Tsunami Warning and Mitigation WG - South East Pacific Region

Emergency Responses and Data Analysis

Outline

- General Actions and Emergency Responses.
- Maximum Tsunami Amplitudes at Sea Level Stations in SEP.
- Use of DART Buoy Network and Historical data.
- Atmosferic Pressure vs Sea Level Observations.
- Final Remarks.




General Actions and Emergency Response

- A total of 43 Sea Level Stations registered Tsunami readings, helping update and cancel Tsunami Threat Levels.

- Continuos comunications were stablished between most of the National Tsunami Warning Centers from the Regional Working Group:

  - Every Bulletin sent by all of the different NTWC were shared by e-mail.
  - Every Bulletin sent by all of the different NTWC were published in a dedicated platform created by the SEP Regional Working Group.
  - Dedicated Chat used by the SEP Regional Working Group, was used to share information and solve doubts regarding to the tsunami Emergency.

- Direct telephone communications with PTWC helped to better analyze the tsunami threat.

- Tsunami Threat Evaluations from the different NTWC that were sent to the National Emergency Agencies, successfully triggered the activation of the National Tsunami Emergency Plans.




Some observations to be remarked

- First 06 PTWC Bulletins about the Emergency were not able to reach some Tsunami National Warning Centers.
- PTWC manually re-sent its Bulletins to as many National Tsunami Focal Points as possible, which helped to start early monitoring of Sea Level Stations and DART systems close to the Volcanic Event in Tonga.
- Based on PTWC´s Bulletin N°4 and Tsunami amplitudes detected at Rikitea, Chile issued its Bulletin N°1 with a Threat Message to the National Emergency Management Agency (ONEMI) establishing “Caution Level” for all its Islands in the Pacific as well as the Antartic Peninsula.
- New message formats had to be created to include **Non Seismic Variables** in the Tsunami Warnings Bulletins.
- Some countries did not have their sea level data fully available online, which could have been used to help better advise if a tsunami was identified near their coast.

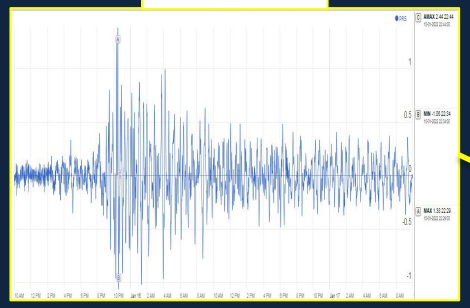



Maximum Tsunami Amplitudes at Sea Level Stations

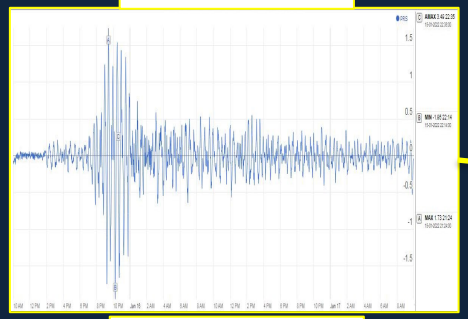
Country	Sea Level Station	Max Amplitude (m)
COLOMBIA	Tumaco	0.06
	Bahía Málaga	0.06
ECUADOR	Baltra, Galápagos	0.50
	Santa Cruz, Galápagos	0.90
	La Libertad, Galápagos	0.30
CHILE	Arica	1.40
	Chañaral	2.00
	Coquimbo	1.50

