



PERUVIAN NAVY
DIRECTORATE OF HYDROGRAPHY AND
NAVIGATION

Russia

National Tsunami Warning Center



PERU

United States

Mexico

Venezuela

Lt. Gerardo MACEDO





GEOGRAPHY



MARITIME, ANDEAN, AMAZONIC, BI-OCEANIC & WITH ANTARCTIC PARTICIPACION





NATIONAL TSUNAMI WARNING SYSTEM



The National Tsunami Warning System integrates the effort of three institutions to issue tsunami warnings on the Peruvian coast.



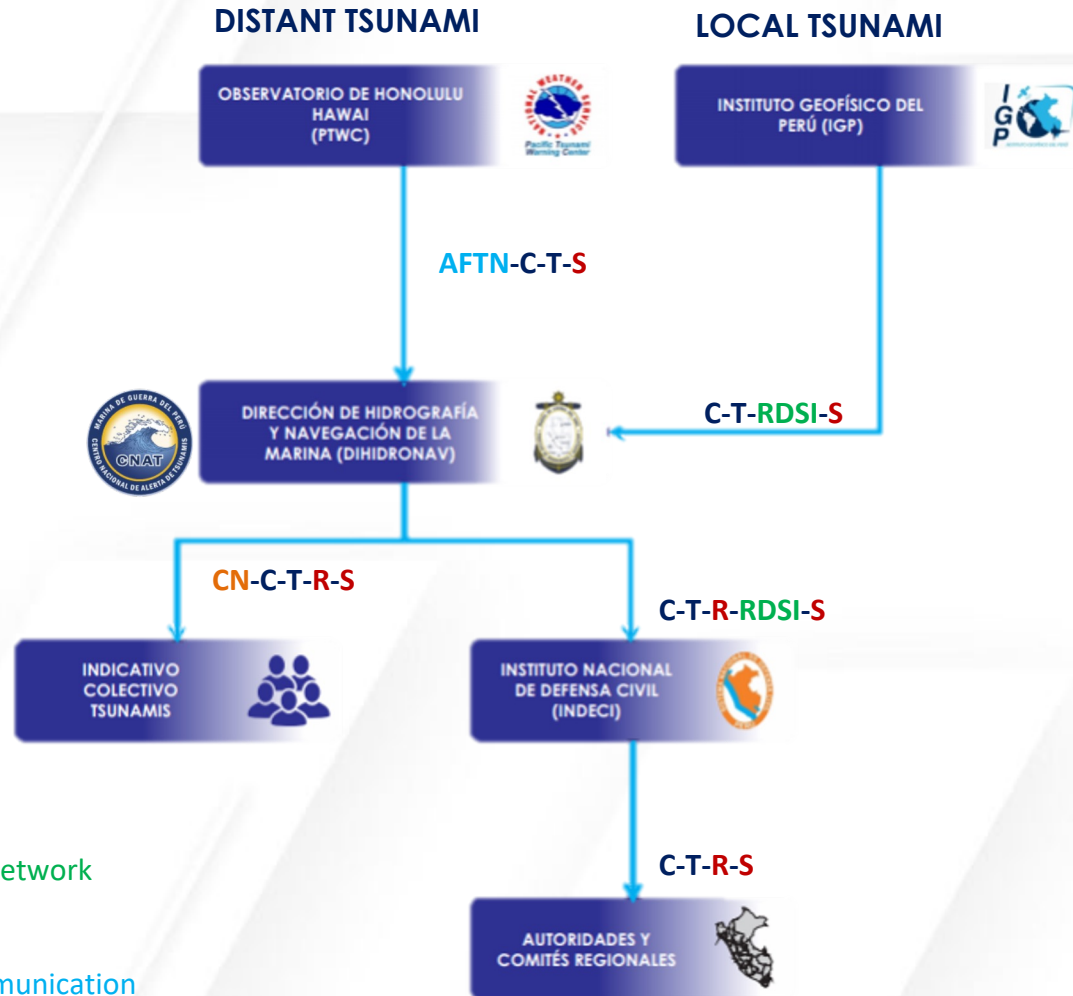


NATIONAL TSUNAMI WARNING CENTER

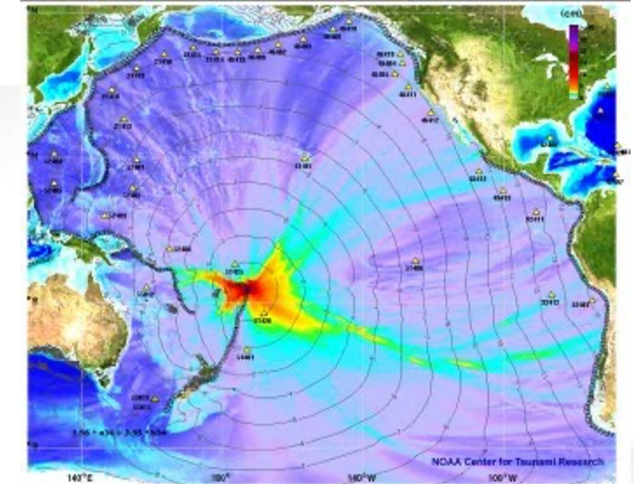




NATIONAL TSUNAMI WARNING CENTER

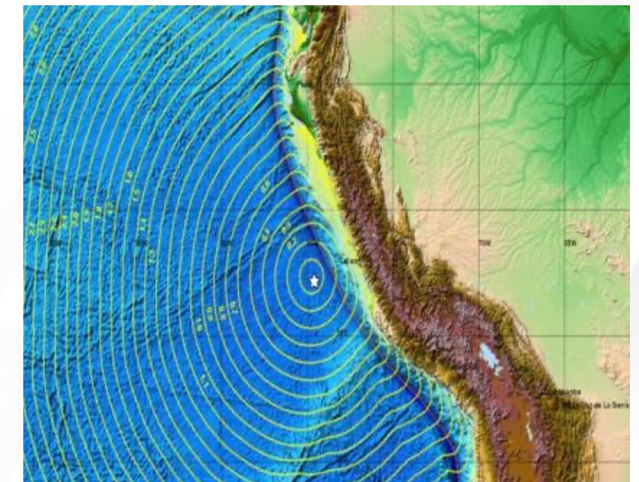


DISTANT TSUNAMI



Tsunami - Samoa

LOCAL TSUNAMI



Tsunami near Callao, Peru

LEGEND

CN: Navy communications

C: E-mal

T: Telephone

RDSI: Integrated Service Digital Network

R: Radio

S: Satelital phone

AFTN: Aeronautical Fixed Telecommunication Network - IN PROCESS TO AHMS



CRITERIA TABLES



LOCAL TSUNAMI

SISMO DE ORIGEN CERCANO			
Ubicación del Epicentro	Magnitud Momento Mw	SISMO CON:	
		Profundidad ≤ 60km	Profundidad > 60km
EN EL MAR O MUY CERCA DE COSTA Distancia epicentral menor a 60 km de la línea de costa, tierra adentro	5.0 - 6.9	(Sismo detectado pero no genera tsunami) SE EMITE BOLETÍN DE INFORMACIÓN	
