



Tides, Water Level and Currents Working Group – TWCWG2 Victoria, Canada, 8-12 May 2017

IHO Resolution N° 3/1919

Captain Fernando Vegas





Ocean tidal zones

- 5** It is resolved that heights on the coast, including the elevations of the lights, should refer to a higher tide datum (HW).
- 6** It is resolved that the Lower Astronomical Tide (LAT), or a datum as close in its equivalence to this level as practical and acceptable for Hydrographic Services be adopted as a chart datum. Alternatively, if the low tide levels in a specific zone are frequently deviated from the LAT, or if a different datum has been established by a national policy, another similar datum may be used.
- 7** It is resolved that the Highest Astronomical Tide (HAT), or a datum as close in its equivalency to this level as practical and acceptable for Hydrographic Services, be adopted as a datum for vertical guards. Alternatively, another similar datum may be used if high water levels in a specific zone are frequently diverted from HAT, or if a different datum has been established by a national policy.



Ocean tidal zones

- 8 It is recommended that LAT and HAT be calculated for a minimum period of 19 years, using harmonic constants derived from observations with a minimum of one year or by other proven methods which are known to give reliable results. The tide levels should, if possible, reflect the estimated error values obtained during the determination of these levels.

Note: LAT (HAT) is defined as the lowest (high) level of tides, which can be predicted to take place in mean weather conditions and in any combination of astronomical conditions.



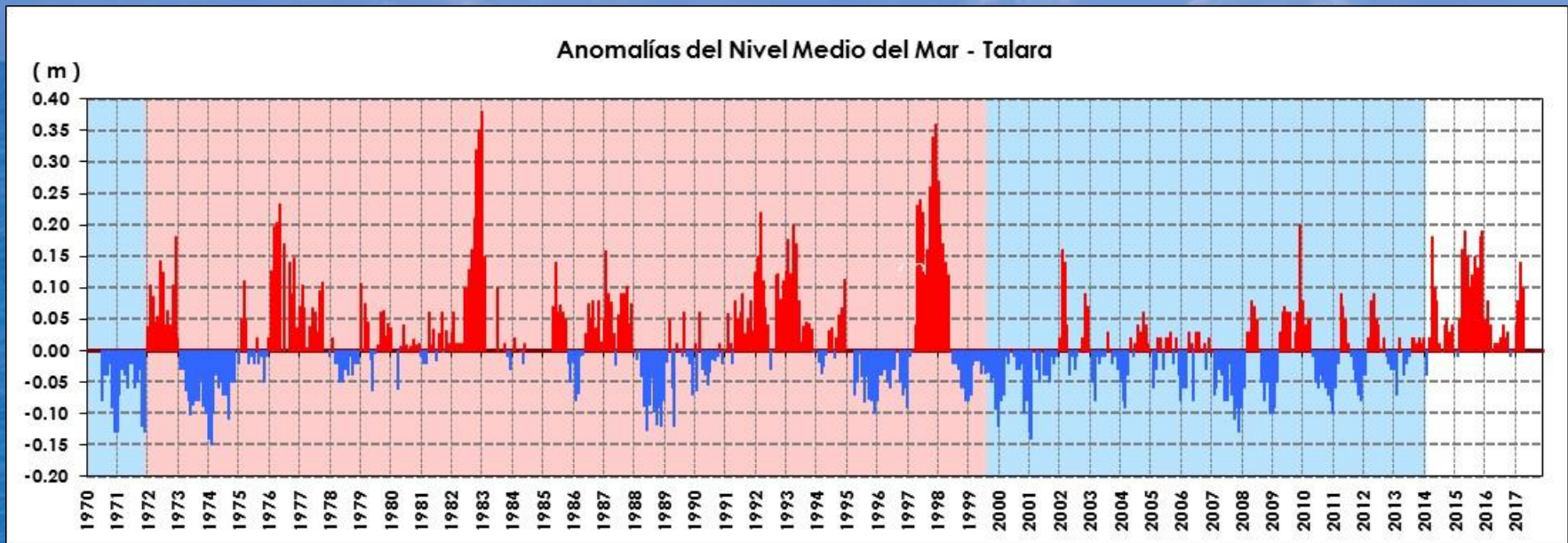
Peruvian position

- In the case of Peru, tides have amplitudes smaller than 2 meters (microtidal tide) so they are not very significant.
- The variation of daily and monthly atmospheric pressure is minimum, so there are no storm surges and a tidal correction by this variable is negligible.
- At the national level, we have sea mean level as the topographic reference level, while the mean low water ordinary springs is the level of chart datum or soundings; However, other tidal datum levels will be used in construction and other territorial regulation purposes.
- The full acceptance of this resolution would imply modifying what we have been making for many years and its impact is important.



