

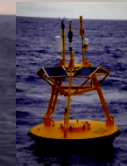
# Operation of a Data Buoy in the tropical W. Pacific

Dongchull Jeon



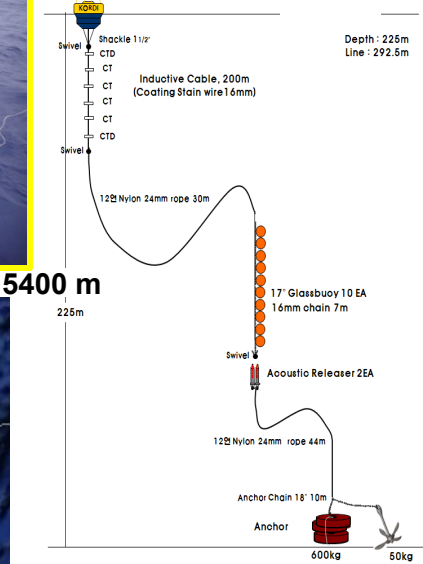
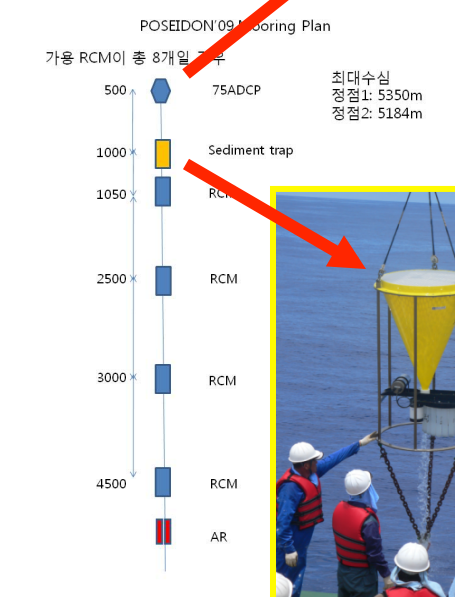
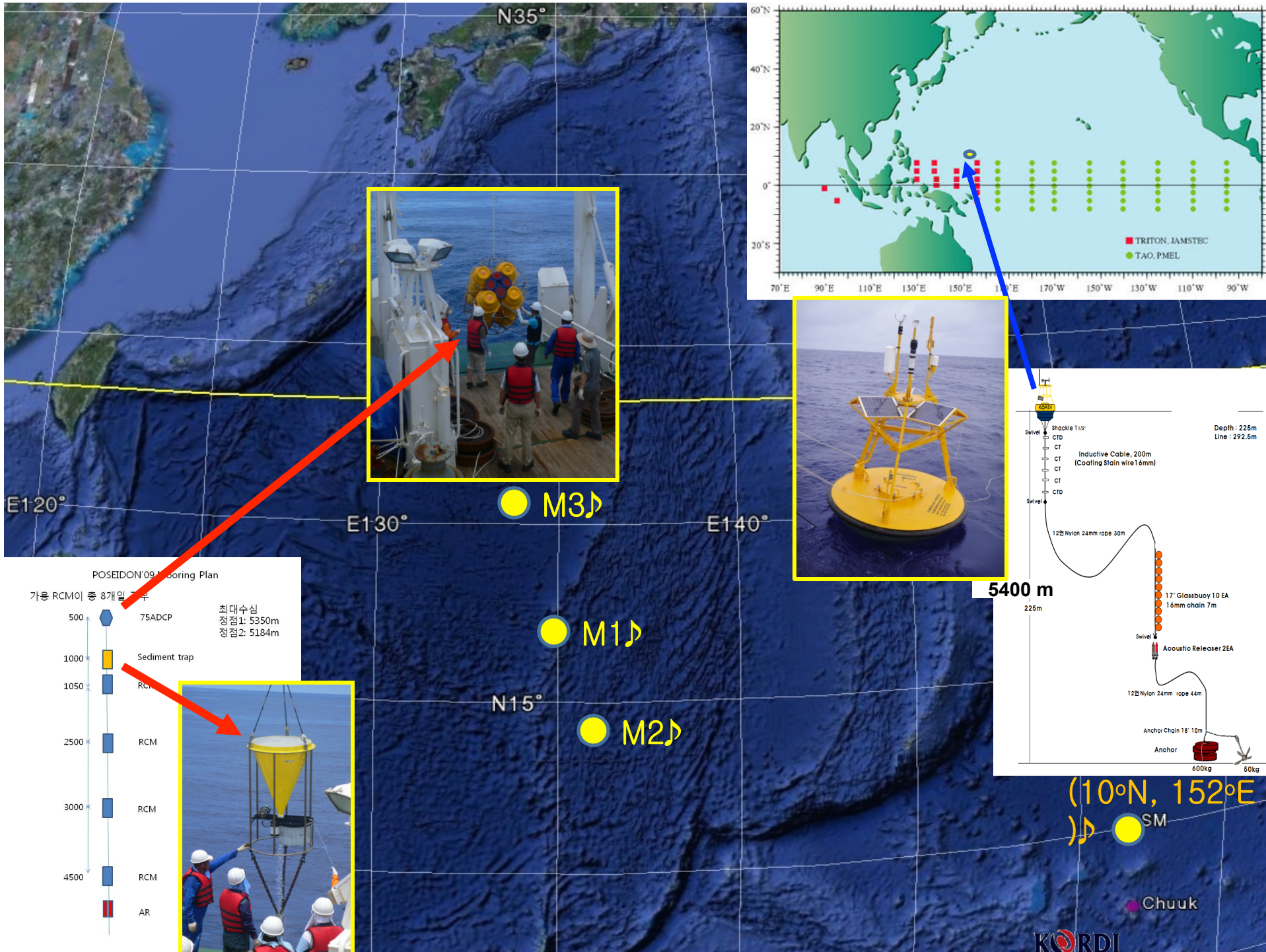
[dcjeon@kordi.re.kr](mailto:dcjeon@kordi.re.kr)

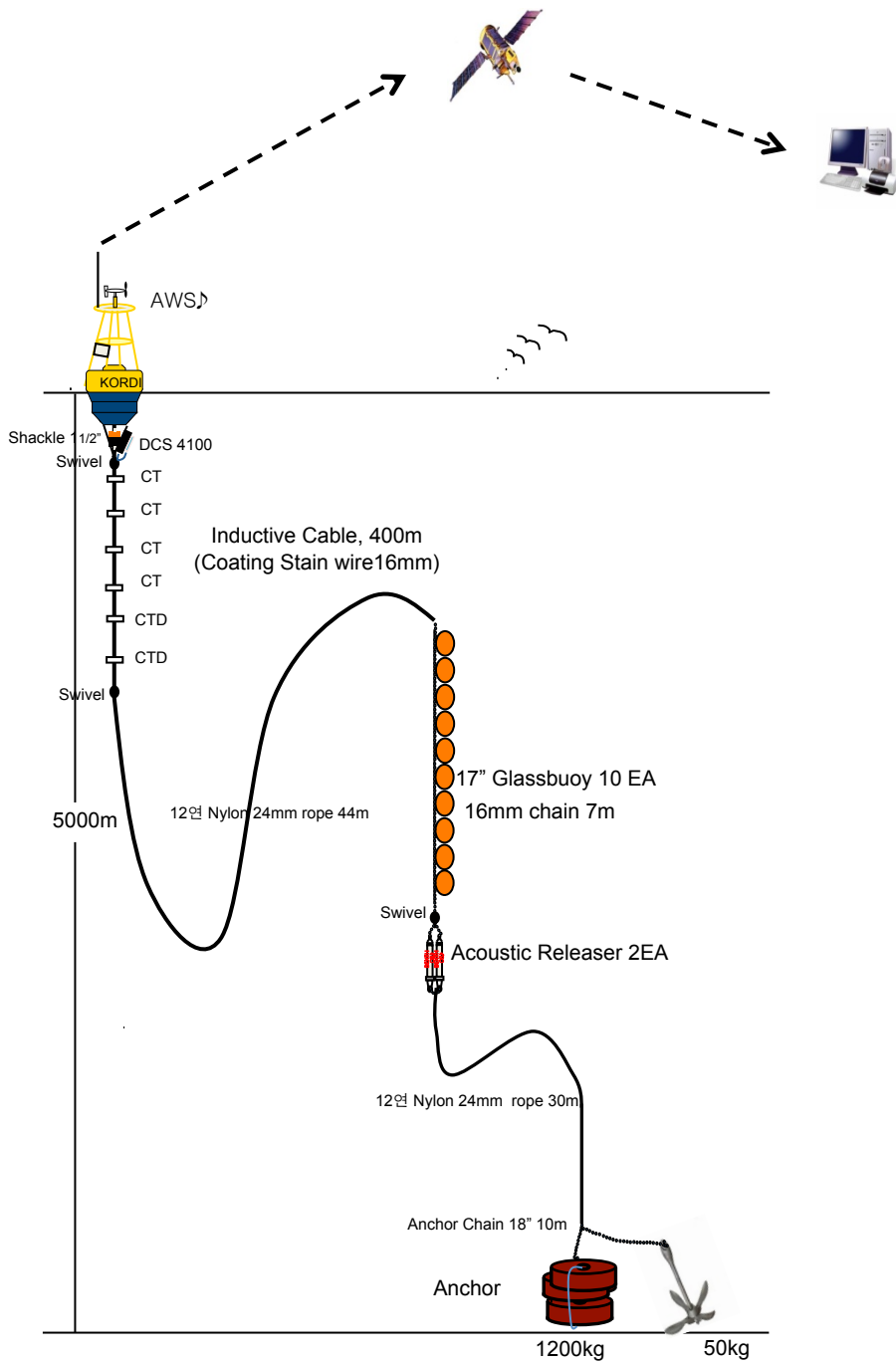
**Contributors:** E.Kim, C.W.Shin,  
S.C.Hwang, D.G Kim



