PICES 2014

Networking ocean observatories around the North Pacific Ocean

OCTOPUS

OIST Cabled Teleopertional Observatory Performing Undersea Surveillance

A new coastal cabled observatory system in Okinawa, Japan.

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OKINAWA INSTITUTE of SCIENCE and TECHNOLOGY

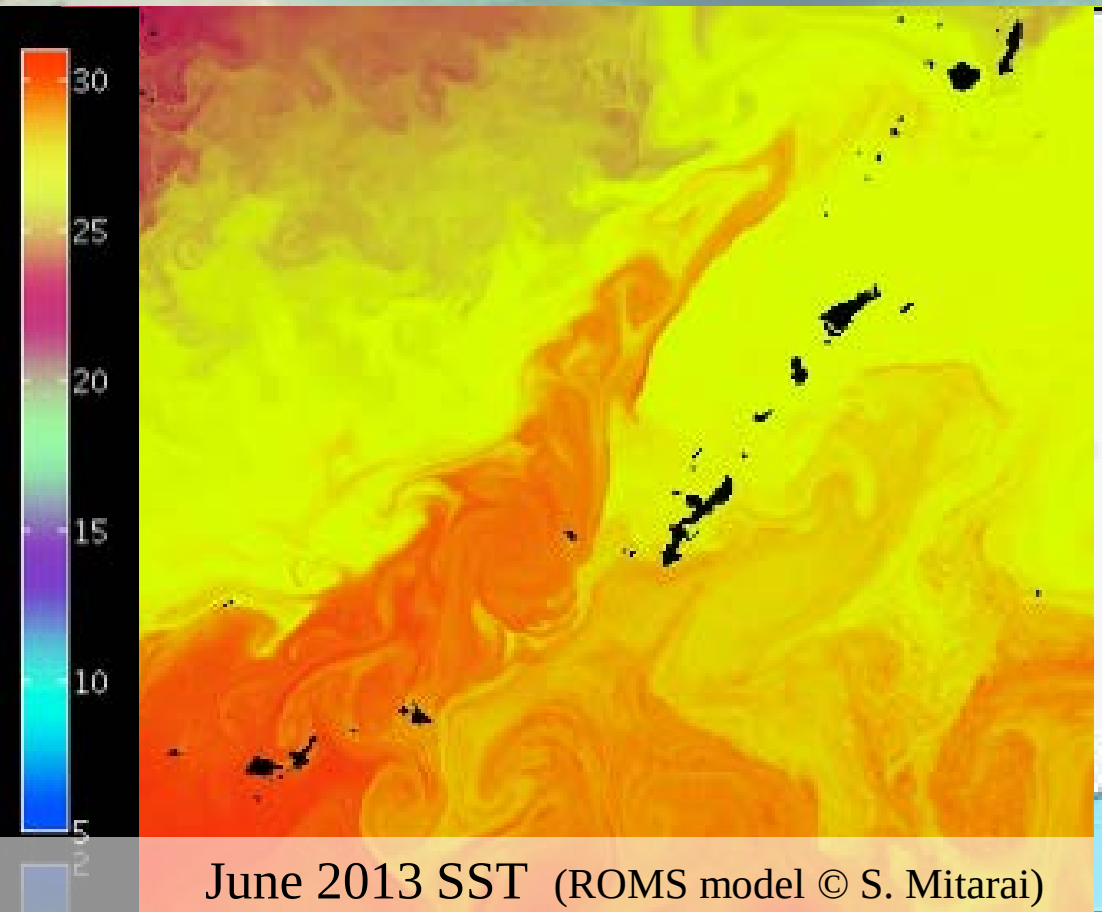
Onna-son, Okinawa, Japan

Scott M. Gallager

Woods hole oceanographic institution

MA, USA

Okinawa



June 2013 SST (ROMS model © S. Mitarai)

Air - Ocean Interface

Plankton

Marine Snow

Transport
Reproduction
Food

Nutrients

Coral coverage

LETTERS
PUBLISHED ONLINE: 7 APRIL 2013 | DOI: 10.1038/NGEO1780
nature geoscience

Caribbean coral growth influenced by anthropogenic aerosol emissions

Lester Kwiatkowski[1]*, Peter M. Cox[1], Theo Economou[1], Paul R. Halloran[2], Peter J. Mumby[3], Ben B. B. Booth[2], Jessica Carilli[4] and Hector M. Guzman[5]

Without action on climate change, coral reefs in the Coral Triangle will disappear by 2100
– WWF

PNAS

Ocean acidification causes bleaching and productivity loss in coral reef builders

K. R. N. Anthony[1], D. I. Kline, G. Diaz-Pulido, S. Dove, and O. Hoegh-Guldberg

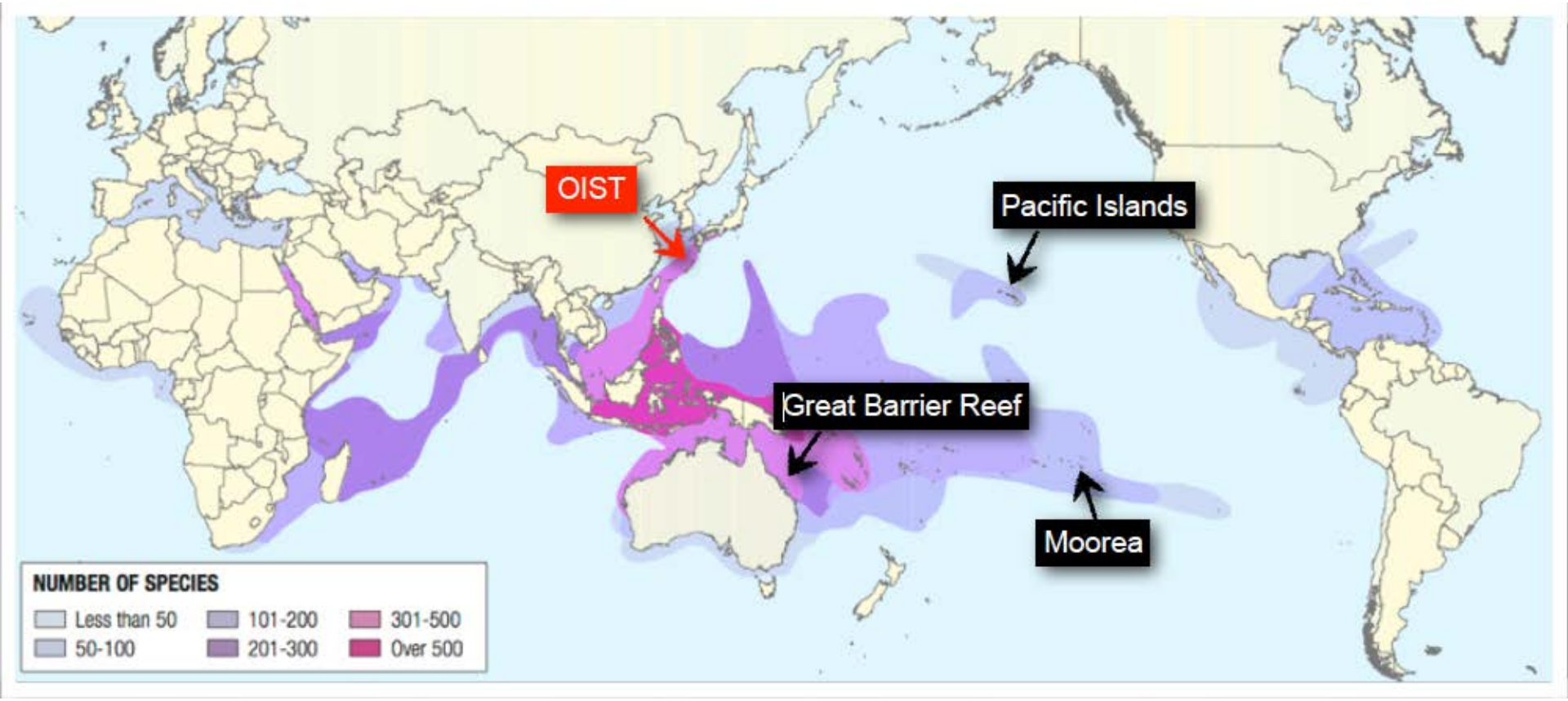
Centre for Marine Studies and ARC Centre of Excellence for Coral Reef Studies, The University of Queensland, St Lucia 4072 Queensland, Australia