	7.0 - 7.5	ALERTA Y VIGILANCIA (Posibilidad de generación de tsunami que afecte áreas próximas al epicentro) SE EMITE BOLETÍN DE ALERTA	(Sismo detectado pero no genera tsunami) SE EMITE BOLETÍN DE INFORMACIÓN
	> 7.5	ALARMA DE TSUNAMI (Generación de tsunami) SE EMITE BOLETÍN DE ALARMA	ADVERTENCIA SE EMITE BOLETÍN DE ALERTA (Posibilidad de generación de tsunami)

DISTANT AND REGIONAL TSUNAMI

SISMO DE ORIGEN LEJANO EN EL OCEANO PACIFICO			
Ubicación del Sismo	Magnitud Momento Mw	SISMO CON:	
		Profundidad ≤ 60km	Profundidad > 60km
EN EL MAR O MUY CERCA DE COSTA Distancia mayor a 500 km desde la frontera Norte (Tumbes) o Sur (Tacna) del Perú	7.0 - 7.9	(Sismo detectado pero no genera tsunami) SE EMITE BOLETÍN DE INFORMACIÓN	
	8.0 - 8.5	ALERTA Y VIGILANCIA (Posibilidad de generación de tsunami) SE EMITE BOLETÍN DE ALERTA	(Sismo detectado pero no genera tsunami) SE EMITE BOLETÍN DE INFORMACIÓN
	> 8.5	ALARMA DE TSUNAMI (Alta Probabilidad de generación de tsunami) SE EMITE BOLETÍN DE ALARMA	ADVERTENCIA SE EMITE BOLETÍN DE ALERTA (Baja posibilidad de generación de tsunami)