# Where & What to monitor?

- Location : 10°N, 152°E  
(north of Chuuk, Micronesia)  
(h ~ 5000m)
- Buoy Size : D ~ 3.5m, H ~ 1.2m  
(16 Li-batteries, 6 solar panels)
- Data Transceiving : Argos satellites
- Sensors : Meteo., 1 Current-meter (sfc),  
1 CO<sub>2</sub>, 4 CTs (sfc, 20, 50, 100m),  
2 CTDs (150, 400m)

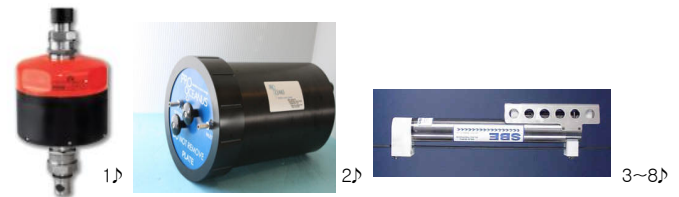




## Specification of Sensors



No.	장비명	모델명	S/N	비고
1	Ultrasonic Wind Sensor	WS425	E3910002	
2	Temp./Humi. Sensor	HMP155	E3220018	
3	Pressure Sensor	278	3511397	
4	Short Wave Sensor	MS802	X47501, X47502, X47503	
5	Rain gauge	50203	1714	
6	Date Processor	CR1000	26971, 26980	
7	Satellite Device	ST20	1093, 1094	
8	Satellite Antenna	12022		
9	Compass	KVH autocomp 1000	090900214	



No.	장비명	모델명	S/N	비고
1	Doppler Current Sensor	4100R	411	
2	Pro Oceanus	PSIPCO2	29-105-45	
3	SBE37-IM MicroCAT	37IM54756	7130	
4	SBE37-IM MicroCAT	37IM54757	7126	
5	SBE37-IM MicroCAT	37IM54757	7127	
6	SBE37-IM MicroCAT	37IM54757	7128	
7	SBE37-IM MicroCAT	37IM54757	7129	
8	SBE37-IM MicroCAT	37IM54756	7131	

# Preparing a Data Buoy System...

- Mar. 2009 : Kordi visited Jamstec (Yokosuka)
- Oct. 2009 : Kordi invited an expert for the  
POSEIDON workshop at Jeju CC
- Feb. 2010 : Mooring groups of Korea/Japan  
discussed at OSM (Portland, USA)
- Apr. 2010 : Kordi visited Jamstec  
(Yokosuka & Mutsu)
- May 2010 : Deploying a surface data buoy
- Aug. 2010 : Kordi-Jamstec meeting (Ansan, Korea)
- Nov. 2010 : send a KORDI technician to Mirai cruise

# 1. Sensor Test

2009.12



# 2. Lab Test (satellite)

2010.3

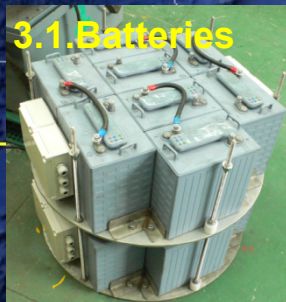


# 3. Assembling

2010.04



# 3.1. Batteries



Tropic-of-Cancer

# 4. Field Test

2010.04-05



# 5. Shipping

2010.5.13



# 6. Preparing

2010.5.21



# 7. Deploying

2010.5.23



SM

Chuuk

N35°

N25°

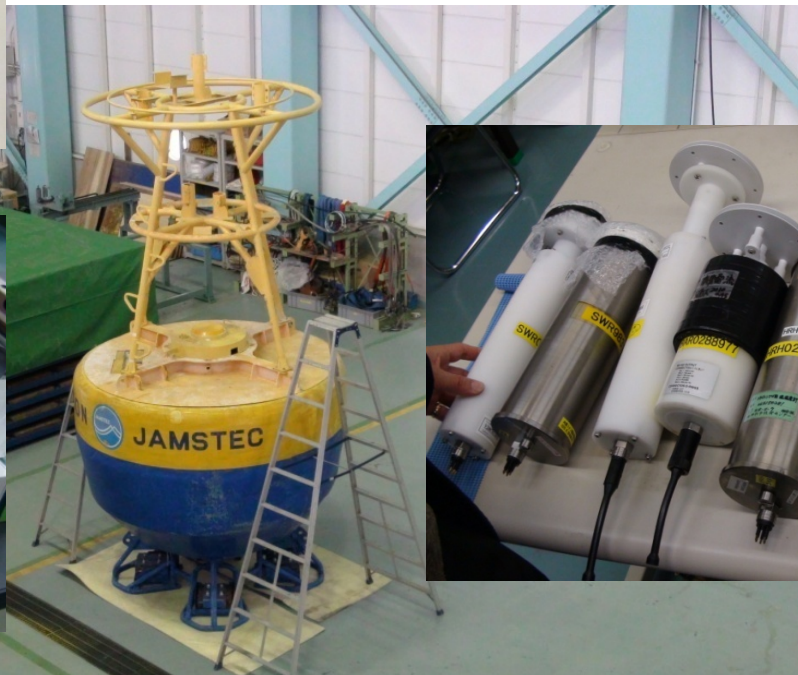
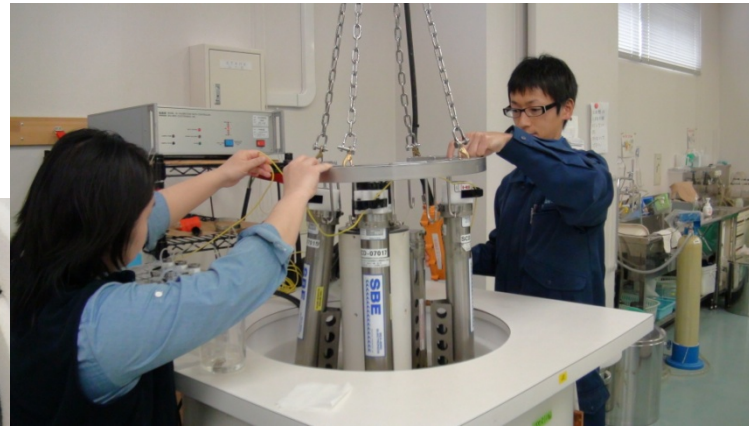
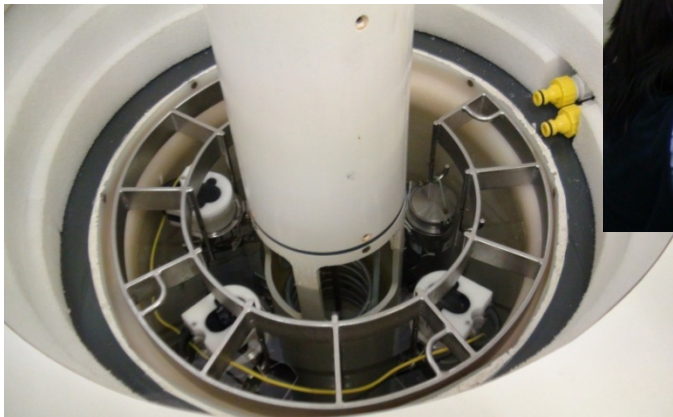
E130°