Edited by David M. Karl, University of Hawaii, Honolulu, HI, and approved September 26, 2008 (received for review May 8, 2008)

Ocean acidification represents a key threat to coral reefs by reducing the calcification rate of framework builders. In addition, acidification is likely to affect the relationship between corals and

link between CO_2 and coral bleaching (16). Secondly, we investigate effects on organic productivity, which is expected to be influenced by bleaching state, and thirdly, we compare the patterns of these

Coral Reef Monitoring Systems



Vernon and Stafford-Smith, 2000

Continuous monitoring of a Coral Reef Ecosystem
Okinawa Island

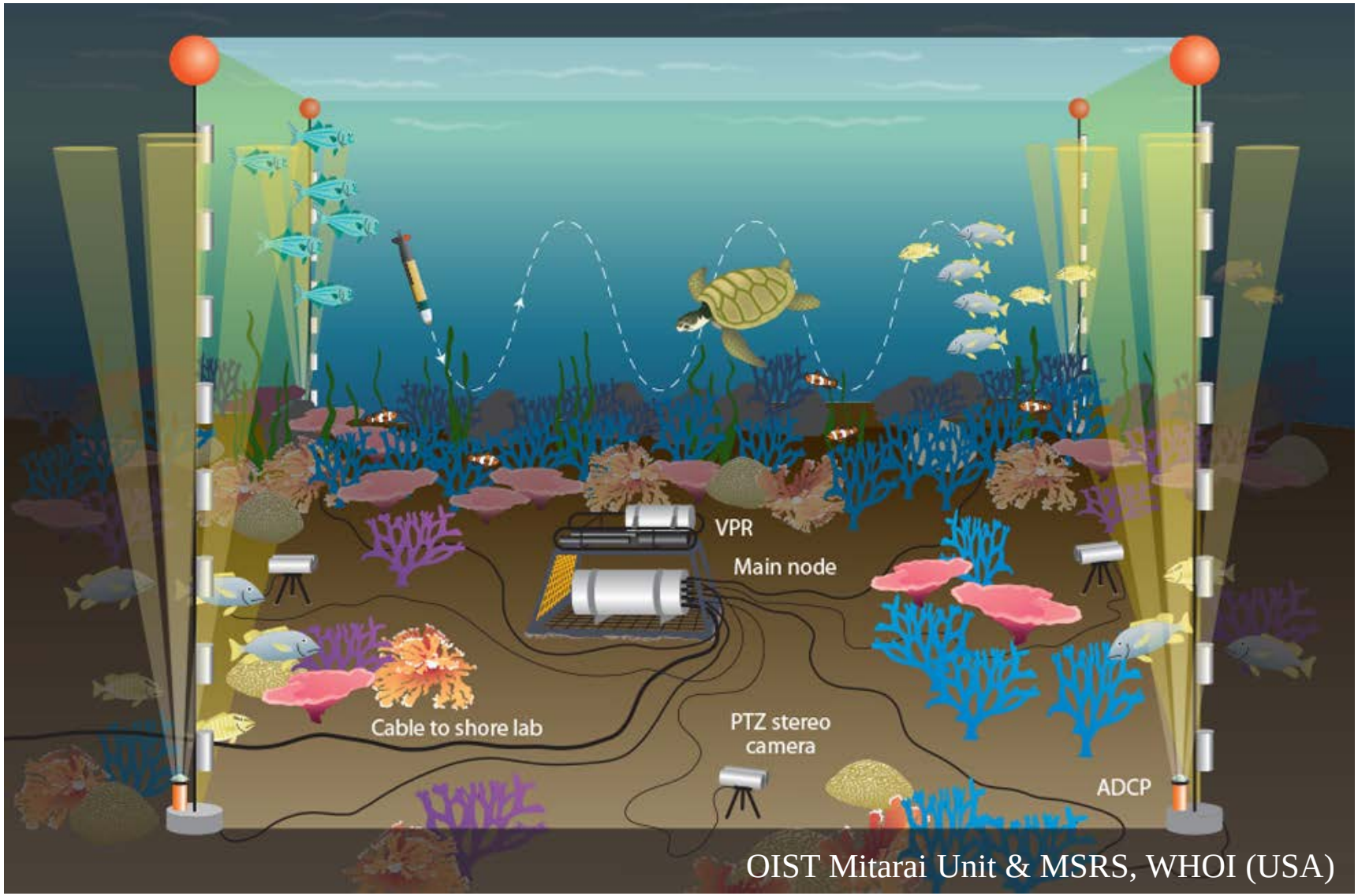
Measure physical and biological parameters
of the coral reef and the water column above it.

Detect distubances at the scale of minutes, hours.

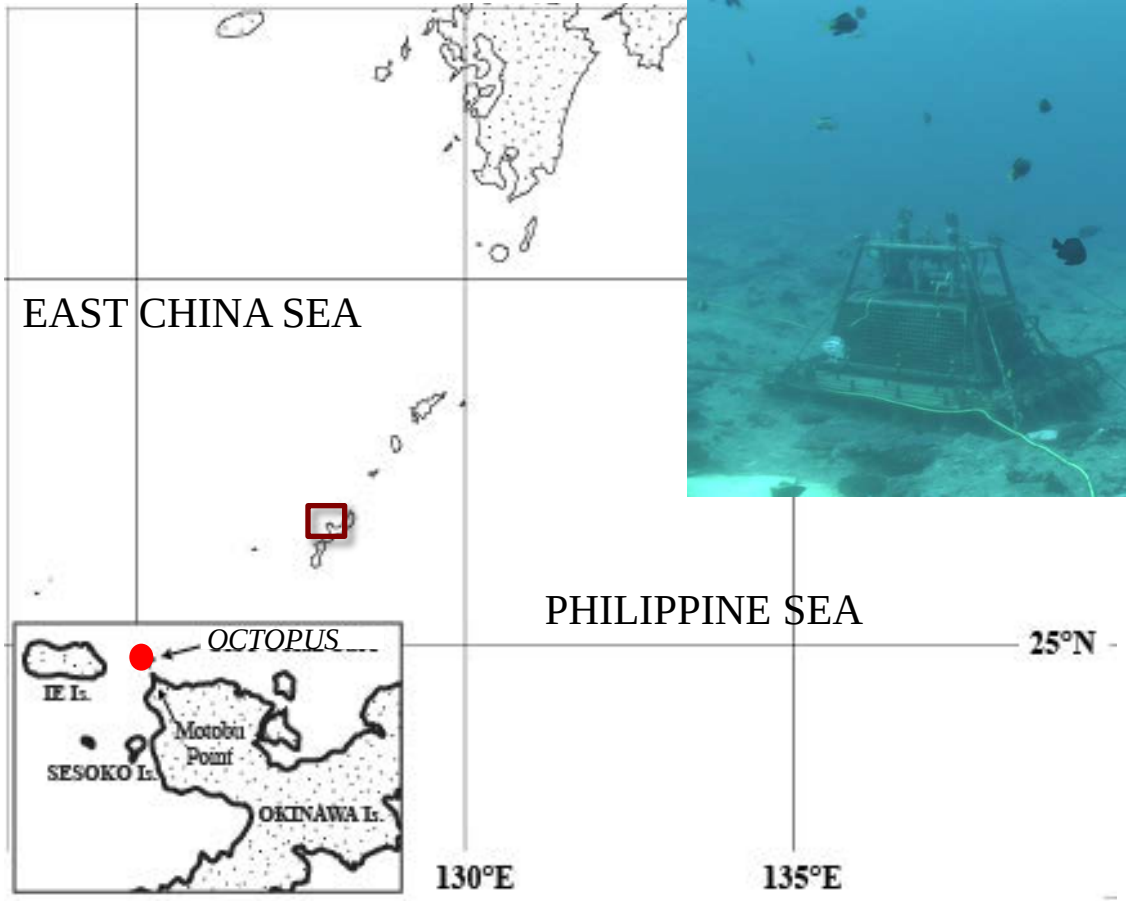
Quantify seasonal and inter-annual variability.

