National Applied Research Laboratories

Taiwan Ocean Radar Observing System (TOROS)

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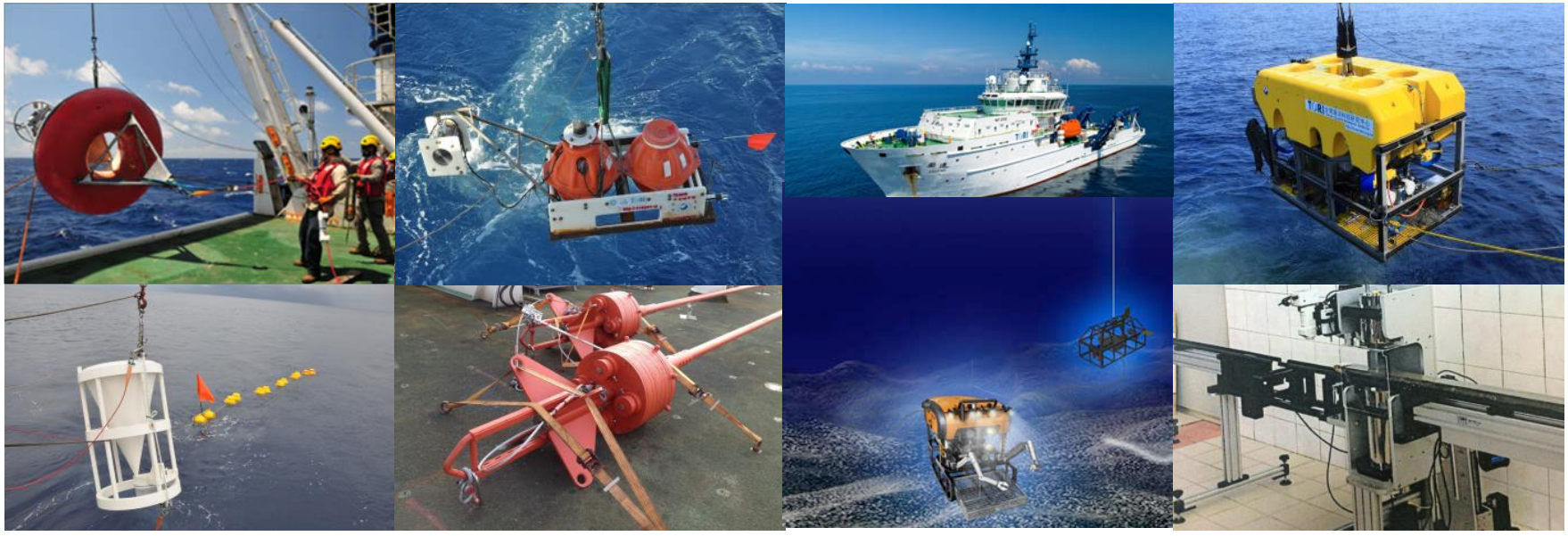
Taiwan Ocean Research Institute (TORI)

NARLabs TORI

Founded in 2008. Research and innovation platform of Marine Science and Technology. Missions:

- **Establish marine technology and ocean science research platforms**
- **Operate and maintain of ocean research vessel**
- **Support and enhance national marine technology and ocean science researches**
- **Promote and motivate cutting-edge ocean researches**
- **Foster ocean research personnel**



Taiwan Ocean Radar Observing System (TOROS)

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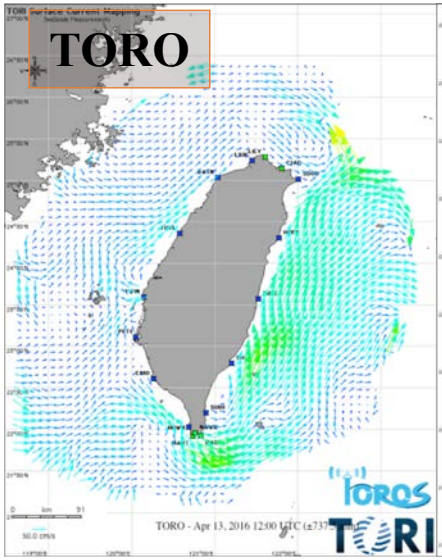
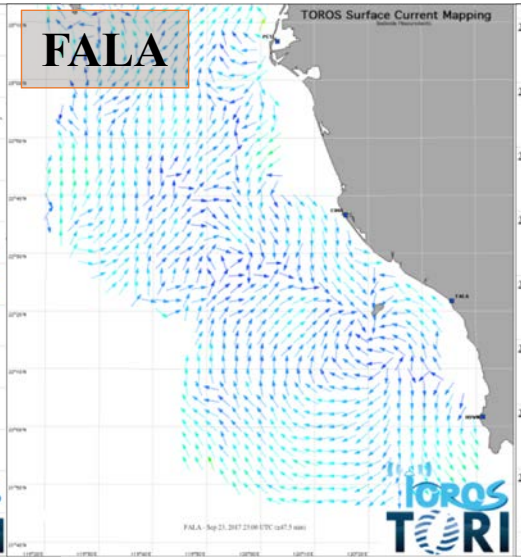
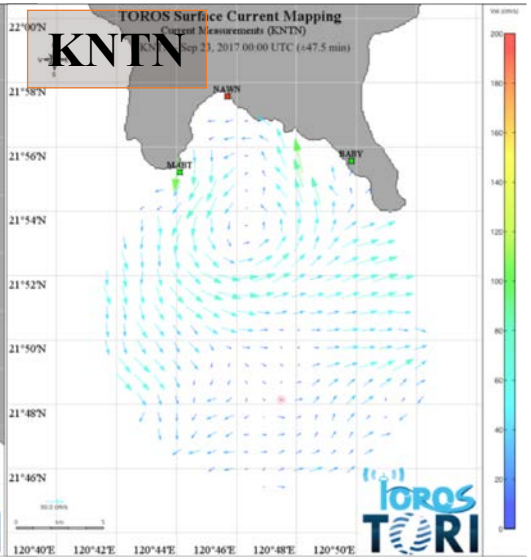
Products	Mesh Grid	Area	Since
TORO	10 km × 10 km	Half of Taiwanese EEZ	Nov. 2012~
FALA	4 km × 4 km	South Taiwan Strait	May 2016~
KNTN	1 km × 1 km	Nanwan Bay	Sep. 2014~