E140°

E12

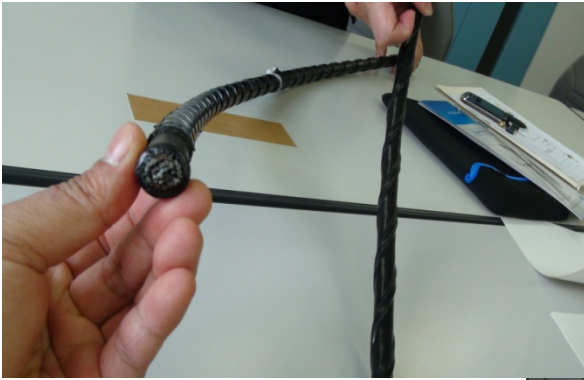
E150

# JAMSTEC calibration system

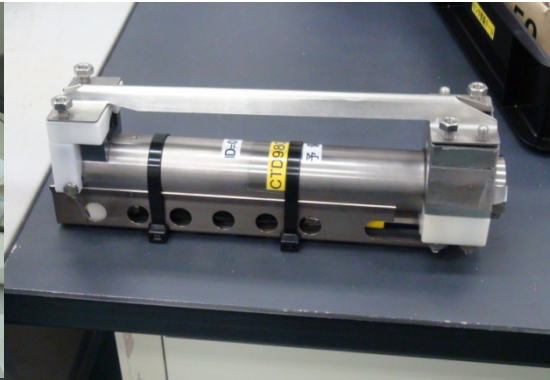


# JAMSTEC's modification

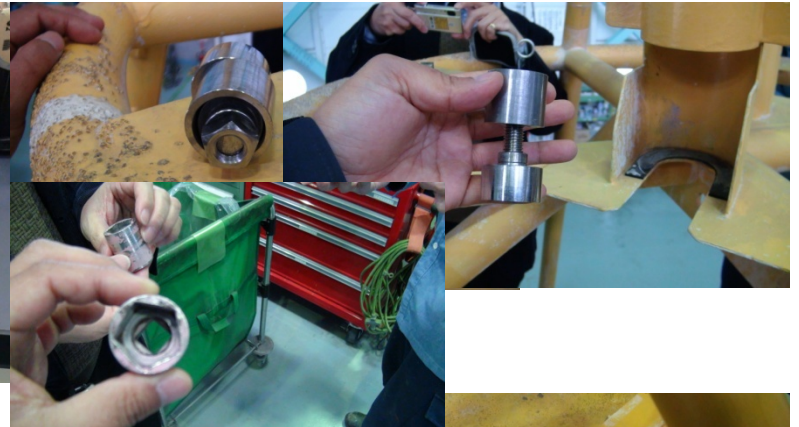
Spiral band over the cable ♪



Wing/no slip ♪



Bolt/nut/protector ♪



Circuit end ♪

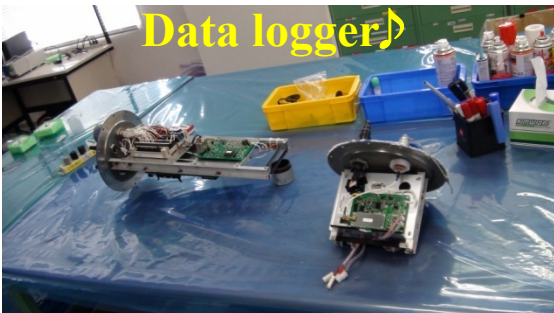


Buoys & alanodes ♪



(corrosion protector) ♪

Data logger ♪

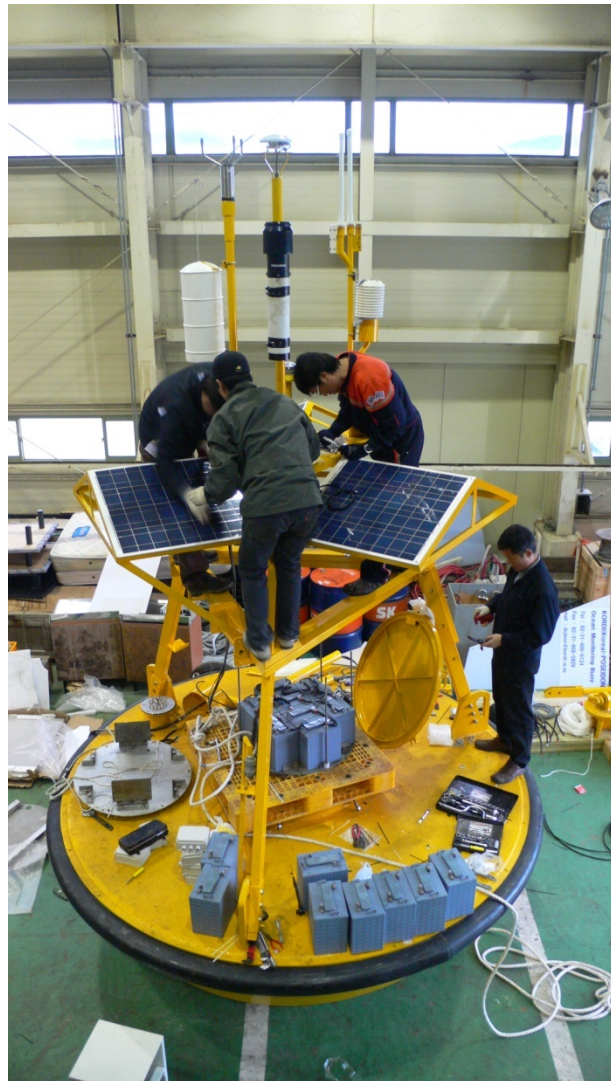


antenna ♪



