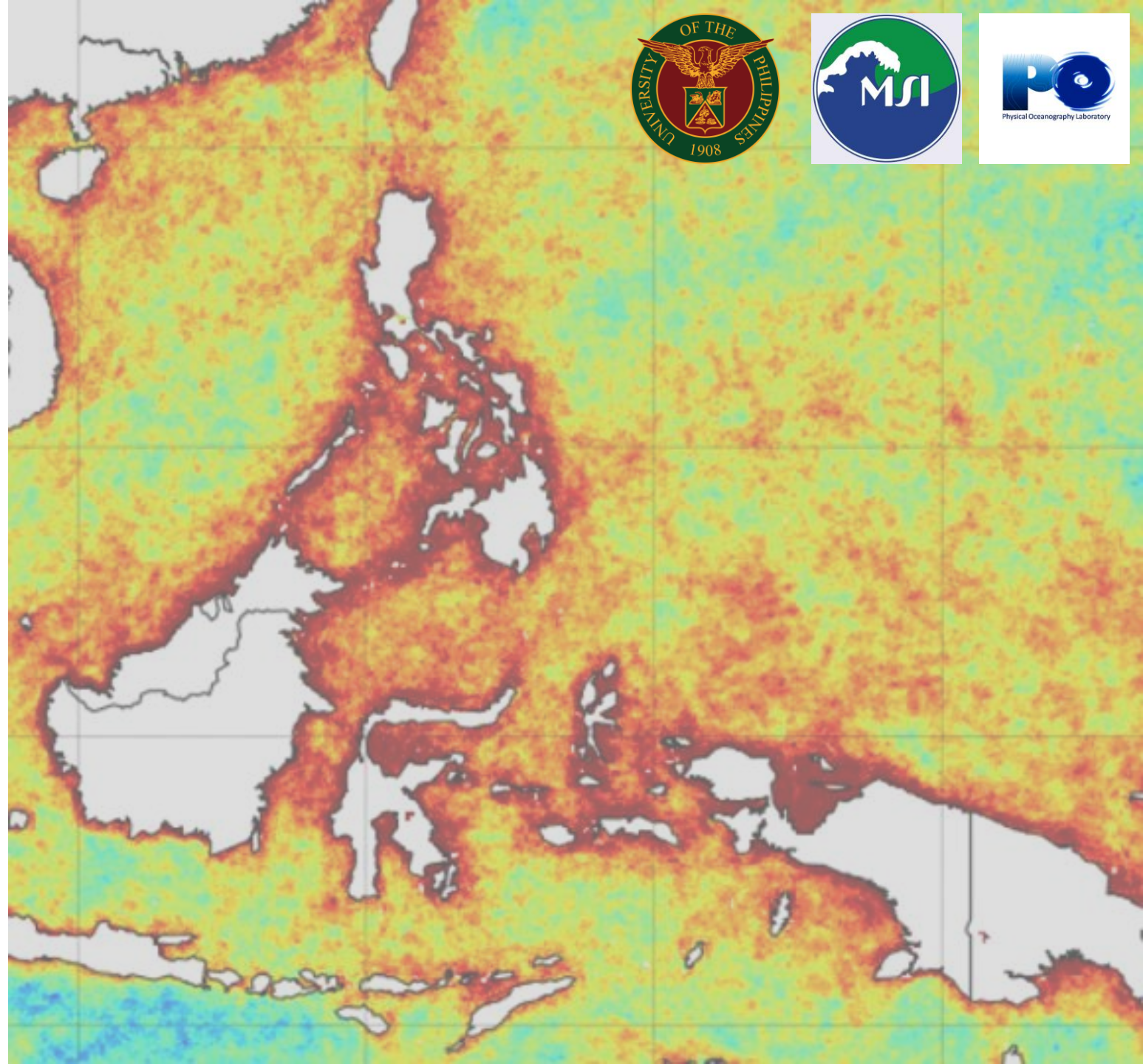

Assessment of the Exposure of Marine Organisms to Thermal Stress due to Marine Heatwaves in the Philippines

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OUR TEAM

Oceanography



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Marine Biology

OBJECTIVES

1. to characterize heating that induces thermal stress to marine organisms in the Philippines
2. To investigate how local oceanographic features affect the evolution of marine heatwaves
3. To assess the vulnerability of various organisms to marine heatwave; and assess its capability to predict historical bleaching events

Research Questions

- How does heating in the Philippine seas progresses?
- How does marine heatwave events affect various marine benthic organisms?