A compact type ocean radar system surrounding Taiwan

SST (Sea Surface Temp.) & SSC (SS Current)

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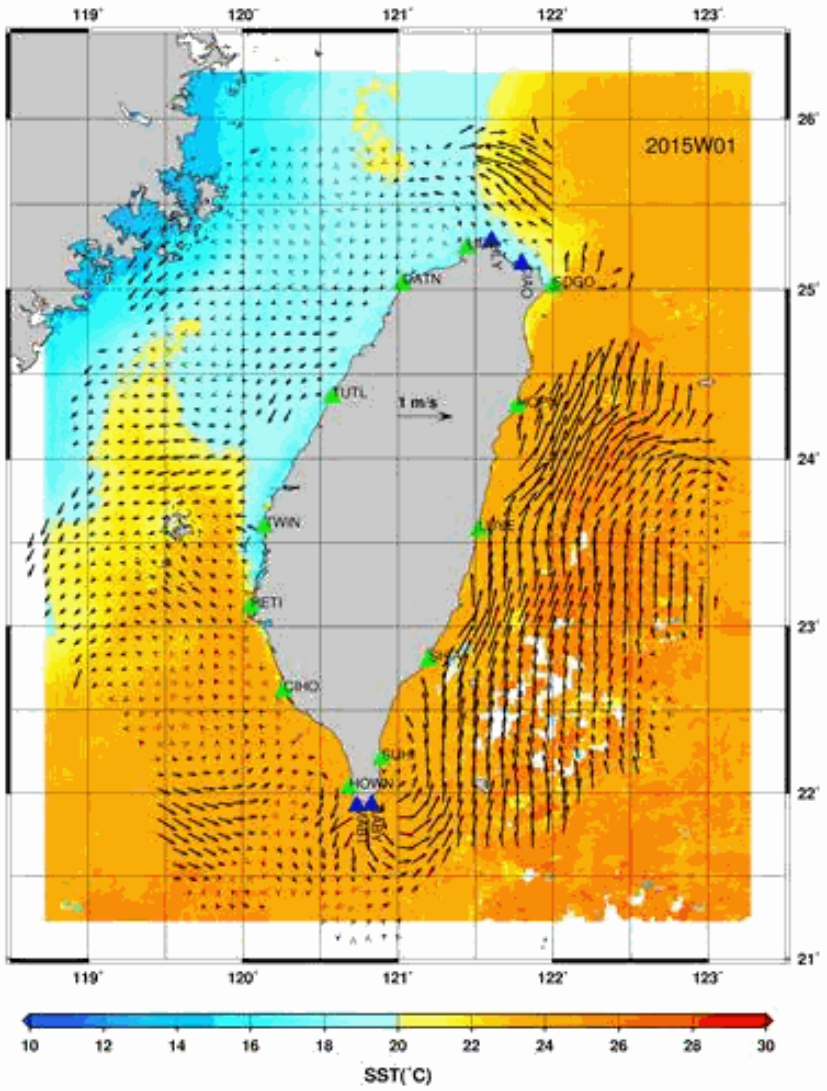
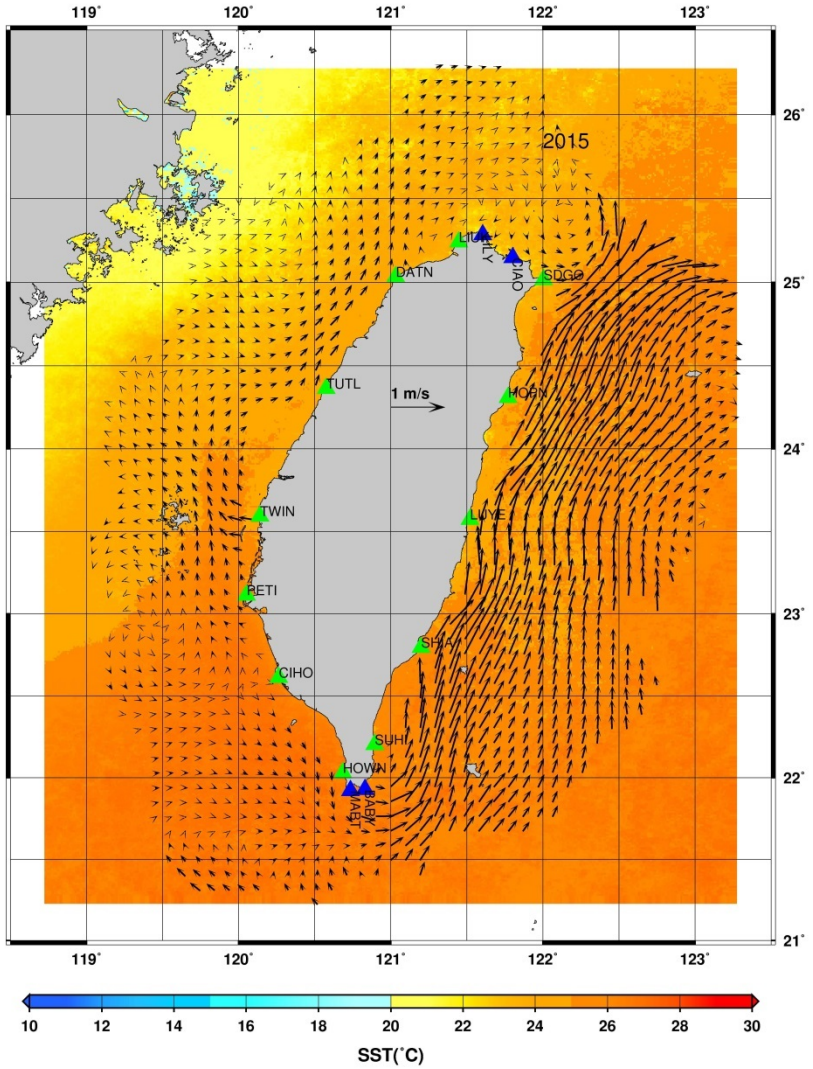
Weekly mean SST and SSC