# KORDI Buoy

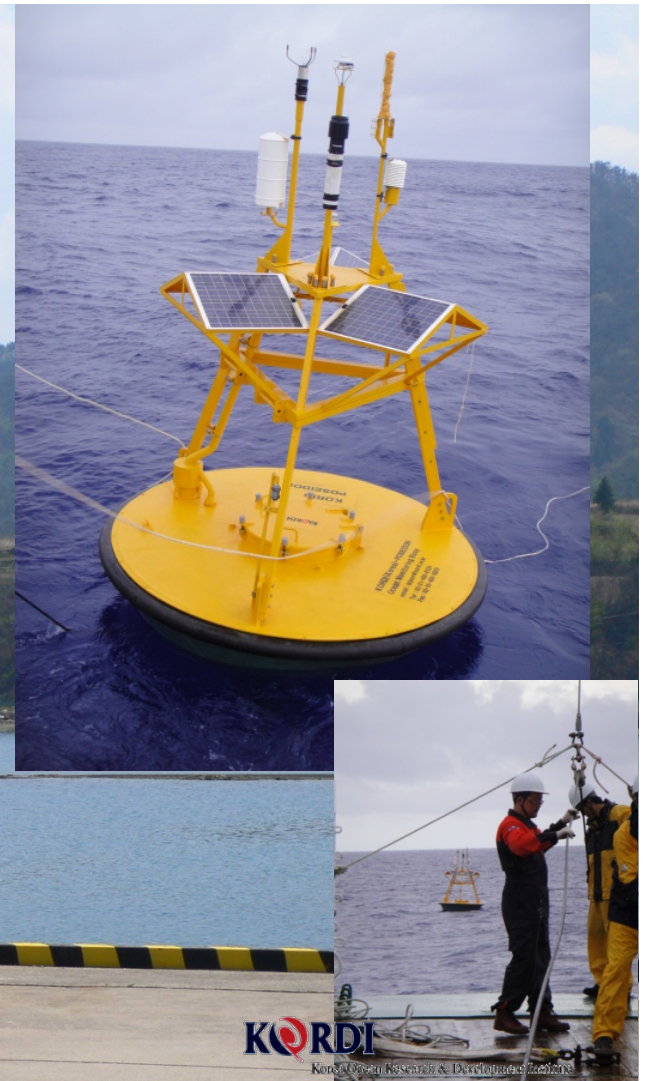
Building up♪



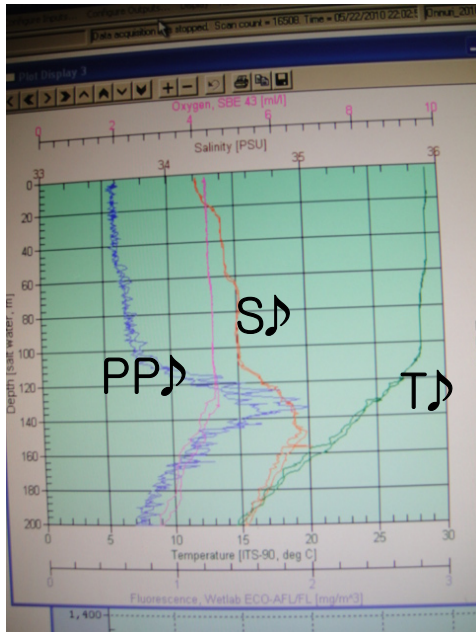
On the pier♪



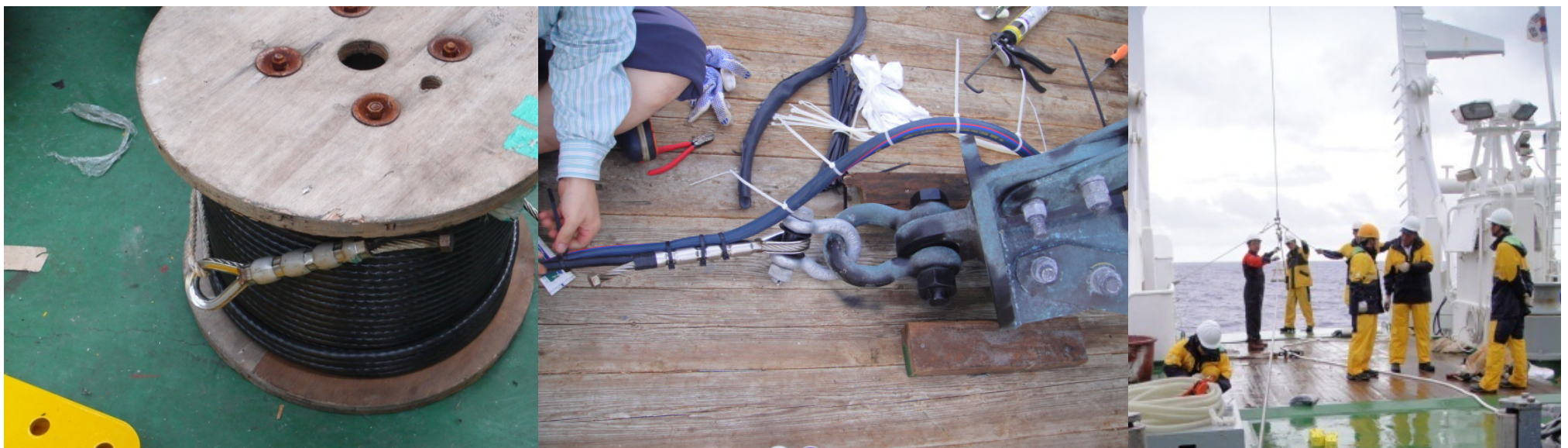
In the sea♪



# 4 CTs (0, 20, 50, 100m) & 2 CTDs (150, 400m)



# Inductive Cable (~400m)



Ending (sea earth) → corrosion problem♪  
(Zn-plate)♪

Cable defect → careful deploying/winding♪  
(taping)♪

Current drag → tail (faring) or ♪  
spiral band♪