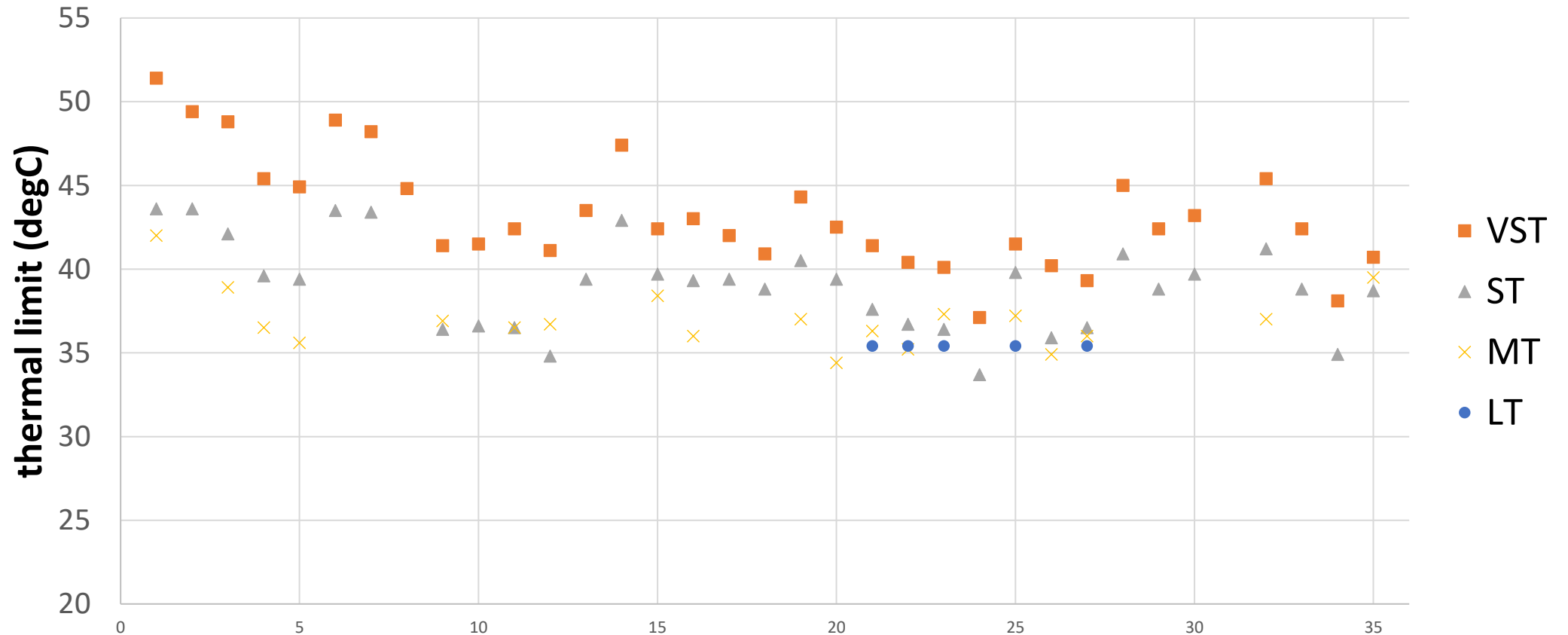
Why do we have to characterize heating?

