Coral sensor network at Racha Island, Thailand

DR. SORNTHEP WANNARAT (NECTEC)

ASSOC.PROF. KRISANADEJ , ASSOC.PROF. MULLICA JAROENSUTASINEE (WU)

ASST. PROF. U. KUHAPONG, S. SURABAN, P. NOONSANG , S. CHUMKIEW (WU)

TONY FOUNTAIN, MICHAEL NEKRASOV, PETER SHIN (UCSD)

SCOTT BAINBRIDGE, DAMIEN EGGELING, GEOFF PAGE (AIMS)

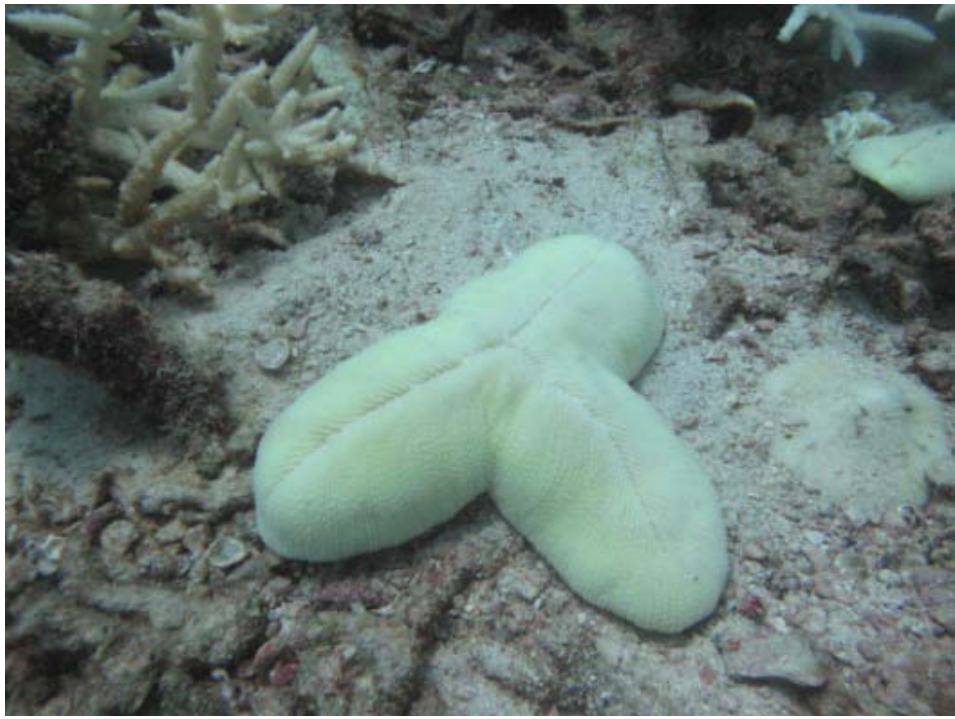
Center of Excellence for Ecoinformatics, NECTEC/Walailak University

Coral Reef Environmental Observatory Network

Racha Island's coral diversity

What cause bleaching events?

- Elevated ocean temperatures
- Reductions or increases in salinity
- Intense solar radiation
- Sedimentation
- Chemical pollutants



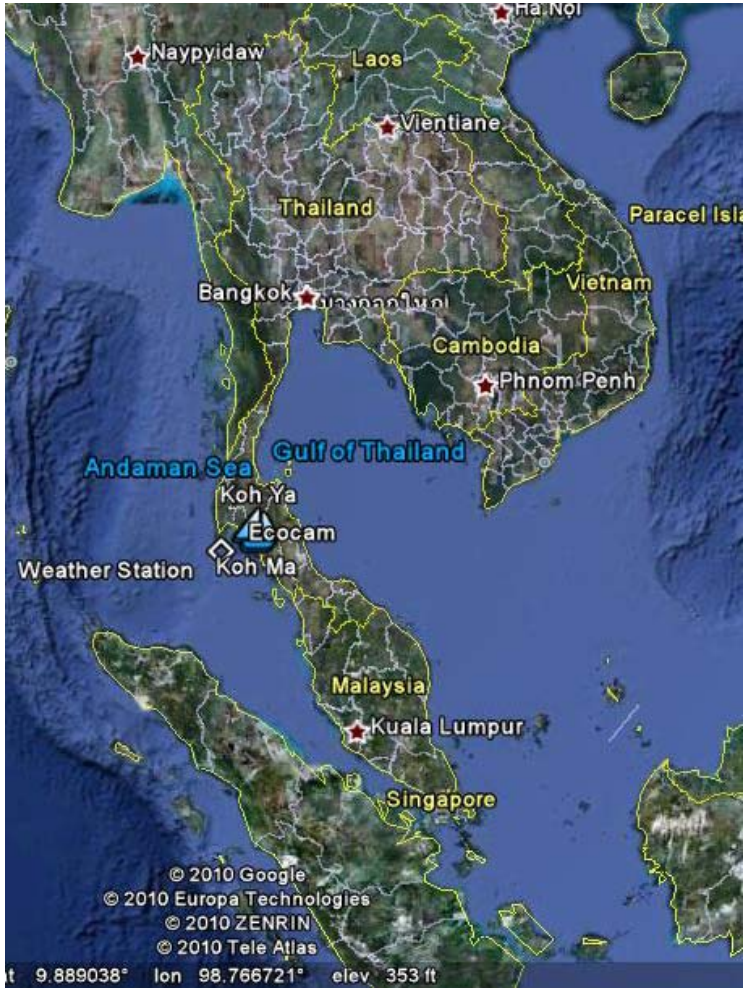
Why Racha Island?

