

National report of Mexico

GLOSS GE 2013

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Summary

During the last two years our network became more robust adding radars, dataloggers, GOES transmitters, solar and panels. We have one new site: Puerto Angel in the Pacific and a new shelter in Tuxpan. The transmission to the IOC continued with 15 sites transmitting now, 4 through GOES and the rest by SSH communication protocol. We celebrate 60 years of UNAM network with the visit of Philip L. Woodworth and in collaboration with IOC-Caribe, IOC and NOAA organize the Third Caribbean Training Course for Operators of Sea Level Stations in June 4–9 2012, Merida, Mexico.



Figure 1. Visit of Philip L. Woodworth giving an invited talk in the celebration of the 60 years of UNAM network.

SEA LEVEL DATA FACILITY

www.ioc-sealevelmonitoring.org/list.php?order=delay&dir=asc&operator=64

Aplicaciones SEA LEVEL DATA FA... Riesgo de inundación... SUTRON COPORA... NOAA - GOES DC3... West Coast and Alas... English to French, B... NDBC DART 8 Progr... National Hurricane... igcib.jl.unsa.gov... Global Change Mat... Política y elecciones... Otros marcadores

IOE

SEA LEVEL STATION MONITORING FACILITY

Intro Map Station lists Station details Services

Stations monitored by Universidad Nacional Autónoma de México (Mexico)

Status at 2013-10-23 06:32 GMT : 17 stations listed ordered by delay

Show: only active only GLOSS only GTS only FTP only Webservice only BGAN only Email

all known stations

Info: general contacts performance

Code	GLOSS ID	Country	Location	Connection	DCP ID	Last observation Level	Time in GMT	Delay	Transmit Interval	View
zihu2		Mexico	Zihuatanejo, Gro	SOMX10	0102D23E	3.19	2013-07-10 09:36	10s	5'	[open]
telc		Mexico	Telchac	ftp		1.37	2013-10-21 13:34	2d	10'	[open]
tuxp		Mexico	Tuxpan	ftp		2.62	01:28	6h	10'	[open]
made		Mexico	Puerto Madero, Chis.	ftp		0.53	05:00	2h	10'	[open]
laza		Mexico	Lazaro Cardenas	ftp		6.39	05:44	48'	10'	[open]
vera2	212	Mexico	Veracruz, Ver.	SOMX10	0102A4AE	1.78	05:55	37'	15'	[open]
acya	267	Mexico	Acapulco Club de Yates	ftp		1.37	06:00	32'	10'	[open]
sali		Mexico	Salina Cruz, Oax.	ftp		0.61	06:06	26'	10'	[open]
maza		Mexico	Mazatlan	ftp		2.51	06:06	26'	10'	[open]
vera	212	Mexico	Veracruz, Ver.	ftp		1.83	06:06	26'	10'	[open]
frfr		Mexico	Frontera	ftp		2.21	-maintenance-	26'	10'	[open]
imuj		Mexico	Isla Mujeres, Q. R.	ftp		2.45	06:06	26'	10'	[open]
gumo		Mexico	Puerto Morelos, Q. R.	ftp		0.71	06:10	22'	10'	[open]
lpaz		Mexico	La Paz	ftp		2.22	06:12	20'	10'	[open]
clst		Mexico	Celestun, Yuc.	ftp		1.88	06:14	18'	10'	[open]
sali2		Mexico	Salina Cruz, Oax.	SOMX10	0103703C	0.71	06:16	16'	5'	[open]
prog2	213	Mexico	Progreso, Yuc	SOMX10	01029134	0.01	06:29	3'	15'	[open]

Site developed and maintained by VLIZ for UNESCO/IOC [contact]

The data presented under this service has not undergone any quality control and data is provided as received. IOC, VLIZ and data suppliers accept no liability for any errors and/or delays in data or for interpretations, transactions, or any other use carried out on the basis thereof.

Figure 2. Sites of UNAM in IOC Web site.

