

CGD Seminar Series

New insights into the spatiotemporal connectivity of marine heatwaves globally

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Time: 11am – 12pm

For Zoom information, please contact Tracy Baker tbaker@ucar.edu

For live stream information, visit the [CGD Seminar Webpage](#)

ABSTRACT

Dangerous hot-water events, called marine heatwaves, cause prolonged periods of thermal stress in the marine environment that can lead to widespread coral bleaching, harmful algal blooms, unproductive fisheries, and even economic loss. Anticipating the evolution of marine heatwaves remains a challenge owing to the complex spatiotemporal evolution of these events and the lack of tools available to identify and track marine heatwaves as they move throughout the ocean. This problem is not only limited to temperature extremes, but it is also applicable to a broad range of environmental properties including ocean hypoxia and increased acidity. To overcome these challenges, we have developed a new open-source python package called Ocetrac to label and track unique geospatial anomalies. In this presentation, I will show how Ocetrac leverages morphological image processing and multiple object tracking to characterize the spatiotemporal evolution of marine heatwaves using global satellite sea surface temperature data from 1981 through 2020. Two distinct marine heatwave patterns emerge: localized events that grow in place and globally connected events that are linked through the tropics. Marine heatwaves with global connectivity tend to be longer lasting and more intense compared to localized events. This talk will focus on the role of the tropics as a conduit for large-scale and persistent marine heatwaves in the Pacific and Indian Oceans. Understanding the spatiotemporal evolution of marine heatwaves and their tropical connection will ultimately guide the future development of forecasts to anticipate marine heatwave risk, as well as improve preparedness in ecosystem management. A brief discussion of machine learning applications will be provided in context of marine heatwave prediction.

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