- Large scale coral bleaching was observed at Racha Island in 2009/10 with some of the HOBO loggers recording water temp up to 33.12 °C.
- There were 70-80% coral mortality.

Objective

- We use a sensor network for monitoring a coral ecosystem at Racha Island, Phuket, Thailand.
- This project is part of the Coral Reef Environmental Observation Network (CREON)

Study site



- Racha Island, Thailand is located at latitude 7.61528 °N and longitude 98.37125 °E .

Study Site: Banraya beach

Table 1 Deployed Sensors in Real-Time System

Sensor	Sampling Interval	Types of Measurement	Networked
Weather Station	1 min	Temperature, Rain, Wind, Humidity, Bar. Pressure, Solar Radiation	Yes
CTD	5 min	Conductivity, Temperature, Depth	Yes
HOBO	10 min	Temperature, Lux	No
EcoCam	Cont.	Video	Yes

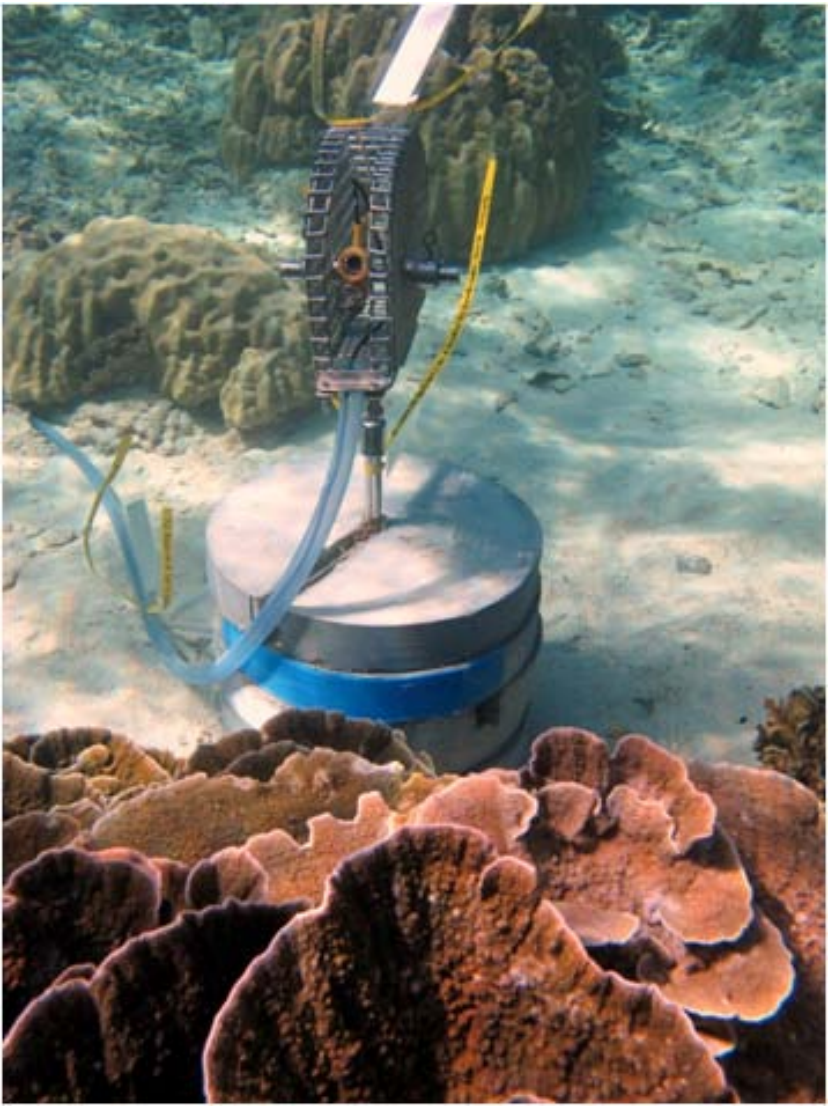
HOBO Light/temp sensor

- On June 2007, we deployed HOBO Pendant temperature and light data loggers.