Annual mean of SST and SSC



International & Domestic Cooperation

No.	Topics & Resources	Association
1	**Domestic Marine Affairs** - Search and Rescue based on HFR surface current - Marine Pollution Response based on HFR surface current - Ship Detection based on HFR backscatter	CGA [12] EPA[1] Navy [123]
2	**East China Sea Joint Research** Flux and Ekman transmission Taiwan : TOROS ocean radar network, sbADCP on TaiMa Star Japan : Yonaguni ocean radar, R/V	TORI Kyushu Univ.[13] * Nagoya Univ.[3] * Ryukyu Univ.[1] NCKU[13] Central Police Univ.[1]
3	**Kuroshio Research** Kuroshio Flux and its variation Taiwan : TOROS ocean radar network, R/V OR1, R/V OR3 USA : R/V Roger Revelle	TORI WHOI[13] * APL[13] * IONTU[123] NSYSU[123]
4	**NANWAN Coastal Marine Science Research** Coral Spawning and Cold water intrusion TORI : TOROS ocean radar network Taiwan : Water Resources Agency, NCKU	TORI WRA[1] NCKU[123]
5	**Luzon Strait Ocean Observing System** Kuroshio and Internal Waves Observation, HF radar R&D Taiwan : 2 Phase Array Radars, R/V Philippines : 3 Phase Array Radars, R/V	TORI Univ. Philippines[123]* WHOI[123]* Univ. Hawaii[123]* NCU[23]*

1 Data Supply 2 Knowledge and Technology supply 3 Technology Development Cooperation

* MOU signed

Domestic Cooperation

Domestic Marine Affairs

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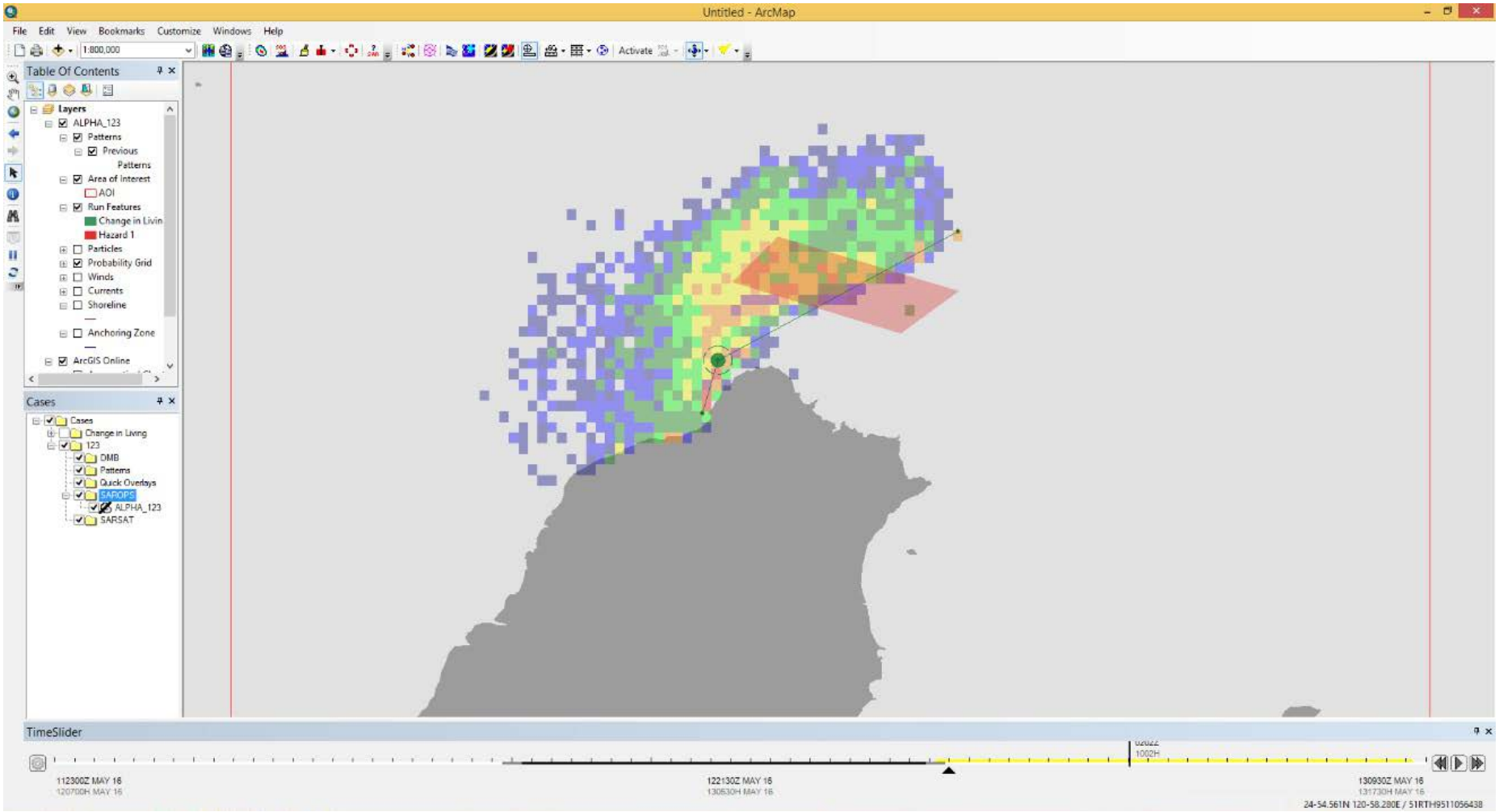
Search and Rescue objects drifting assessment by SARMAP with HFR surface current data