SIGNIFICANCE

- Thermal limit related to functionality and survival depends on rate of heating

(Peck et al., 2004)

Thermal limit of marine organisms

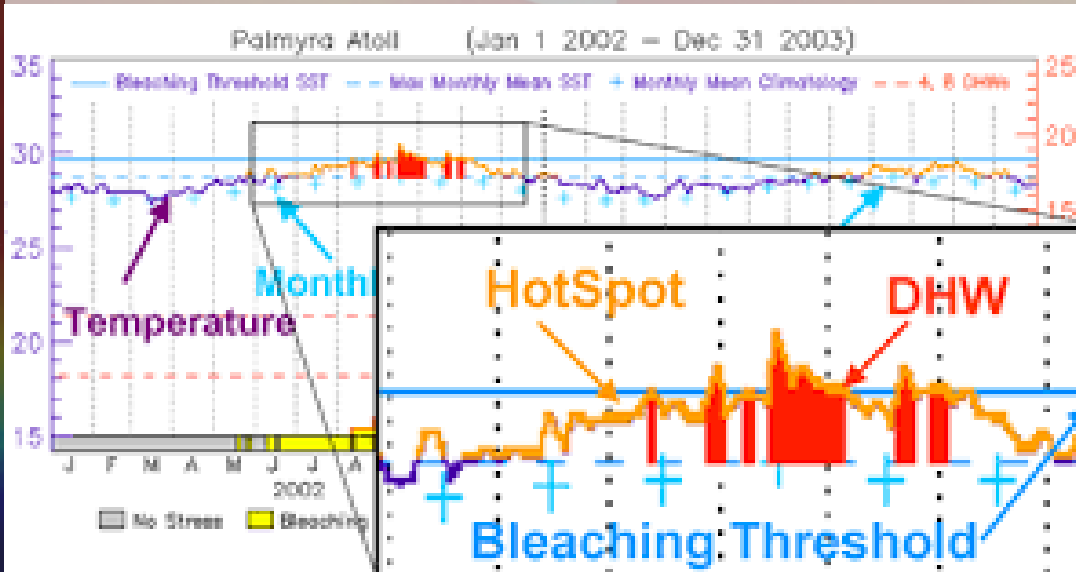


MEASURES OF HEAT STRESS

Degree Heating Week (DHW)

- Fixed threshold (1°C) from MMM
- Gradual accumulation of heat
- Validated with bleaching events

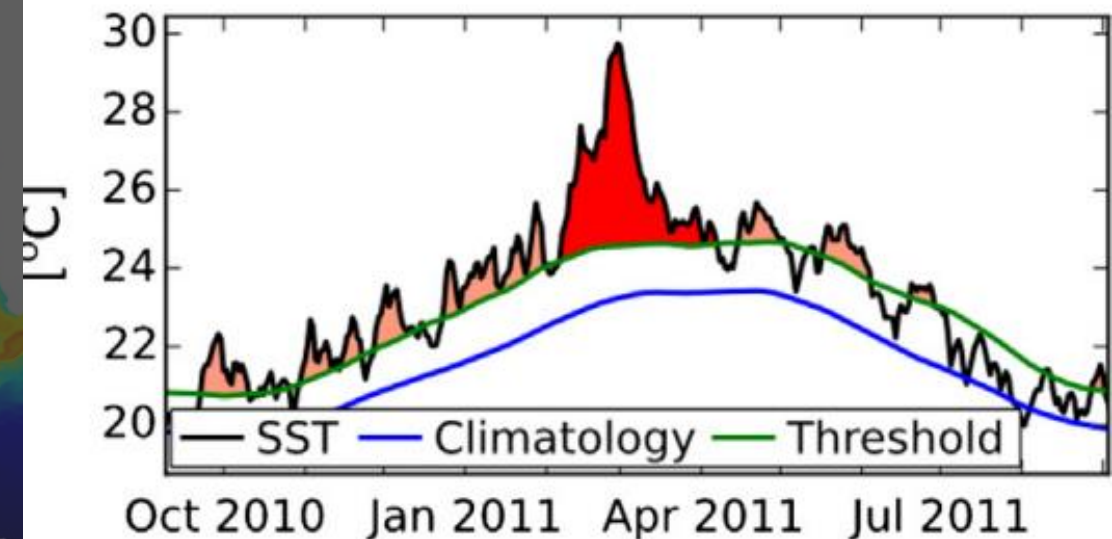
(Liu et al., 2006, 2002)