# Current meter CO<sub>2</sub> flux sensor



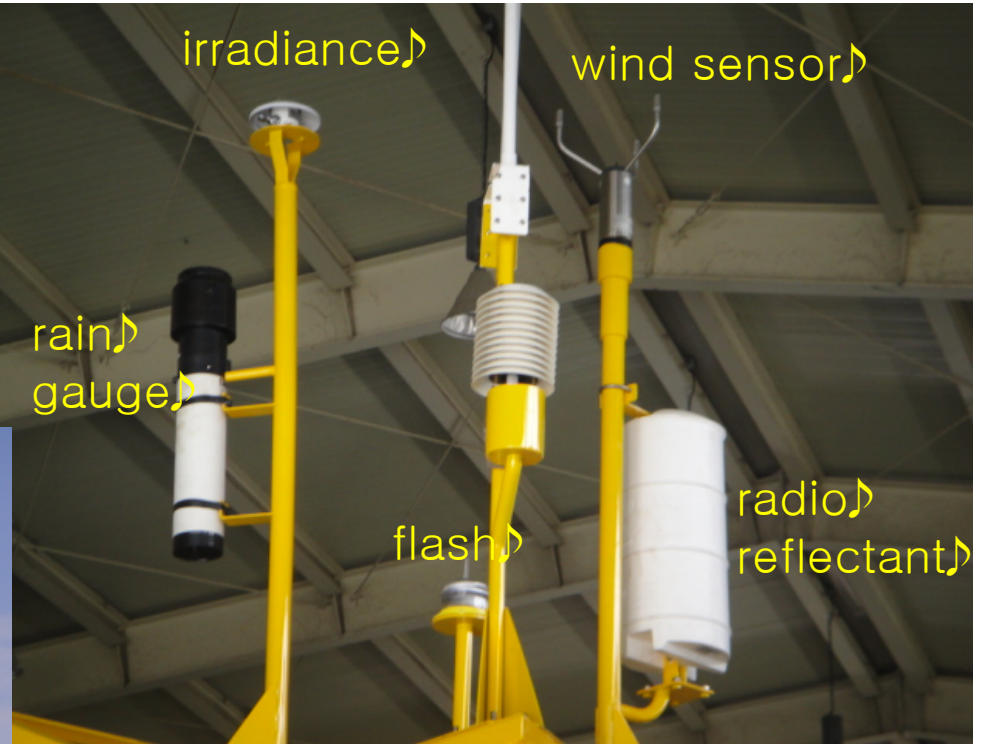
# Meteo. sensors

rain gauge♪



irradiance♪

wind sensor♪



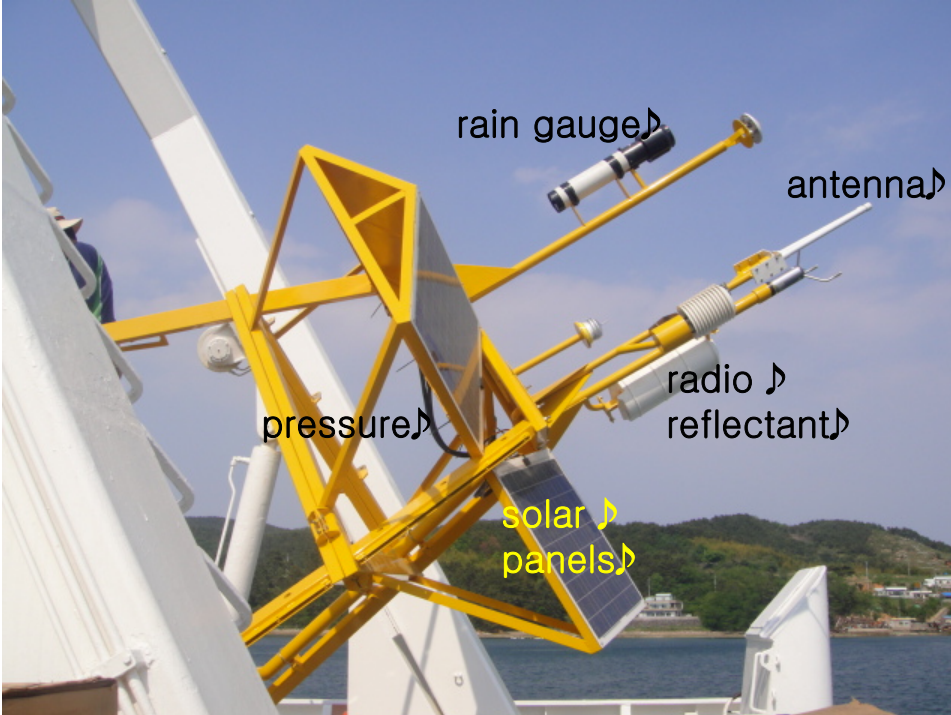
rain gauge♪

antenna♪

pressure♪

radio reflectant♪

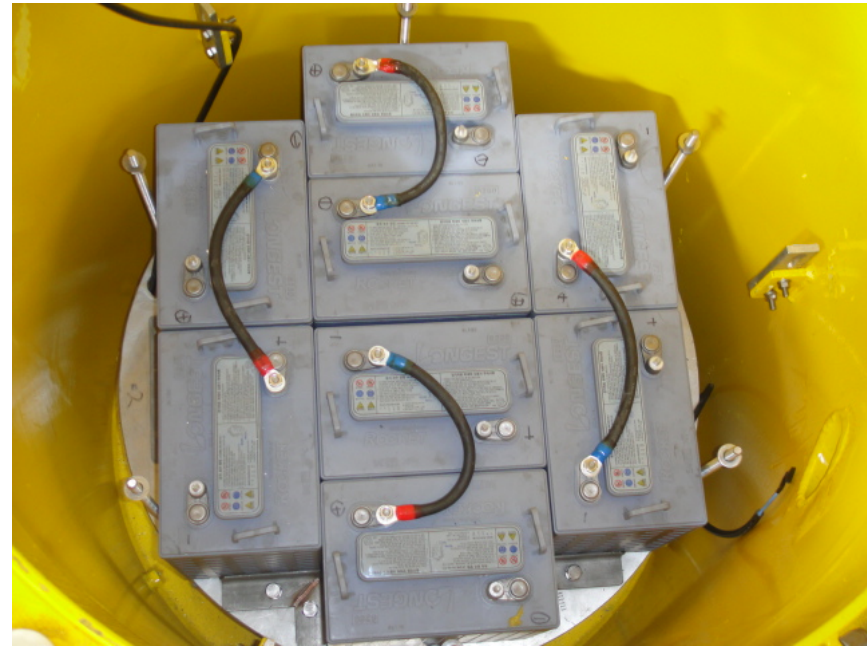
solar panels♪



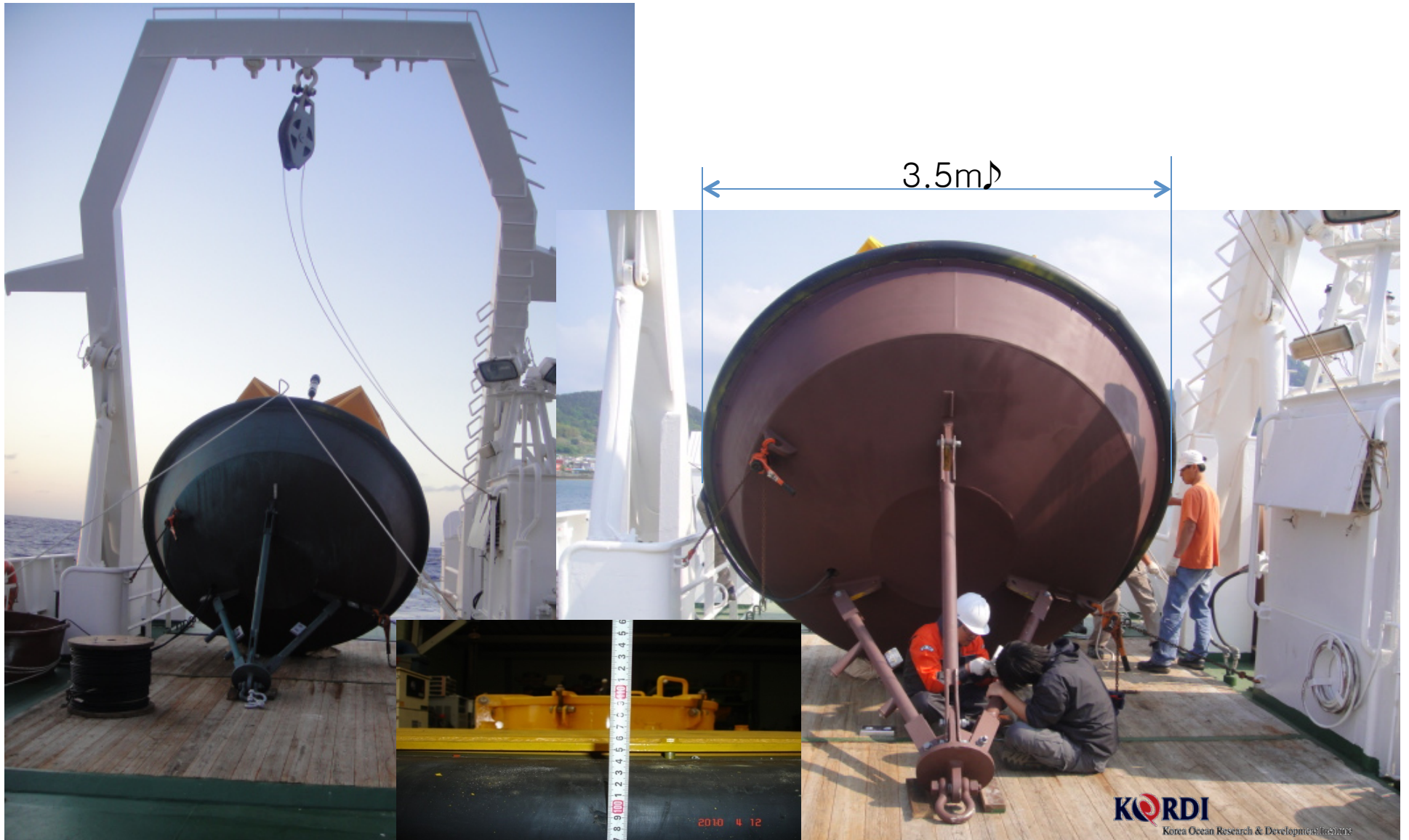
humidity♪  
temperature♪



# Data Logger Li-batteries



# Buoy on the deck

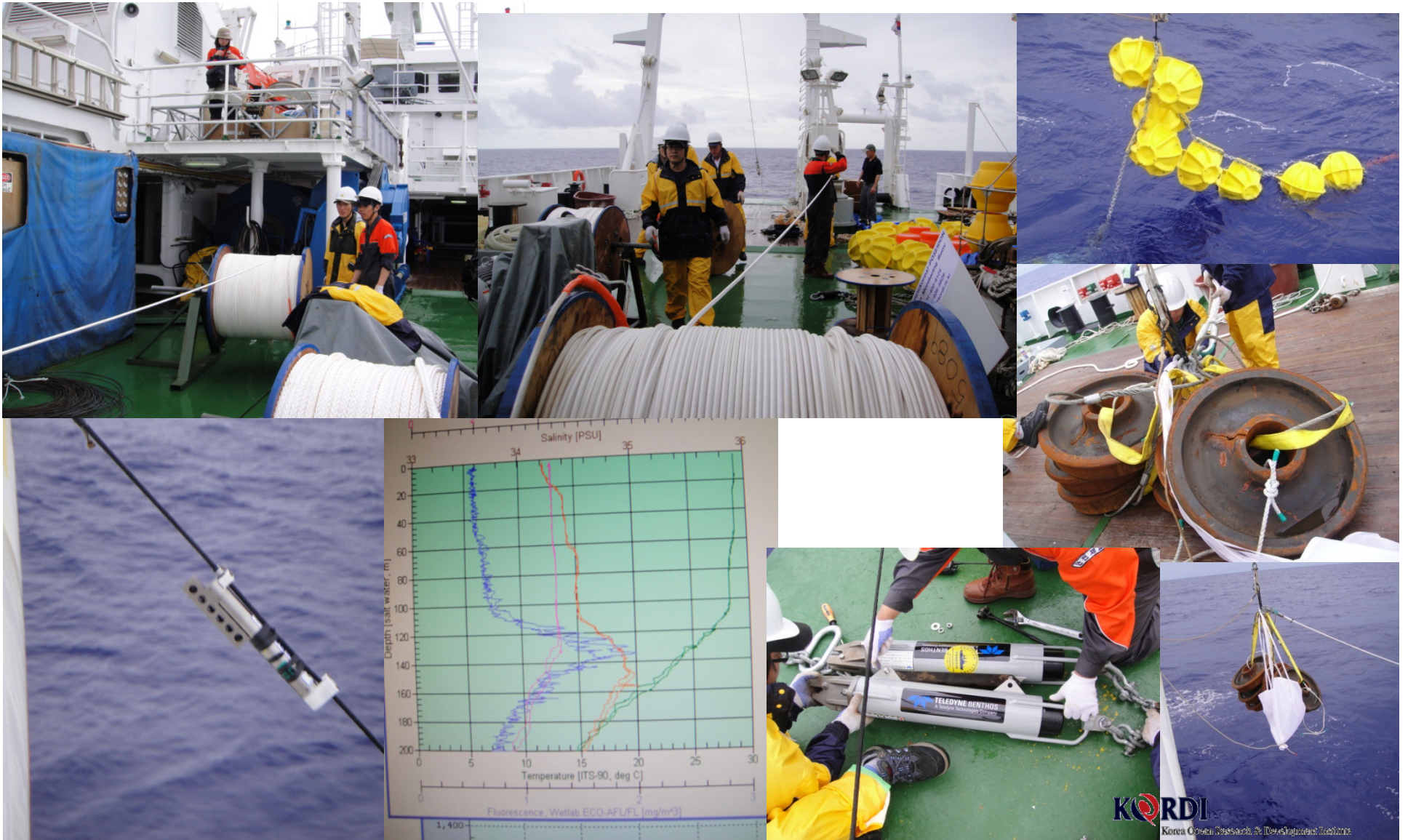