Mexican sea level measurements networks

In Mexico there are currently several sea level monitoring networks: the CICESE network (CICESE is a research center), the Mexican Navy network and the UNAM network (National University of Mexico).

CICESE network

CICESE network is mainly focused in the northwestern part of the country. They have been collaborating with the University of Hawaii to install and maintain some sites, including Cabos, Manzanillo, and one in Acapulco.



Figure 3. CICESE network distribution. Active (green), in preparation (yellow) and planned (blue).

The Mexican Navy network

The Mexican Navy have a network with 40 sites, 17 in the Gulf of Mexico and the Caribbean Sea, and 23 in the Pacific Ocean. The network began in 1999 with 30 sites, in 2001 there were installed 3 stations, 5 in 2010 and during 2011 two were rehabilitated. Stations measure sea level using pressure sensors and sea temperature. They currently modernize two sites.

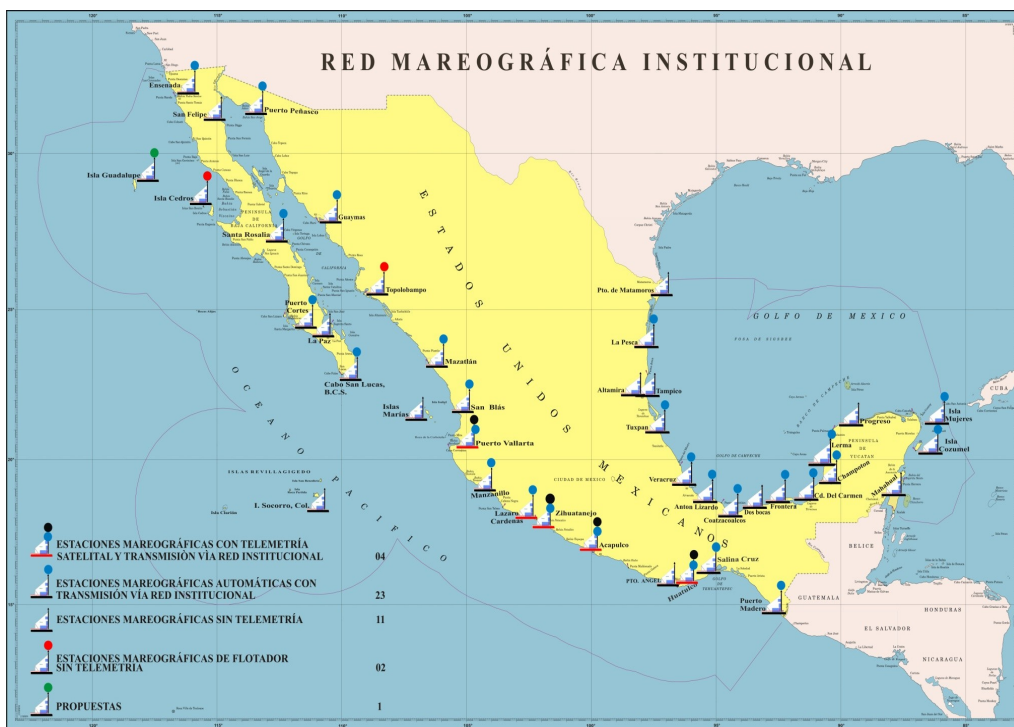


Figure 4. Distribution of Mexican Navy sea level stations. (black) sites with satellite telemetry, (blue) sites with internal Navy network communication, (no color) sites without telemetry, (red) sites with float sensor without telemetry, and (green) planned sites.

UNAM sea level Network

Background

The Universidad Nacional Autónoma de México hosts the National Sea Level Service since 1952. It had a network that grew up to 16 permanent sites in the early 70's, by the end of 2006, only Veracruz was working and partially Acapulco. Most of the sites that were working during late 80's were not working since the 90's and in many of them there were not shelters or any UNAM equipment. There was also a considerable amount on non digitized mareograms, most of them from the late 80's, with around 900 months of data waiting to be digitized. In addition, international collaboration with the *Global Sea Level Observing System (GLOSS)* and PSMSL was very weak and the calendars and tide tables were not published.