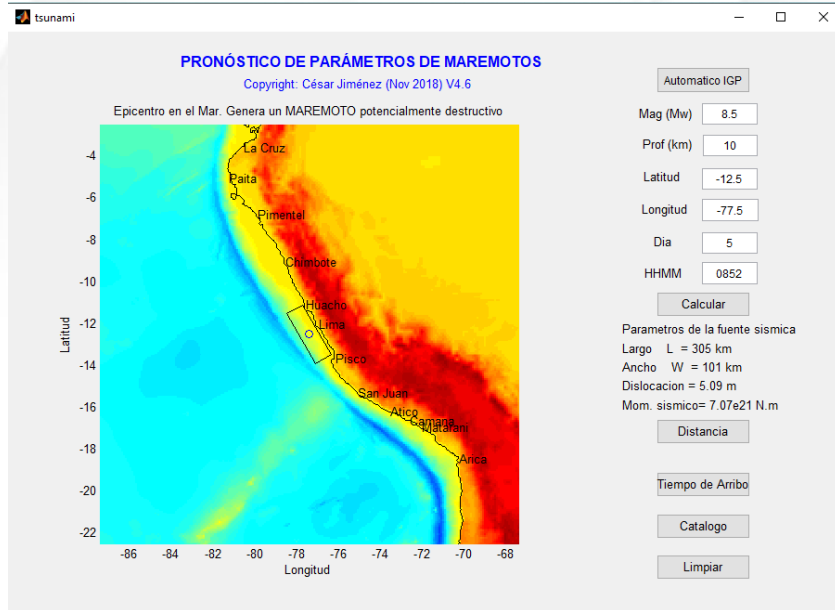


FORECAST MODELS



PRE TSUNAMI

TSUCAT



salida.txt: Bloc de notas

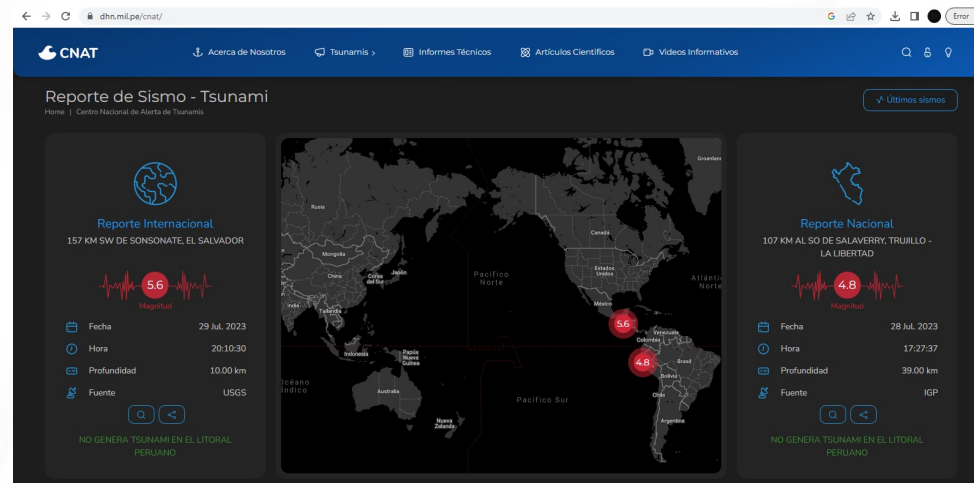
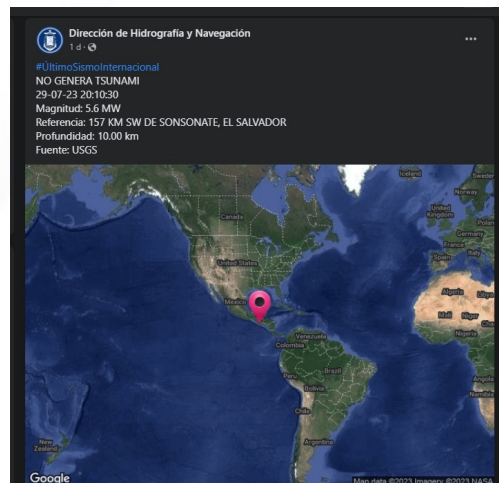
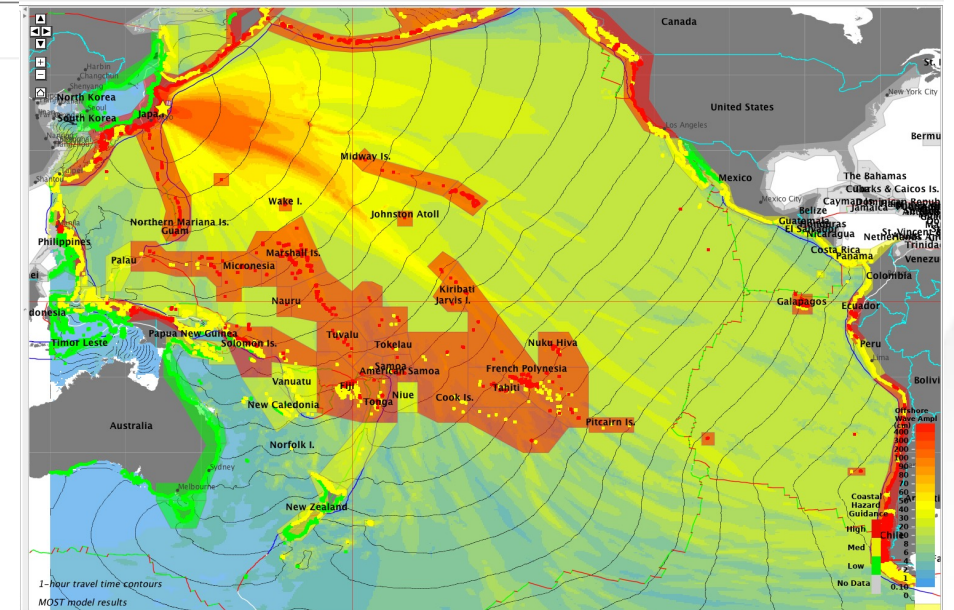
Archivo Edición Formato Ver Ayuda

