

Pacific Islands Climate Change Cooperative



New Pacific datasets pivotal to understanding and management of coral reefs

Time series data crucial to the understanding of climate change and its environmental impacts in the islands of the North Pacific have been developed at the behest of the [Pacific Islands Climate Change Cooperative](#) (PICCC). The datasets are compilations of key ocean features at a much finer scale than was previously available, which is essential because Pacific islands are relatively small in size.

Time series data are those captured in a consistent way at regular intervals, and they are important in both ecology and economics for analysis of trends and forecasting of future change. They are valuable in understanding ecosystem variability and processes, such as reproduction and survival, that determine the health of wildlife populations. The datasets created for the PICCC make use of satellite observations to create time series for particular islands, but also maps of conditions and changes in the ocean over several decades.

Application of time series data to the understanding of coral reefs

Coral reefs are among the most diverse and productive marine ecosystems on earth and provide economic benefits to millions of people as sources of food, employment, natural products, coastal protection and recreation. Despite this, the interplay between coral reef ecosystems and their surrounding environmental conditions is not fully understood.

Through time, coral reef ecosystems have adapted to local conditions, governed by a reef's geographic location. When conditions exceed the range to which coral are adapted, ecological consequences such as bleaching, coral disease, and reef decline can result.

In recent decades it has become abundantly clear that coral reef communities are suffering from the impacts of human activities, including land clearing, improper waste water treatment, and coastal urbanization -- all of which affect habitat and water quality. In addition, climate change is driving ocean warming, ocean acidification, sea-level rise, and increased storminess around the globe. Now, more than any other time in history, effective ecosystem-based management and successful strategies to reduce human-caused impacts to coral reefs require a better understanding of the factors that determine coral reef function and health.



Island- and basin-specific datasets now available

A team of researchers from the Joint Institute for Marine and Atmospheric Research, University of Hawai'i at Mānoa, and the Coral Reef Ecosystems Division of the NOAA Pacific Island Fisheries Science Center has provided climatological and time series information for the following factors important to coral reef ecosystems across the Pacific:

Island-specific data

- wave height, period, direction, and energy
- sea-surface temperature
- chlorophyll-a, a measure of productivity
- solar radiation available for photosynthesis

Island and basin scale data

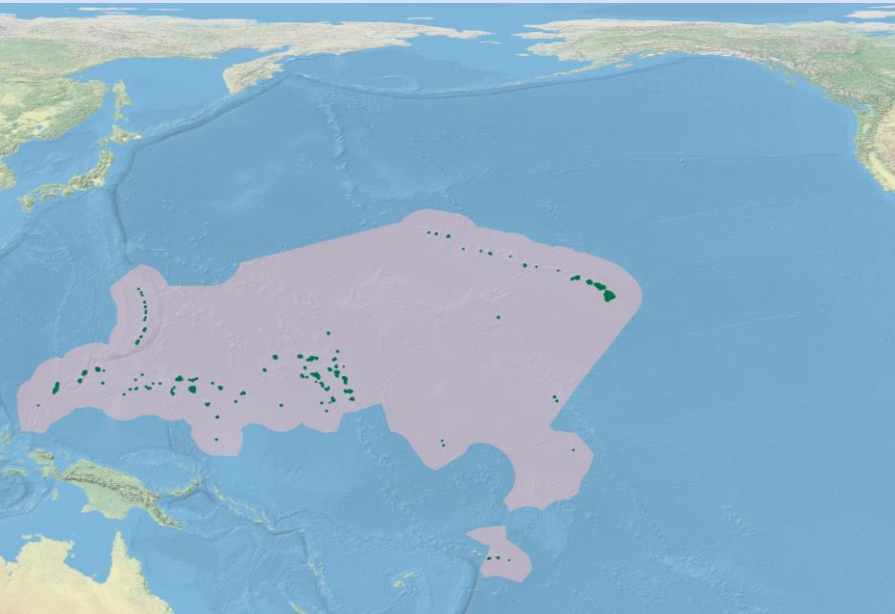
- wind speed and direction
- ocean current magnitude and direction

Basin scale data

- sea-surface height
- dissolved inorganic carbon (a measure of ocean acidification)
- precipitation

These data will be made available on the PICCC website's Conservation Planning Atlas. For more information, contact the PICCC Data/GIS manager, Patrick Grady, at patrick.grady@piccc.net or visit the PICCC projects page: piccc.net/our-projects.

The map below depicts the PICCC geography, which includes Hawai'i, American Sāmoa, Guam, the Northern Mariana Islands, the Marshall Islands, the Federated States of Micronesia, Palau and 4 Marine National Monuments.



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The Pacific Islands Climate

Change Cooperative (PICCC) was established in 2009 to assist those who manage native species, island ecosystems, and key cultural resources in adapting their management to climate change for the continuing benefit of the people of the Pacific Islands. The PICCC provides a range of services and tools to help managers in Hawai'i, the Mariana Islands, American Sāmoa, and other Pacific Island groups make informed decisions for conservation of natural and cultural resources including climate models at the scale of islands and archipelagos, ecological response models, and implementation and monitoring strategies for island species, resources, and communities. Our goal is to help managers reach explicit biological and cultural conservation objectives in the face of climate change and ongoing threats such as fire, land conversion, and invasive species.

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Banner photo by Matthew Wingate, and tang amongst finger coral in Hawai'i, both from NOAA Photo Library on Flickr