Since late 2006 a diagnostic of the situation was done and we have been working in three basic issues: reconstruction of the network, digitalization of mareograms and data base organization and website development and collaboration with international and national organizations.

Current situation

Currently there have been rehabilitated 23 sites, 13 in the Gulf of Mexico and Caribbean (Tuxpan, Veracruz, Frontera, Desemb-Grijalva, Ciudad del Carmen, Campeche, Celestún, Sisal, Progreso, Telchac, Puerto Morelos, Isla Mujeres and Cozumel) and 10 in the Pacific (Puerto Chiapas, Salina Cruz, Huatulco, Puerto Angel, Acapulco, Zihuatanejo, Lázaro Cárdenas, Puerto Vallarta, Mazatlán and La Paz) (Fig. 5). Between the last GLOSS meeting

and this one, 1 site was added to the network. Now 15 sites are transmitting, via ftp, to IOC-Sea Level Center. The network was reconstructed with the minimal equipment, which was a float sensor with integrated datalogger and a transmitter, Internet, GOES or 3G. In addition, radars, GOES transmitters, no-breaks and solar panels were added to some sites. Leveling was carried out in several sites and an electronic switch was developed and installed in one site for testing. Several shelters were maintained. New or reconstructed shelters are in Tuxpan and Puerto Angel. The sites have float and/or radar sensors, 4 sites have GPS, two thanks to the University of La Rochelle, four GOES transmitters are currently being installed in Progreso, Veracruz, Salina Cruz and Acapulco.

Table 1. UNAM stations rehabilitated since 2007. In red new equipment since 2011 GLOSS meeting.

	Site	In collaboration with	Sensors	Sensor brand	Data transmission	Rehabilitated in year /GPS
1	La Paz, B.C.S.	API	Float	Thalimedes/OTT	Internet	2008
2	Mazatlán, Sin.	UNAM	Float	Thalimedes/OTT	Internet	2008
3	Puerto Vallarta, Jal.	API	Radar Float	RLS/OTT Thalimedes/OTT	3G	2011
4	Lázaro Cárdenas, Mich.	API	Float Radar	Thalimedes/OTT Sutron (M. Merrefield)	3G	2008/Yes Kostoglodov)
5	Zihuatanejo, Gro.	API Fonatur	Radar Float	RLS/OTT Thalimedes/OTT	3G GOES	2011
6	Acapulco, Gro.	Club de Yates	Float	Thalimedes/OTT	3G	2007/Yes (Kostoglodov)
7	Pyo Angel	API	Radar	RLS/OTT	3G	2013
8	Huatulco, Oax.	API Fonatur	Radar	RLS/OTT	3G	2011
9	Salina Cruz, Oax.	API	Float	Thalimedes/OTT	3G GOES	2008/Yes (Kostoglodov)
10	Puerto Madero, Chis.	API	Float	Thalimedes/OTT	3G	2008
11	Tuxpan, Ver.	UNAM	Float Radar	Thalimedes/OTT	3G	2009
12	Veracruz,	ENM	Float and	Thalimedes/OTT	3G	2008

	Ver.		radar meteorology	Kalesto OTT	GOES	2011/Yes (Univ. La Rochelle)
13	Frontera, Tab.	API	Float	Thalimedes/OTT	3G	2010
14	Desembocadura Grijalva, Tab.	API	Float	Thalimedes/OTT	3G	2010
15	Cd.Carmen, Camp.	API	Float	Thalimedes/OTT	3G	2010
16	Campeche, Camp.	API	Float	Thalimedes/OTT	3G	2011
17	Celestún, Yuc.	II-UNAM/API	Float	Thalimedes/OTT	3G	2010
18	Sisal, Yuc.	II-UNAM	Radar	RLS/OTT	3G	2011
19	Progreso, Yuc.	API	Radar	Sutron RLS/OTT	3G GOES (M. Merrefield)	2011/Yes (Univ. La Rochelle)
20	Telchac, Yuc.	II-UNAM	Float	Thalimedes/OTT	3G	2011
21	Puerto Morelos, Q. Roo.	UNAM	Float	Thalimedes/OTT	Internet	2007/Yes (Cabral)
22	I. Mujeres, Q. Roo	API	Float	Thalimedes/OTT	3G	2009
23	Cozumel, Q. Roo	API	Presión	Hobo	no	2010

API – Administración Portuaria Integral; ENM - Escuela Náutica Mercante

Sites to be rehabilitated in the near future (2012-2013).