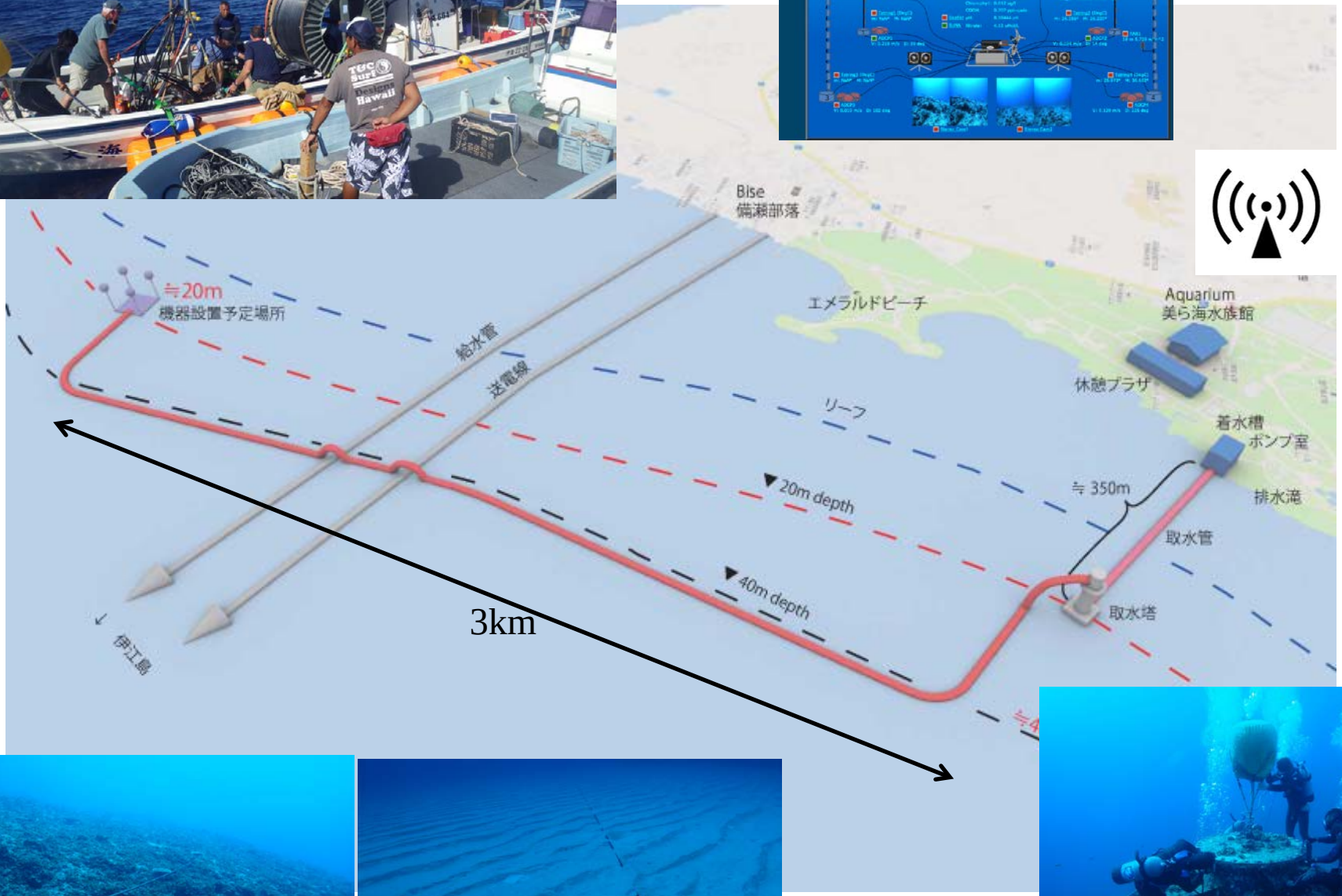
OCTOPUS

Cabled Observatory System

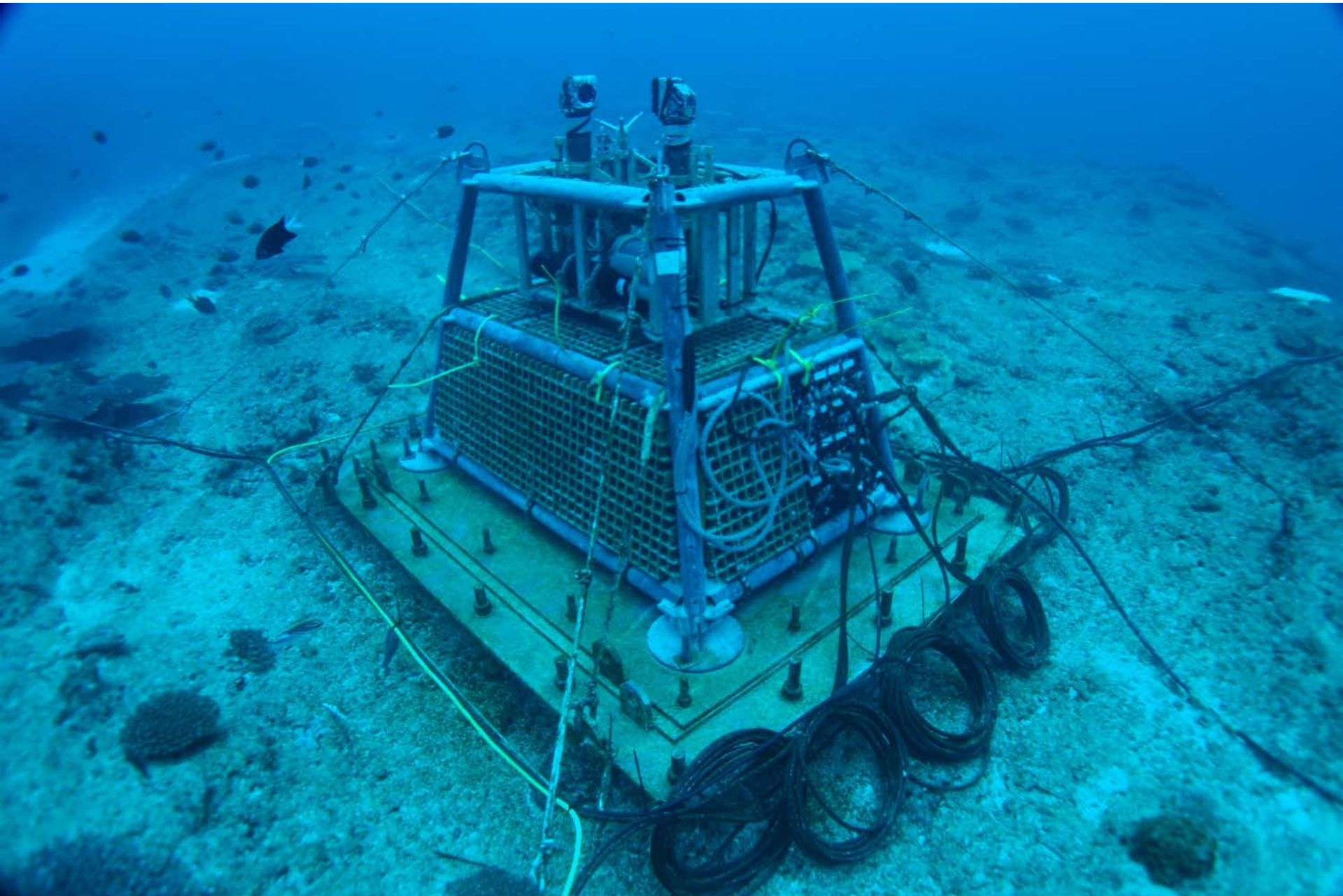


SINCE AUGUST 27, 2013


EAST CHINA SEA
PHILIPPINE SEA
25°N
130°E
135°E
OCTOPUS
IE Is.
Motobu Point
SESOKO Is.
OKINAWA Is.

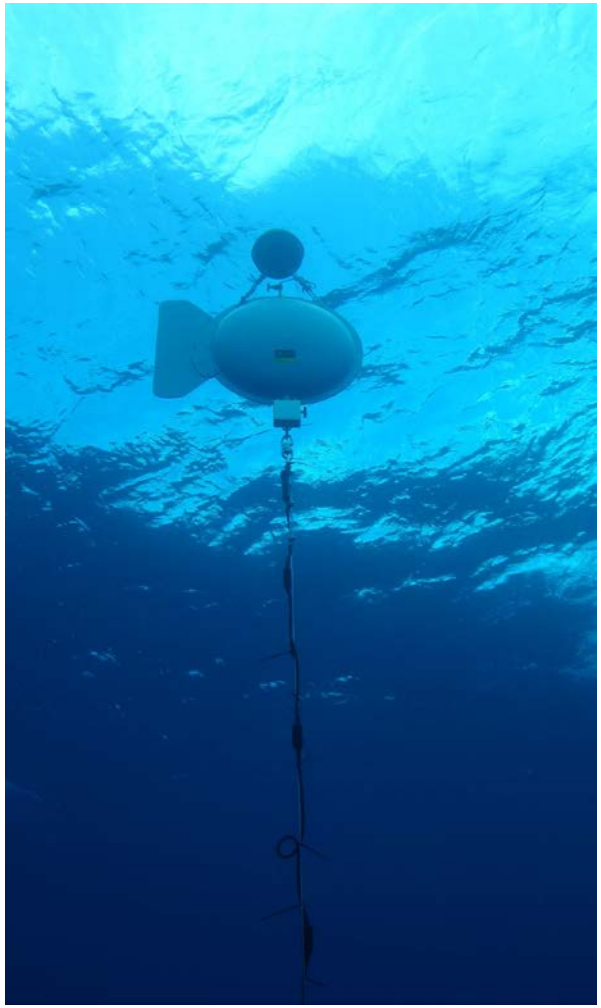

Bise
備瀬部落
≒20m
機器設置予定場所
給水管
送電線
エメラルドビーチ
Aquarium
美ら海水族館
休憩プラザ