Maximum Tsunami Amplitudes at Sea Level Stations

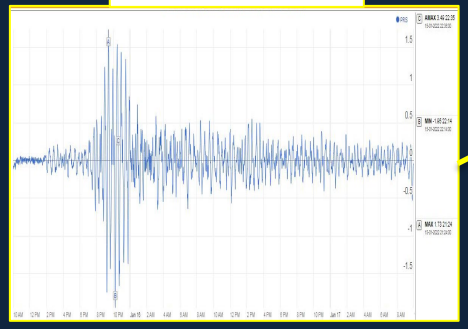
Arica, Chile



Chañaral, Chile

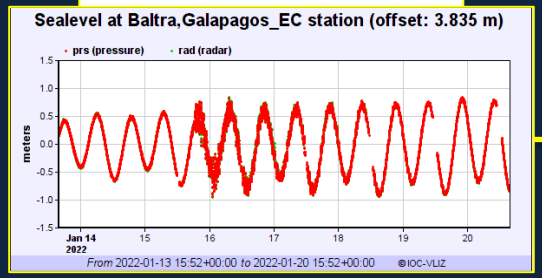


Coquimbo, Chile

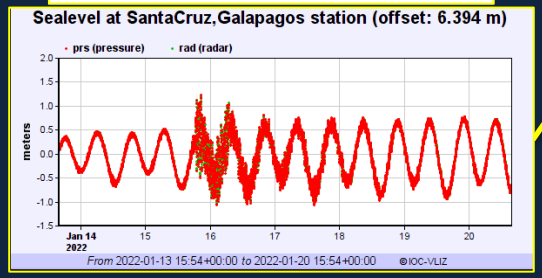


Maximum Tsunami Amplitudes at Sea Level Stations