ESTIMACION DEL TIEMPO DE ARRIBO DE MAREMOTOS

Coordenadas del epicentro:
Fecha = 5 Jan-2021
Hora = 0852
Latitud = -12.50
Longitud = -77.50
Profund = 10 km
Magnitud = 8.5

Tiempo actual: 05-Jan-2021 08:52:17

Puertos	Zona	Hora_llegada	Hmax(m)	T_arribo
La Cruz	N	10:46	0.12	01:55
Talara	N	09:57	0.15	01:05
Paita	N	10:07	0.28	01:15
Pimentel	N	10:34	0.75	01:42
Salaverry	N	10:26	1.92	01:34
Chimbote	C	10:03	1.01	01:11
Huarmey	C	09:15	1.80	00:22
Huacho	C	09:22	2.01	00:30
Callao	C	09:16	4.27	00:24
Cerro Azul	C	09:06	4.22	00:14
Pisco	C	09:27	1.81	00:35
San Juan	C	09:31	0.82	00:39
Atico	S	09:43	0.22	00:51
Camana	S	10:03	0.16	01:11
Matarani	S	09:58	0.15	01:06
Ilo	S	10:10	0.20	01:18
Arica	S	10:27	0.29	01:35





NATIONAL TIDE GAUGE NETWORK



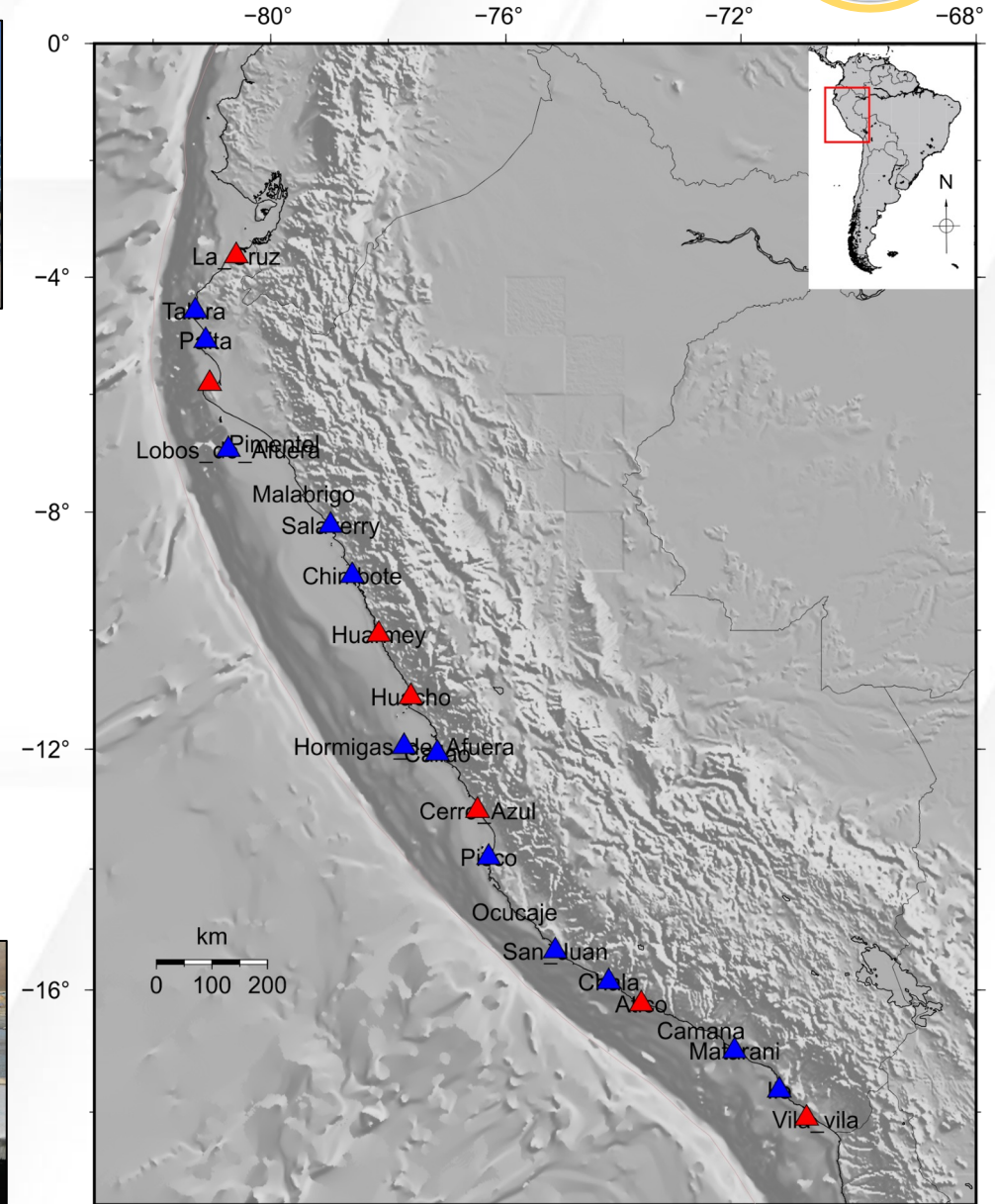
La Cruz



Callao



Cal. Grau



19 Stations integrated to IOC Observation System

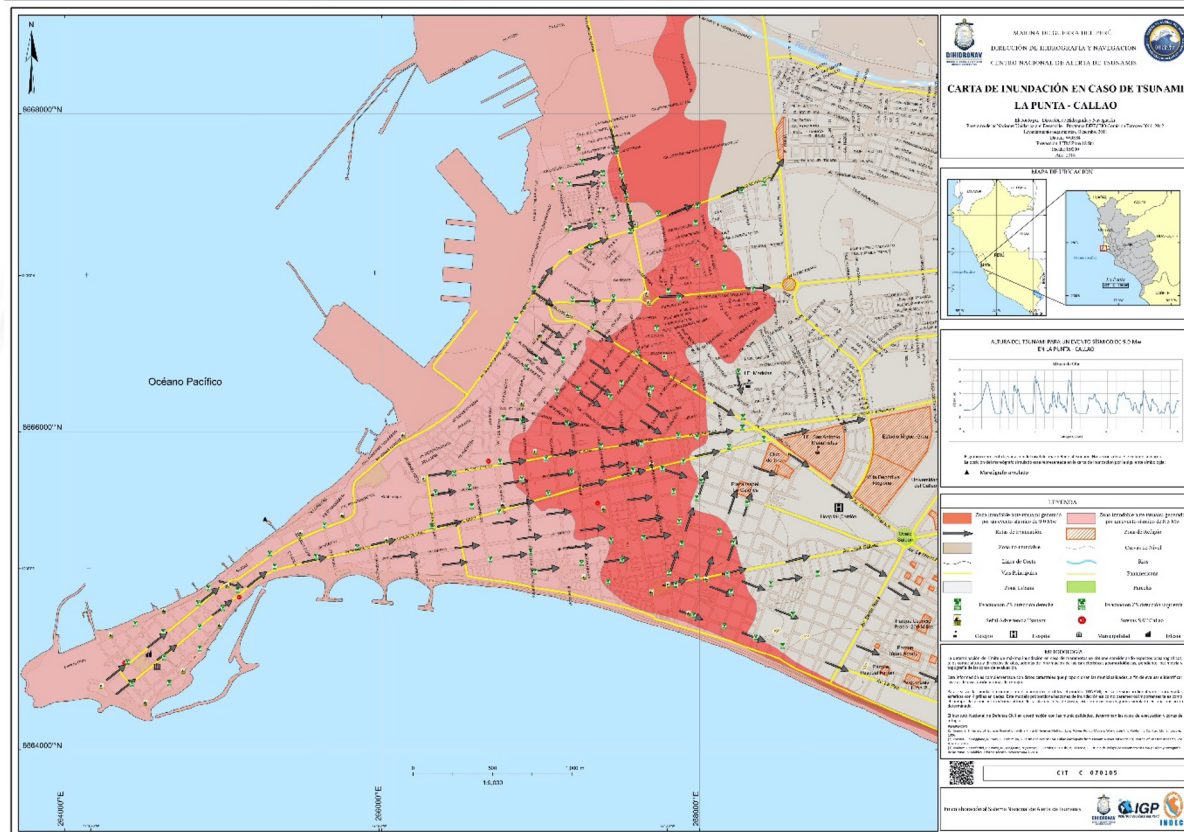