リーフ
着水槽
ポンプ室
20m depth
≒ 350m
排水滝
取水管
40m depth
取水塔
3km
伊江島

OCTOPUS main node



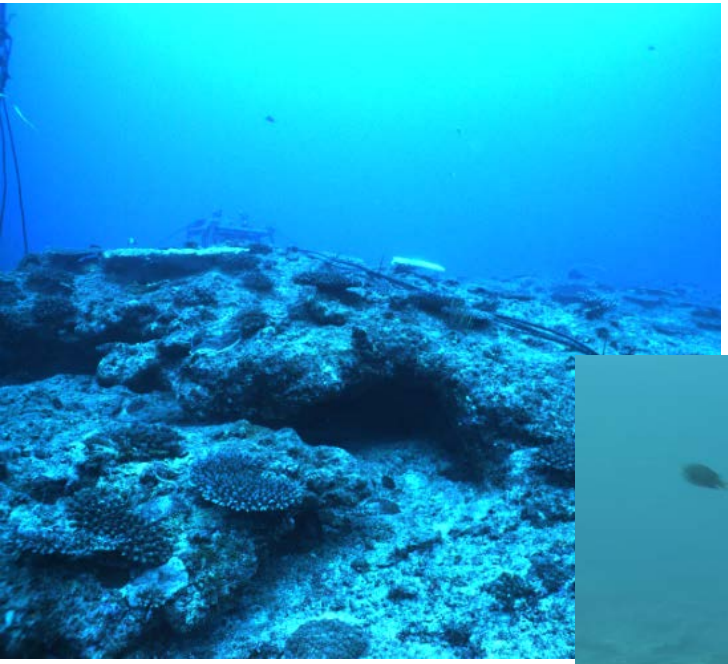
Environmental parameters

- Wave height
- Current speed
- Water temperature
- Salinity
- Density
- pH
- Turbidity
- Dissolved oxygen
- Nitrate concentration
- Chlorophyll *a* concentration
- Coloured dissolved organic matter