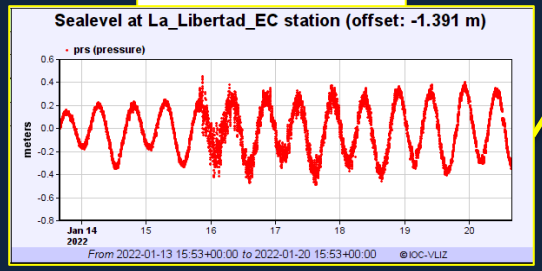
Baltra-Galápagos, Ecuador



Santa Cruz-Galápagos, Ecuador

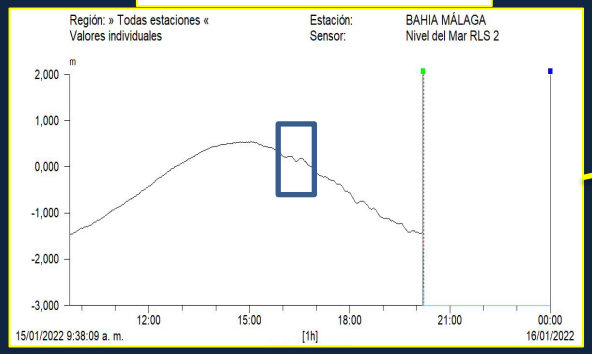


Libertad, Ecuador

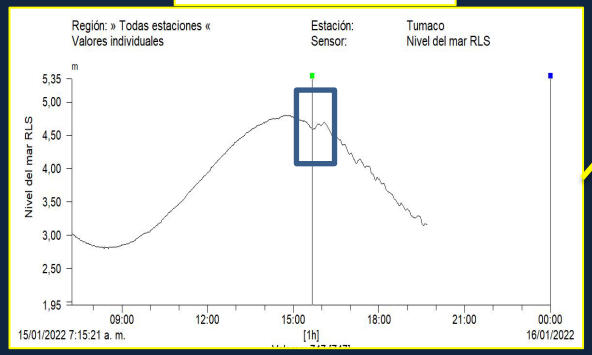


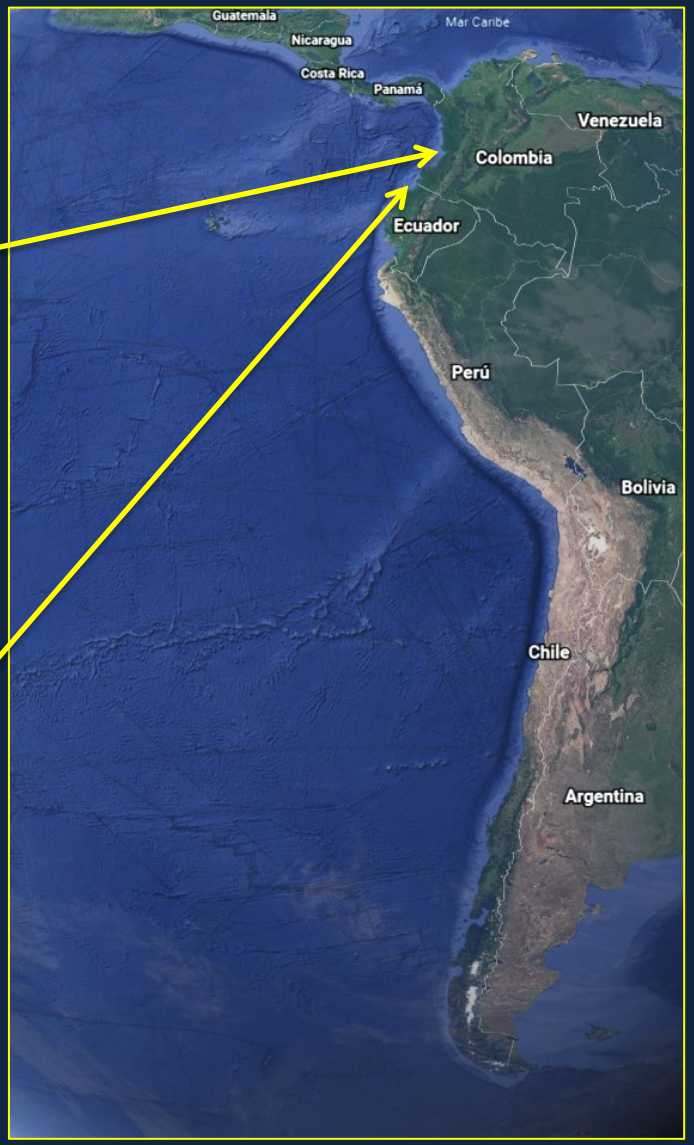
Maximum Tsunami Amplitudes at Sea Level Stations