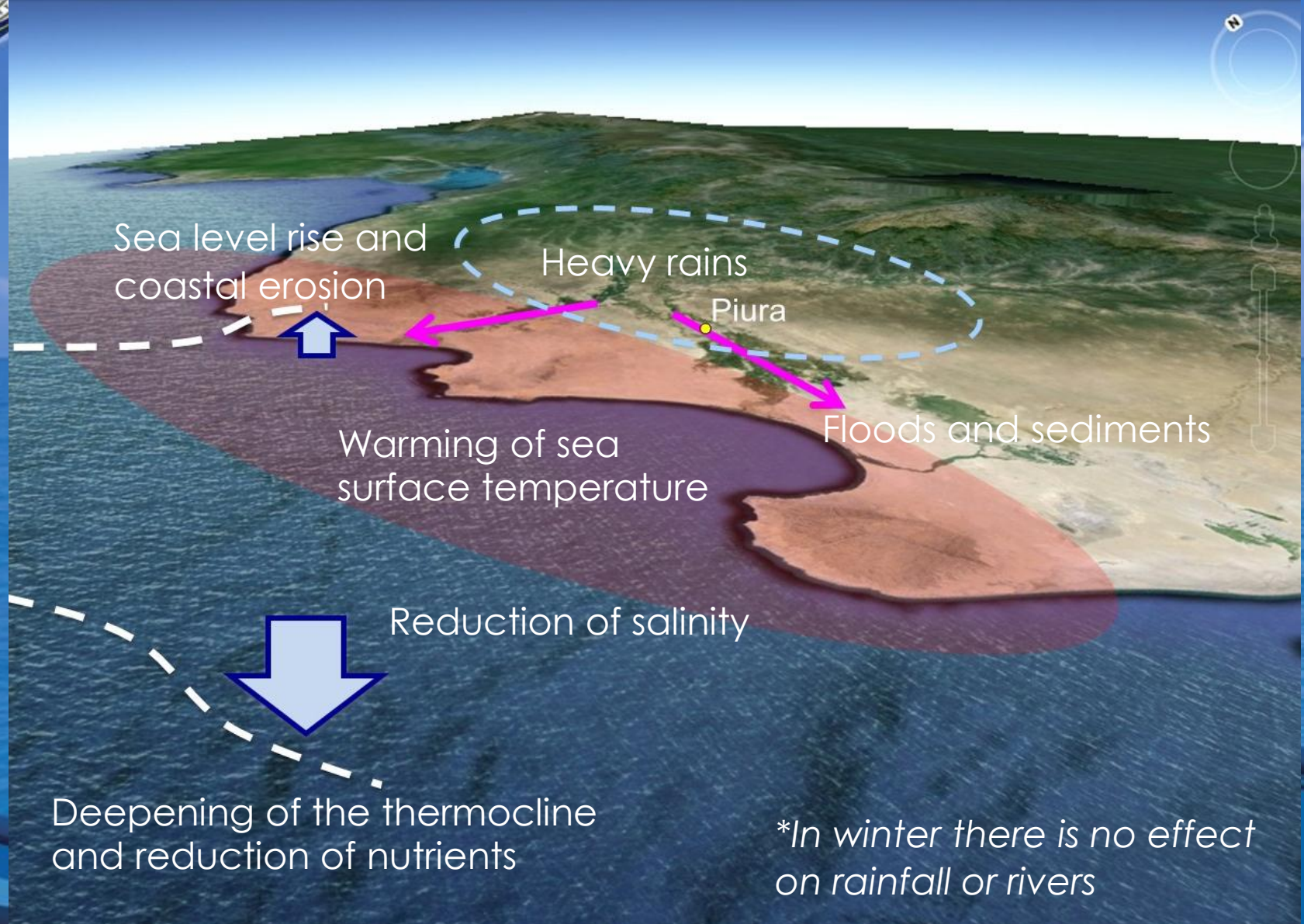
Peruvian position

➤ The use of the LAT and HAT levels is not recommended in our country, as the effects of the El Niño phenomenon are recurrent events, that should be considered in order to obtain vertical clearance which is appropriate to our reality.