Domestic Cooperation

Domestic Marine Affairs

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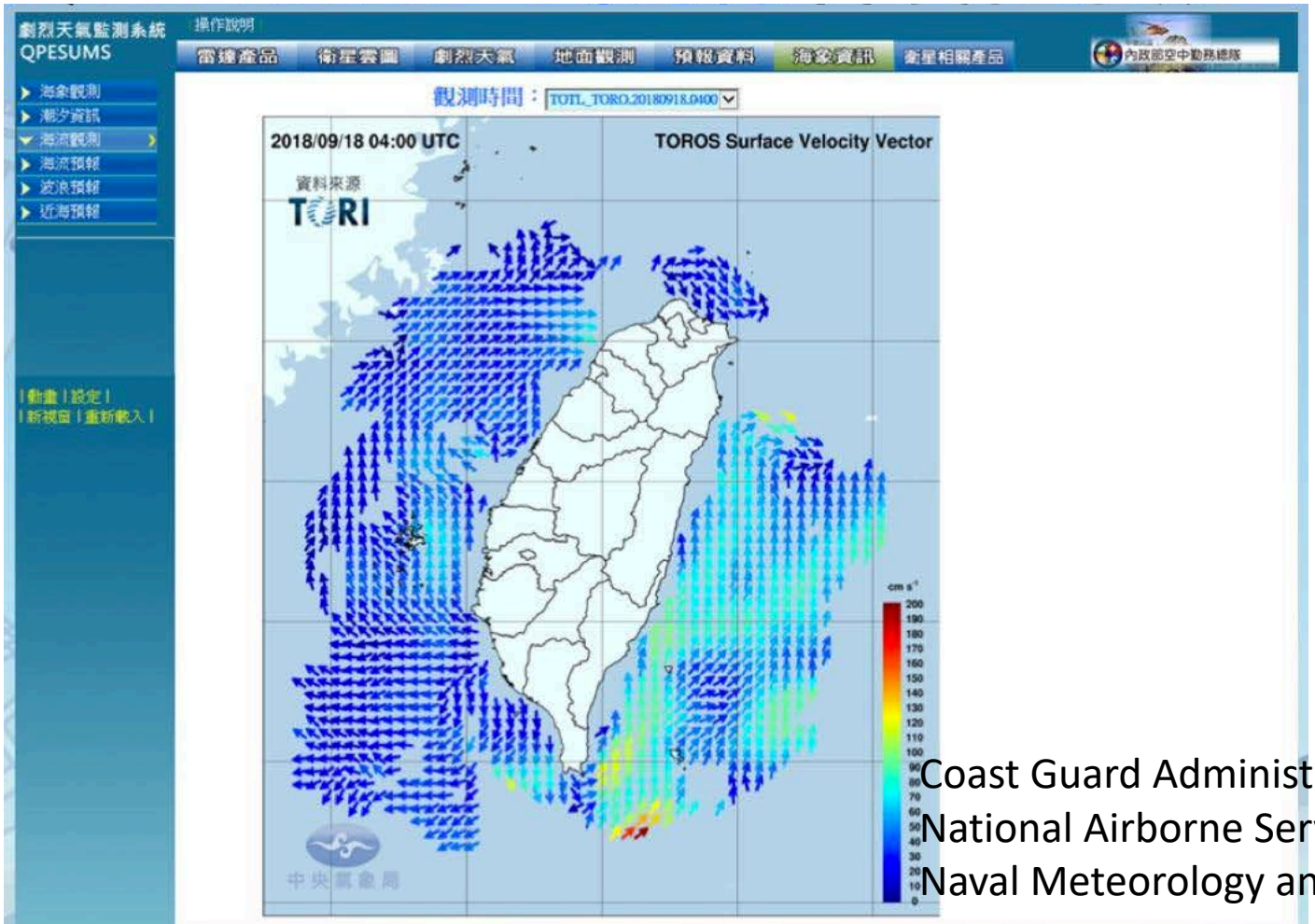
QPESUMS for CGA, NASC and Naval METOC

