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

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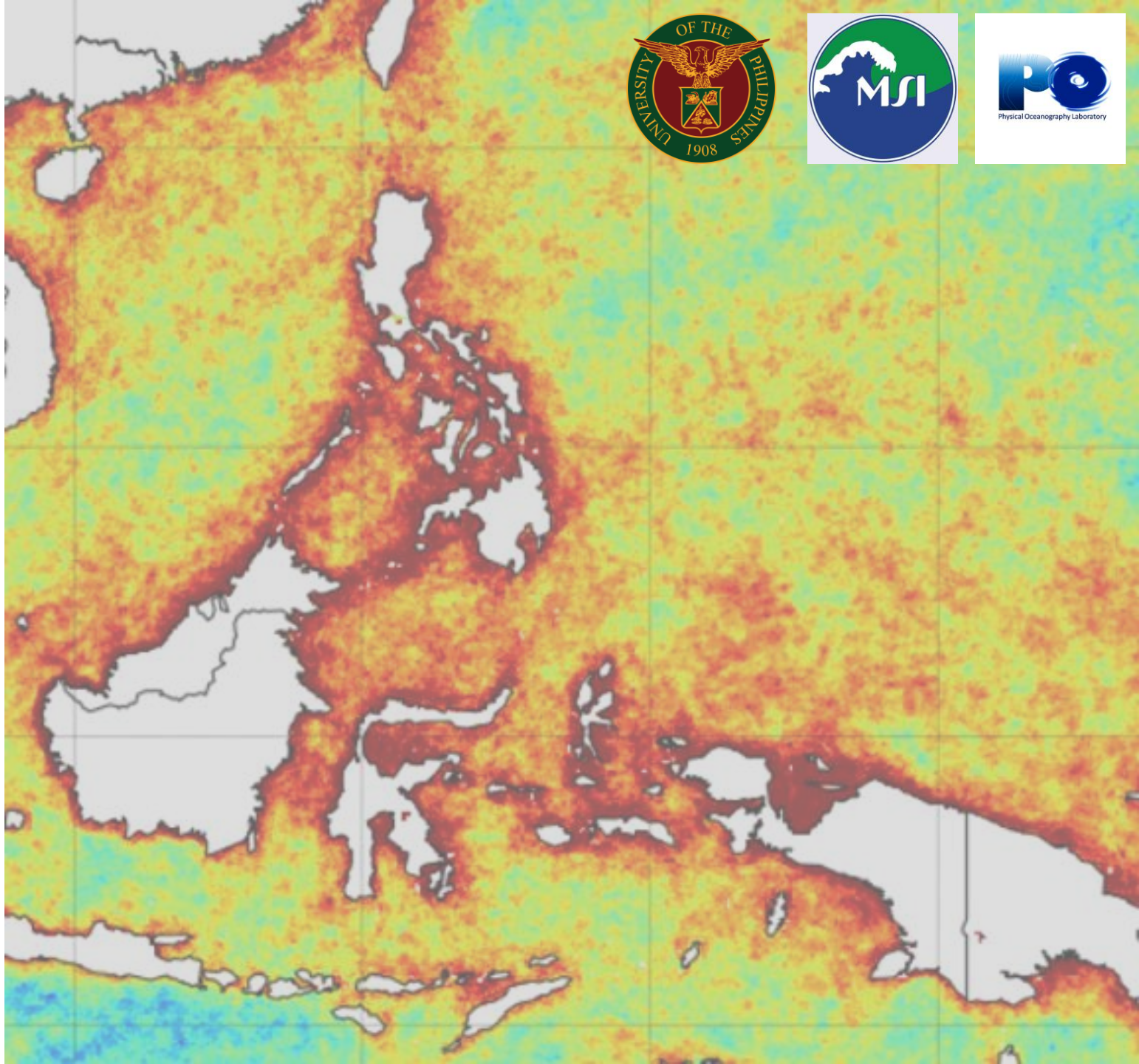

# OUR TEAM

## Oceanography

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# 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

