PACIFIC ISLANDS OCEAN OBSERVING SYSTEM

Success Story

Forecasting Potential Wave Inundation to Save Lives and Property in the Marshall Islands

Low-lying Atolls Are Vulnerable to Flooding

Pacific Islanders are reporting that extreme weather and climate events have become more frequent over the past years. As a result, coastal communities, homes, businesses, and general infrastructure are increasingly impacted by wave activity. The Marshall Islands are comprised of low-lying atolls and therefore highly vulnerable to potential flooding. Majuro, the most populated atoll is particularly vulnerable.

At the beginning of 2012, PacIOOS developed a forecast for Majuro (and other selected places in the Pacific) to predict higher than normal sea levels that could result in potential coastal flooding. The **Six-Day High Sea Level Forecast** provides a more accurate analysis of tides and also takes several other kinds of non-tidal sea level variability into consideration, such as eddies and currents.

Severe Damage in 2014

In March 2014, Majuro and other atolls of the Marshall Islands declared a state of emergency due to a severe flooding event, causing the evacuation of almost 1,000 members of the community.

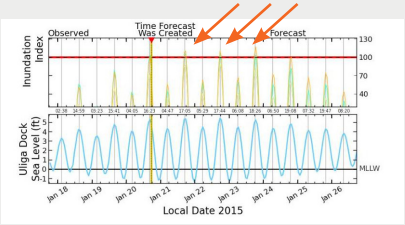
Shifting Priorities to Serve Community Needs

PacIOOS made it a priority to bring the Six-Day High Sea Level Forecast to the next level for the Marshall Islands through an enhanced flooding forecast. Wind-generated waves are a major contributor to the flooding of shorelines and a combination of storm events, high waves and extreme tides can easily threaten public safety and health. To complement the existing forecast with wave data, the PacIOOS wave buoy located off Majuro and regional wave models serve as crucial pieces to provide real-time and forecast data of wave conditions.

The first **Wave Run-up Forecast** was launched in October 2014. It updates hourly and provides a forecast of high sea level and potential wave run-up for ocean facing shorelines for the upcoming six days.

> *The PacIOOS wave run-up tool has aided in providing early warning for decision makers to take necessary measures to alleviate impact of sea surges. The information can help us prepare for impacts, and take necessary measures to protect lives and properties. I make it a common practice to utilize this tool.*
>
> *Jennifer Debrum, National Disaster Management Office, RMI Office of the Chief Secretary*

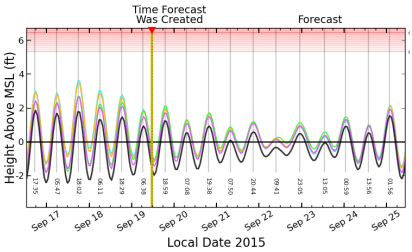
Wave Run-up Forecast in Action



In January 2015, the Majuro wave run-up forecast suggested a series of potential flooding events for the upcoming days (see orange arrows). Indeed, ocean-facing shorelines experienced wave inundation and houses got flooded, clearly emphasizing the urgent need for the wave run-up forecast.

Enhanced Usability & Readability

PacIOOS continues to refine the model output and works closely with local partners to ground truth the data. Based on stakeholder feedback, usability and readability were improved to better serve community needs. In June 2015, PacIOOS expanded its reach and launched a second wave run-up forecast for the Marshall Islands, at Kwajalein Atoll.



The forecasts do not include predictions of tsunamis or storm surge flooding. Please seek advice from the National Weather Service in those cases and follow their advisories and warnings.

Majuro Wave Run-up Forecast
www.pacioos.org/data_product/SLpred/Maj_Exc.php

Kwajalein Wave Run-up Forecast
www.pacioos.org/data_product/SLpred/Kwa_Exc.php

Contact us for questions and feedback at info@pacioos.org, or visit us at www.pacioos.org.

The Pacific Islands Ocean Observing System (PacIOOS) provides easily accessible and reliable ocean observation and forecasting data to keep Pacific Island communities safe, support livelihoods and lifestyles, and sustain ocean resources. PacIOOS is based within the School of Ocean and Earth Science and Technology at the University of Hawai'i at Mānoa. It is one of 11 regional associations of the U.S. Integrated Ocean Observing System (IOOS®).

IOOS Integrated Ocean Observing System

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