



Japan International Cooperation Agency (JICA)
Nicaraguan Institute of Territorial Studies (INETER)



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Progress of the Japanese-Nicaraguan Project for the Establishment of the Central American Tsunami Advisory Center (CATAC)

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The central American countries are suffering from tsunamis that occur in the Pacific Ocean and the Caribbean Sea (Fig. 1). Therefore, in order to release reliable and prompt tsunami alarm to this area, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama accepted Nicaragua's proposal to establish the **Central American Tsunami Advisory Center (CATAC)** as a regional tsunami advisory center at INETER in Managua, Nicaragua in 2015. This proposal was also approved by the Intergovernmental Oceanographic Committee (IOC) of UNESCO and the Intergovernmental Coordination Groups (ICG) of the Pacific Ocean Tsunami Warning Systems (PTWS) and the Caribbean Sea (CARIBEWS) (Fig. 2).

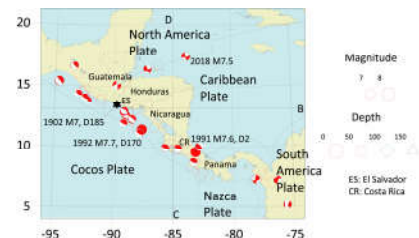


Fig. 1 Distribution of M ≥ 7.0 earthquakes in central America (ISC-GEM, 1900-2009). Global CMT solutions are also shown (1976-2018/4, Mw ≥ 7.0). D indicates deaths by tsunami (NOAA).

Organizations of a Pacific Ocean Tsunami Warning System

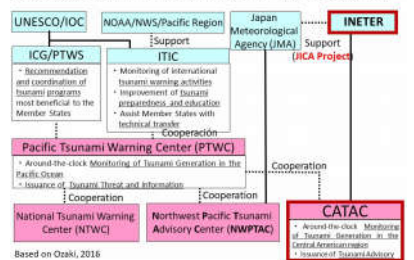


Fig. 2 Organizations of a Pacific Ocean Tsunami Warning Center (Modified from Ozaki, 2016).

The CATAC will provide scientific real-time technical tsunami services related to the Pacific Ocean and the Caribbean Sea to the Scientific Institutions (Table 1) and Civil Protection Agencies of the central American countries. The issuance of tsunami advice to the population remains the responsibility of national governments.

| Country | Institution |
|-------------|--|
| Guatemala | INSIVUMEH Instituto Nacional de Sismología, Vulcanología, Meteorológica e Hidrología |
| El Salvador | MARN/DIGDA Dirección General del Observatorio Ambiental, Ministerio de Medio Ambiente y Recursos Naturales |
| Honduras | COPECO Comisión Permanente de Contingencias |
| Nicaragua | INETER Instituto Nicaragüense de Estudios Territoriales |
| Costa Rica | OVISCOH (UNA) Observatorio Oceanográfico y Sismológico de Costa Rica (Universidad Nacional de Costa Rica) RSN-UCR Red Sismológica Nacional - Universidad de Costa Rica SPASMOCT (UNA) Sala de Monitoreo de Tsunami |
| Panamá | IGC-UPA Universidad de Panamá, Instituto de Geociencias |

Table 1. Project relevant organizations in Central America.

JICA Project – C A T A C -

The Nicaraguan government asked Japan for technical assistance for supporting the CATAC. Then, the Japan International Cooperation Agency (JICA) began a technical assistance project to strengthen the CATAC in October 2016.

Name: Project for the Strengthening of Capacities of CATAC
Executing institution: Nicaraguan Institute of Territorial Studies (INETER)
Period: October 6, 2016 to October 5, 2019. 3 years

Strengthening and Improvement

1. Analysis of earthquakes
2. Quantitative Tsunami Forecast
3. SOPs and Protocol
4. HR training system.



SeisComPRO was also donated in the project. It's modules MT and TOAST will be used for tsunami warning.

Training in Nicaragua

- "Calculation of Hypocenter"
- "Analysis of Seismic Parameters"
- "Standard Operating Procedures (SOP)"
- "Tsunami Simulation and Tsunami Database"

Training in Japan

- "Seismology, Earthquake Engineering and Tsunami Disaster Mitigation" in the International Institute of Seismology and Earthquake Engineering (IISEE)



- "Tsunami Simulation, Tsunami database, Centroid Moment Tensor (CMT)" at Hokkaido University
- "Standard Operating Procedures (SOP)" at Japan Meteorological Agency (JMA)

Donated equipment - Seismic and tide gauge networks

1. Eight Broadband Seismometers
- Trillium compact (120 s – 160 Hz)

- ★ Existing Stations
- ★ Proposed Stations

(These will be installed this summer!)

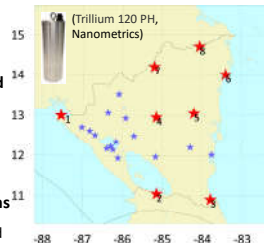


Fig. 3 Distribution of Broad Band Seismic Stations in Nicaragua.

2. Eight Tide-Gauge Stations (These will be installed by this summer!)

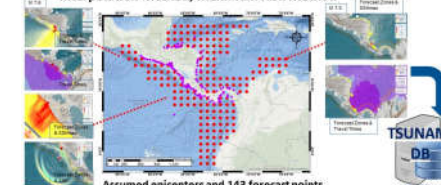


Fig. 4 Distribution of planned tide-gauge stations in Nicaragua.

Construction of Tsunami Database

- 11,655 cases (Pacific Ocean and Caribbean Sea)

- 185 location (1.0 degree interval)
- 21 cases of magnitude (M6.5 - M8.5 with 0.1 interval)
- 3 cases of depth (10km, 30km, 60km)
- Interpolation Method, Maximum Risk Method



CATAC intends to start preliminary tsunami services in January 2019.