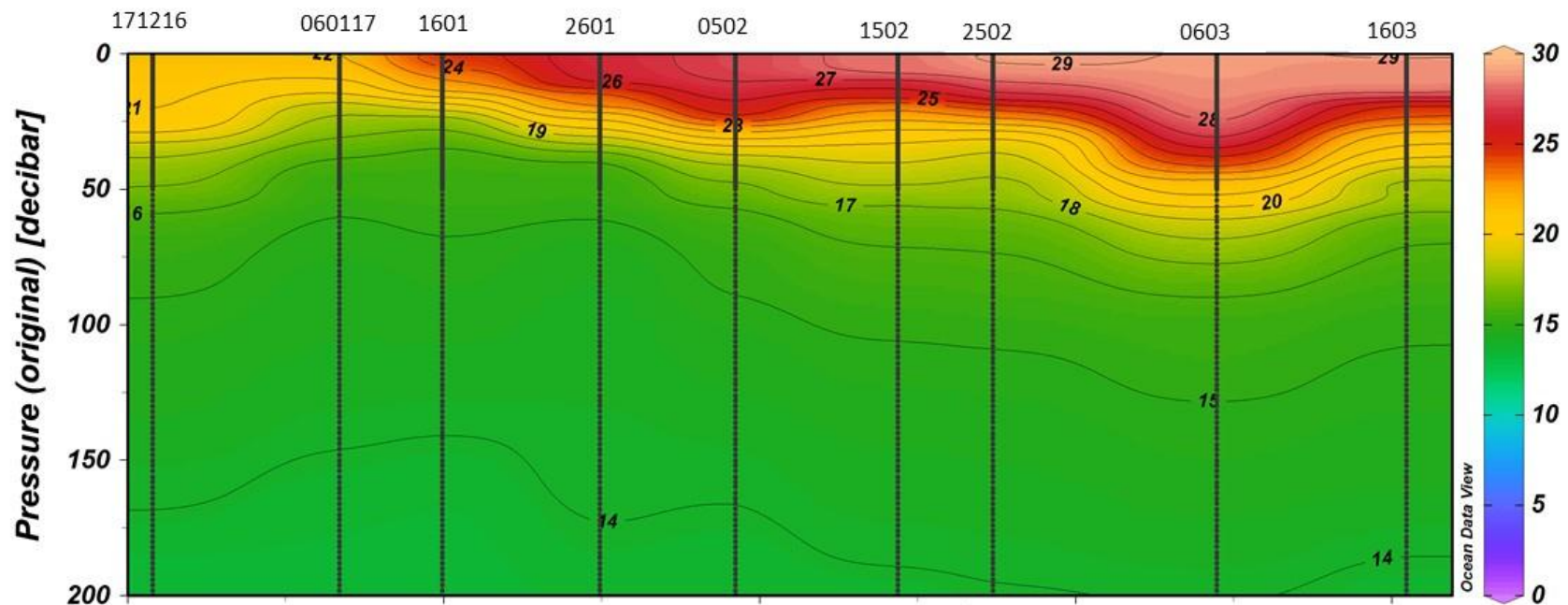


El Niño phenomenon in the North coast in summer



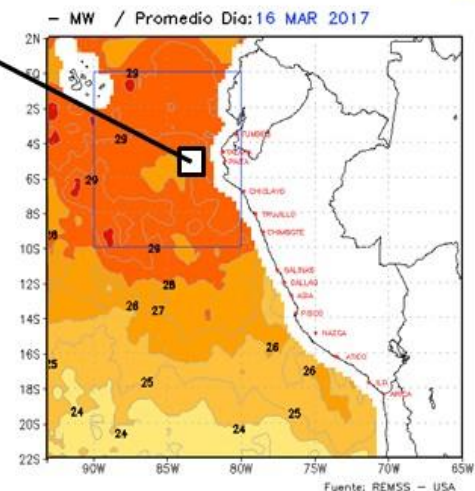


The Coastal Niño 2017



The Argo Buoys show that TSM warming in front of the northern coast of Peru was started in January 16th.