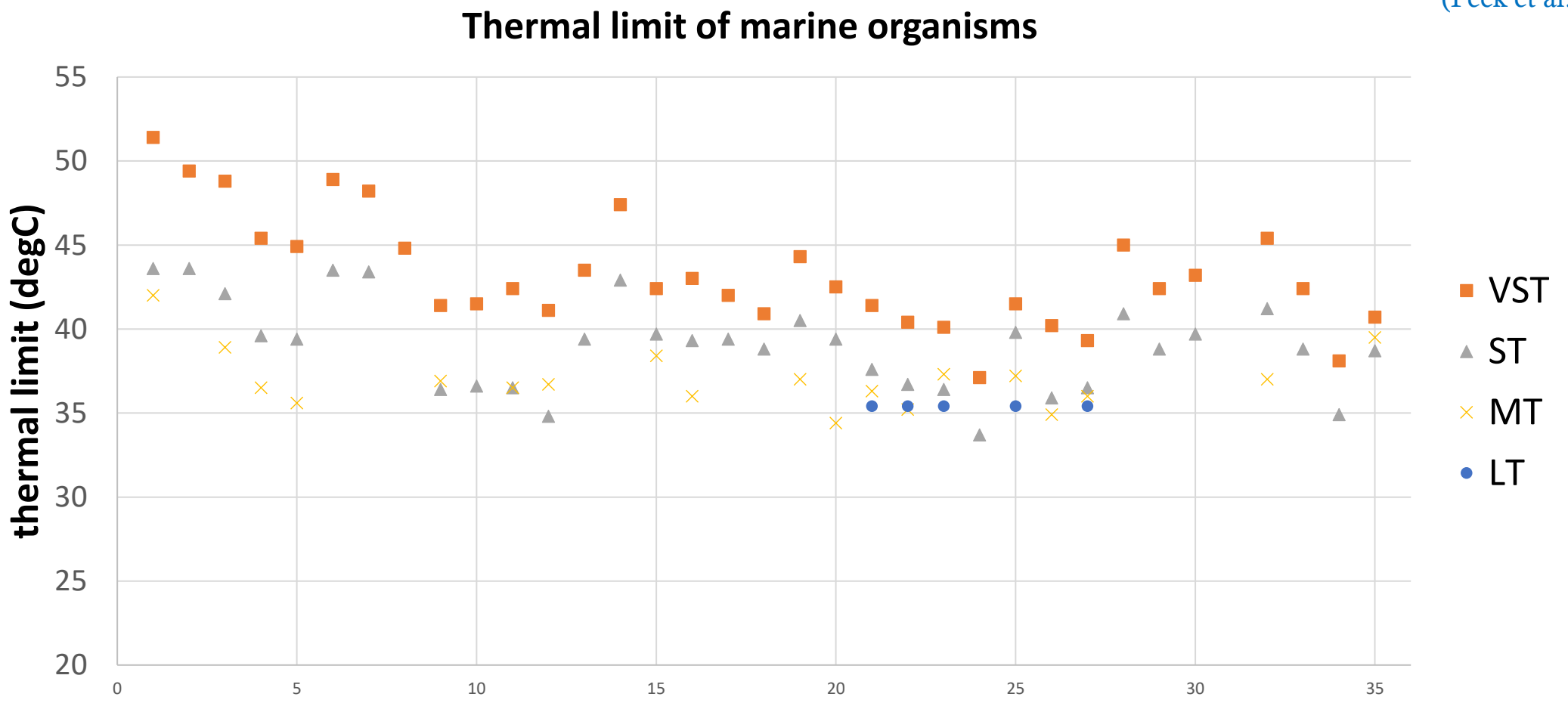
## Research Questions

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

# SIGNIFICANCE

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

(Peck et al., 2004)