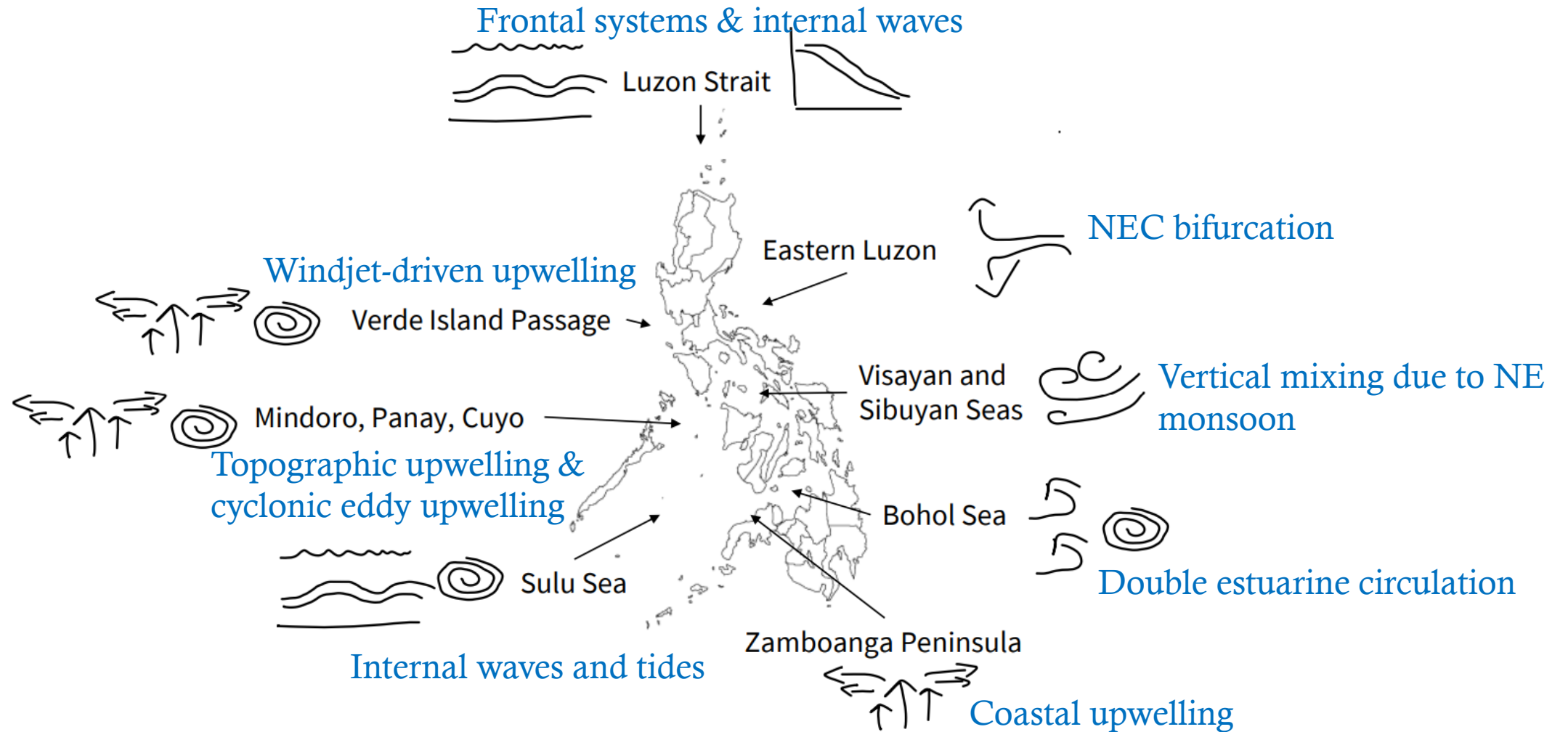
Marine Heatwave (MHW)