# Deploying on May 23, 2010



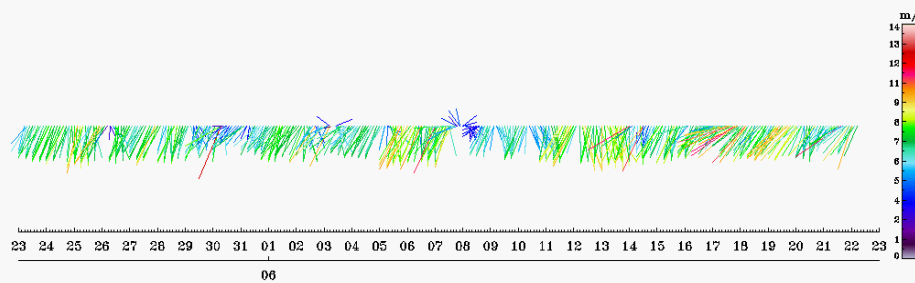
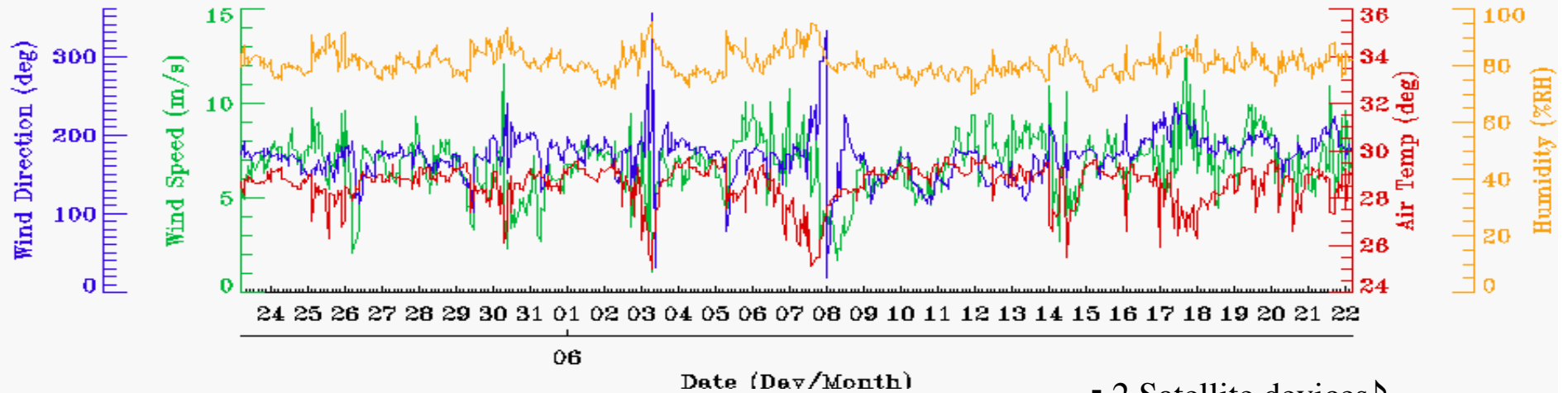


# Deploy Sensors, A/R, Weights

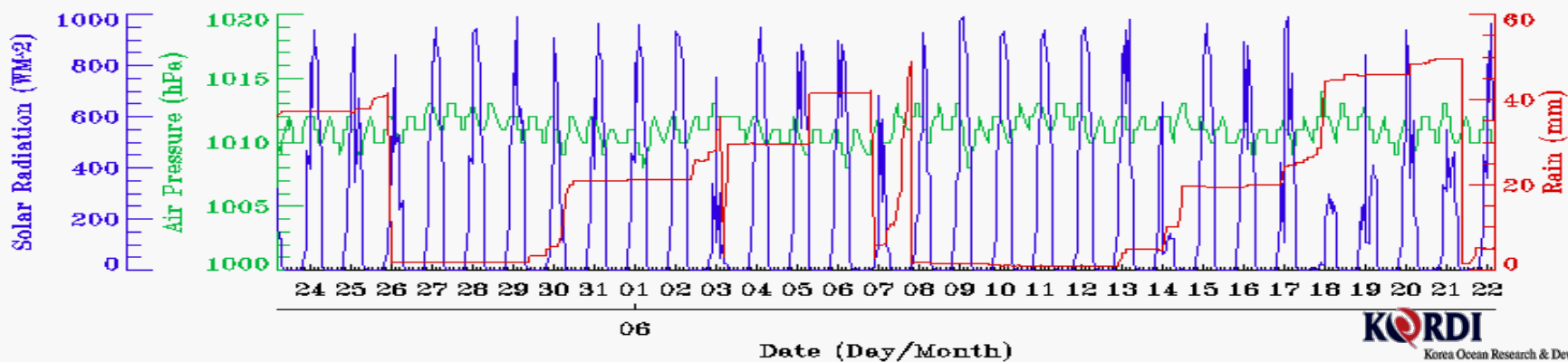


# Real-time Data Sample

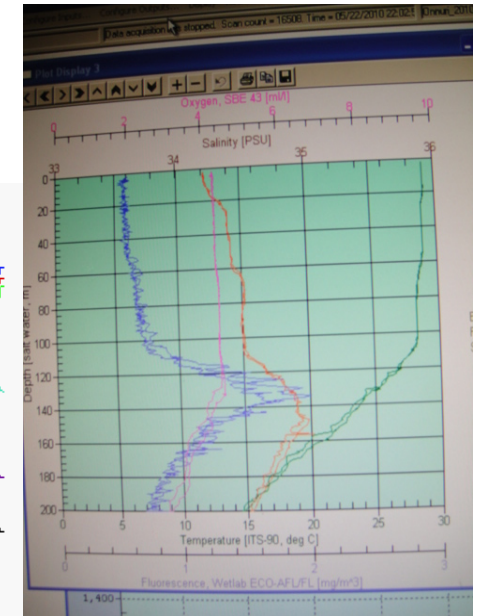
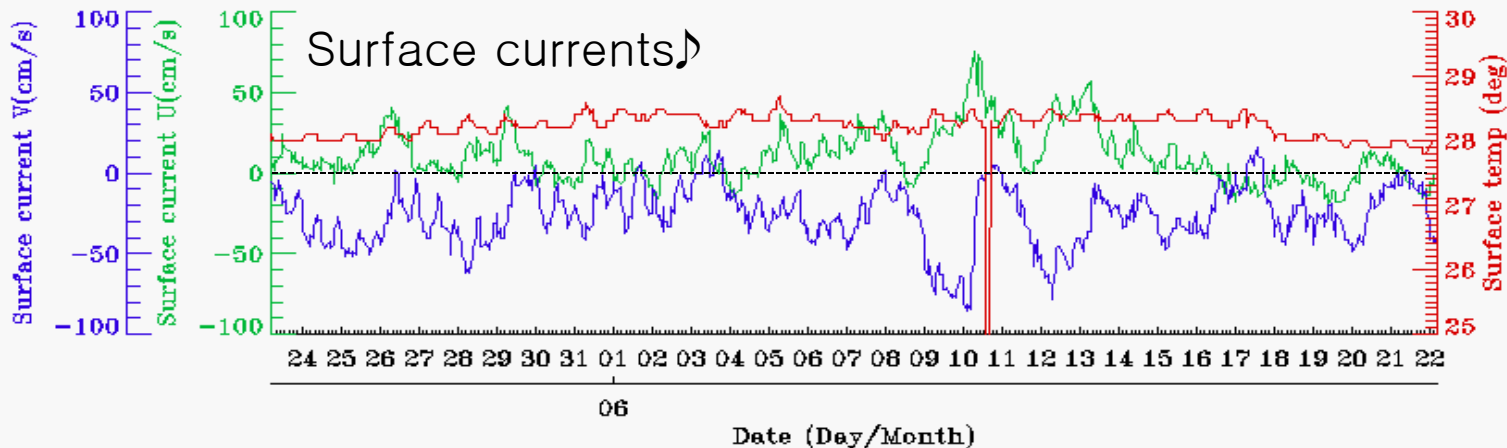
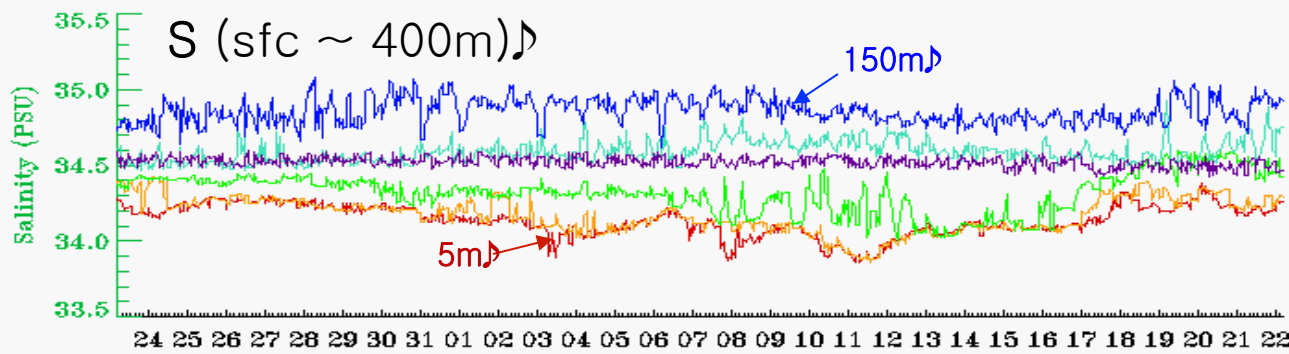
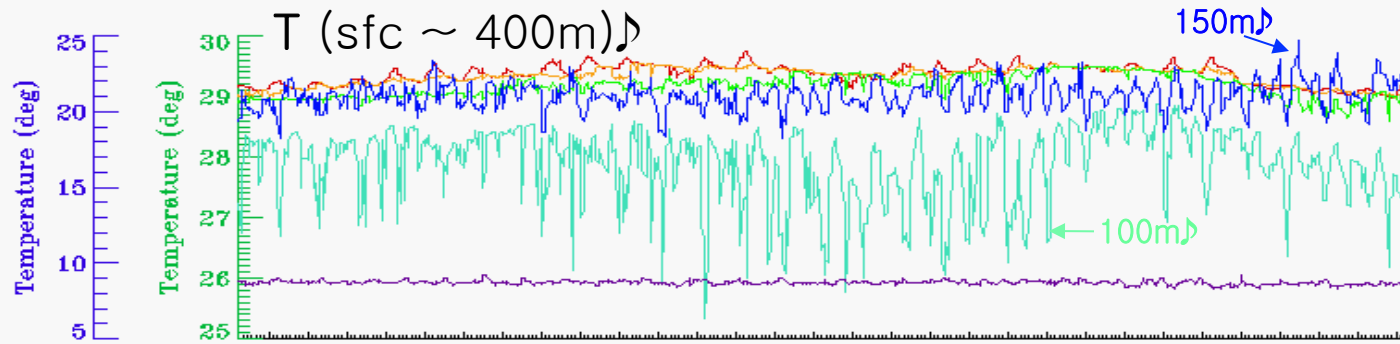
- Argos 2 satellite system
- # of Parameters -> 25
- interval -> 10min
- Data-logger -> raw data ♪