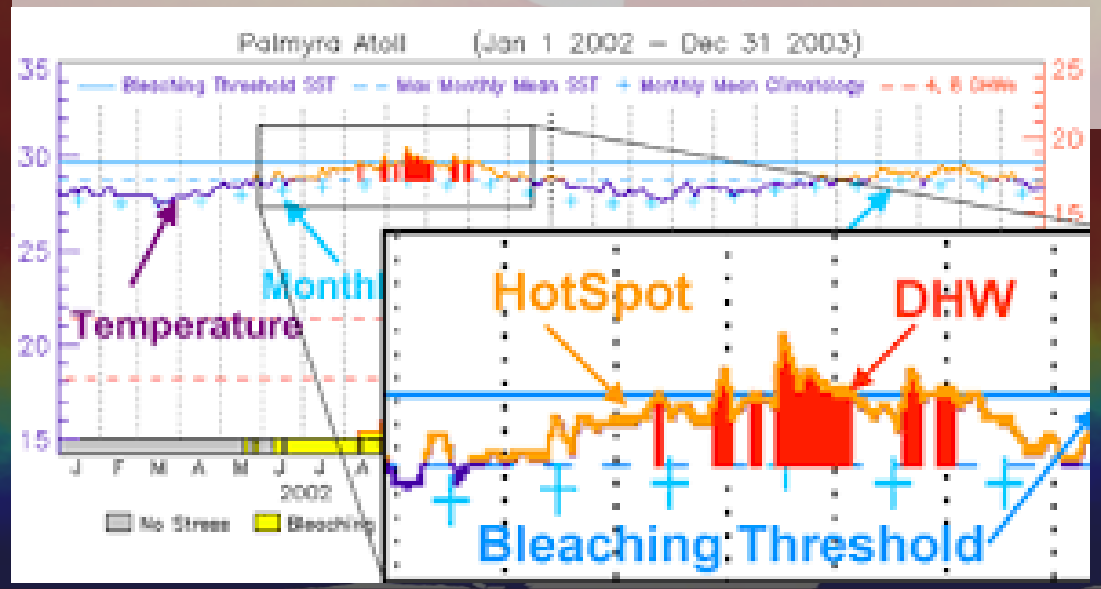


# MEASURES OF HEAT STRESS

## Degree Heating Week (DHW)

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

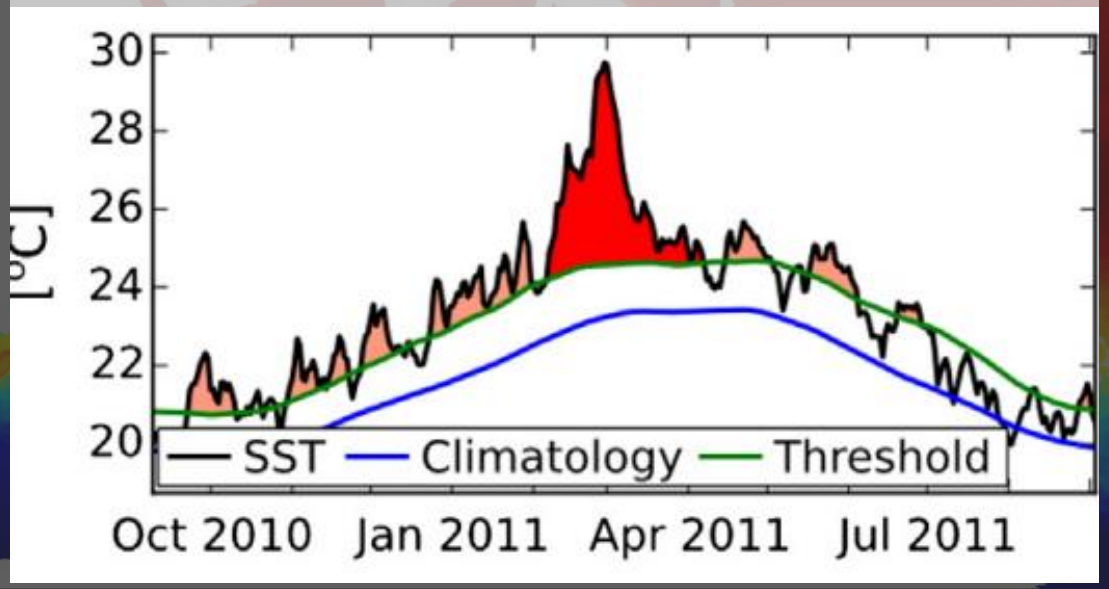
(Liu et al., 2006, 2002)