- Seasonal threshold
- Rapid onset of heat
- Limited study quantifying impact to marine organisms

(Hobday et al., 2016)



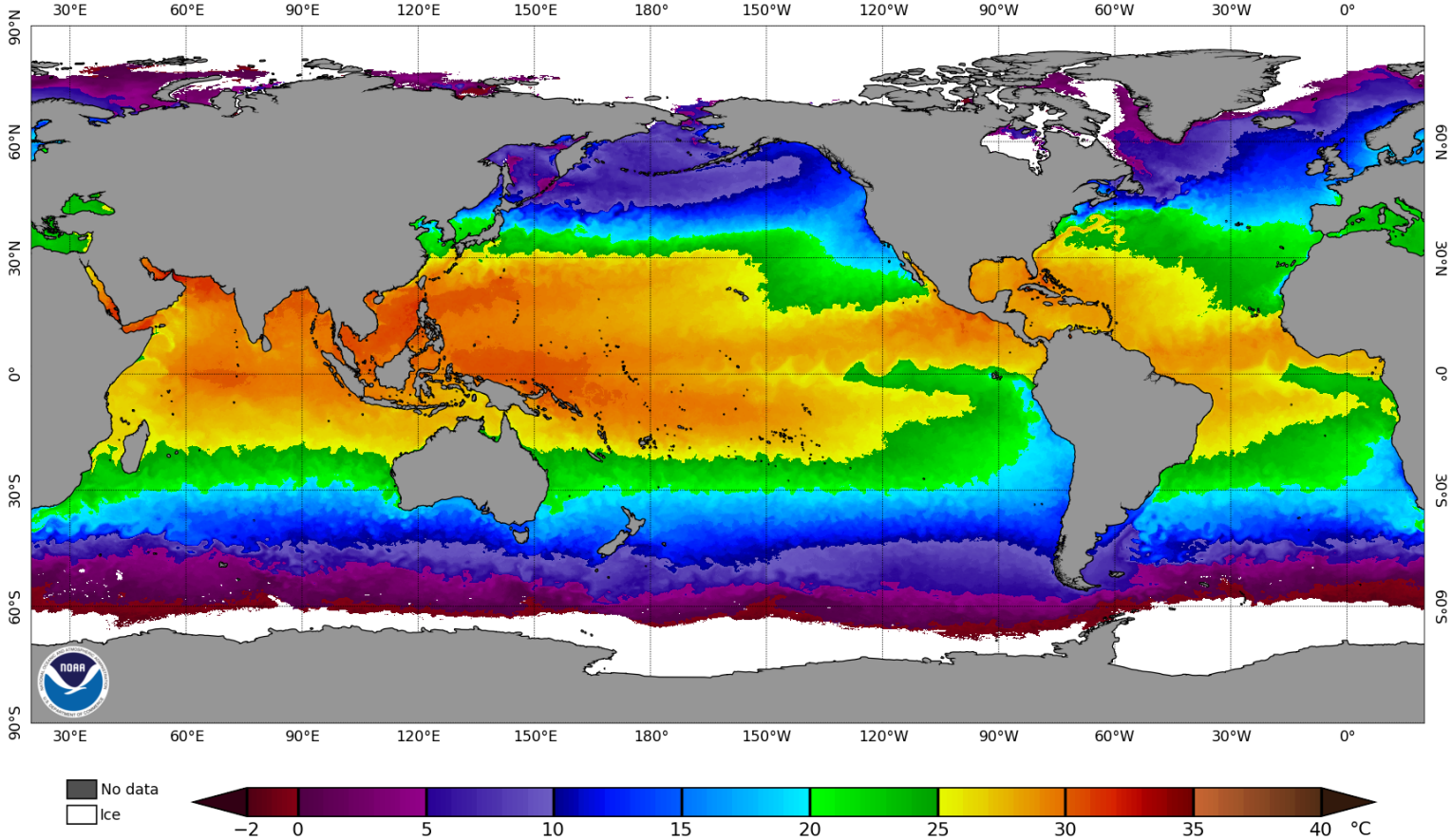
PHILIPPINE OCEANOGRAPHIC FEATURES



Lermusiaux and others (2011)