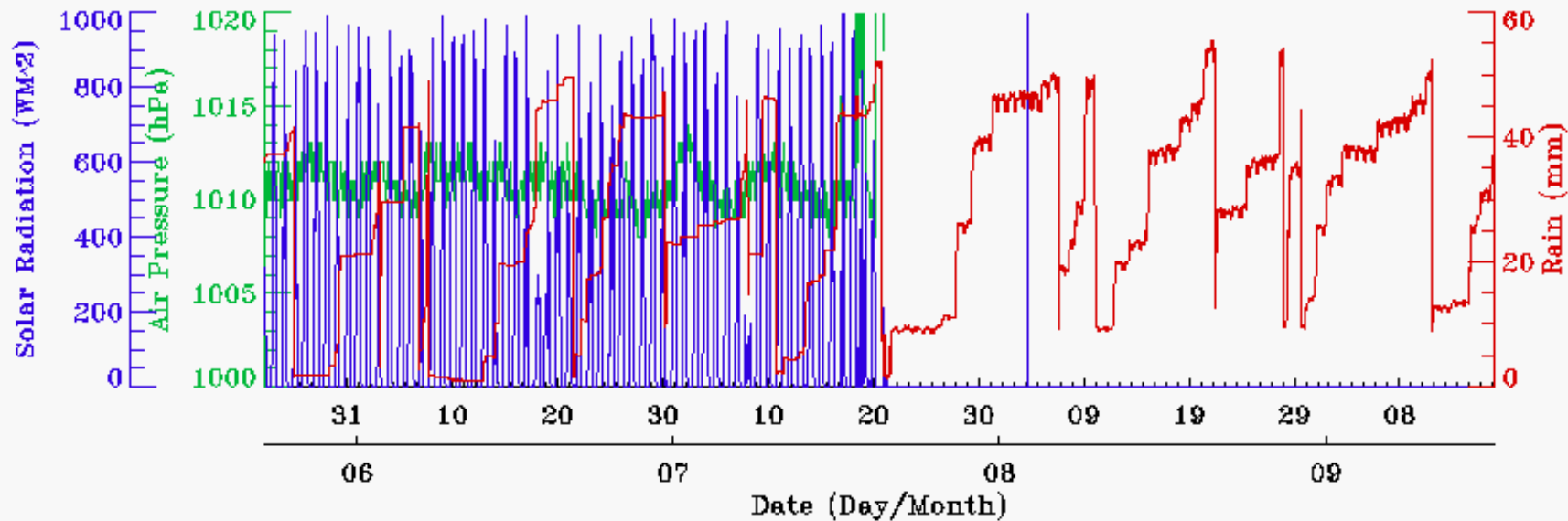
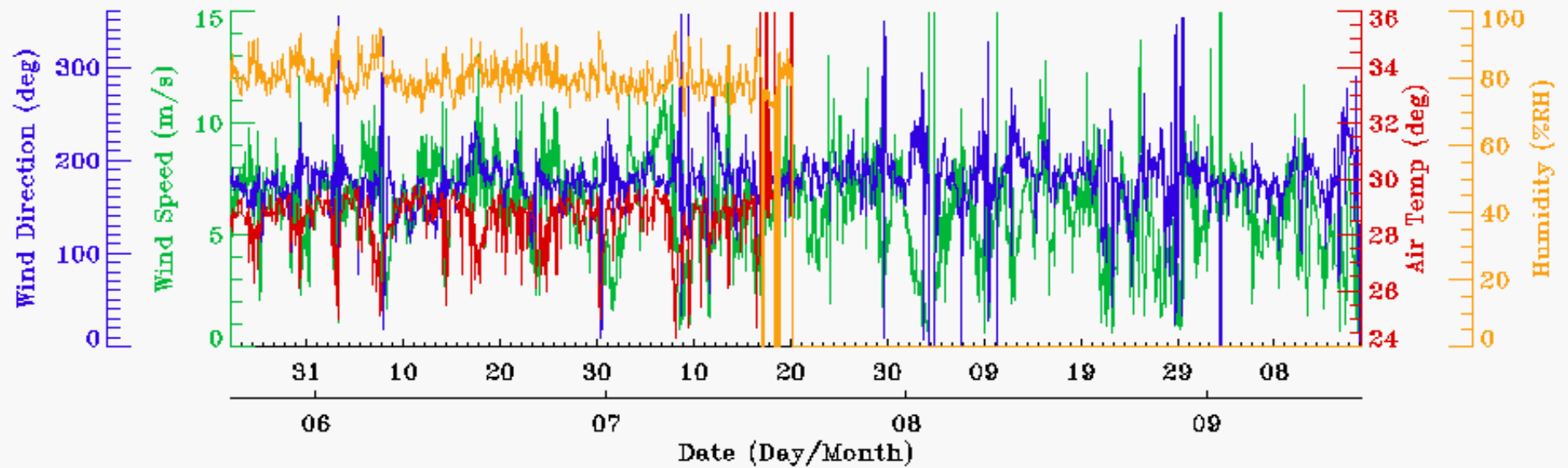
- 2 Satellite devices ♪
- format-hexadecimal ♪
- transmitting interval-1 hr ♪
- # of messages ♪  
-> 6 (32bytes/1message) ♪