Weather Station

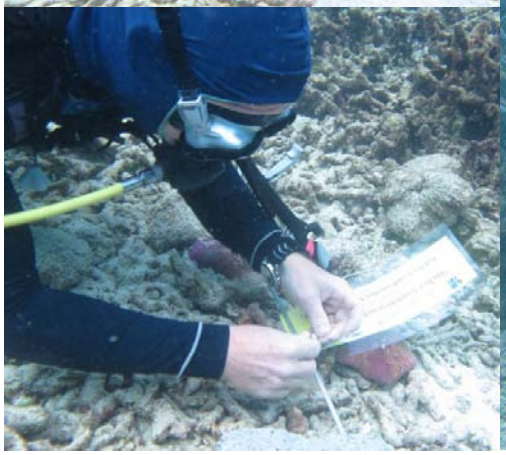
- Davis Vantage Pro II Plus was installed at Racha Island since Nov 2009.
- 26 weather data were measured, e.g. max/min temp, RH, rainfall, UV index, solar radiation, wind speed, wind direction.

Ecocam at Racha Island



- On February 2010, four EcoCams capable of real time video capture were deployed, 2 underwater on the reef and 2 on land.

CTD



- In October 2010, a SeaBird SBE37 CTD was deployed on the fringing reef in 10 m water depth with 5 min sampling frequency.

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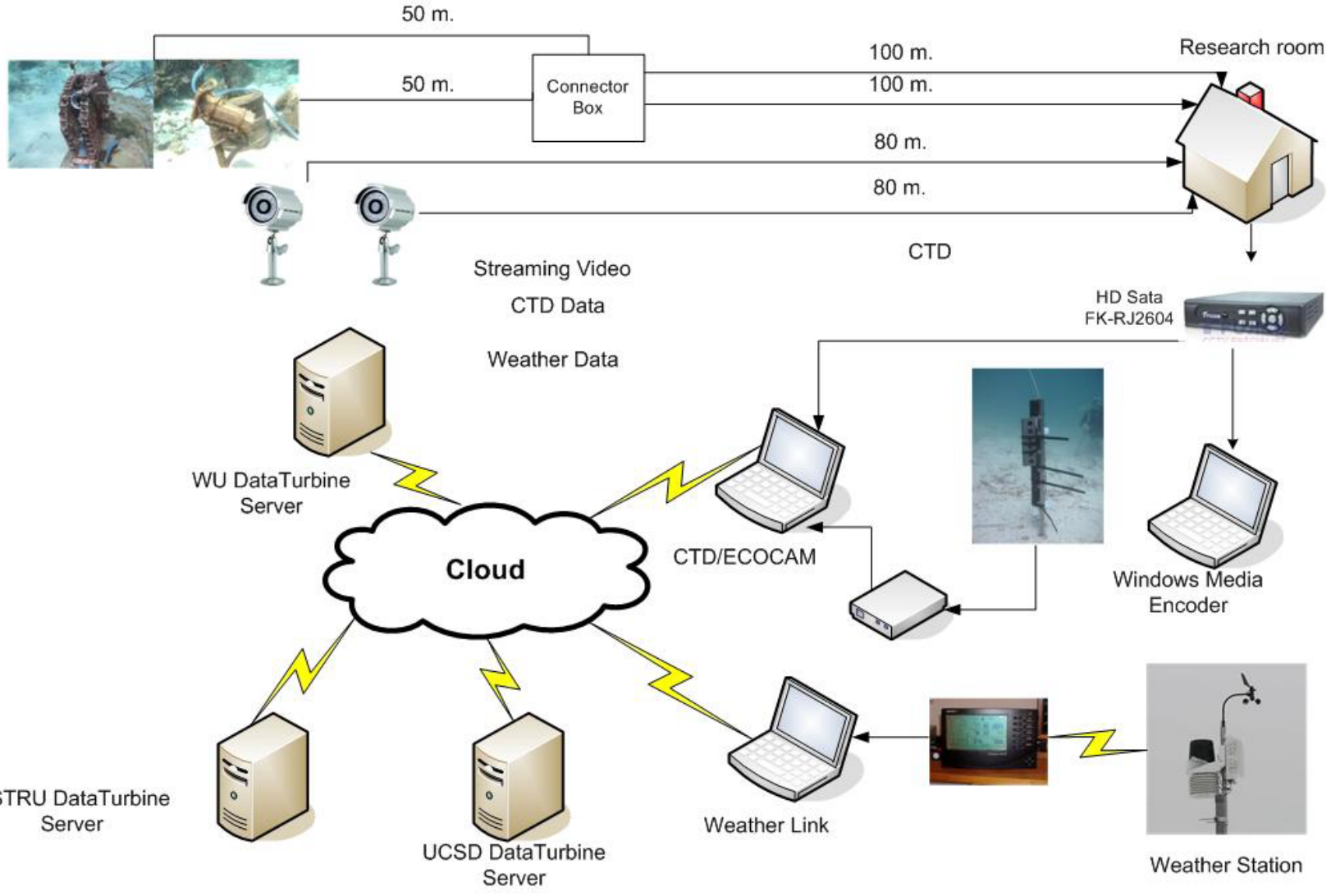
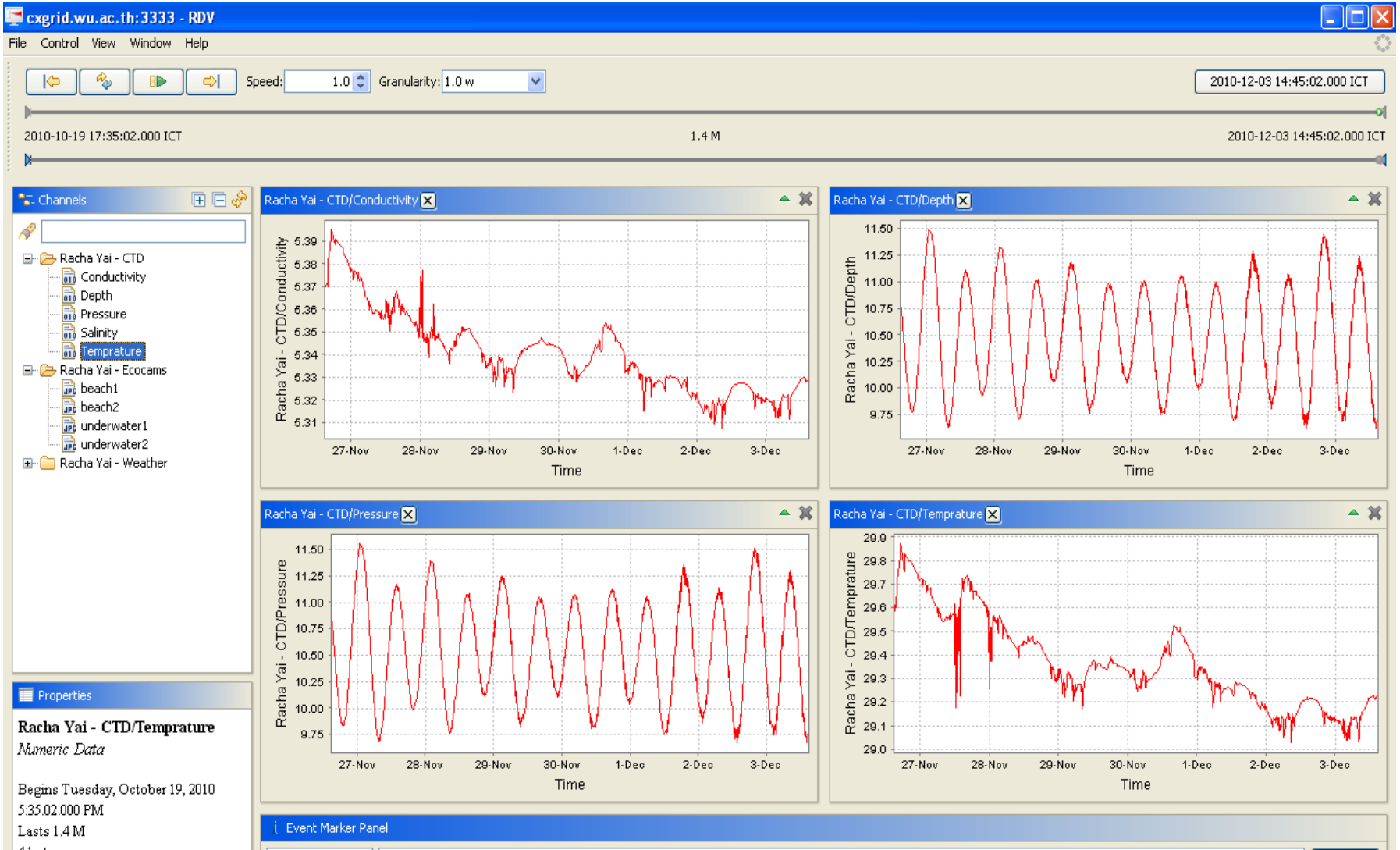
Racha Island System Overview