TEMPERATURE DATA

NOAA Coral Reef Watch Daily 5km Sea Surface Temperatures (v3.1) 25 Jun 2020



BLEACHING DATA

Severity of Coral Bleaching in the Philippines 2020



PHILIPPINE
CORAL BLEACHING
WATCH

Number of Reports
191

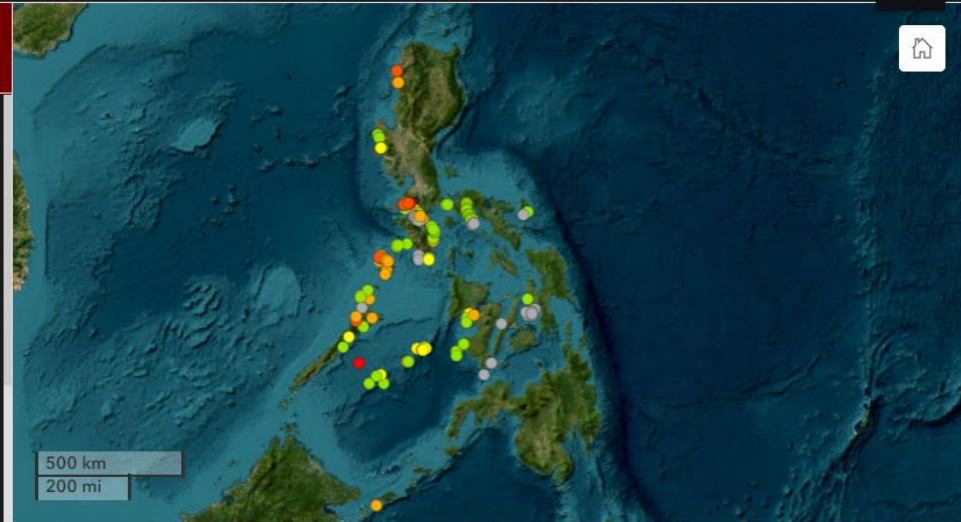
The **Philippine Coral Bleaching Watch (PCBW)** aims to map out and monitor the extent and severity of coral bleaching and other reef stressors in the Philippines through citizen science.

Help us look for healthy, non-bleaching reefs or [#ReefsOfHopePH](#). Please report and send photos for validation, and documentation at our [reporting form](#). You may also download our [PCBW mobile app](#) if you are an android user.

To know more about the initiative, please visit our [storymap](#).

What is CORAL BLEACHING?

Coral bleaching is a response to an environmental stress including changes in ocean temperature, coral predation, coral diseases, pollution, among others. During a bleaching event, corals expel zooxanthellae (their source of nutrients) to relieve itself from the stress, and as a result, the corals will lose their color and appear to be white or pale. Massive coral bleaching occurs where there are unusually high sea surface