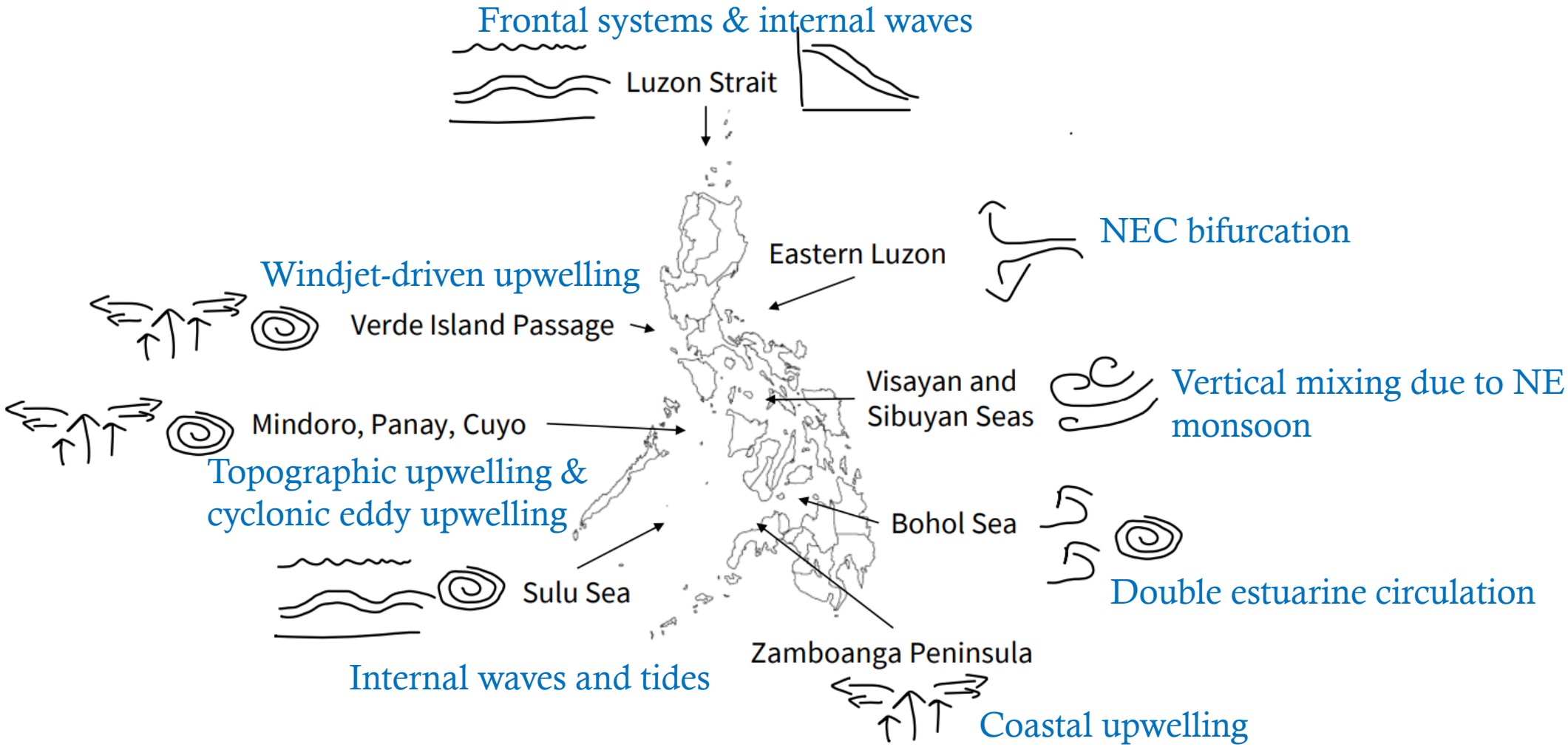

## Marine Heatwave (MHW)

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

(Hobday et al., 2016)