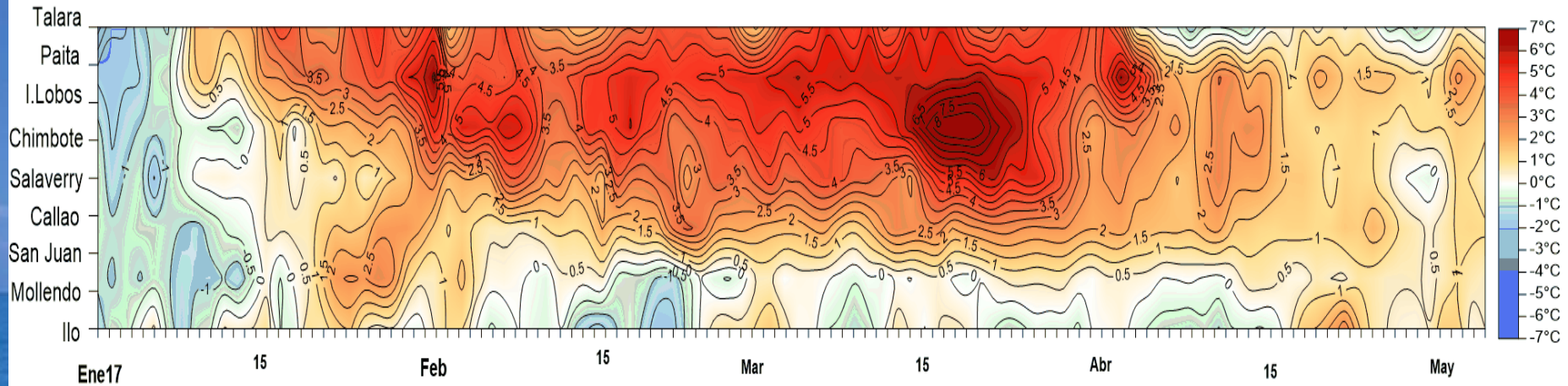
The deepening of the thermocline is noted due to the arrival of a warm Kelvin wave and a surface temperature up to 29 ° C.



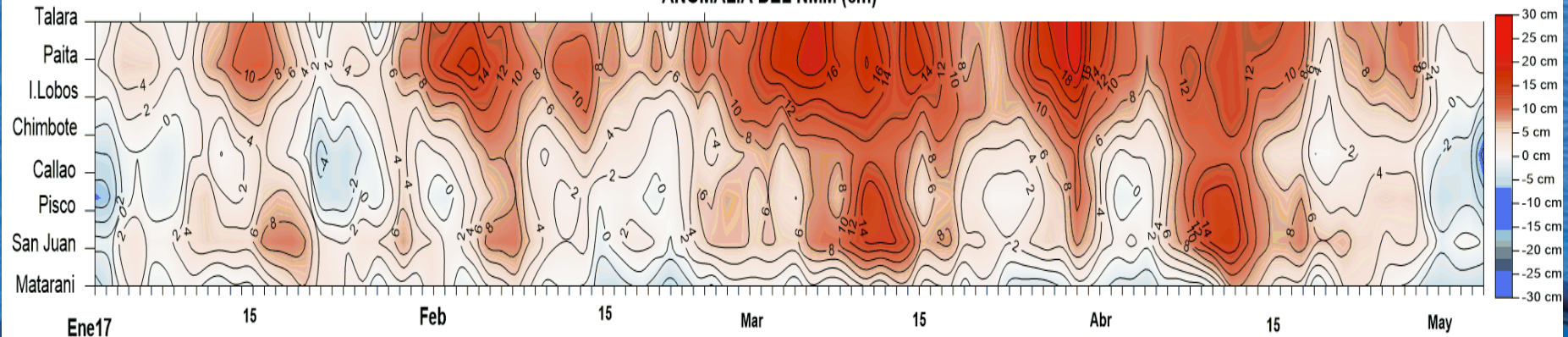


The Coastal Niño 2017

ANOMALÍA DE LA TSM CON C.MENSUAL (°C)



ANOMALÍA DEL NMM (cm)



The monitoring of sea level is very important because it makes possible to check the passage of Kelvin (warm) or Rosby (cold) waves.