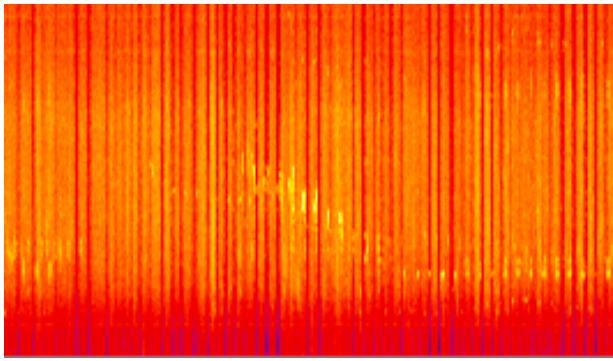


Biological imaging

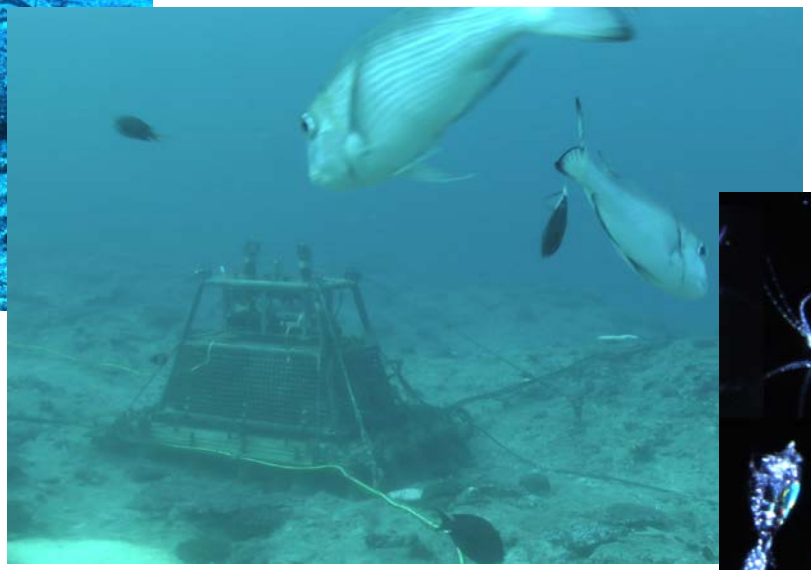
2 stereo camera sets
coral reef



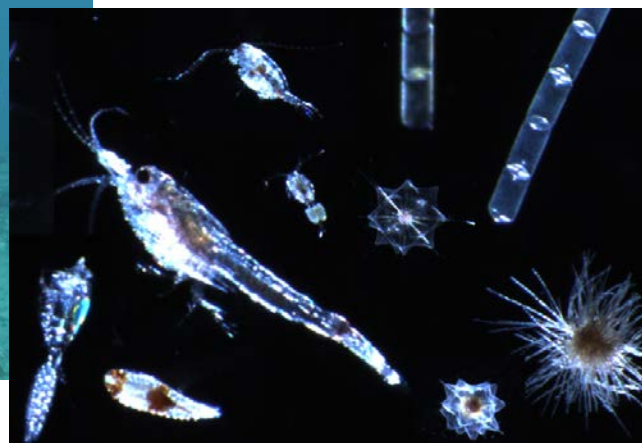
1 Hydrophone
Cetaceans + boat traffic



1 PTZ camera
larger vertebrates



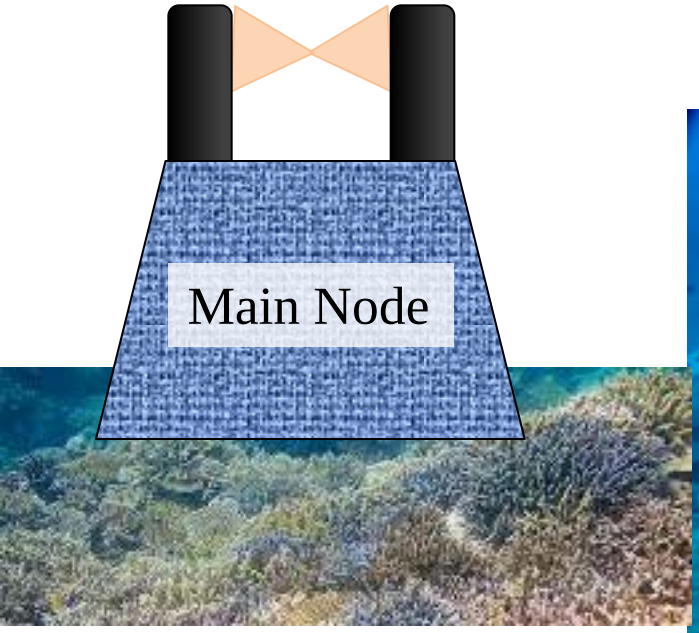
1 continuous plankton recorder
plankton

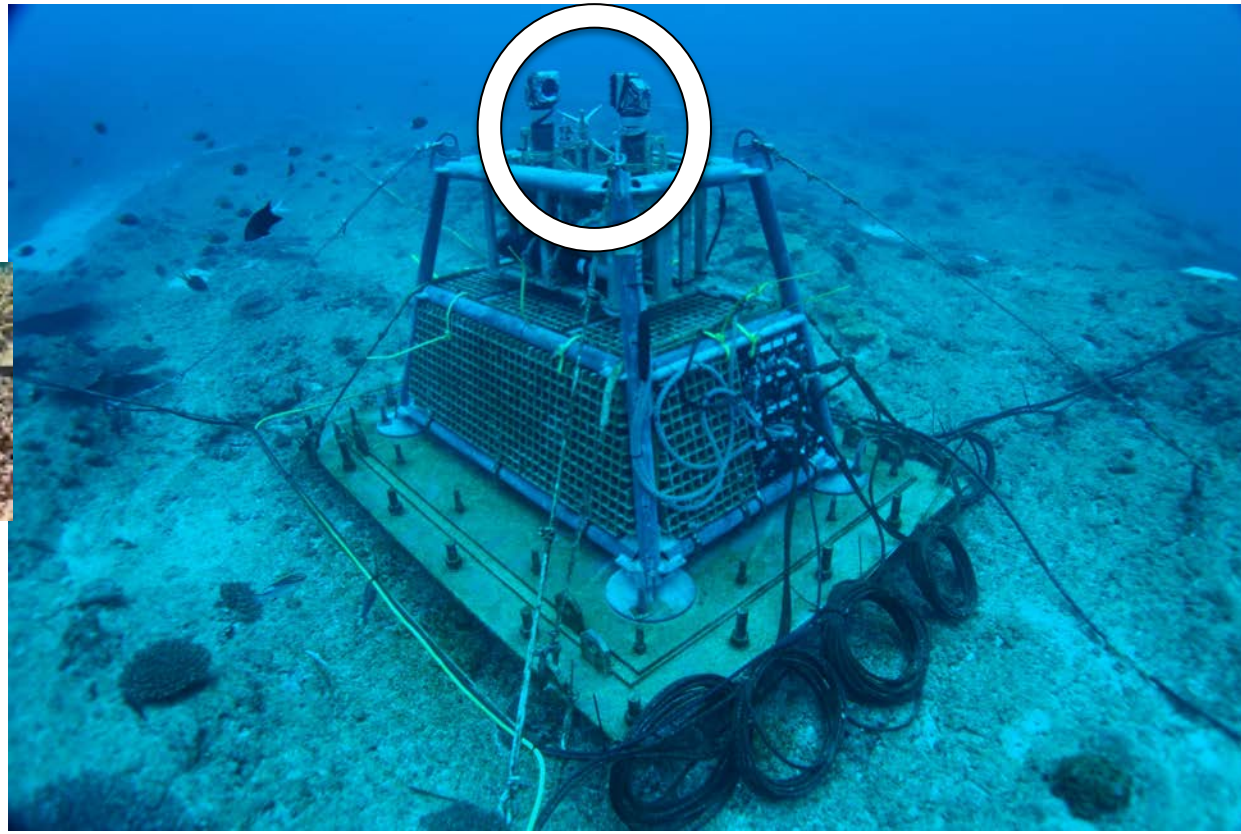