(Quantitative Precipitation Estimation and Segregation Using Multiple Sensor)



- Coast Guard Administration
- National Airborne Service Corps
- Naval Meteorology and Oceanography Office

International Cooperation

East China Sea Joint Research

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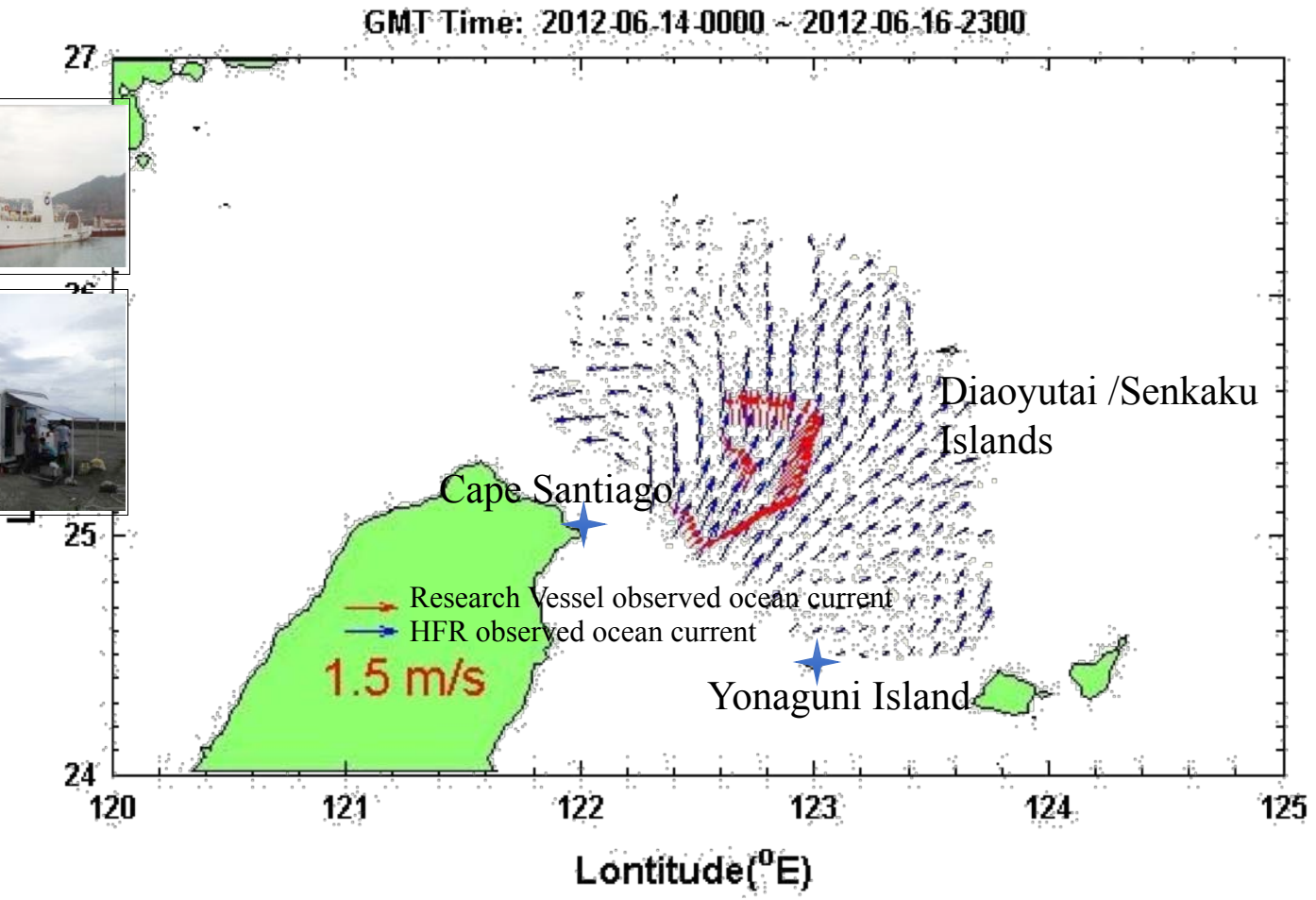
Japan and Taiwan