The Coastal Niño 2017





Thanks



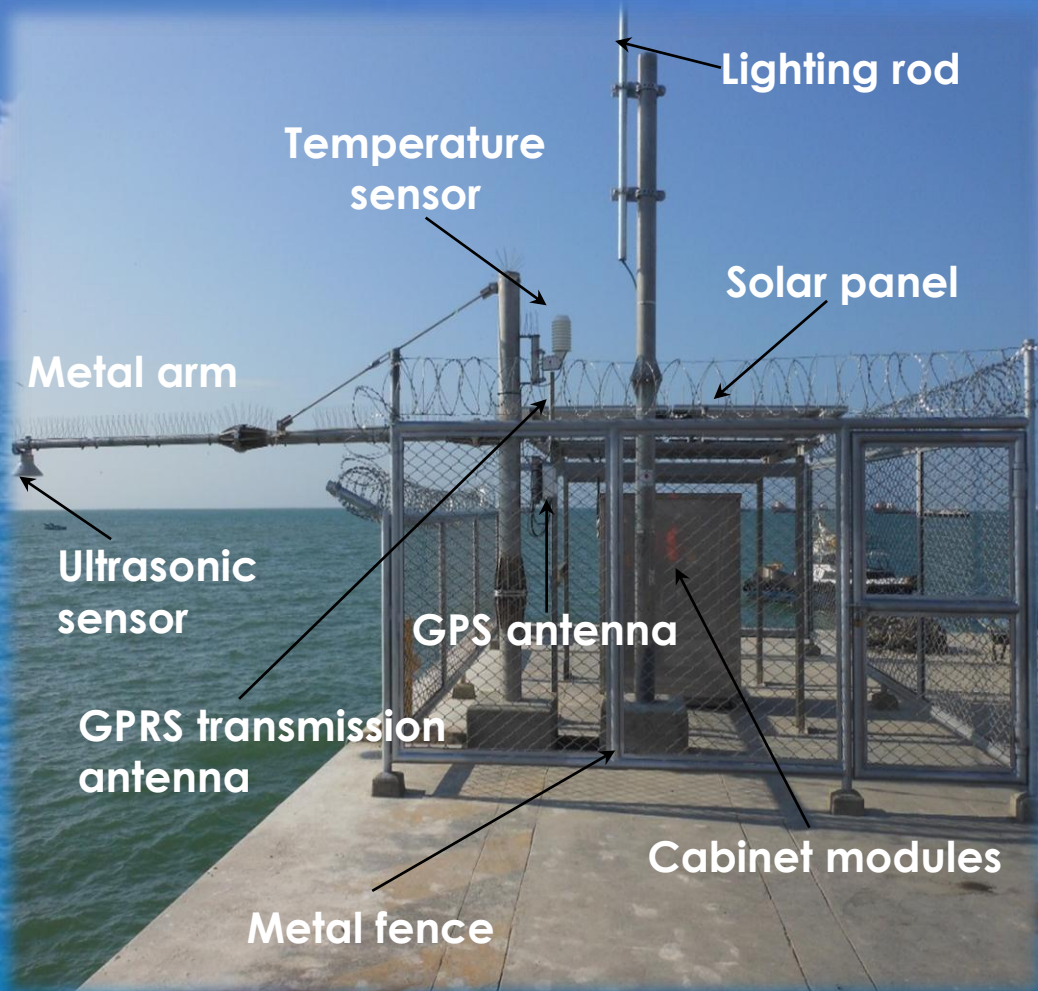
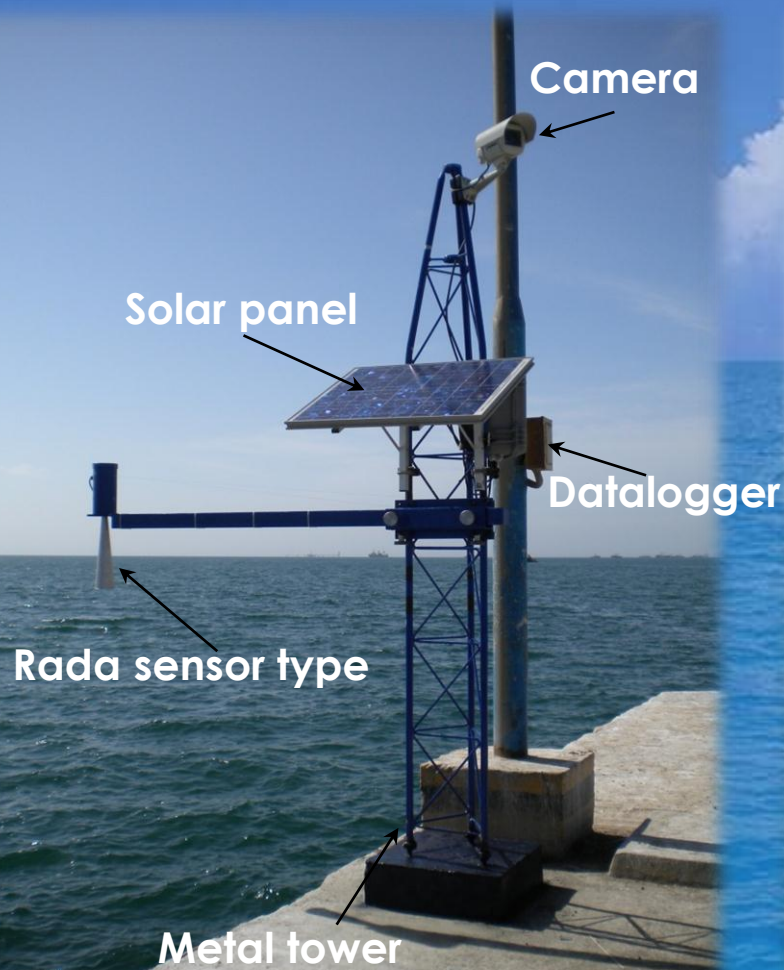
Peruvian Sea Level Stations Network