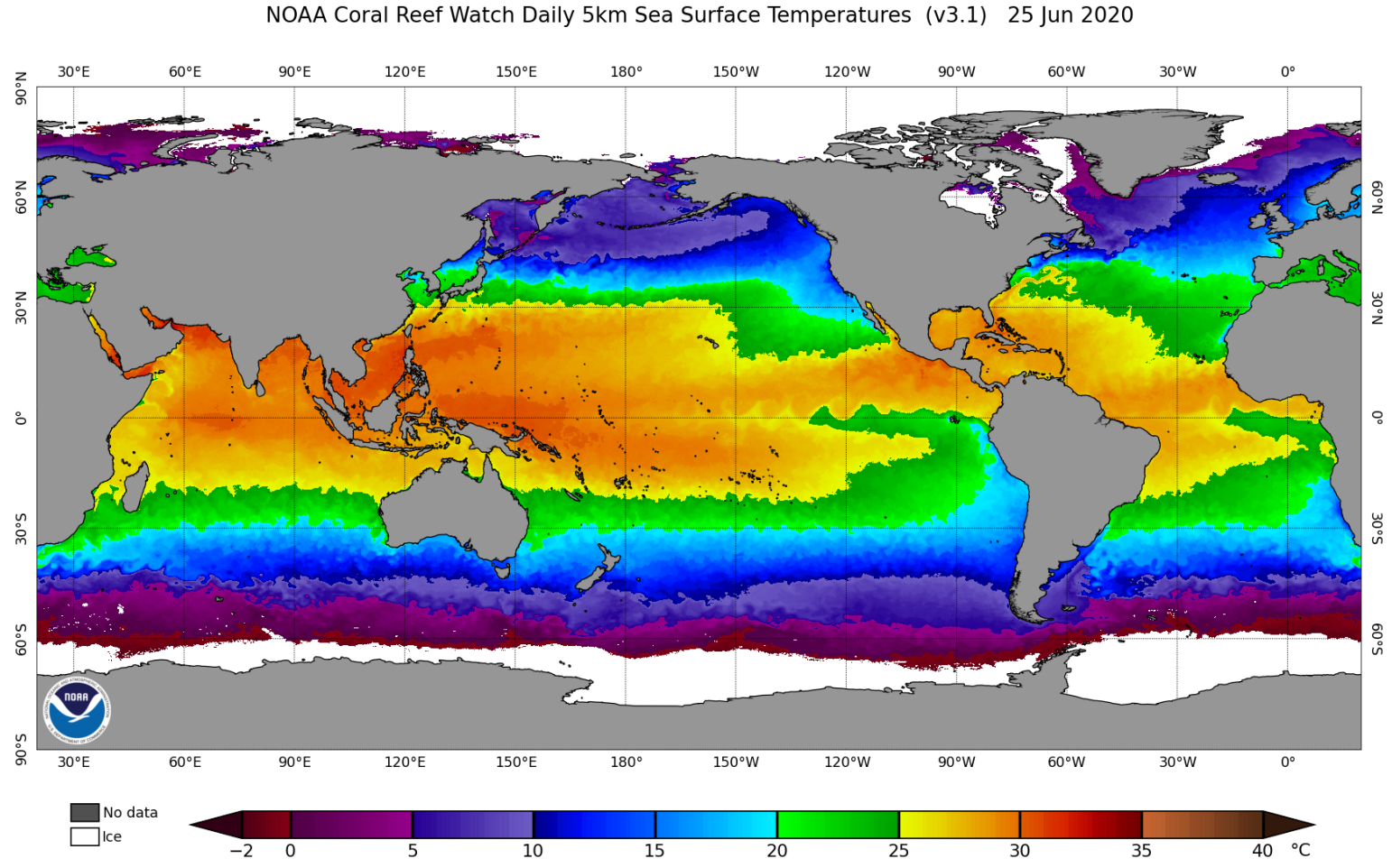


# PHILIPPINE OCEANOGRAPHIC FEATURES

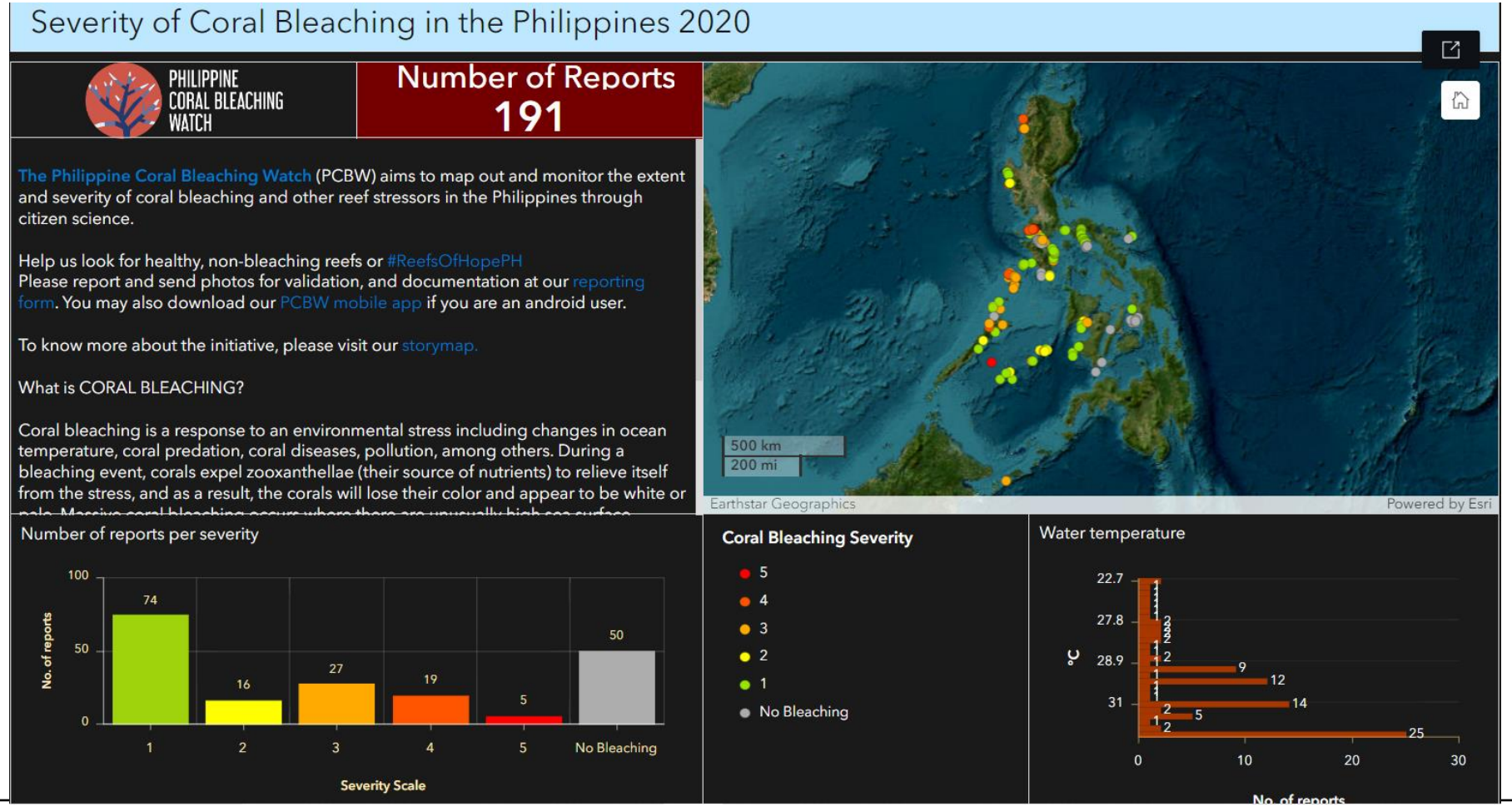



*Lermusiaux and others (2011)*

# TEMPERATURE DATA



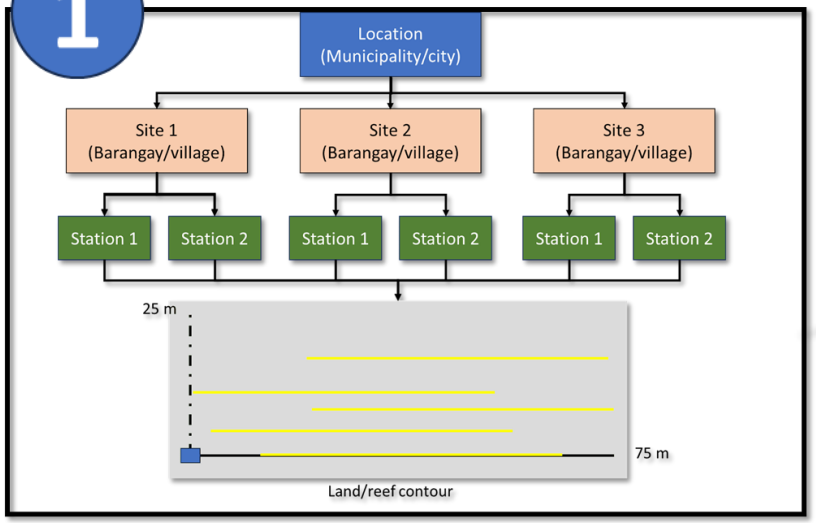
# BLEACHING DATA

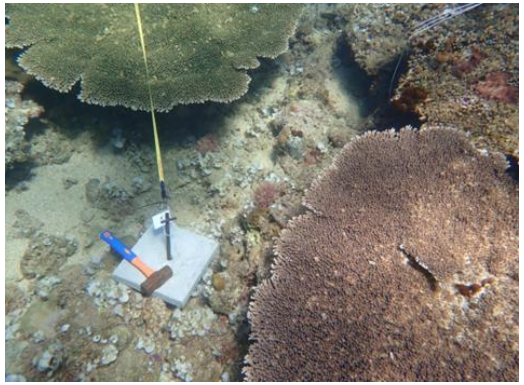