International Cooperation

Kuroshio Joint Research

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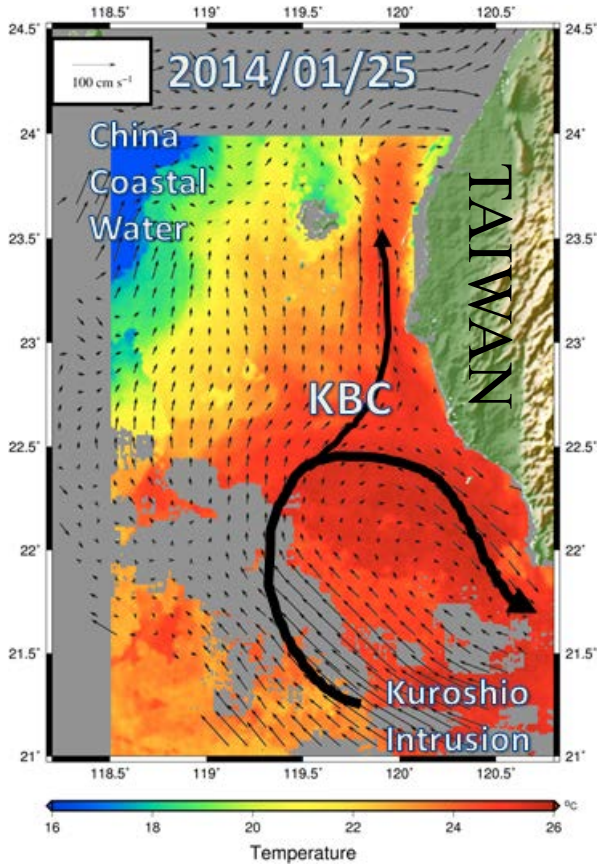
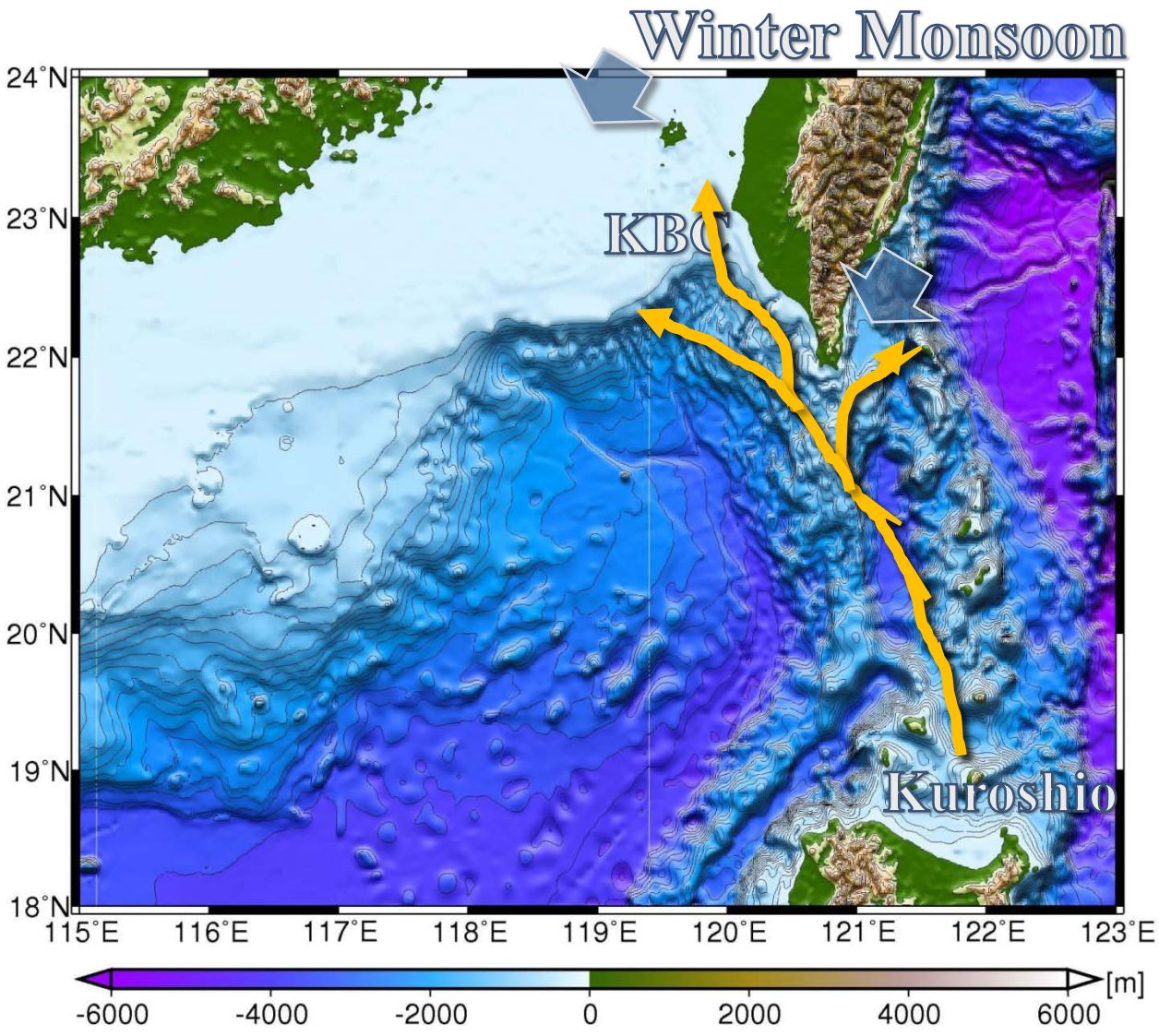
Taiwan and US