Bahía Málaga, Colombia

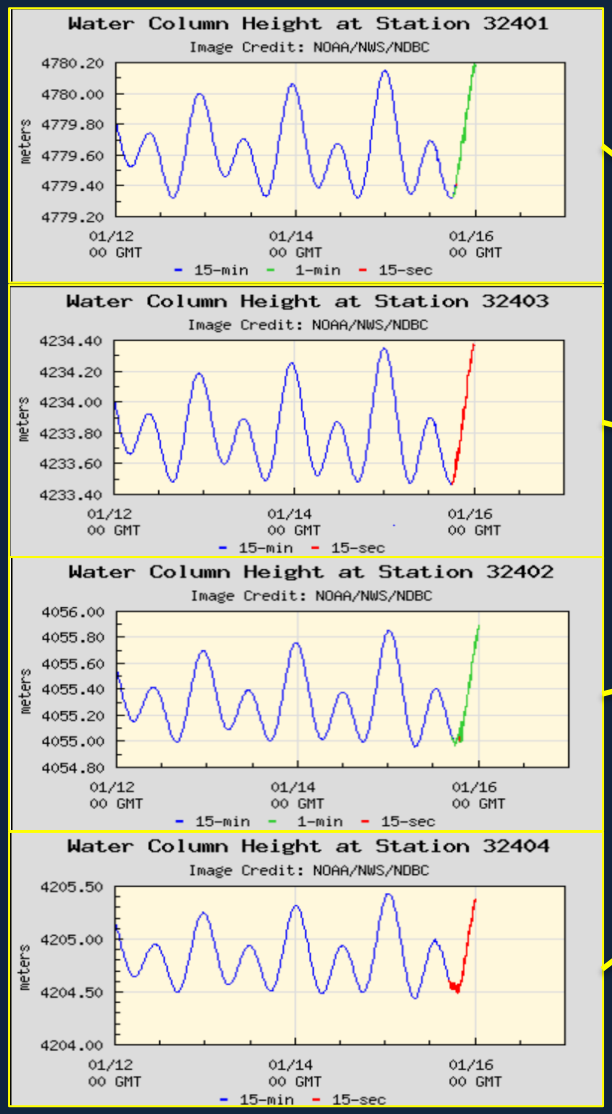


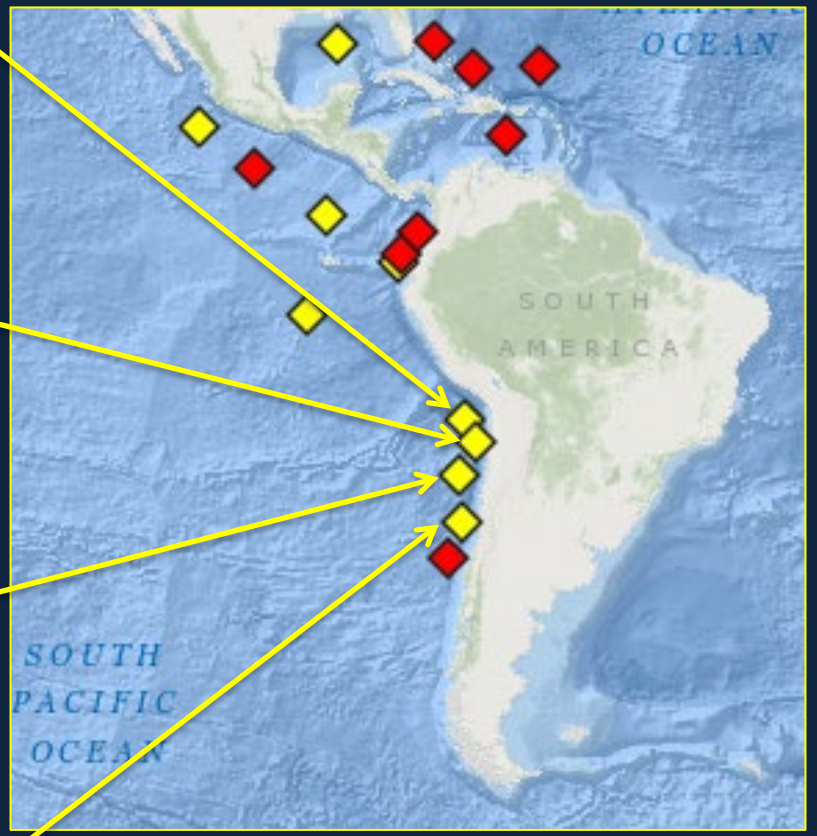
Tumaco, Colombia





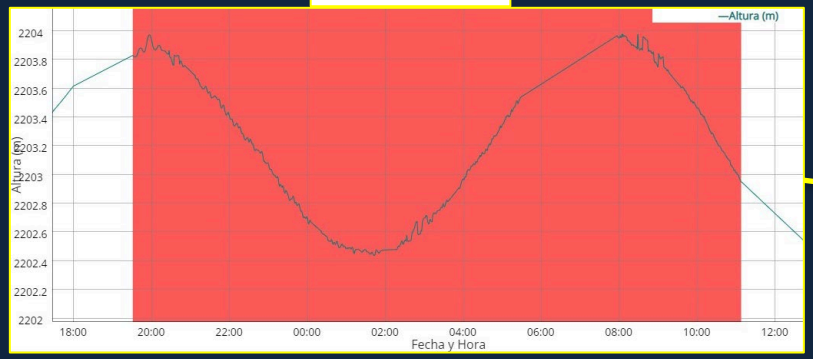
Use of Tsunami DART Buoy Network Data and Historical data