# Coral bleaching monitoring

## *Study design*

1

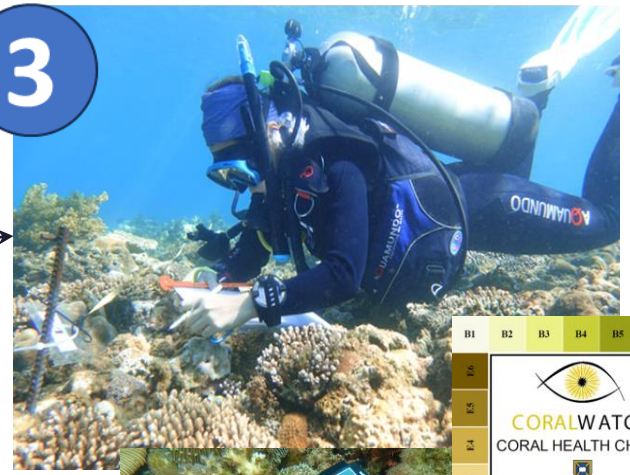


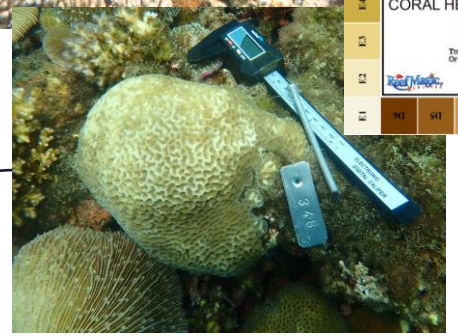



2

Establishing permanent transect using nylon

3



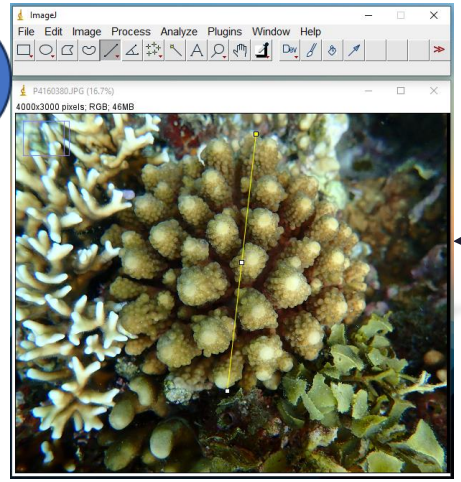
| Category | | Description |
|---|---|---|
| 1 | Healthy | No bleaching |
| 2 | Moderately bleached | Colony pale or less than 50% of surface area bleached |
| 3 | Severely bleached | Colony greater than 50% of surface area bleached |