System Overview of Racha Island, Walailak University

DataTurbine Real-time Data Viewer (RDV): CTD data



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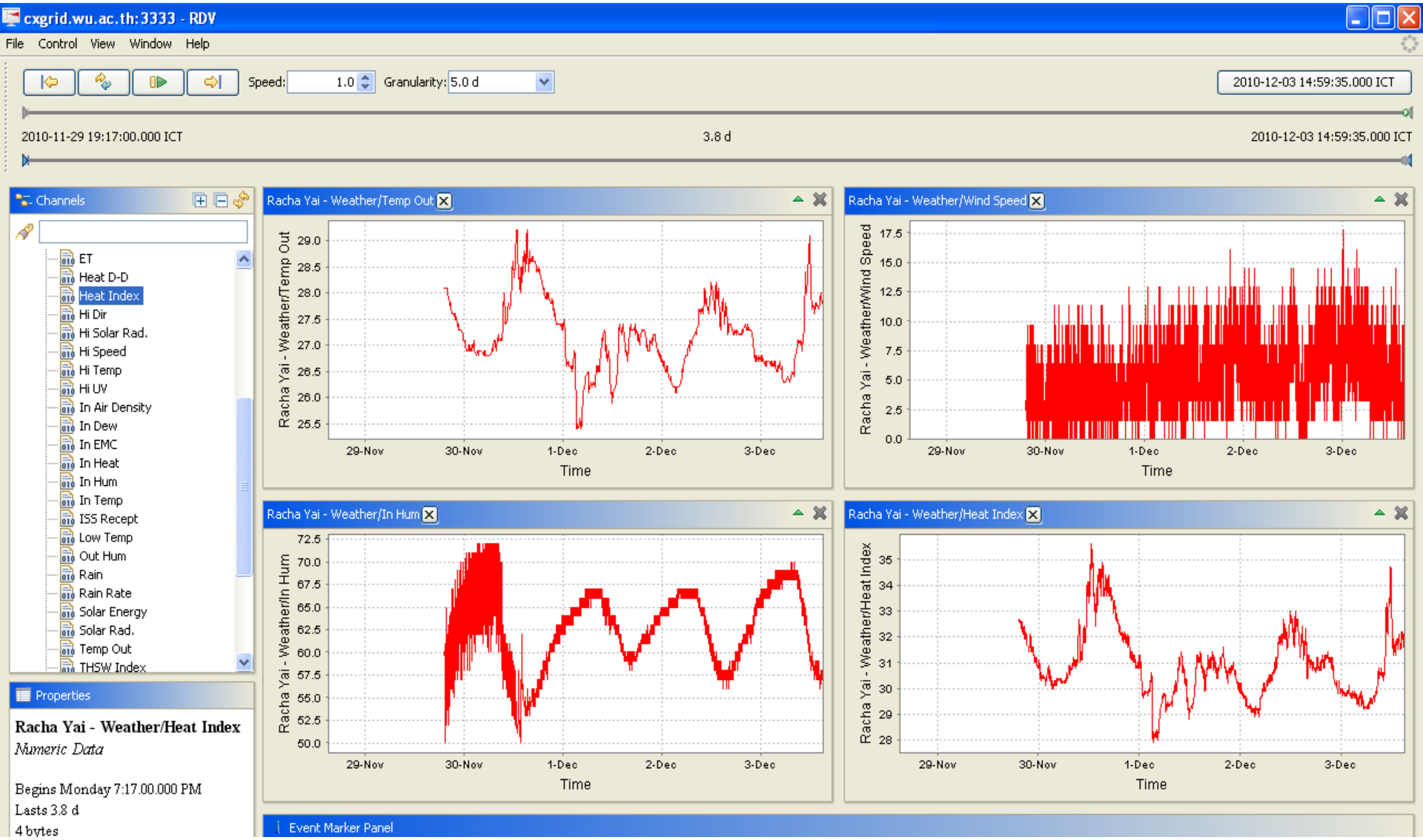
RDV: Weather data