Zone	Station	Location	
		Latitud °S	Longitud °W
North	La Cruz	03°38'01"	080°35'15"
	Talara	04°34'30"	081°16'57"
	Paita	05°05'01"	081°06'27"
	Bayóvar	05°47'38"	081°03'16"
	Lobos de Afuera	06°56'06"	080°43'19"
Central	Salaverry	08°13'40"	078°58'54"
	Chimbote	09°04'34"	078°36'45"
	Huarmey	10°05'57"	078°10'54"
	Huacho	11°07'18"	077°36'58"
	Callao	12°04'08"	077°10'00"
	Cerro Azul	13°01'33"	076°29'07"
	Pisco	13°49'10"	076°15'07"
South	San Juan	15°21'19"	075°09'37"
	Chala	15°51'58"	074°14'53"
	La Planchada	16°13'52"	073°41'39"
	Atico	16°24'17"	073°13'15"
	Matarani	17°00'03"	072°06'31"
	Ilo	17°38'40"	071°20'54"
	Caleta Grau	17°59'36"	070°53'03"





Sea Level Stations Components





Tide Table Predictions

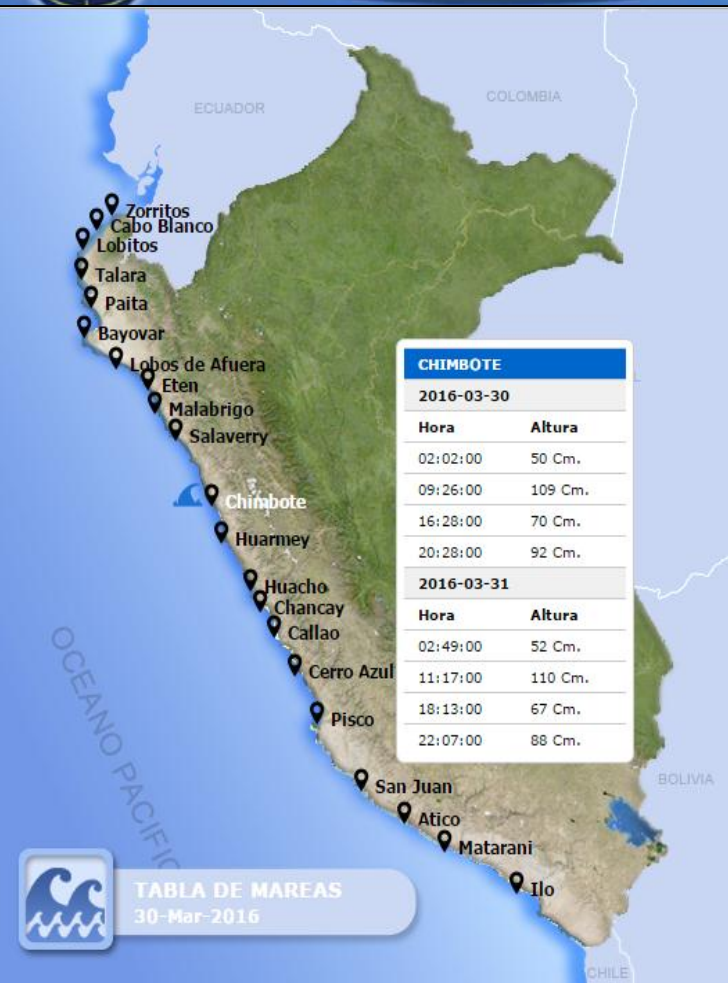


TABLA DE MAREAS

La presente información muestra las predicciones de las horas, alturas de las pleamares y bajamares de los Puertos del Perú las que se basan principalmente en la información proveniente de la Red de Estaciones Mareográficas referidas al Nivel Medio de Bajamares de Sicigias Ordinarias (NMBSO), establecidas por la Dirección de Hidrografía y Navegación (DHN) en el Litoral Peruano.

Definiciones

- Marea: movimientos periódicos y alternativos de ascenso y descenso del nivel del mar producidos por la atracción gravitacional que ejercen sobre la tierra la Luna y el Sol principalmente.
- Pleamar: nivel máximo alcanzado por una MAREA CRECIENTE.
- Bajamar: nivel mínimo alcanzado por una MAREA VACIANTE.
- Marea creciente: MAREA CRECIENTE.
- Marea vaciante: MAREA VACIANTE.