*Guest et al. 2016*

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

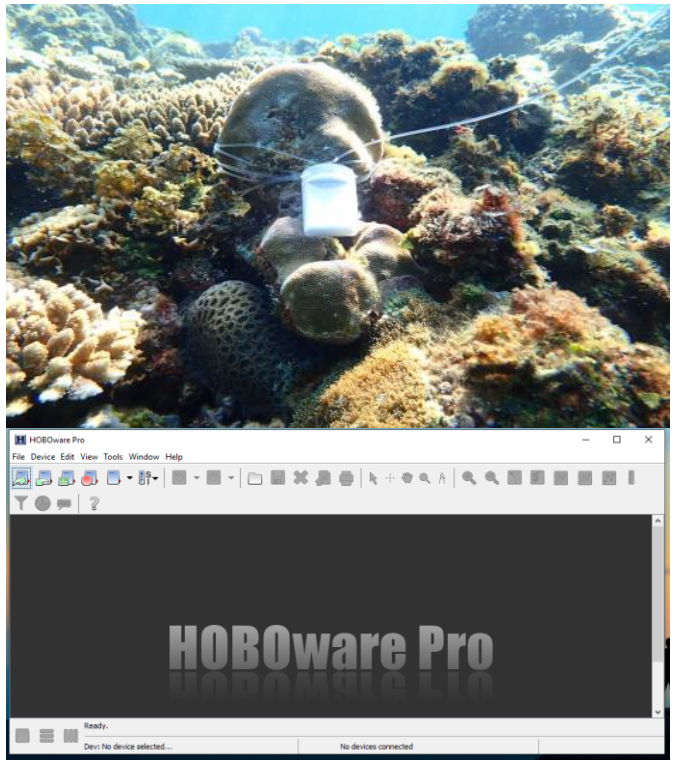
4

Size measurement using ImageJ



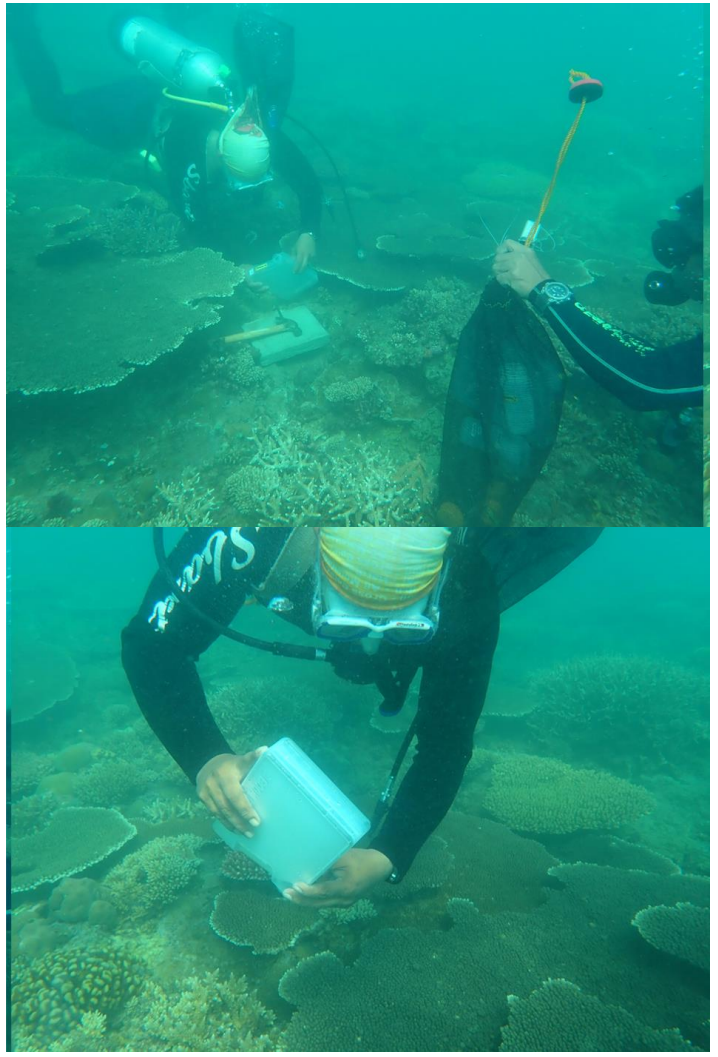
# Deployment of on-site temperature loggers and other environmental parameters

## 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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