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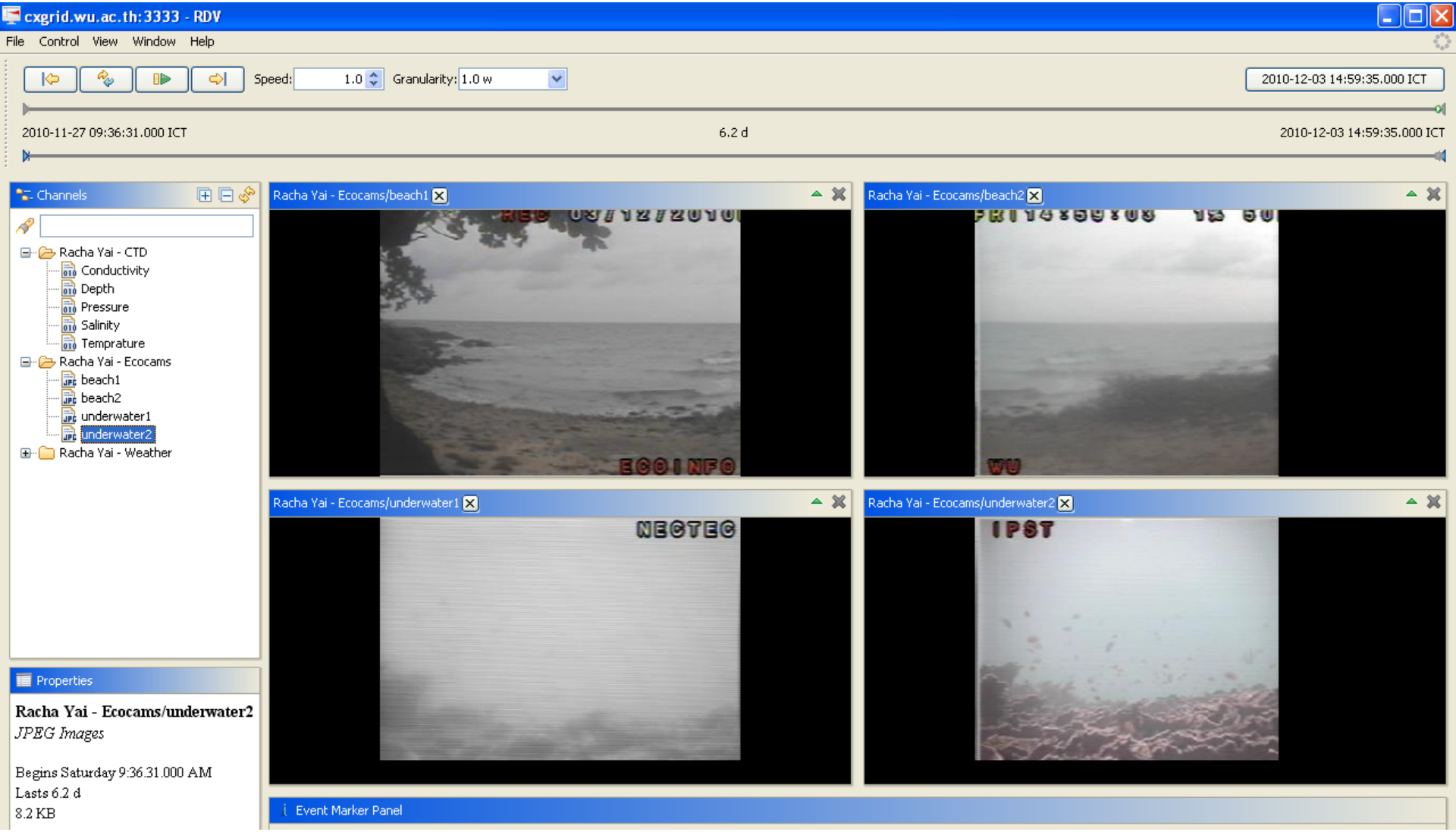
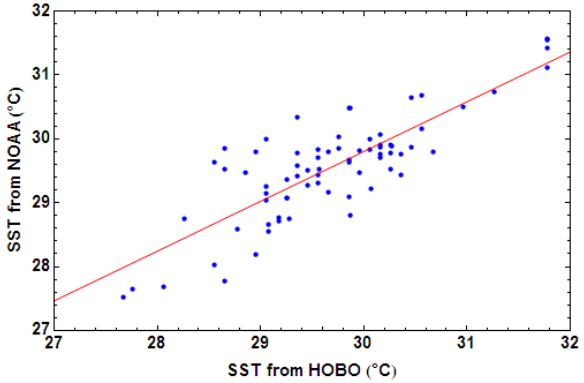
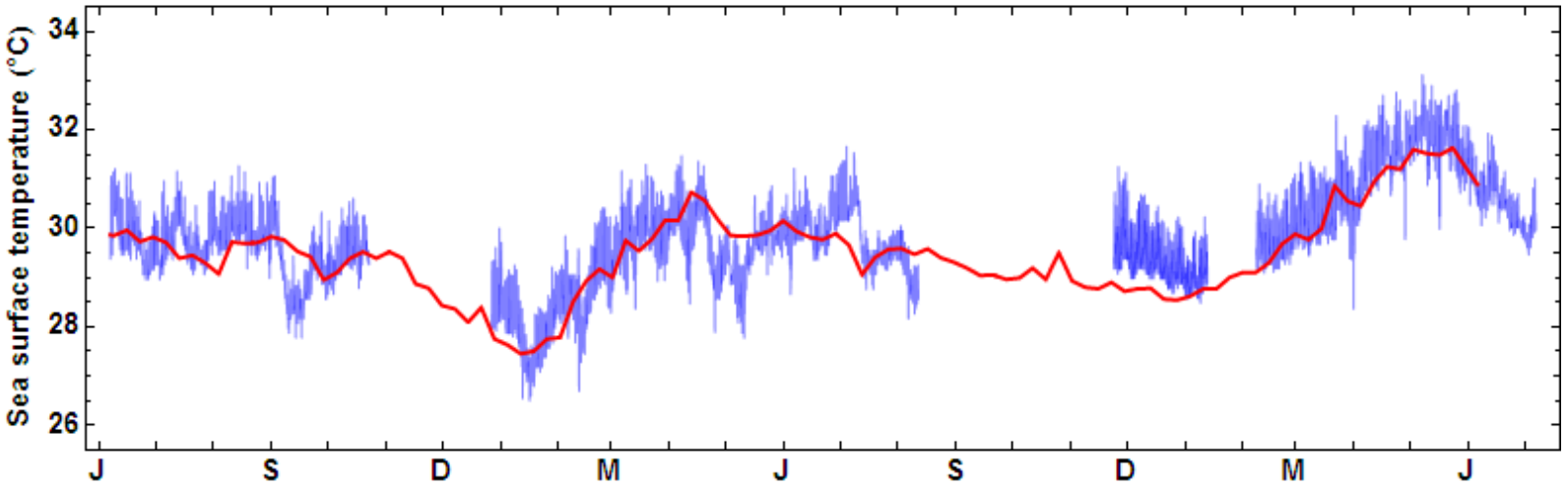
RDV: Ecocam data



