

Third Meeting of the Pacific Meteorological Council (PMC-3)

20-23 July 2015
Nuku'alofa
The Kingdom of Tonga

Agenda Item 8.3: Coastal Inundation and Hazards

Purpose

1. The purpose of this paper is to inform the Council about:
 - (i) The risk posed by coastal inundation from extreme ocean surface waves to the sustainable development and management of our coastal areas in the absence of effective early warning systems (EWS).
 - (ii) The opportunities to significantly increase the capacity of national meteorological and hydrological services (NMHSs) to generate and communicate impact-based early warning and risk information for extreme wave events to protect lives, livelihoods and property in the Pacific region

Background

1. Many of our large ocean island states are inherently coastal entities with limited accommodation space and stressed ecosystems. Development of the coastal zone usually takes place in the absence of evidence-based disaster and climate resilient planning. Communities, businesses and public assets therefore find themselves increasingly at risk from coastal hazards impacts such as inundation due to extreme wave events.
2. Significant progress has been made in improving our understanding of the physical processes that cause inundation in our mid-ocean small islands. Progress has been particularly evident in the development of computer models that are able to forecast inundation at reef-fringed coastlines. Moreover, the advances in, for example, geographic information systems (GIS) are making impact-forecasting more accessible and meaningful.
3. The Pacific island countries and territories (PICTS) have not benefited as much as they could have from this progress in EWS and associated impact tools, and significant gaps remain. Key challenges are (i) access to wave observations; and (ii) to build and maintain the capacity of NMHSs to operate and utilise EWS. This gap will be bridged by building a consortium of partners around Pacific regional organisations, effectively improving access to wave data and introducing the appropriate tools with the benefit of technical backstopping services by the Secretariat of the Pacific Community (SPC) and Secretariat of the Regional Environment Programme (SPREP).

4. We propose to first develop an open-source coastal inundation end-to-end operational forecasting and warning system in Fiji, embedded in the national disaster management system. This will be an implementation of the World Meteorological Organisation (WMO) initiative of the Coastal Inundation Forecasting Demonstration Project (CIFDP) framework. Lessons learnt from this will then be incorporated into an operational prediction tool that will be able to calculate the direct and indirect hydrodynamic (water level, currents, wave heights) and morphodynamic (bottom changes) impacts of tropical and extra-tropical storms at other locations in the Pacific. International and regional collaboration is critical, as is the support of development partners, in order to leverage the success of the multitude of efforts and tools in this area of research, also keeping in mind the borderless nature of ocean surface waves.

5. This initiative will directly contribute to:

- (i) Target 7¹ of the Sendai Framework for Disaster Risk Reduction (2015-2030)
- (ii) The Disaster Risk Reduction objective of the Global Framework for Climate Services (GFCS-WMO)
- (iii) Pacific Key Outcomes 2², 4³, and 7⁴ of the Pacific Islands Meteorological Strategy
- (iv) Goal 1⁵ of the draft Strategy for Climate and Disaster Resilient Development in the Pacific

Recommendations

4. The Meeting is invited to:

- **Note** the priority placed on coastal hazards in the region and the technical support that is required to build resilience against marine inundation;
- **Recognise** the significant contribution that SPC and a consortium of partners have made to develop tools that can support National Meteorological Services in coastal inundation early warning systems;
- **Support** an experts working group on coastal inundation and impact forecasting under the patronage of PMC/WMO, in collaboration with SPC and SPREP; and
- **Endorse** the collaborative approach by SPC to seek the support of development partners for the implementation of real-time forecasting systems of coastal storm impacts in the Pacific, whereby the support will need to consist of funding as well as tools, technical assistance, and access to data.

09 July 2015

¹SFDRR- target 7: “substantially increase the availability and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030”

²PIMS-PKO 2: “Marine weather services in the PICTs’ region are improved”.

³ PIMS-PKO 4: “Multi-Hazard Early Warning Systems (MHEWS) for tropical cyclones, storm surges, waves and tsunami in the PICTs’ region are implemented and improved.”

⁴PIMS-PKO 7: “Improved quality of observations and coverage of networks in the Pacific Islands region”.

⁵Draft SRDP Goal 1 (h): “Strengthen the capacity of institutions, such as national meteorological, hydrological and seismological services, to develop and provide access to hazard and risk information and to monitor and provide timely and effective warning services to the public.”