National Report to the Seventeenth Session of the Group of Experts for the Global Sea Level Observing System (GLOSS)

Current status of the Argentinian Sea Level Network

The tide gauge network in Argentina depends on the Naval Hydrographic Service (SHN) and includes the 4 tide gauges belonging to the GLOSS network: Mar del Plata, Puerto Madryn, Puerto Deseado and Ushuaia, and the tide gauges located in San Fernando, Buenos Aires, La Plata, Atalaya, Santa Teresita and Puerto Belgrano (Figure 1). In addition to the observations from these devices, the SHN processes observed water level heights from tide gauges installed and maintained by other national or binational organizations (Comisión Administradora del Río de la Plata -CARP-, Dirección Nacional de Vías Navegables -DNVN-), and by private ports (Puerto Quequén, Puerto Bahía Blanca, Puerto Punta Loyola), (Figure 1).
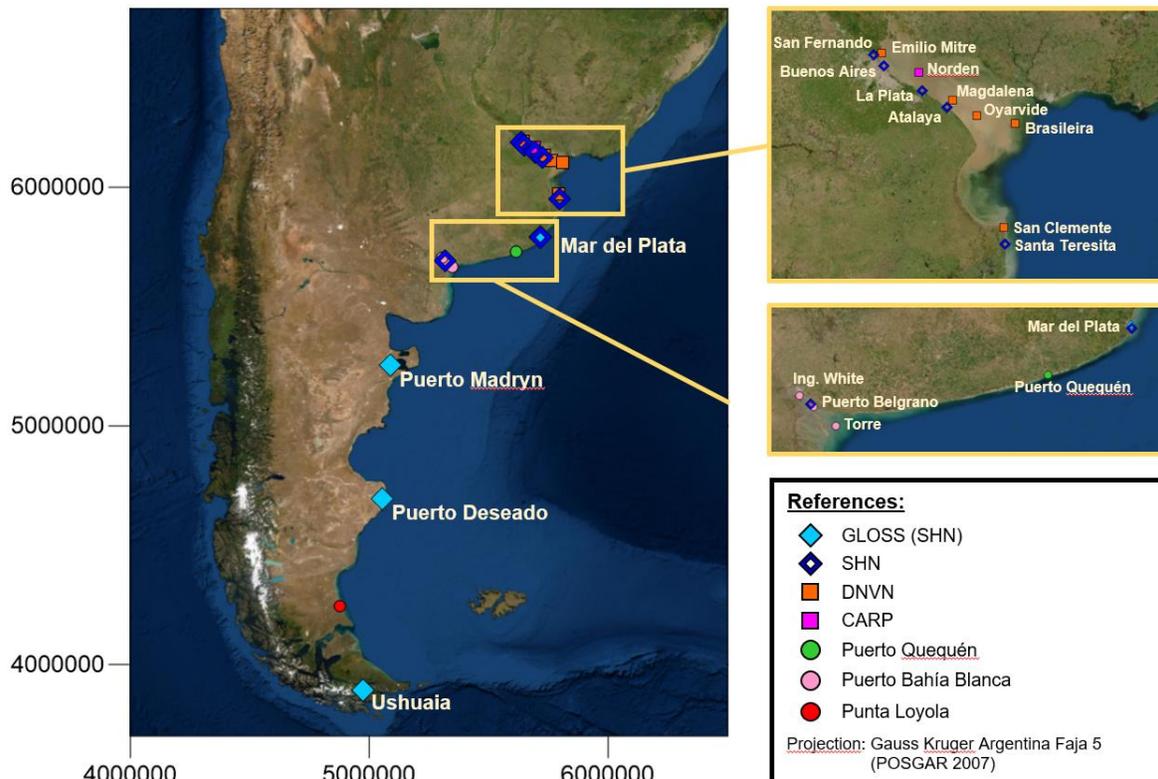

Figure 1. Location of tide gauges processed by the SHN.

These tide gauges are also used to identify in real time phenomena that may present a danger in terms of nautical safety, such as extreme storm surges events that occur frequently in the Río de la Plata. The observations of the tide gauges of the SHN and other agencies can be obtained through its website.

The Argentinian GLOSS tide gauges are jointly maintained with University of Hawaii Sea Level Center, and observations can be obtained through the IOC Sea Level Station Monitoring Facility website in near real time. Table 1 shows the coordinates, ID numbers and sensors of the GLOSS stations that obtained data since 01/01/2020.

Station	Coordinates	PSMSL ID	GLOSS ID	UHSLC ID	Sensor (sampling rate)		
					1	2	3
Mar del Plata	38°.00015278 S 57°.53850556 W	819	192	729	R (1)	R (3)	F (5)
Puerto Madryn	42°.76265 S 65°.03068611 W	2305	191	731	P (1)	R (3)	R (3)
Puerto Deseado	47°.75357778 S 65°.91469444 W	185	190	286	P (1)	R (3)	F (5)
Ushuaia	54°.817 S 68°.217 W	1850	181	600	R (1)	R (5)	-

Table 1. Características de las estaciones GLOSS argentinas. Type of gauges: R: Radar, P: Pressure, F: Floater.