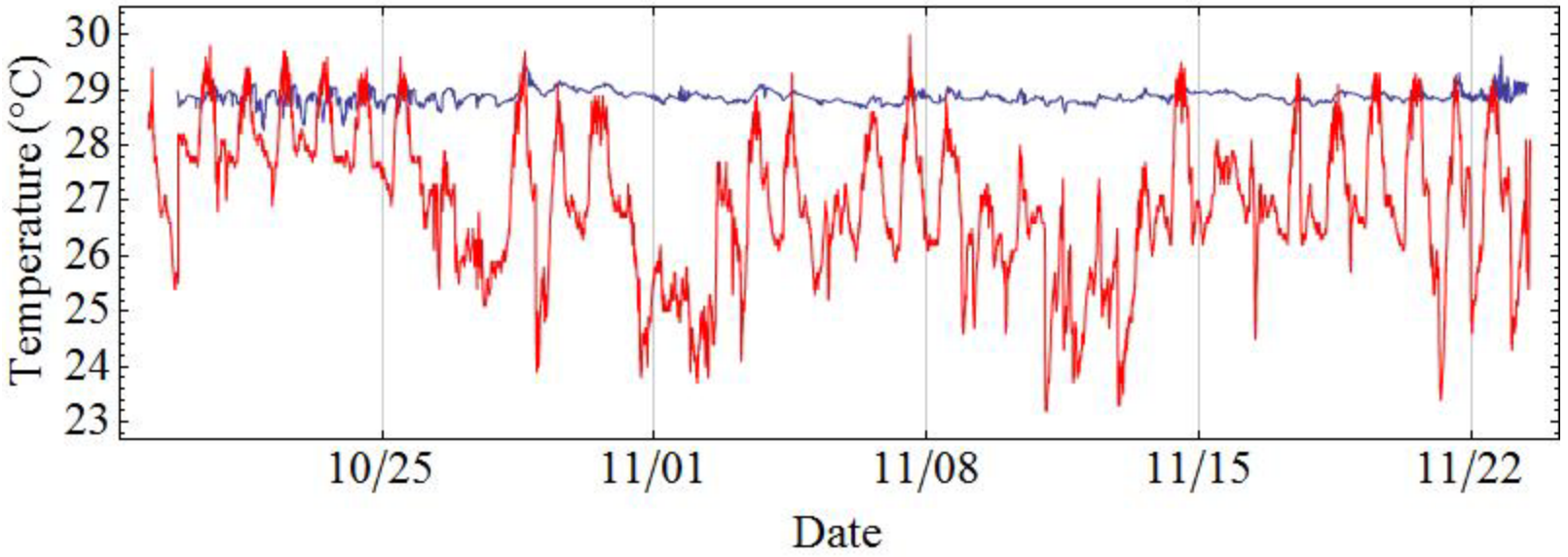
Comparison between HOBO and NOAA data





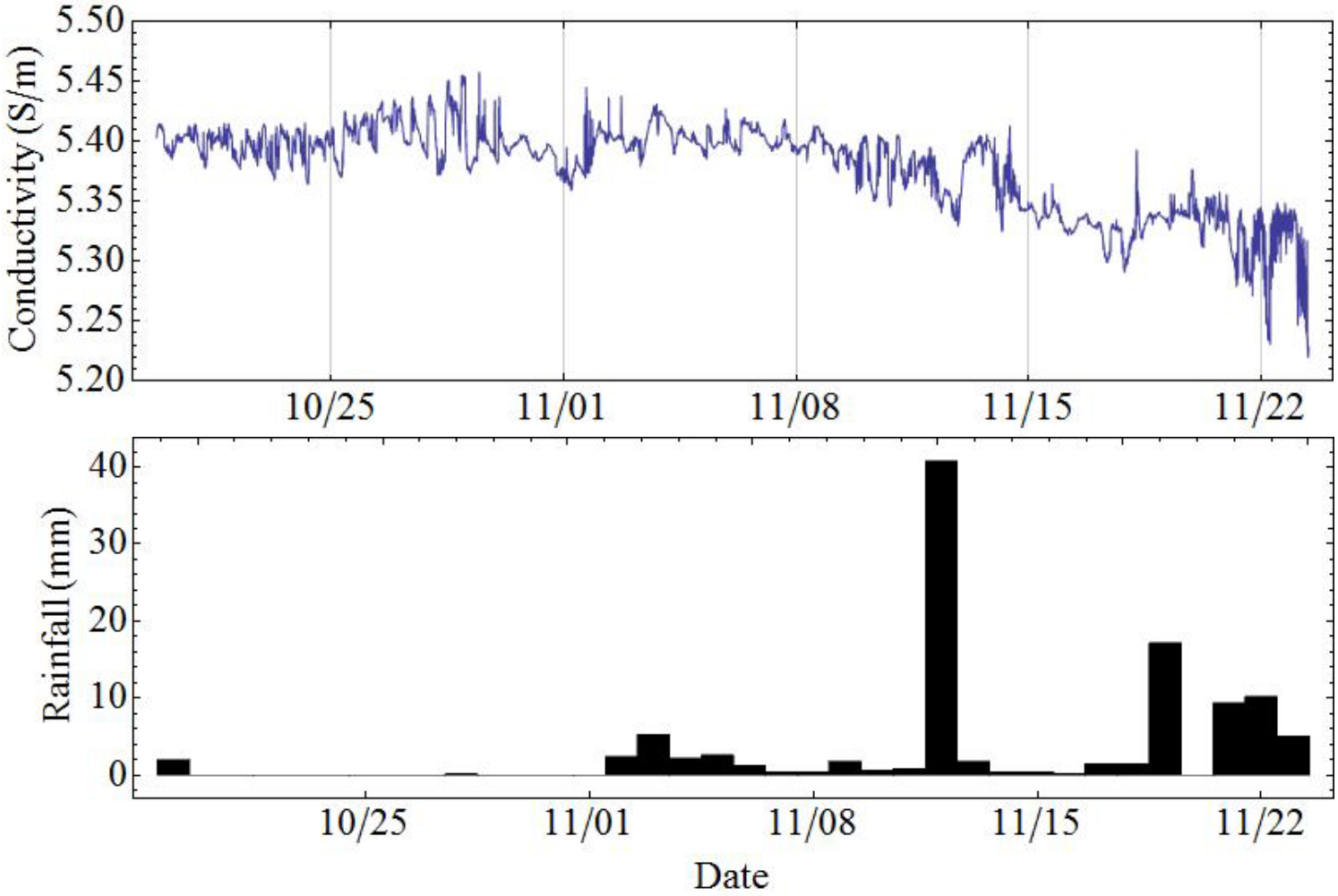
SST from HOBO (blue line) and NOAA (red line):
Racha Island in the Andaman Sea (7 June 2008-7 July 2010)