Earthstar Geographics

Powered by Esri

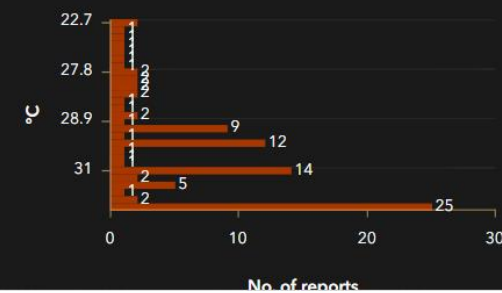
Number of reports per severity



Coral Bleaching Severity

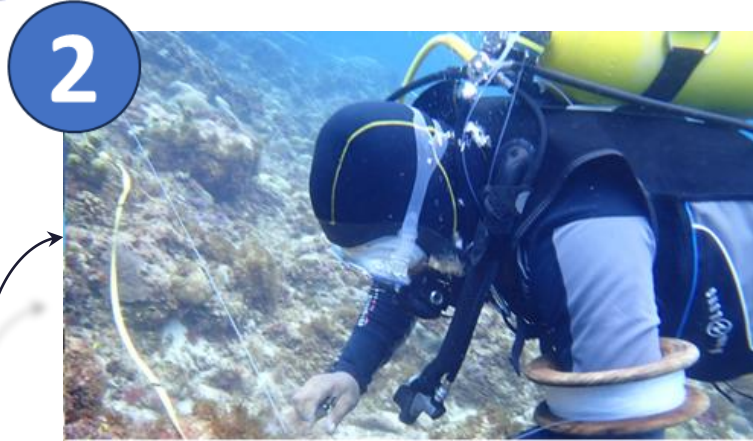
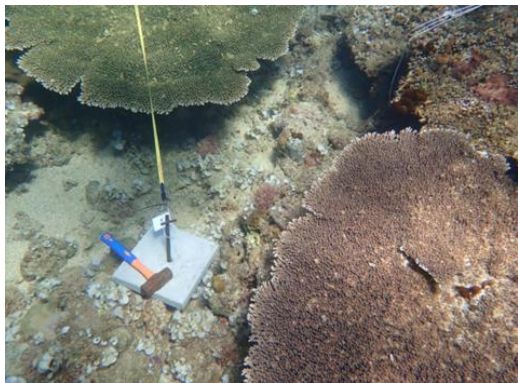
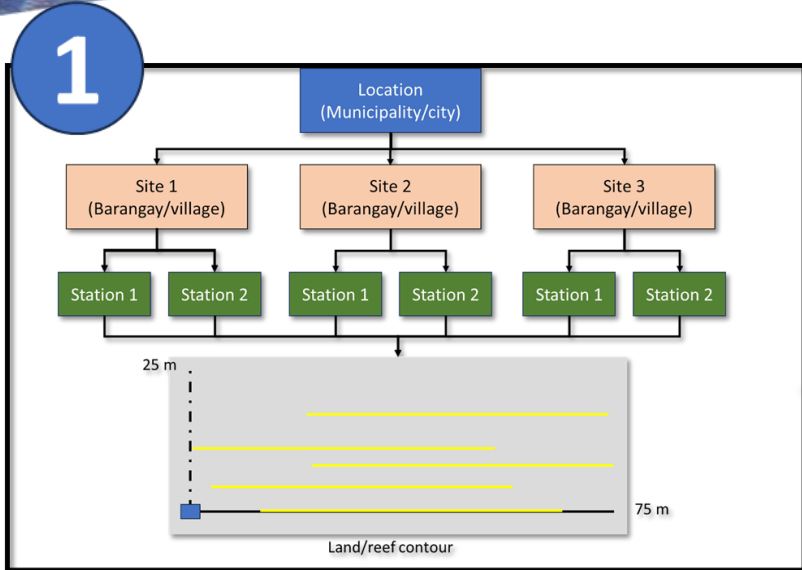
- 5
- 4
- 3
- 2
- 1
- No Bleaching