Since 2020 all 4 stations recorded observations with a percentage higher than 97.5% for at least one of the installed sensors. The radar (rad) sensor at Mar del Plata has missing observations, and since October 2021 there is no data available from the float (enc) sensor at Puerto Deseado, but in both cases the stations have 2 additional sensors which recorded more than 99% of the observations. The two sensors at Ushuaia, the 3 sensors at Puerto Madryn and the two remaining sensors at Puerto Deseado show good continuity with few gaps in the observations and few outliers and spikes. The radar sensor (rad2) at Mar del Plata tends to have frequent spikes

and outliers, but the float sensor has stable observations during the whole period. Figure 2 shows the comparison of the relative monthly mean sea levels of the GLOSS station sensors after applying spike and outlier filtering processing.
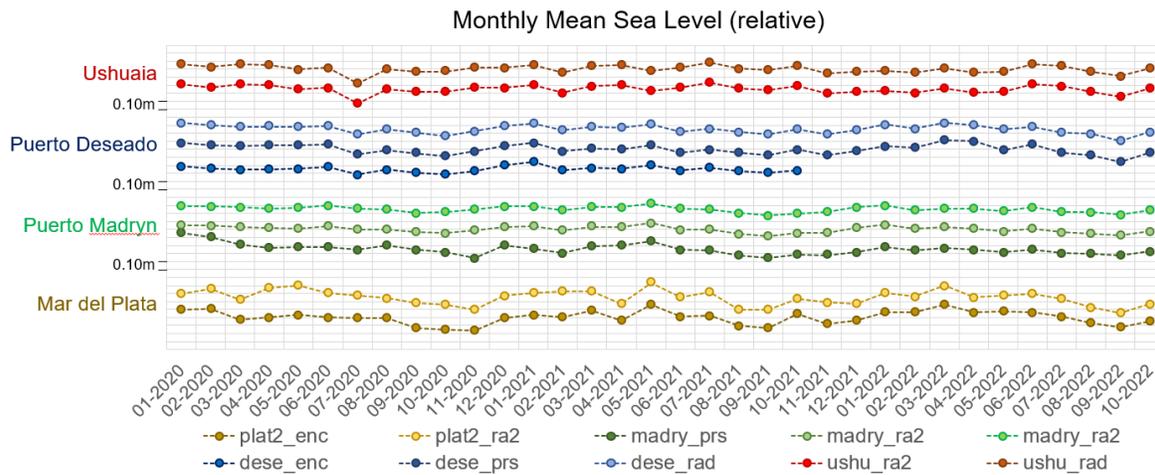

Figure 2. Relative monthly mean sea Level of GLOSS stations.

Observations from the SHN's own and external tide gauges are processed in delayed mode to obtain or update tidal harmonic constants, characterize phenomena such as meteotsunamis and storm surges, and to calculate and analyze mean sea level changes. The results of the processing of these observations are published in technical reports and research papers, and mean sea level information from GLOSS stations is sent to the PSMSL for publishing.

In addition to the stations mentioned above, the SHN continues to work on upgrading and installing new sensors to measure water levels. Funds are currently approved for several projects for this purpose, including the installation or updating of water level sensors, and the incorporation of sensors to measure environmental parameters in existing tide gauges. In order to achieve adequate coverage of the Atlantic coast, the cities of San Antonio Este, Camarones, Comodoro Rivadavia,

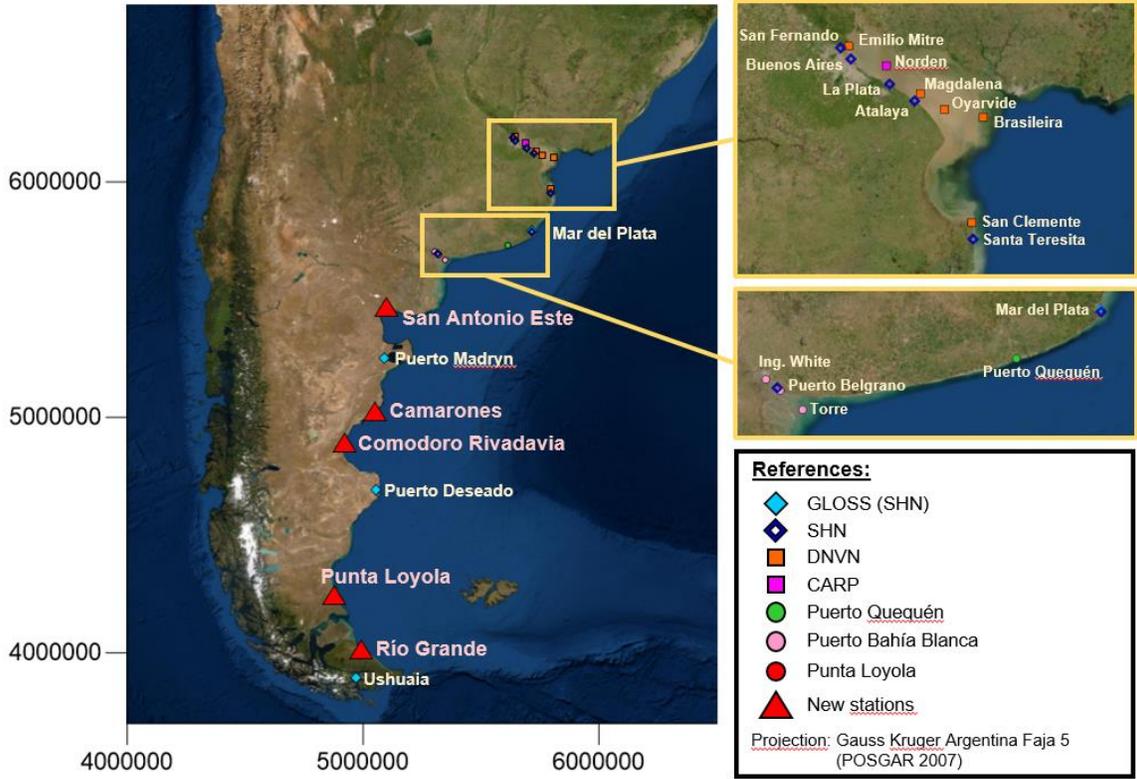Punta Loyola and Río Grande have been selected as destinations for the new stations to be incorporated (Figure 3).

Figure 3. Location of planned SHN stations.