<https://www.ioc-sealevelmonitoring.org/map.php>



TSUNAMI INUNDATION MAPS



Maps showing the maximum flood limit for a tsunami event of seismic origin. They are made on a local scale, due to the need to maintain detail for make evacuation plans.



Flooding area by tsunami generated by a seismic event of 9.0 Mw.



Flooding area by tsunami generated by a seismic event of 8.5 Mw.



Tsunami refuge zones.



Evacuation route

Currently: 130
Project: 95 more



TSUNAMI INUNDATION MAPS



The process for obtaining a Tsunami Inundation Map begins with planning and ends with its publication.



Planning

Prioritization criteria for exposed populations.



Field work

Survey of topography and bathymetry.



Modeling work

Use of numerical models, field information and probable seismic scenario.

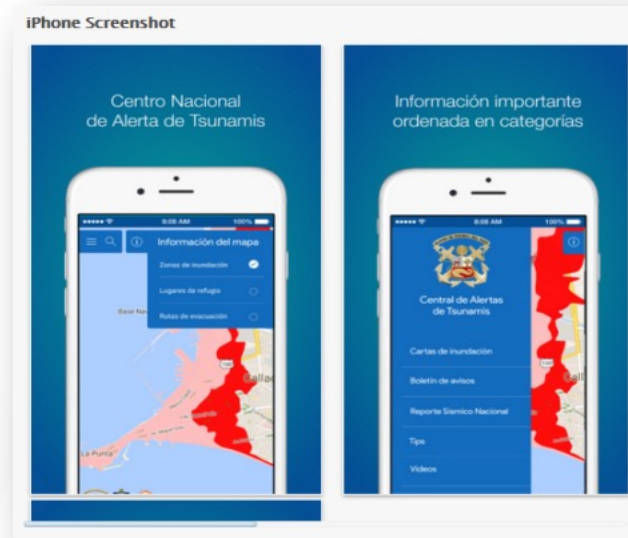


Publication

Website of the National Tsunami Warning Center and MGP Tsunamis app.