Water temperature

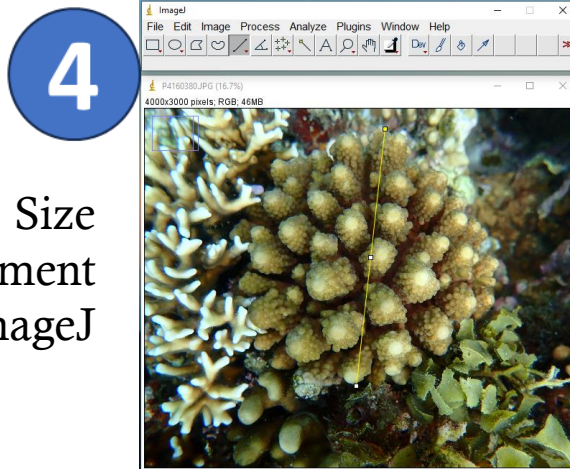


Coral bleaching monitoring

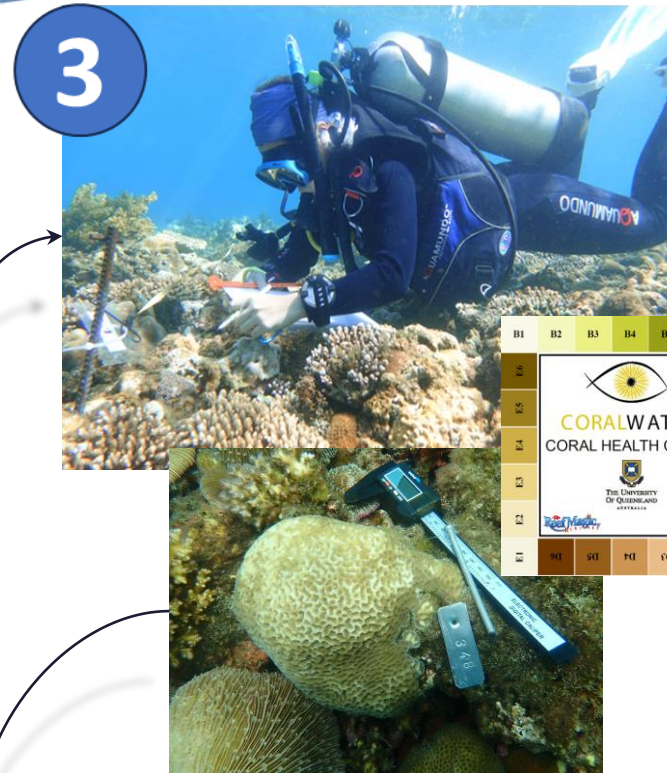
Study design



Establishing permanent transect using nylon



Size measurement using ImageJ



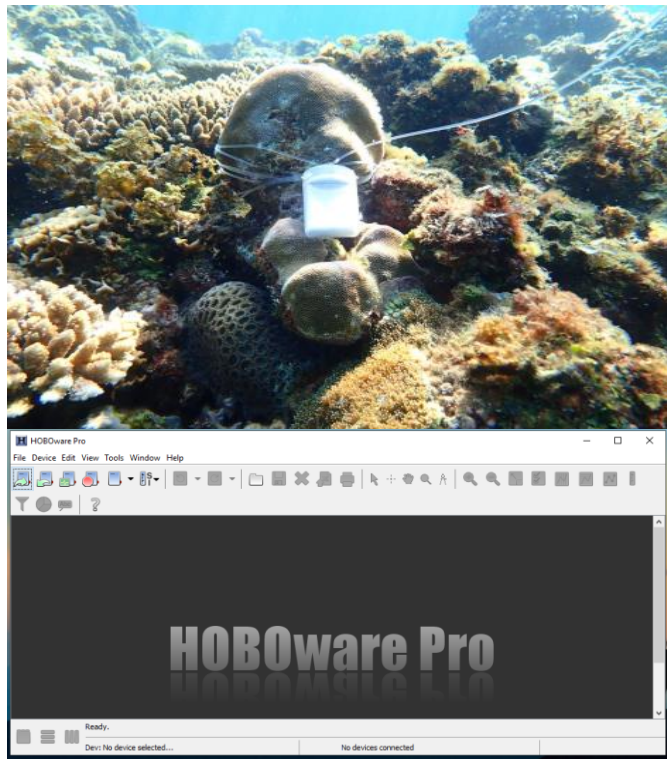
Category	Description
1	Healthy No bleaching
2	Moderately bleached Colony pale or less than 50% of surface area bleached
3	Severely bleached Colony greater than 50% of surface area bleached

Guest et al. 2016

Haphazard tagging of common coral colonies; photograph colonies; identification of highest taxonomic level and bleaching category

Deployment of on-site temperature loggers and other environmental parameters

HOBO Pendant Temperature/ Light Data Logger



Secchi disk



Water sampling



INITIAL FINDINGS

Preliminary comparison of observed bleaching events in 2020 with marine heatwave events and degree heating week in the Philippine waters showed that bleaching events may be associated with both MHW and DHW or with either MHW only or DHW only

THANK YOU!

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Marine Heatwave in the Philippines

