"Sustainable Weather, Climate, Oceans and Water Services for a Resilient Pacific"

Fourth Meeting of the Pacific Meteorological Council (PMC-4) Working Papers

14-18 August 2017
Honiara
Solomon Islands

Agenda Item 14.2: Seismic data sharing through the establishment of the Oceania Regional Seismic Network (ORSNET) for Tsunami Early warning

Purpose:
The Oceania Regional Seismic Network is established to support Seismic observatories in the South West Pacific to improve their national capabilities through regional arrangement of sharing of seismic data, resources and technical expertise for tsunami early warning

Background:
30% of global seismicity is observed in the South West Pacific Region (Lebellegard et al., 2007) when less than 3% of seismic stations are available for real time monitoring within this area (repartition based on GSN network). Pacific island countries were depending on global seismic networks as the Global Seismograph Network of IRIS supported by the USGS to confirm parameters of earthquakes occurring in their vicinity. The information required was made available 10 to 15 minutes after the earthquakes - by that time for some countries, tsunami would have already reached the shore. National seismic observatories in most Pacific Island countries have less than 5 staffs to manage earthquake and tsunami mitigation, and as a result, they were dependent to external counterparts from international seismic networks in technology, engineering and scientific matters.

Scientists agreed since 2003 that the only way to better cover the wide Pacific Ocean in earthquake detection for Tsunami Early warning is through sharing of seismic data. Starting in 2011, Vanuatu and New Caledonia trialed this and proved it to be technically feasible for all country that would agree to share their Seismic data. The network has started to expand to other Pacific nations since 2013, with simple Letters of Agreement from countries who showed their interest to join the network to contribute to and benefit from the development of the network.

The main motivation of establishing this Oceania Regional Seismic Network (ORSNET) is to better manage Tsunami Alerts in national tsunami warning centers (more stations mean better/faster/more accurate earthquake detection and source characterization). This is also supports the National TWS with a Regional Alert System and allows sharing of resources (financial, technical and human) for mutual support. This has been the only and best way to ensure that ORSNET member states can obtain continuous training and

mutual support to become self-reliant to cope with earthquake hazards and tsunami early warning.

Update:
The ORSNET member states are Papua New Guinea, Solomon Islands, New Caledonia, Vanuatu, Fiji, Tonga and Samoa. All ORSNET data are shared with PTWC since the end of 2016.

Other countries later joined the network through a letter of agreement. The connection of the Solomon Islands seismic observatory was trialed in 2013. The Samoan seismic network was connected to the ORSNET server in New Caledonia in 2014, Fiji and Tonga in 2015, and Papua New Guinea in June 2017.

Vanuatu has been coordinating the ORSNET project since 2013. New Caledonia is hosting and maintaining the network server, as well as providing network services to countries when needed. The project was established with the support of the Pacific Fund to establish the full network server infrastructure in New Caledonia and the connection to the countries.

The initial proposal of the seismic data sharing needs was submitted to the then SOPAC Governing council in 2010 for the council's consideration. Since the successful data sharing trial between Vanuatu and New Caledonia, Vanuatu has continued to advocate for ORSNET in various audiences for endorsement.

The first audience was the UNESCO IOC PTWS Working Group of Tsunami detection and warning dissemination meeting in Wellington in 2011, and in Samoa in July 2012 when the IOC/ICG/PTWS endorsed the sharing of seismic data between Vanuatu and New Caledonia as the appropriate pattern for other countries to follow. The first ever ORSNET executive committee was held in Vanuatu in 2013 after the CTBTO national data centre training where the countries elected Vanuatu as the chair and Samoa as Vice chair. Since 2013, ORSNET executive committee meetings are held annually back to back with other meetings due to funding constraint to update on the progress of each country and to discuss needs.

Through the Intergovernmental Coordination Group (ICG) for Pacific Tsunami Warning and Mitigation System (ICG/PTWS), it was recognised that ORSNET serves as the only vehicle for seismic data sharing in the region, and as such, it strongly requested for ORSNET member Countries to use bilateral or multilateral funding mechanisms to ensure that ORSNET is sustainable. Currently, there is no funding mechanism in place to ensure the sustainability of the network.

The ORSNET member countries will need continuous support in terms of capacity building to ensure the maintenance of the networks, and to ensure the quality of the data and continuous running of the network.

The ORSNET server host is providing the service to member countries particularly by undertaking the system back up and the data archive for national seismic Observatories, issuing the daily network status and the earthquake detection notification to members who would like to receive this service. Moreover mutual technical support remotely or on site is up to date to ensure continuous data streaming. As the network gets mature, more technical areas of need are continuously required which will need limited funding support. Together as a region and as a regional network, ORSNET countries are helping each other to develop to the standard required by the Federation of Digital Seismograph Networks.

Various ORSNET products were developed in 2017 and have been made available to all ORSNET countries and tsunami focal points in the region through a web service that is accessed at www.ORSNET.org

Recommendations:

1.   The Meeting is invited to:

   ➢ **Note**
      .1.   The progress of ORSNET
      .2.   The commitment and contribution of all ORSNET countries in the development and running of this regional network
      .3.   The Commitment of Vanuatu in coordinating and leading the project
      .4.   The technical expertise and commitment of New Caledonia in managing and maintaining the ORSNET server and providing assistance to ORSNET countries
      .5.   That ORSNET member countries are the owners of the network
      .6.   The concern on the medium to long term sustainability of ORSNET
      .7.   The high cost of communications including internet bandwidth for seismic data transmission

   ➢ **Request.**
      .1.   ORSNET to be aligned to PMC, with the formation of a PI Panel on ORSNET, working closely with the PICI and PIMOS panels
      .2.   Support for ORSNET to be sustainable in the long term

   ➢ **Endorse**
      .1.   ORSNET as the approved vehicle for sharing seismic data in the region for tsunami early warning only
      .2.   The draft ORSNET TOR

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Attachments

- Annex 1   The ORSNET general concept
- Annex 2   The ORSNET technical aspect]
- Annex 3   Proposal to SOPAC governing council- 2010
- Annex 4   Minute of ORSNET meeting
- Annex 5   Draft MOU
- Annex 6   Draft TOR

[08.08.2017]