International Cooperation

Plan on LuSOOS

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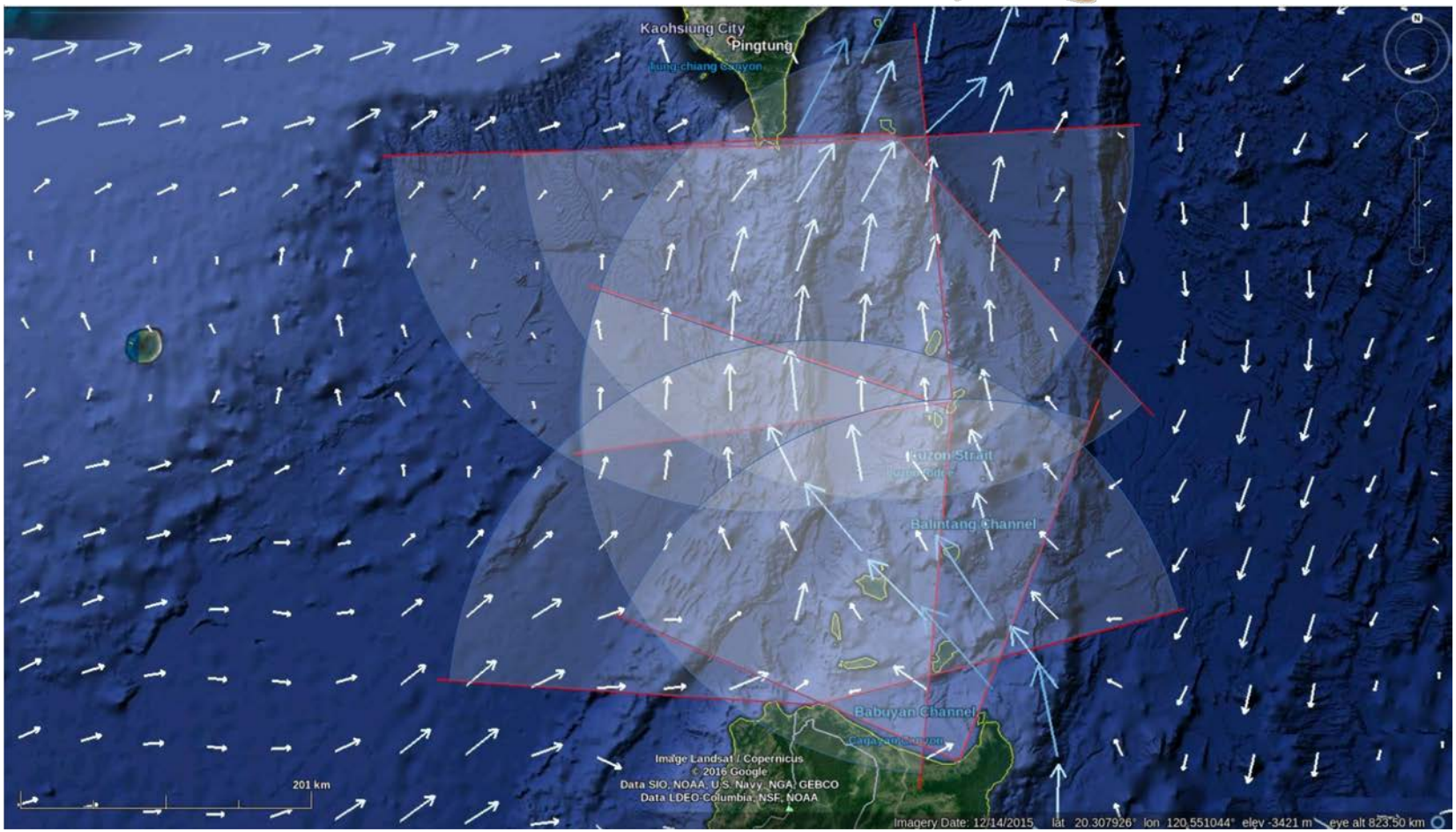
Luzon Strait Ocean Observing System



Plan to Show Surface Current Maps on GEO HF Radar Network

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Global HF Radar Network

Established at the GEO-VIII Plenary in Istanbul, Turkey; the Global High Frequency Radar Network is a vision for a global operational system measuring ocean surface currents to support monitoring of marine and coastal ecosystems.

Home | References/Reports | GEO HF Radar Activities | Network Members | Contacts | Meetings

Interactive Map of High Frequency Radar

This map shows all of the locations of the HF Radar sites all over the world.

Coming Soon…

« -1 Day -1 Hour 2018-09-21 00:00:00 from UTC +1 Hour +1 Day » Bookmark View

Control Panel X

UTC: 2018-09-21 14:15:36
Local: 2018-09-21 22:15:36

Participants

Australia
IMOS
Canada
Ocean Networks
Croatia
Institute of Oceanography and Fisheries
Germany
GKSS Institute for Coastal Research