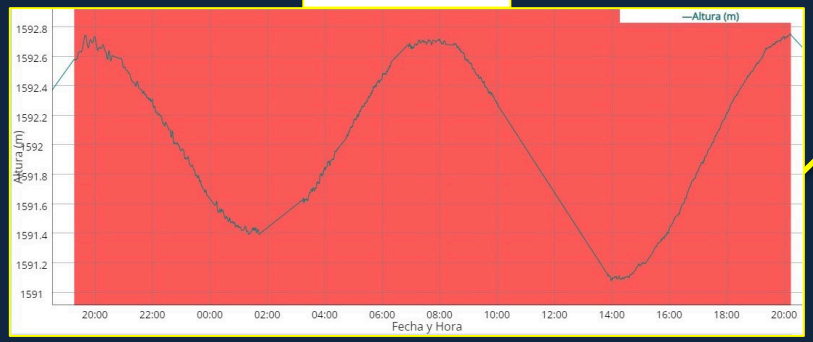


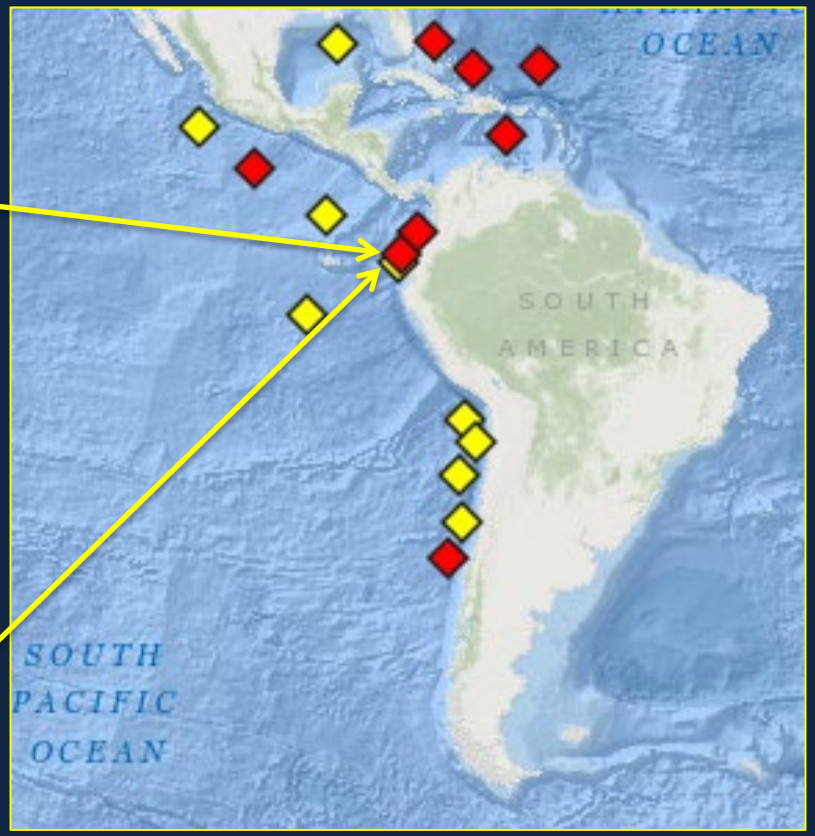
Use of Tsunami DART Buoy Network Data and Historical data