Niveles de

- Nivel Medio: nivel medio del mar.
- Nivel Medio de Bajamares de Sicigias Ordinarias (NMBSO): nivel medio de bajamares de sicigias que ocurren una vez al mes.

Descargar

Nombre del

ANCON

ATICO



Links to access

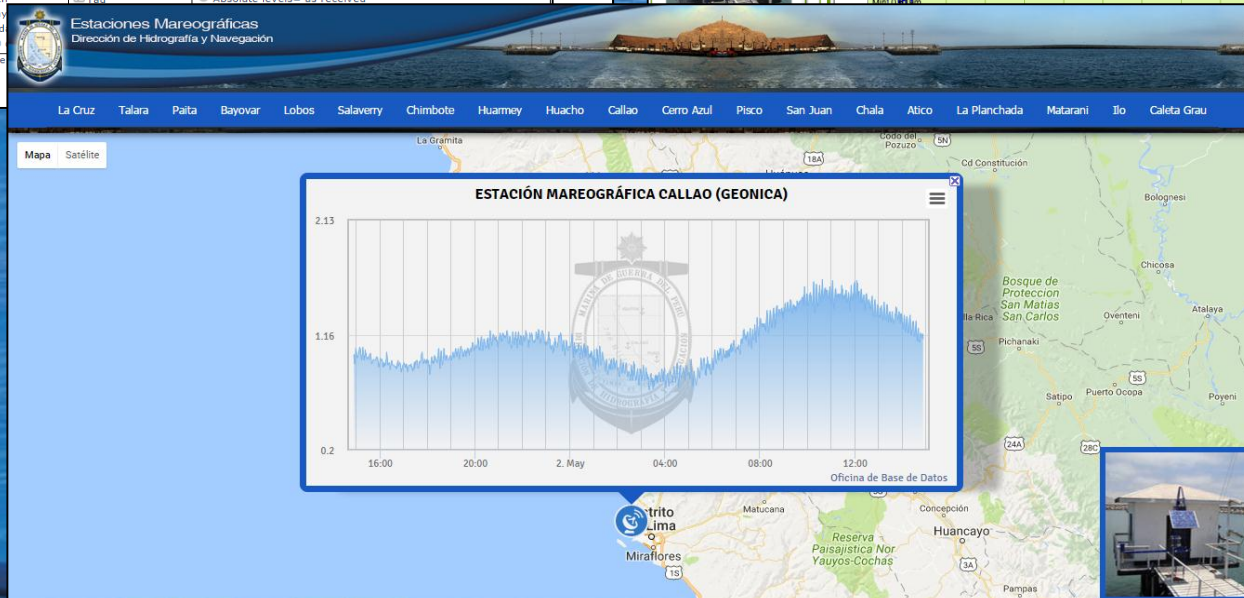
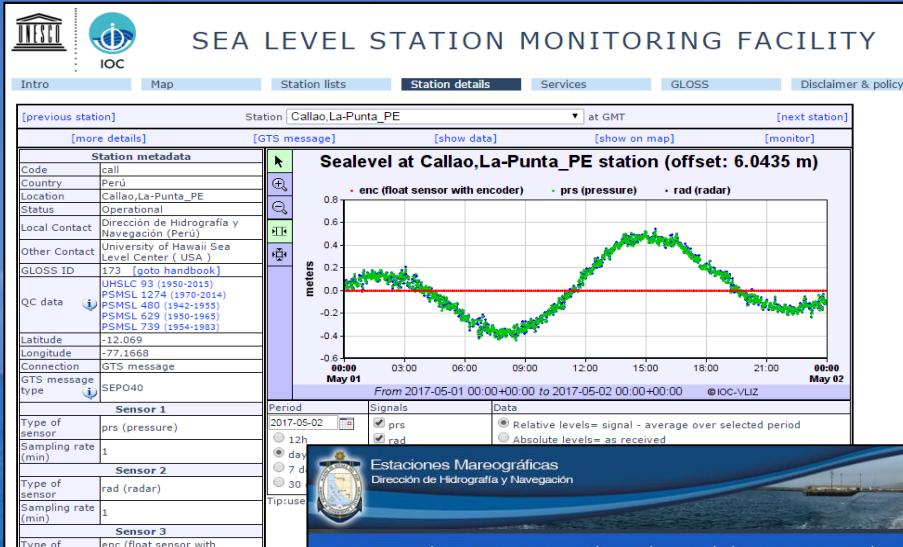
<https://www.dhn.mil.pe/secciones/mareas/index.php?f=2016-03-30>