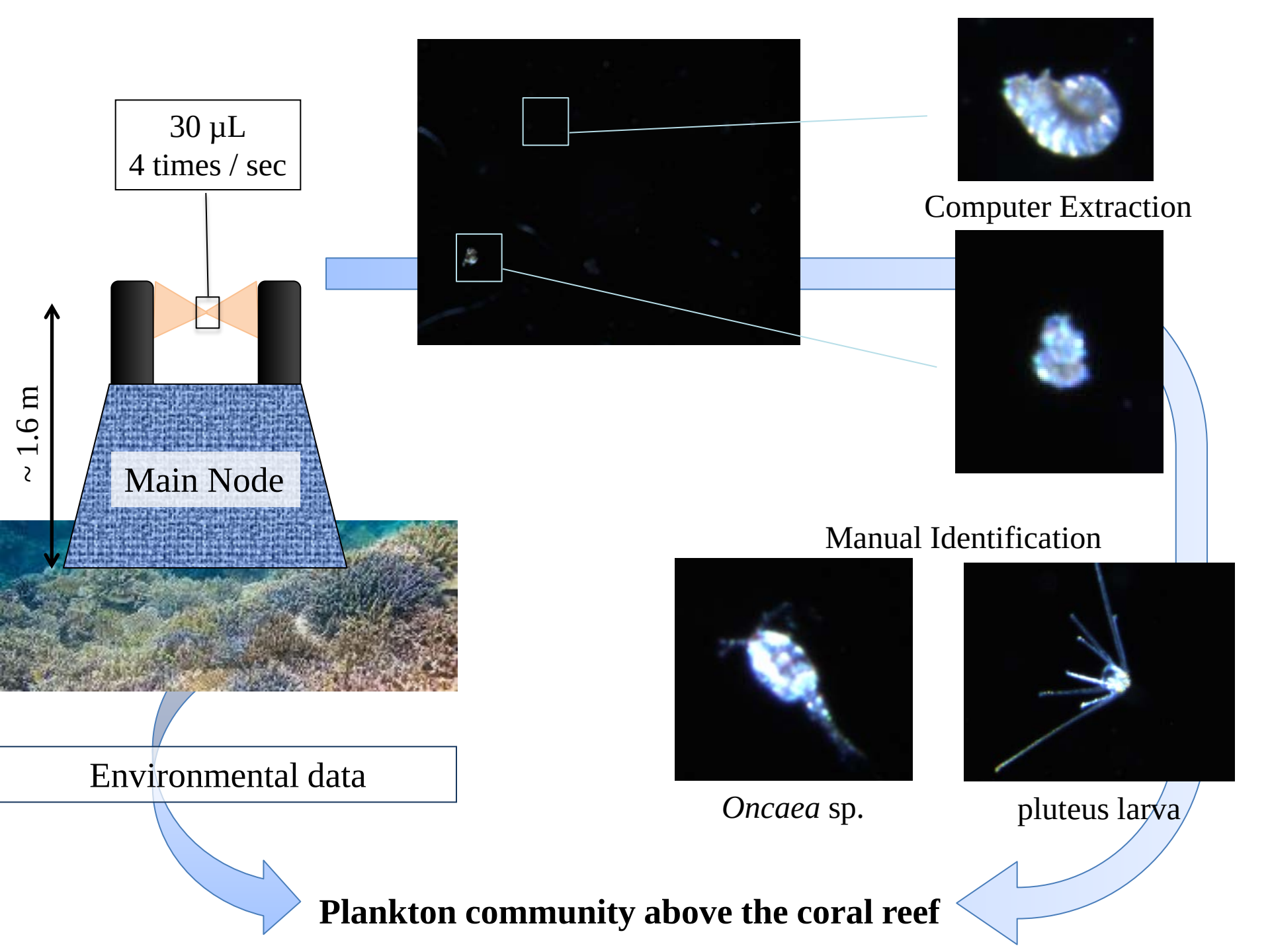
CPICS

Continuous Plankton Imaging System

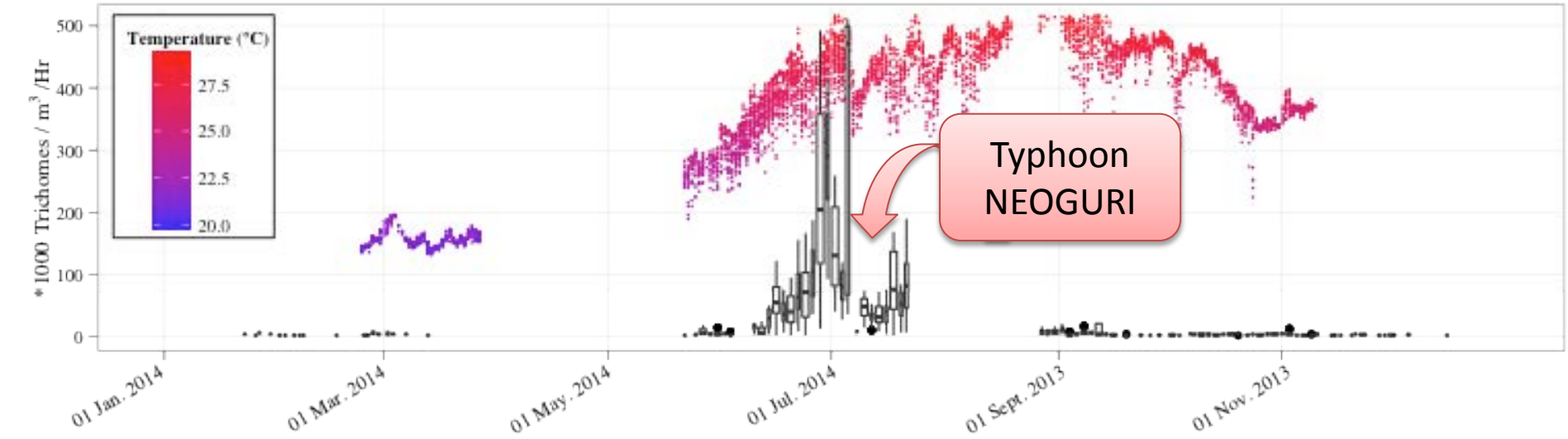
Fixed-station Visual Plankton Recorder

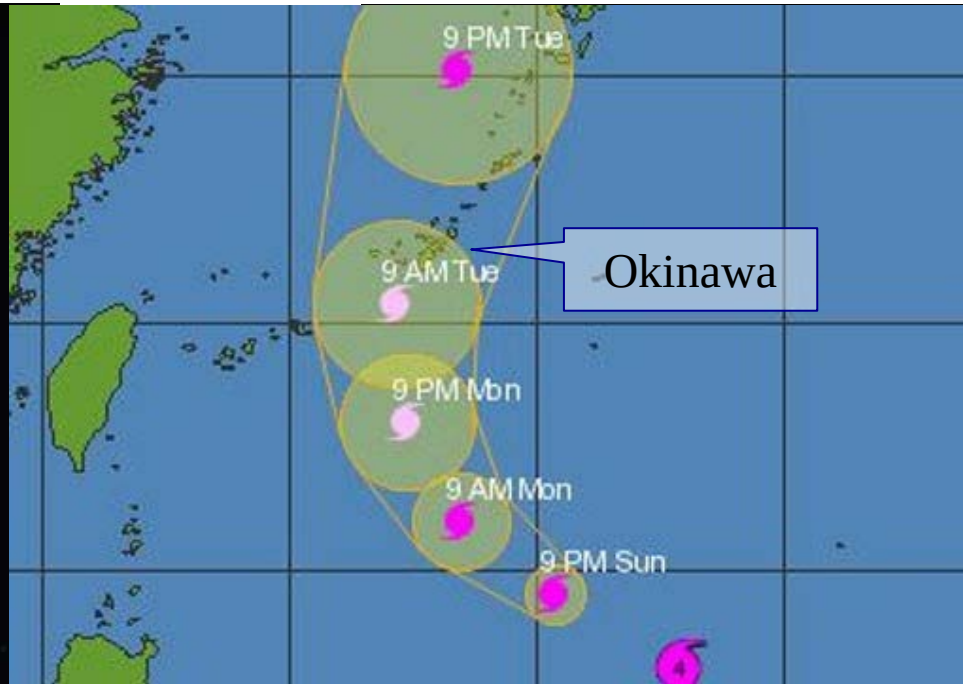




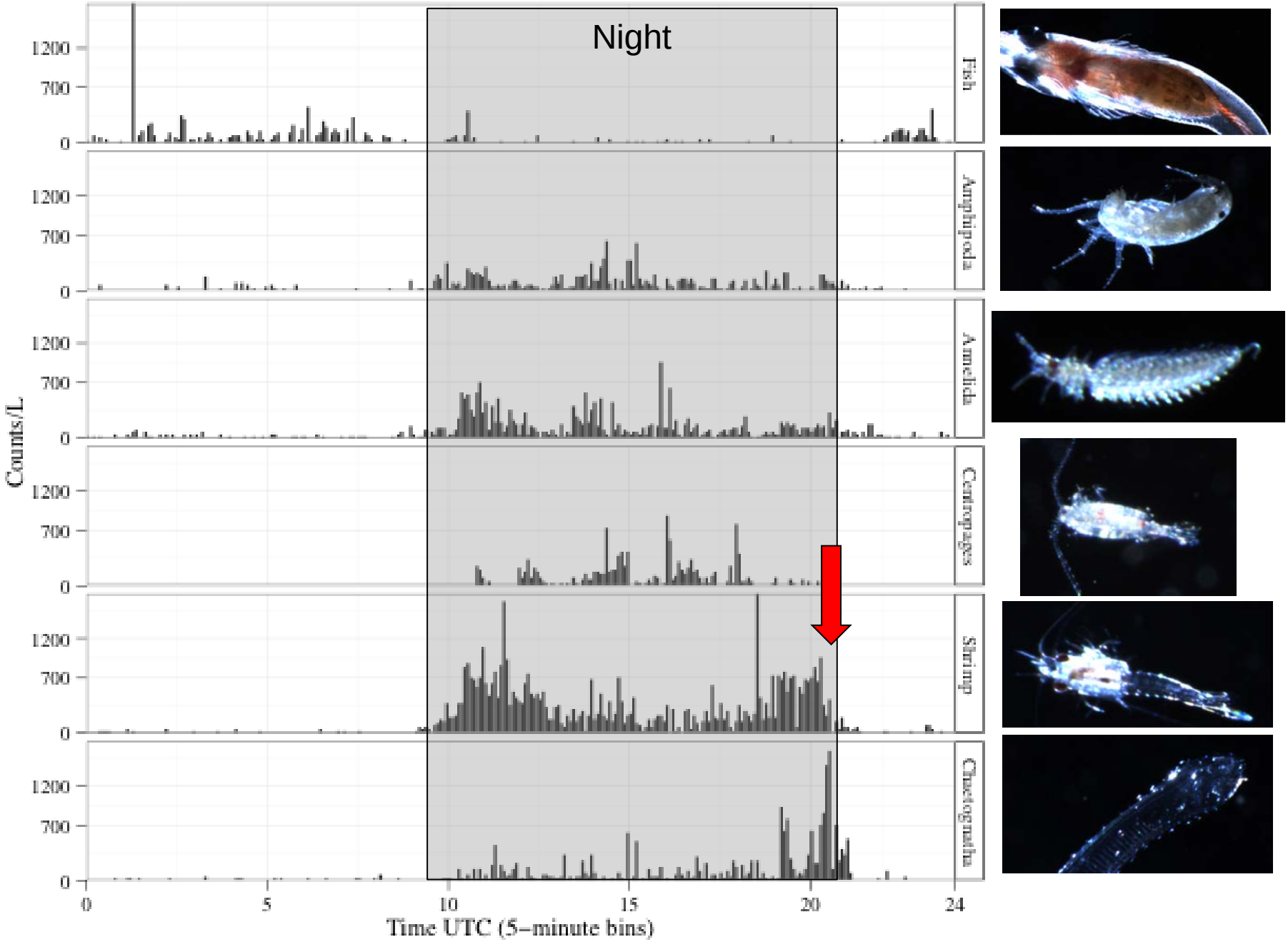

30 µL
4 times / sec
~ 1.6 m
Main Node
Computer Extraction
Manual Identification
Environmental data