DART 32069



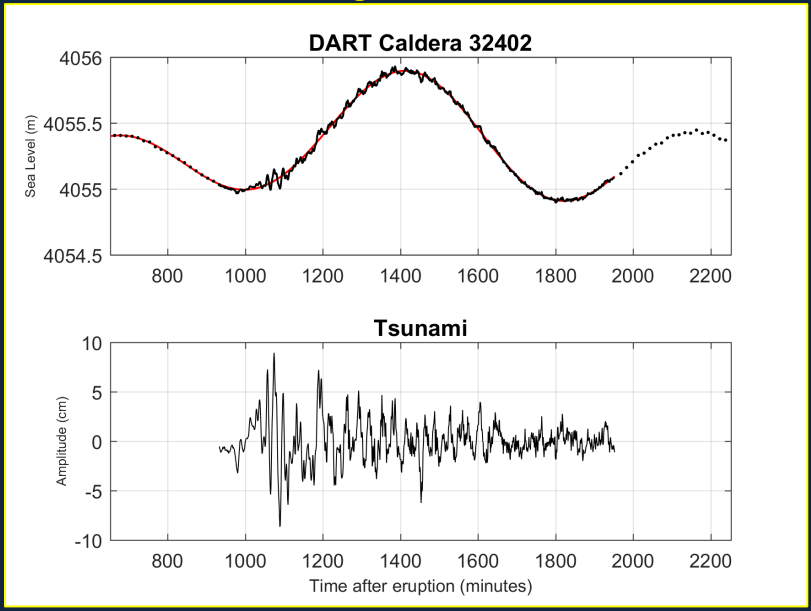
DART 32068



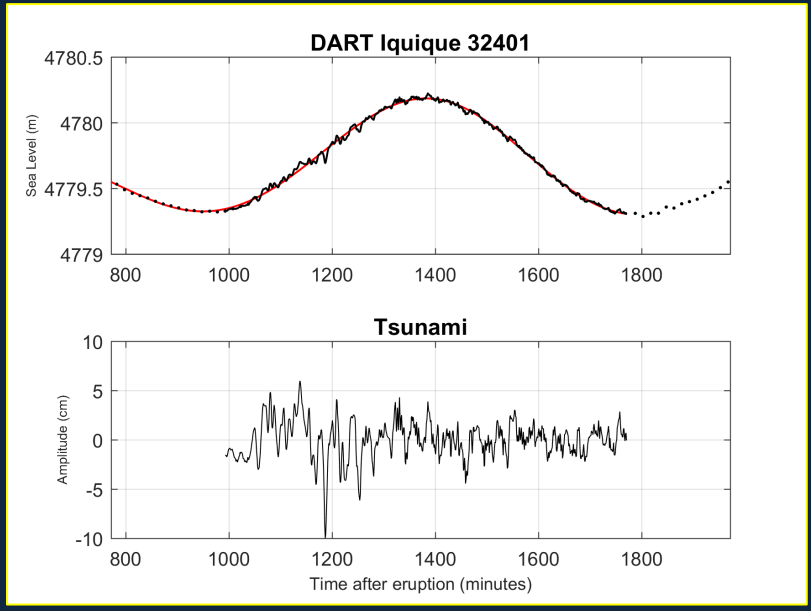


DART Buoy vs Coastal Amplitudes

Tonga event



Historical data 2011

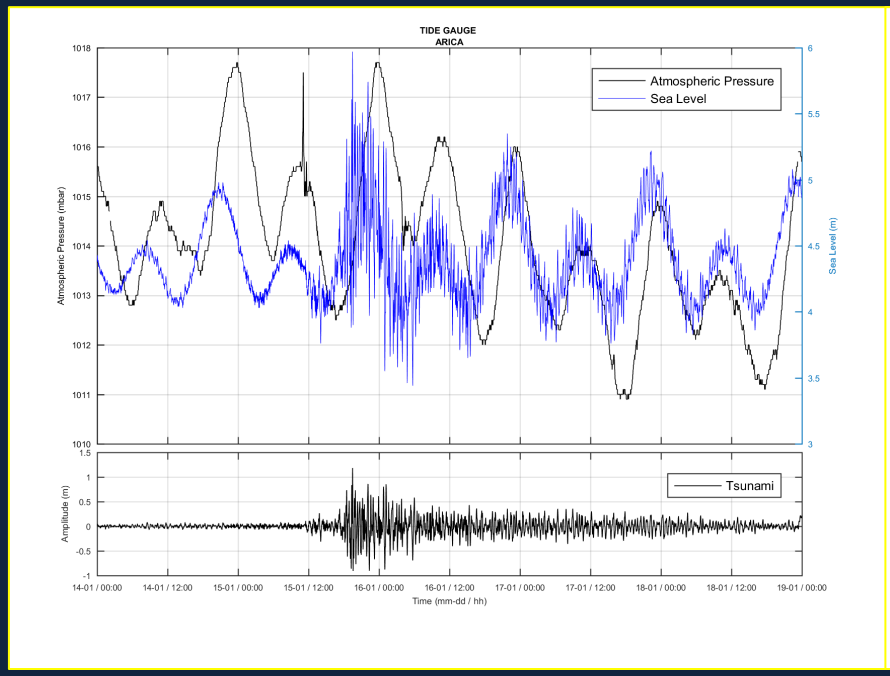


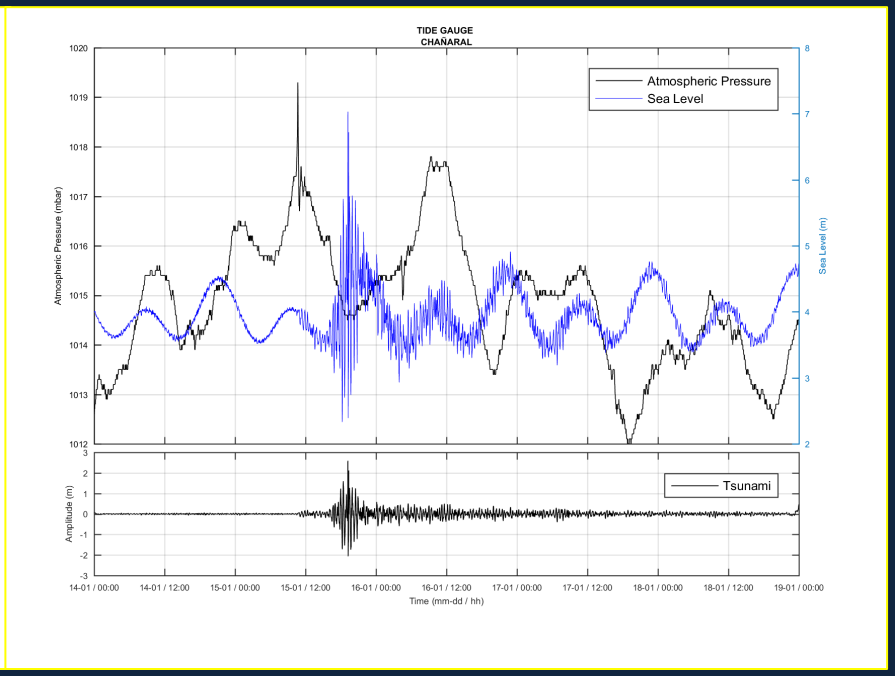
Sea Level Station	Start of Tsunami Recording (UTC)	Max Amplitude (m)	Time Max Amplitude (UTC)
Chañaral	15-01-2022 14:07	1.95	15-01-2022 22:14
Caldera	15-01-2022 13:49	0.90	15-01-2022 23:32

Sea Level Station	Start of Tsunami Recording (UTC)	Max Amplitude (m)	Time Max Amplitude (UTC)
Arica	12-03-2011 03:28	2.2	12-02-2011 08:09
Pisagua	12-03-2011 03:13	0.8	12-02-2011 04:44
Iquique	12-03-2011 03:14	1.0	12-02-2011 07:59




Tonga Eruption 2022, Atmosferic Pressure vs Sea Level





Location	Start of Tsunami Recording (UTC)	Atmospheric Pressure Peak (UTC)
Arica, CL	15-01-2022 15:27	15-01-2022 14:07
Chañaral, CL	15-01-2022 14:03	15-01-2022 13:43




Final Remarks

- Importance to count with fully funcioning DART systems and sharing information from Seal Level Stations with IOC website.
- Usefulness of keeping fully documented records of past Tsunami events, that can be consulted in emergencies where Tsunami Models can not be run based on seismic parameters.
- National Tsunami Focal Points should always be reachable, highlighting the importance of always having their information updated. Email address for NTFO should be generated according to the position and not the name of the person itself.
- Direct telephone communications with PTWC helped to better analyze the tsunami threat.
- Interesting atmospheric pressure recordings with early Tsunami readings, were registered in most of the Sea Level Stations of the SEP-WG.
- Social Media for early Tsunami awareness.




THANK YOU FOR YOUR ATTENTION