Sea and Air Temperature



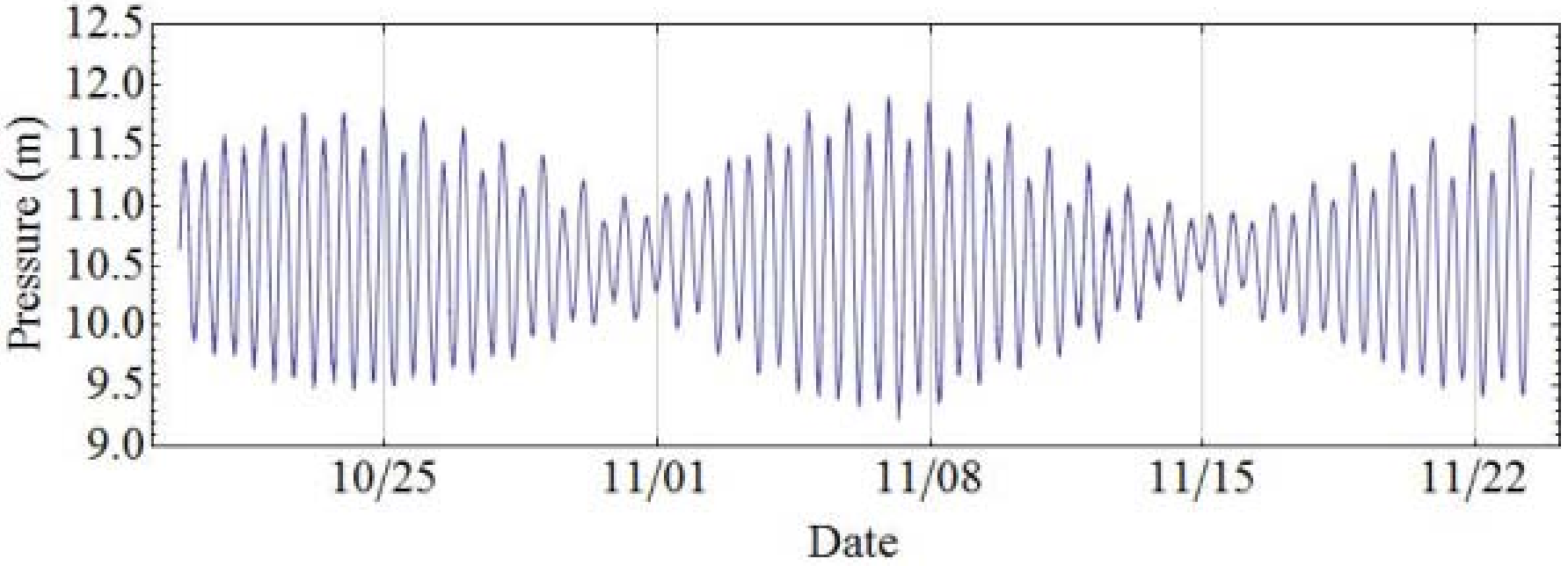
Water temperature (10 m) (28.88±0.12 °C) (blue line) and air temperature (26.96±1.27 °C) (red line). Water temperature at 10 m had a higher mean but a lower SD than air temperature.

Conductivity and rainfall



Mean and SD of Conductivity 5.38±0.06 S/m, Rainfall 3.00±7.40 mm

Depth



- Our pressure results showed that coral reef site at Racha Island was at 10.57 m deep and had a semidiurnal tide with the common pattern of two daily tidal peaks. Maximum tide range from high to low was around 2.5 m.

Conclusion

- The system has been operational since coming on line in 19th October 2010.
- The Data Center services have been very stable.
- The system has been robust to occasional power and network outages, even during through several very heavy storms in early November 2010.

Acknowledgements

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Thank you for your attention