MOBILE APP “MGP – TSUNAMIS”



2023-07-29 20:10:30.000
157 KM SW DE SONSONATE, EL SALVADOR
NO GENERA TSUNAMI EN EL LITORAL PERUANO
Internacional MAGNITUD 5.6

2023-07-28 17:27:37.000
107 km al SO de Salaverry, Trujillo - La Libertad
NO GENERA TSUNAMI EN EL LITORAL PERUANO
Nacional MAGNITUD 4.8

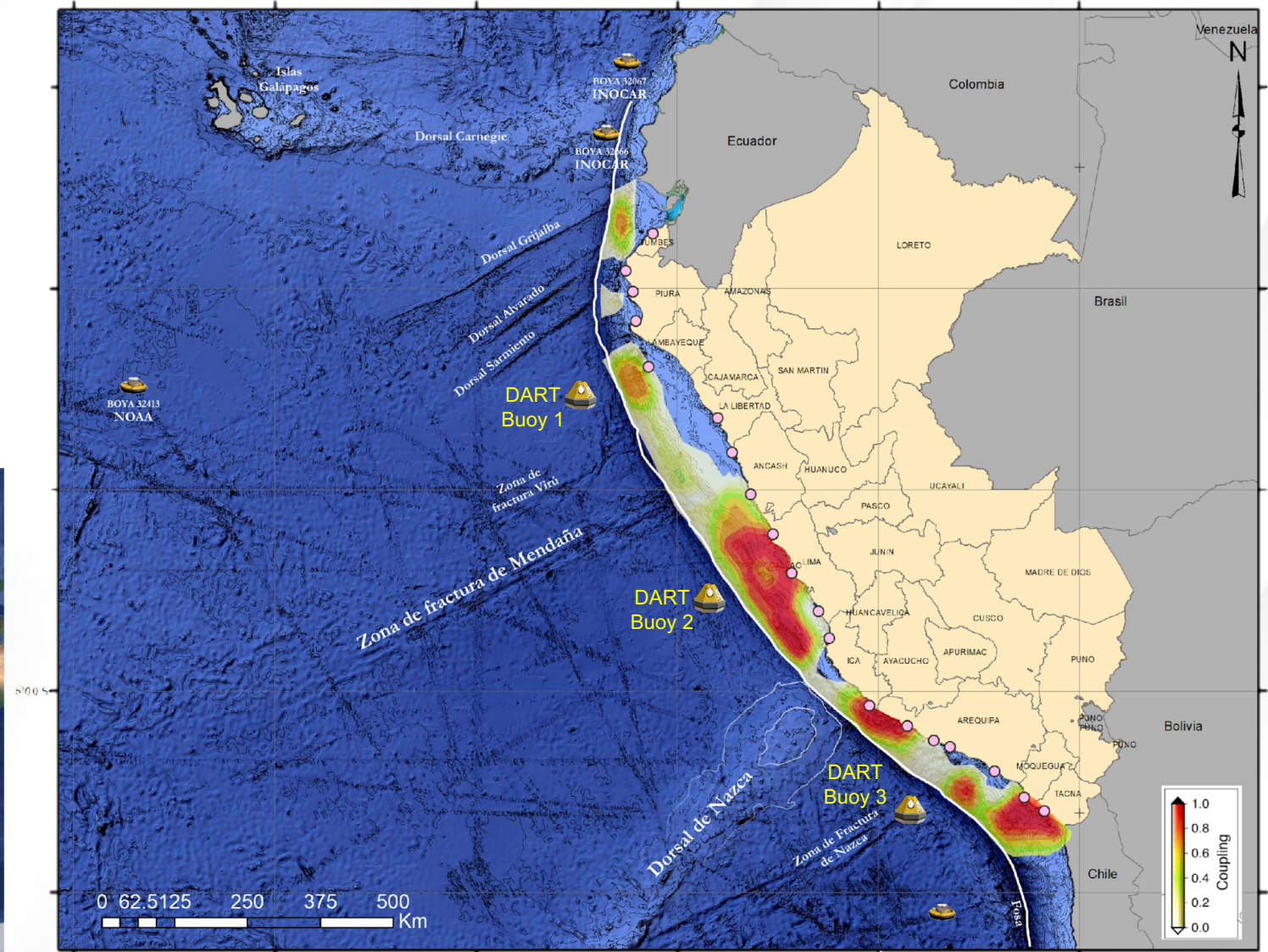
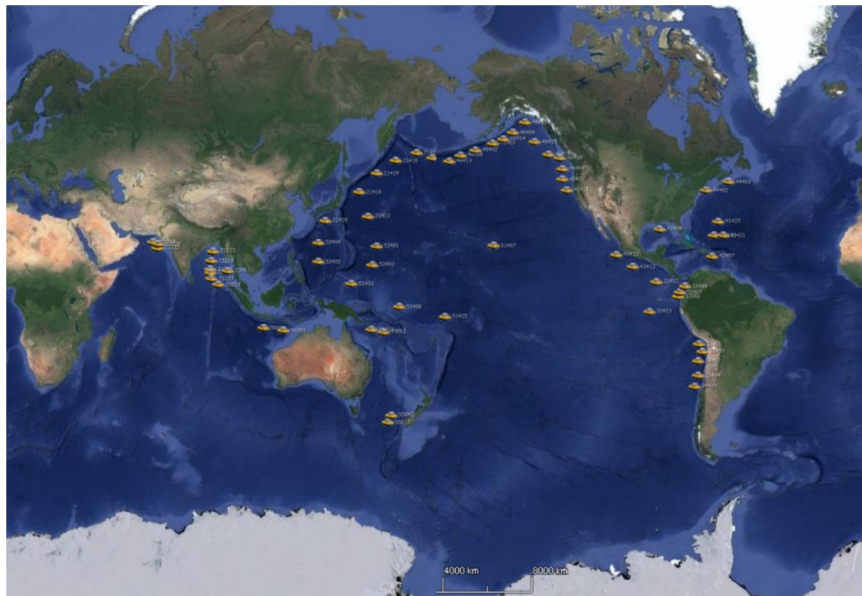
2023-07-27 02:03:07.000
94 km ENE of Port-Olry, Vanuatu
NO GENERA TSUNAMI EN EL LITORAL PERUANO
Internacional MAGNITUD 5.5



