	Contributing RTX	CPACC/MACC	

Calliaqua (Coast Guard Base)	calq	prs	St. Vincent & the Grenadines	13.1299	-61.1955	Contributing RTX	CPACC/MACC; Upgraded by UNESCO/ NEMO	
		rad						
Gustavia			St. Barthelemy	17.8833	-62.8500	Planned	Collectivite de St. Barthelemy	
Marigot	stmt	prs	St. Martin	18.0833	-63.0854	Contributing RTX	Collective de St. Martin	
		rad						
Cedros Bay	cdtt	rad	Trinidad and Tobago	10.0946	-61.8654	Contributing RTX	Trinidad and Tobago Hydrographic Unit, Originally CPACC ?	
Charlotteville	chrl	rad	Trinidad and Tobago	11.3238	-66.5490	Contributing RTX	CPACC Trinidad and Tobago Hydrographic Unit	
Point Fortin	pnfo	rad	Trinidad and Tobago	10.1833	-61.7000	Contributing RTX???	Trinidad and Tobago Hydrographic Unit	
Port Of Spain	ptsp	rad	Trinidad and Tobago	10.6500	-61.5167	Contributing RTX	Trinidad and Tobago Hydrographic Unit, CPACC/MACC	203
Scarborough	scar	rad	Trinidad and Tobago	11.1667	-60.7333	Contributing RTX	Trinidad and Tobago Hydrographic Unit	
Toco Trinidad			Trinidad and Tobago	10.8333	-60.9333	Non operational	Trinidad and Tobago Hydrographic Unit	
Point a Pierre			Trinidad and Tobago	10.5167	61.5155	Planned		
Grand Turk			Turks and Caicos	21.4336	-71.1497	Planned	George Maul, Florida Institute of Technology Proposed NOAA/UHSLC/PR SN2009-2011 upgrade, eliminated.	
Charlotte Amalie, St. Thomas	amal	pwl	USVI	18.3349	-64.9197	Contributing RTX	NOS/NOAA	



	amal2							
Christiansted Harbor, St. Croix	stcr	pwl	USVI	17.7500	-64.7050	Contributing RTX	NOS/NOAA	
	stcr2							
Lameshur Bay, St. John	lame	pwl	USVI	18.3183	-64.7242	Contributing RTX	NOS/NOAA	
	lame2							
Lime Tree Bay, St. Croix	lime	pwl	USVI	17.6845	-64.7540	Contributing RTX	NOS/NOAA	
	lime2							
Aves Island			Venezuela	15.7000	-63.6000	Gap		
Punta Arenas, Margarita Island			Venezuela	10.9700	-64.4000	Gap		
La Guaira			Venezuela	10.6167	-66.9333	Unknown	Instituto Geografico de Venezuela Simon Bolivar	328