- 1.- Tampico, Tamps.
- 2.- Coatzacoalcos, Ver.
- 3.- Cozumel, Q. R.
- 4.- Calica, Q. R.
5. Boundary of Guerrero/Oaxaca

National Tsunami Warning Center was implemented last year as a collaboration between UNAM, the Mexican Navy, CICESE, CENAPRED and the ministry of Gobernación.

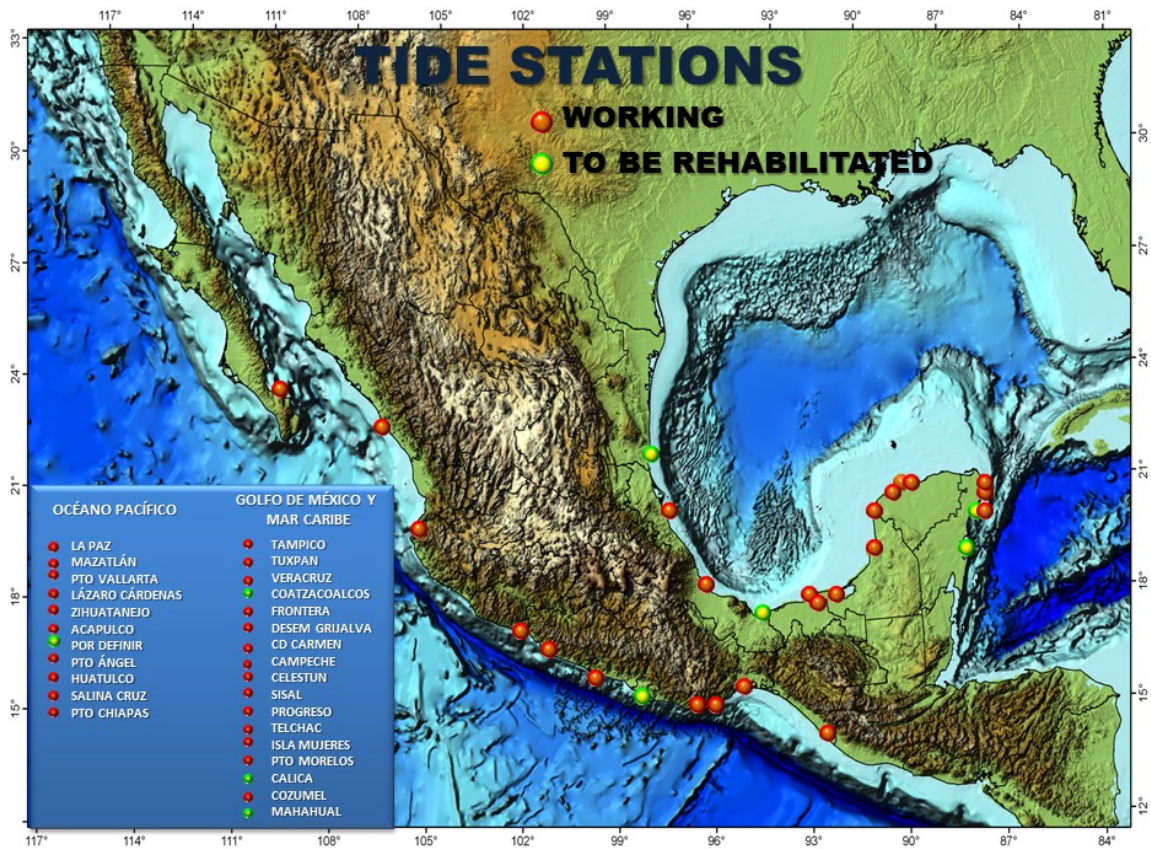


Figure 5. Location of UNAM sites. In red sites already working, green those that will be rehabilitated in the near future.