Oncaea sp.
pluteus larva
Plankton community above the coral reef

Hourly abundance of N_2-fixing cyanobacteria *Trichodesmium*



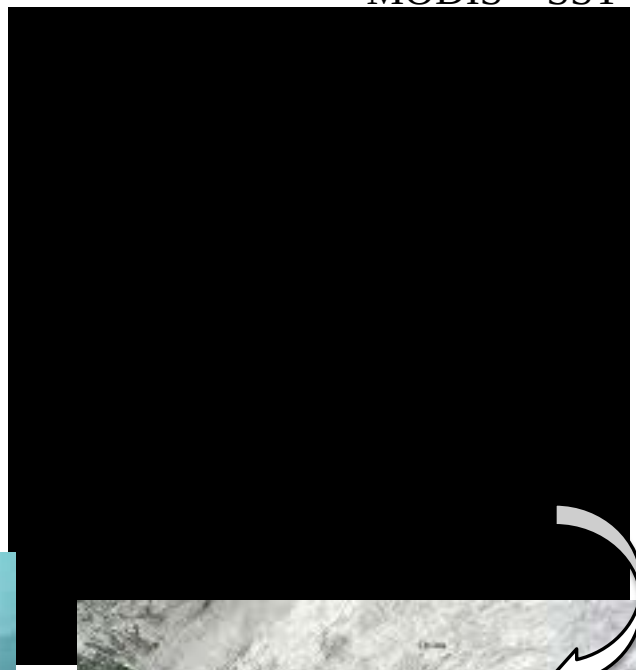


Temporal segregation amongst predatory plankton groups

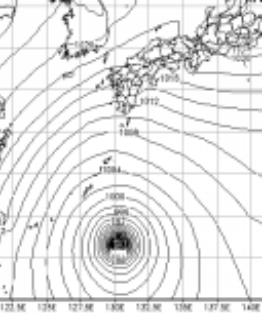


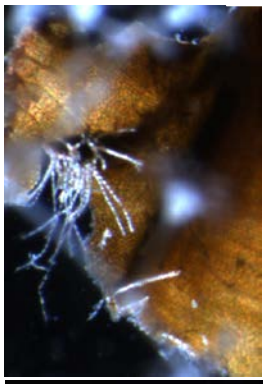
Sampling dur[illegible]tropical cyclones