EARLY WARNING SYSTEM PROJECT

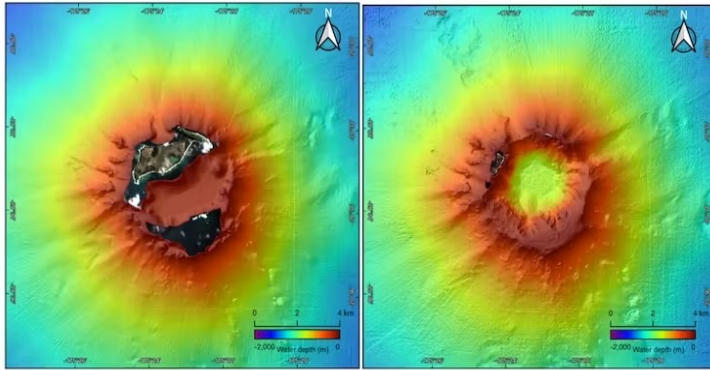
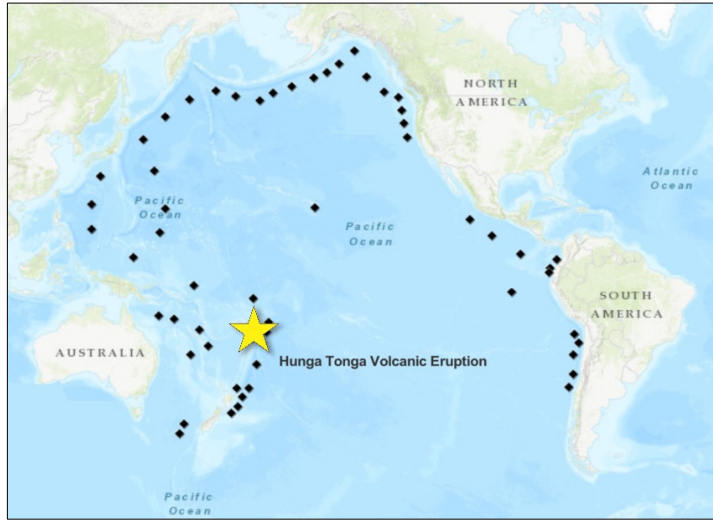


Installation of 3 DART buoys (north, center and south).





STANDARD OPERATING PROCEDURE



Tonga, 2022

INDECI DEFENSA CIVIL, temas de todos

DIHIDRONAV DIRECCIÓN DE HABILITACIÓN Y OPERACIONES MARÍTIMO-AEROMARÍTIMAS

IGP Instituto Geográfico del Perú

PROTOCOLO OPERATIVO DEL SISTEMA NACIONAL DE ALERTA DE TSUNAMI

PO-SNAT

2023

Protocolo Operativo del Sistema Nacional de Alerta de Tsunamis

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We are currently updating the SOP, including procedures for volcanic activity and other concerns.



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Information
Alert
Alarm



OUTREACH AND EDUCATION



THANKS



John DeGado