Database and website

The website have been upgraded including near real time data, tide tables, tide calendars, historical database, general information about the tides and particular information about the tides of each place.

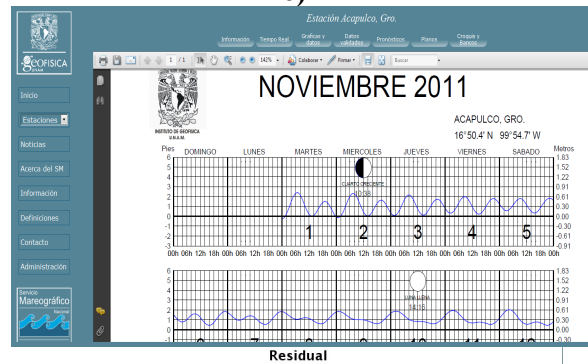
a)

The screenshot shows the homepage of the 'Servicio Mareográfico Nacional' (National Tide Service) of the 'Universidad Nacional Autónoma de México' (UNAM). The page features a navigation menu on the left with options like 'Inicio', 'Acerca del SM', 'Información', 'Noticias', 'Contacto', and 'Estaciones'. The main content area includes a header with the service name and university affiliation, followed by a descriptive paragraph about the service's mission. Below this is a 'Mapa de Estaciones' section with a legend for 'Estación con datos históricos' (yellow dot) and 'Estación con datos históricos y de tiempo real' (red dot), and a map of Mexico showing the locations of these stations. A dropdown menu labeled 'Estaciones' is visible at the bottom of the map area.

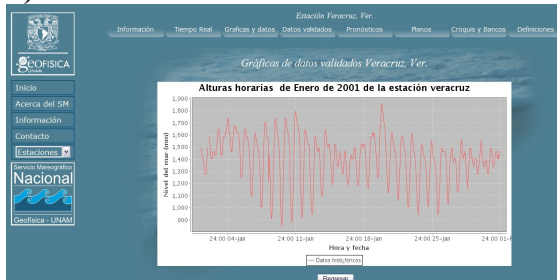
b)



c)



d)



e)

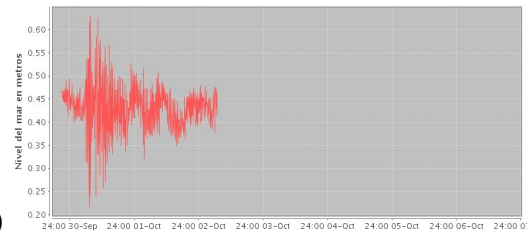


Figure 6.- a) Initial page of the UNAM sea level service website, b) near real time data and residual, c) example of tide calendar, d) example of graph of historical data, and e) residual showing the 2009 September 30 tsunami registered in Acapulco.



PTO. CHIAPAS, CHIS.
CASETA
MAREOGRAFICA
RECONSTRUIDA



CD. DEL CARMEN, CAMP.
CASETA MAREOGRAFICA
REMODELADA



MAZATLAN, SIN.
CASETA
MAREOGRAFICA
RECONSTRUIDA



TUXPAN, VER.
CASETA
MAREOGRAFICA
QUE REQUIERE
RECONSTRUCCION



VERACRUZ, VER.
CASETA MAREOGRAFICA
RECONSTRUIDA Y EQUIPADA
CON SENSORES DEL NIVEL
DEL MAR REDUNDANTES,
METEOROLÓGICOS Y GPS DE
ALTA PRECISIÓN



SALINA CRUZ, OAX.
EQUIPO INSTALADO:
MAREOGRAFO,
EQUIPO DE
COMUNICACIÓN Y GPS