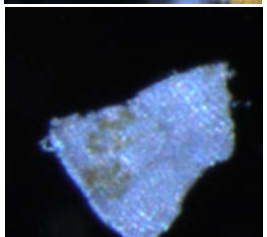
MODIS – SST

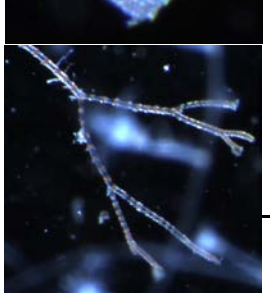


Monitoring of typhoons at short time scales

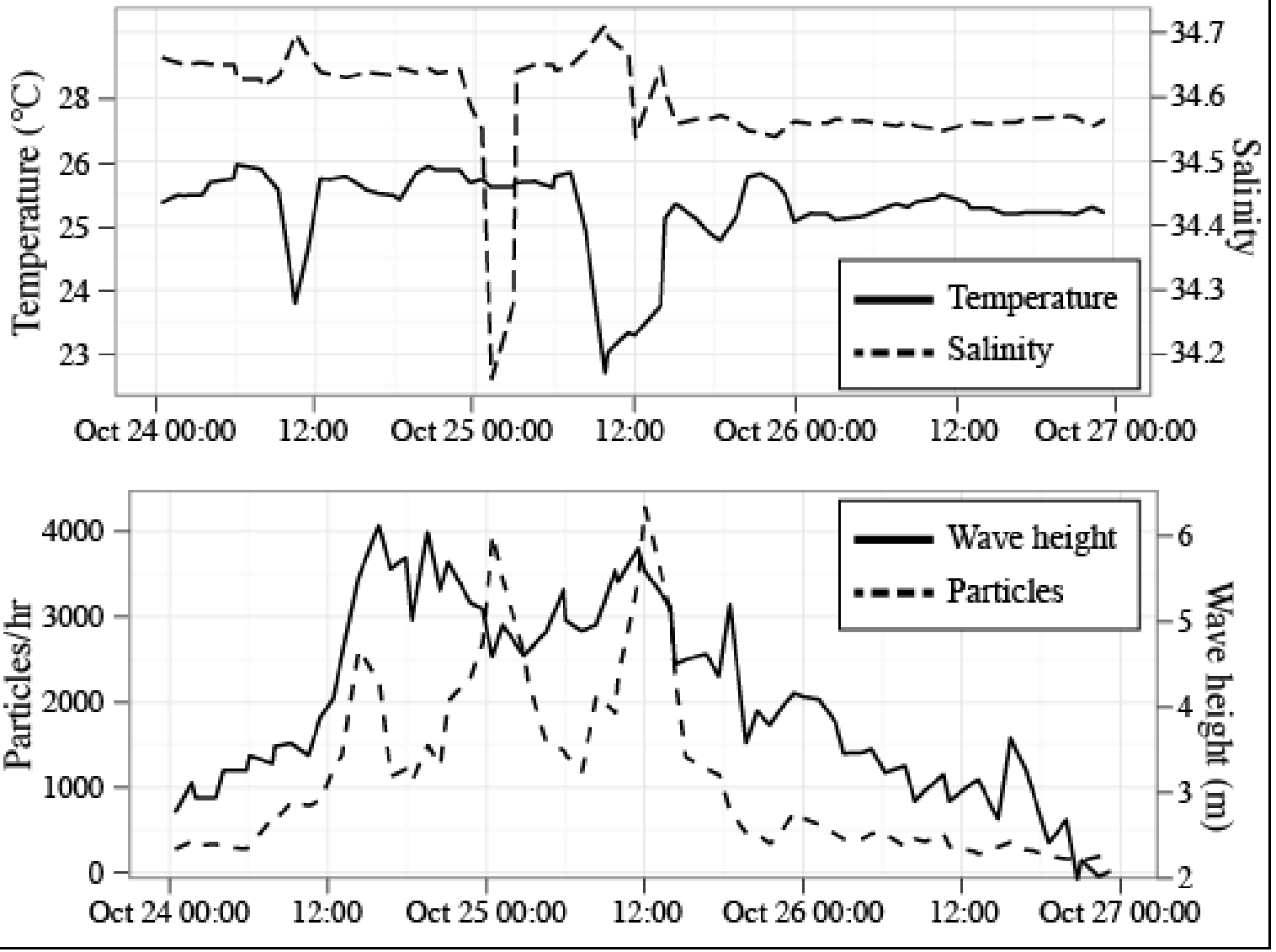




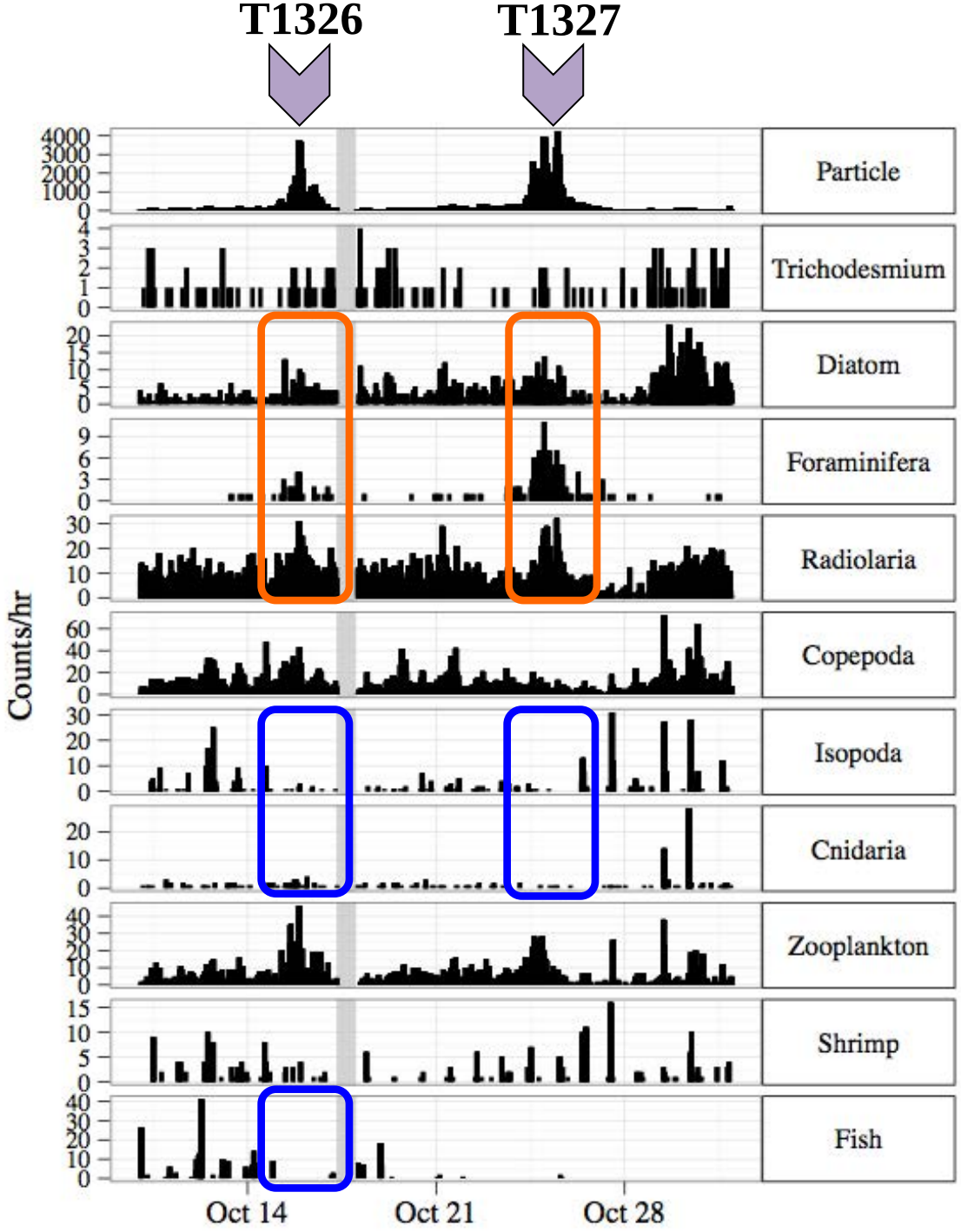




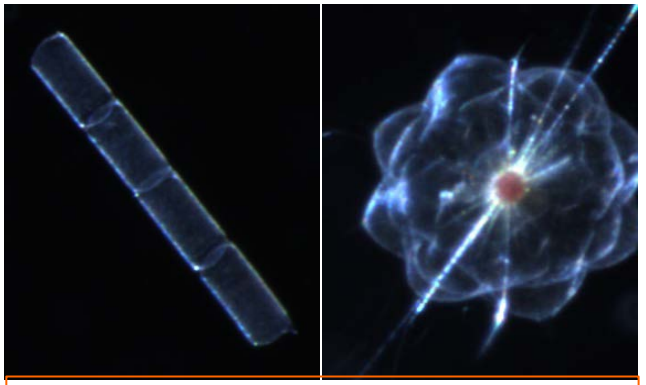
T1327 (1-hour bins)



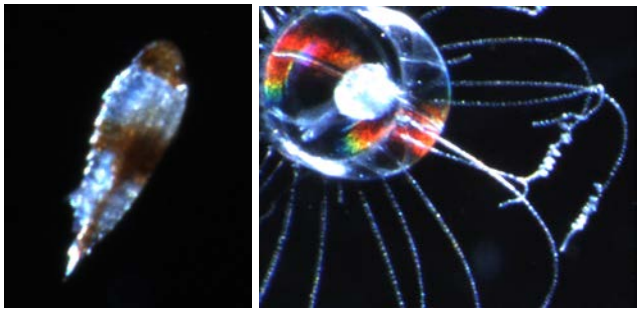
Grossmann, Gallager & Mitarai (*J. Oceanogr*., accepted)



Foraminifera



Diatom – Radiolaria



Isopoda – Medusae

Study of Anthoz[redacted]eding

Comments?

Recommendations?

Ideas?

And thanks to the captain and crew of the *Kuroshio-maru*; Amber York and the rest of the WHOI Ocean Cube team; Shohei Nakada and Yukiko Murayabashi, Koichi Toda, Takeshi Sannomiya and Yuko Hasegawa, OIST; Special Framework budget, Okinawa Promotion for Education and Research Project.