Tide Data in Real Time

<http://www.ioc-sealevelmonitoring.org/>

<http://webtrans.geonica.com/index.php>



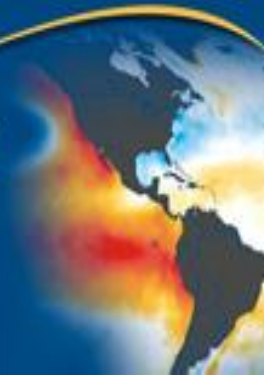
https://www.dhn.mil.pe/secciones/departamentos/oceanografia/apps/est_mareograficas/



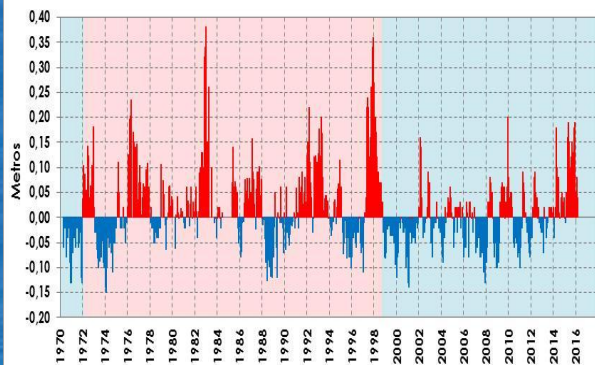
Operational and Scientific purposes



Monitoreo del Fenómeno El Niño



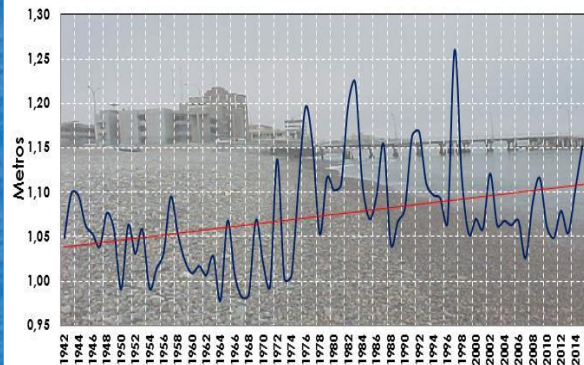
Anomalías del NMM de Talara



COP 20

EVIDENCIAS DEL CAMBIO CLIMÁTICO EN LOS NIVELES DEL MAR FRENTA A LA COSTA PERUANA

Promedios Anuales del Nivel del Mar - Callao

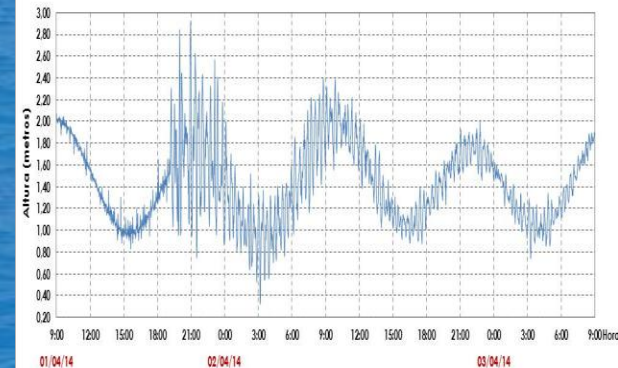


REPÚBLICA DEL PERÚ
MINISTERIO DE DEFENSA
MARINA DE GUERRA DEL PERÚ
DIRECCIÓN DE HIDROGRAFÍA Y NAVEGACIÓN



DEPARTAMENTO DE OCEANOGRAFÍA
DIVISIÓN DE GEOFÍSICA-OCEANOGRAFÍA
INFORME POST-TSUNAMI DEL SISMO DE
IQUIQUE-CHILE (8.2 Mw) DEL 01 DE ABRIL 2014

Registro Mareográfico de Ilo





Radar – Pressure





Conclusions

- ✓ At present, we have redundant sea level measurement (radar / pressure) and real-time transmission (satellite / telephony systems), which will improve the work of this Directorate which is the responsible authority of the National Tsunami Warning System.
- ✓ Updating and densification of sea level stations have contributed to improve the information reception for operational and scientific purposes. Monitoring of El Niño and La Niña phenomenon, the study of sea level rise related to the climate change, detection and monitoring of tsunamis and flood forecasting by rough seas are some of the principal scientific research.
- ✓ It is important to consider the willingness and participation in courses and / or workshops on tides applied to Hydrography. In this case, we require specifically to increase our knowledge on tidal currents.