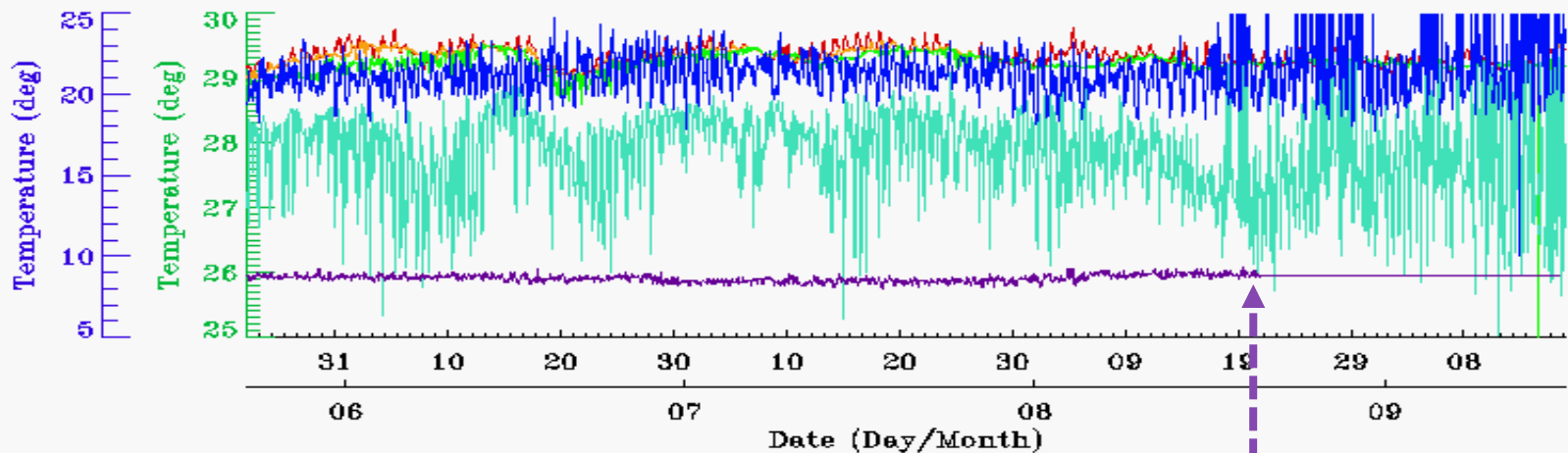


# Real-time Data Sample



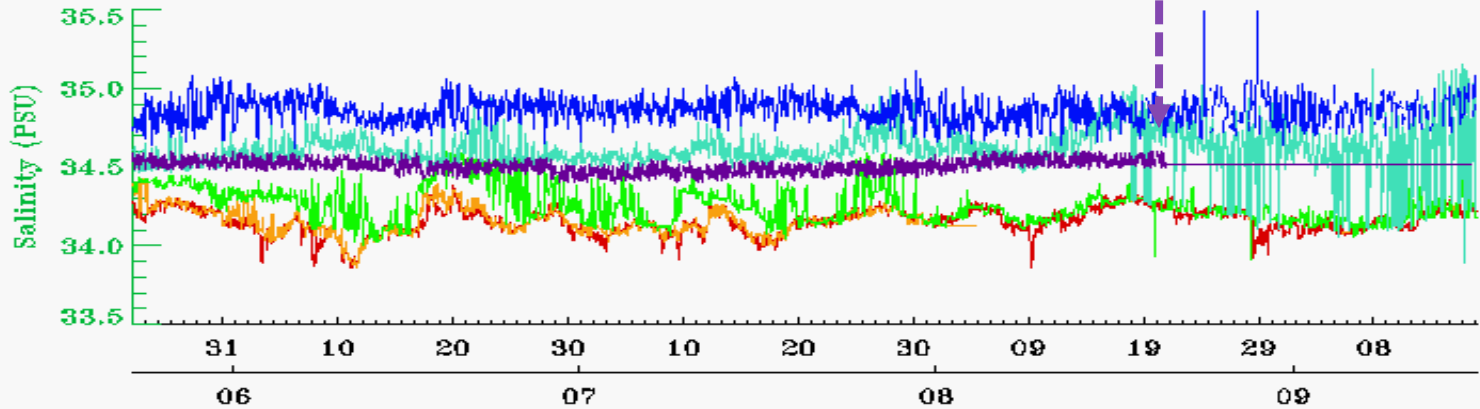
# Tair, RH, Radiation (~malfunctioned since July 20)





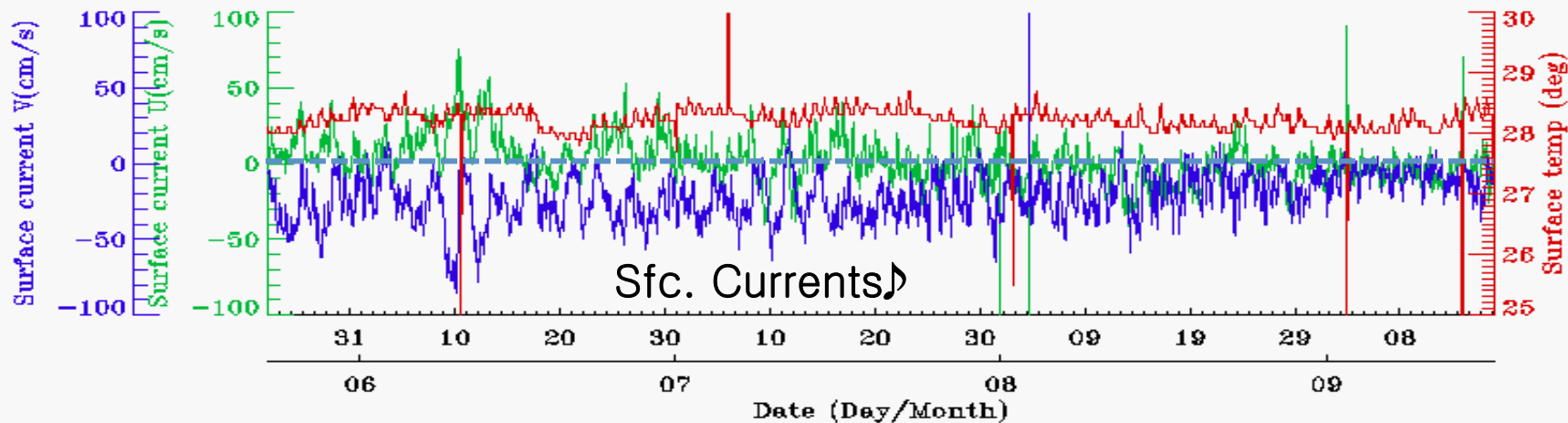
T♪

- 5m
- 20m
- 50m
- 100m
- 150m
- 400m



S♪

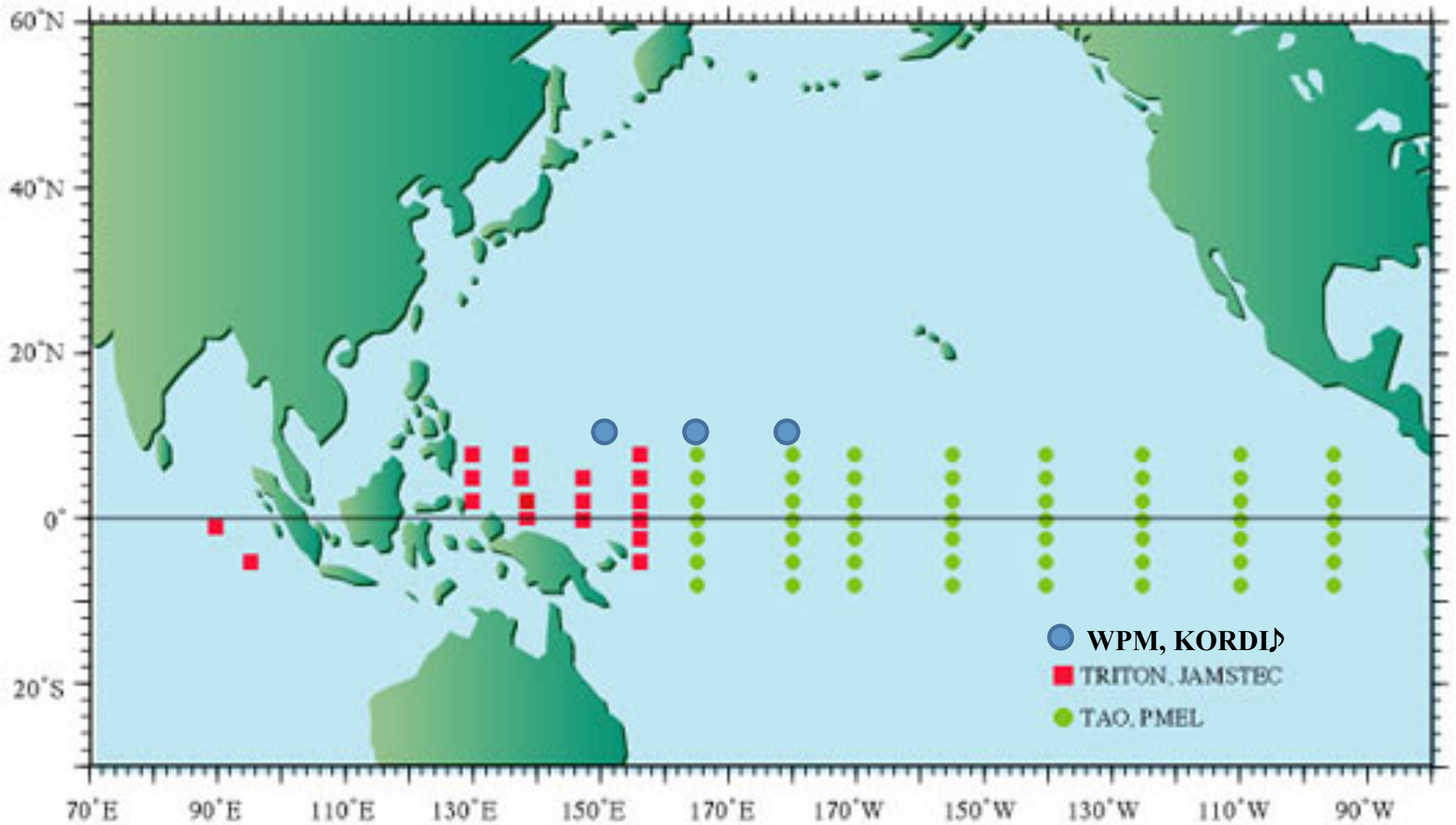
- 5m
- 20m
- 50m
- 100m
- 150m
- 400m



# Surface Data Buoy System

- Warm Pool Monitoring
- Tropical Moored Buoy Implementation Panel (TIP)
  - 3 Argos II satellites
  - send 6 messages per hour, 24 hrs/day
  - recover raw data once a year (maintenance)
- Compare the environments
  - in & out of the reef of Chuuk Island
- Protecting from Corrosion, Damages, Vandalism
- TRITON-WPM-TAO buoy system

# TRITON - WPM - TAO



# How to maintain & distribute data?

- Monitoring
  - 3 Argos II satellites
  - send 6 messages per hour, 24 hrs/day
  - recover raw data once a year (maintenance)
- Protecting from Corrosion, Damages, Vandalism
- Maintaining
  - Malfunctioned sensors
  - Ship time
  - Recover



*Thank You* 🎵



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