地圖 衛星檢視

North Pacific Ocean
North Atlantic Ocean

http://global-hfradar.org/

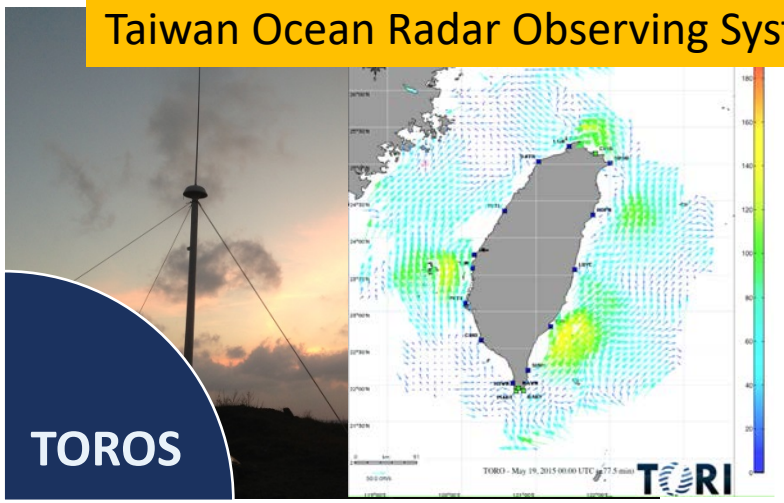
TORI's Mission

Offshore, deep sea, near real-time, long-term observations

Moored Ocean Observing System, Taiwan

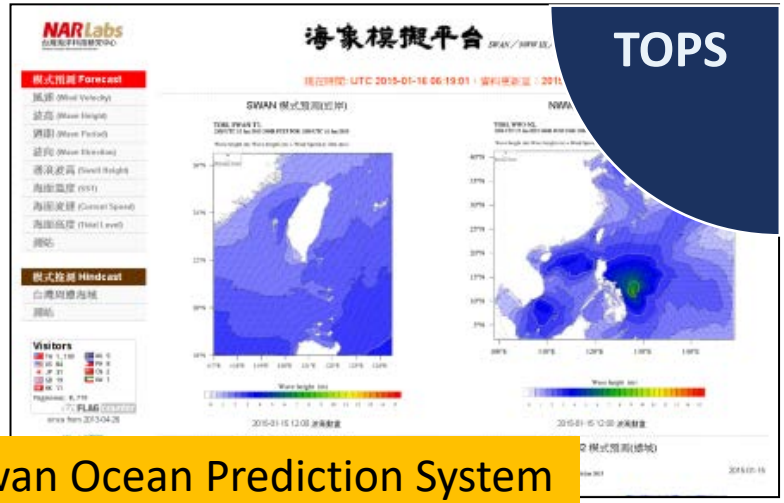
BUOY

Taiwan Ocean Radar Observing System



TOROS

TOPS



Taiwan Ocean Prediction System

LIDAR

Offshore Wind Speed Measurement

Research Vessel LEGEND

-Deep Sea Resources and Geo-hazard Explorer

L.O.A	75.97 m	Speed max.....	12 kts	Keel Laying	March 2016
Breadth..	16 m	Cruising spd.	10 kts	Launch	May 2017
Draft.....	5.6 m	Duration.....	30 days	Delivery	November 2017
GT.....	2,581	Crew/Sci. Berth...	19/24	Operation ...	2018

LEGEND : Characteristics

- **Full-Depth Seafloor Mapping :**

  Deep Water : *Kongsberg* EM 122 (2 degree X 2 degree; up to 11000 m)

  Shallow Water : *Kongsberg* EM 2040 (0.7 degree X 0.7 degree; < 600 m)

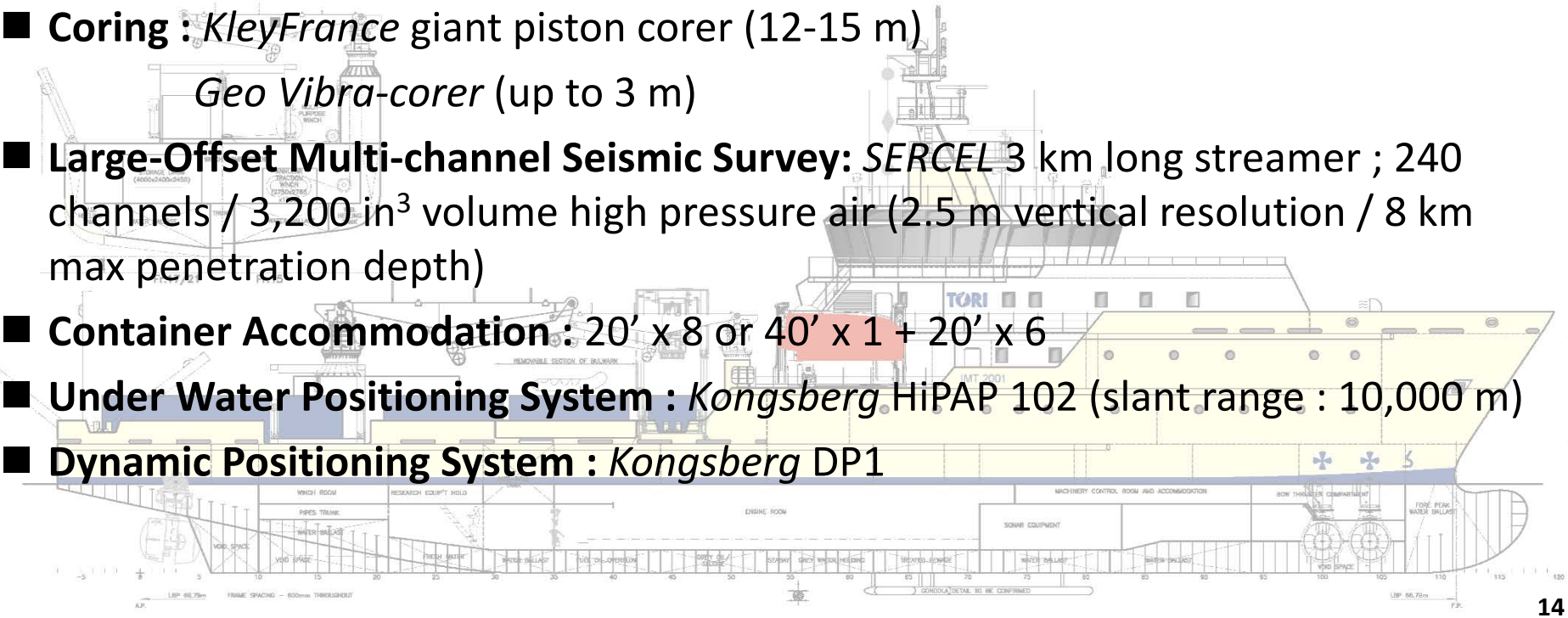
- **Sub-bottom Profiler :** *Kongsberg* SBP120-3 (1-20 kHz; < 1 m vertical resolution)
- **ROV Survey and Seafloor Samplings :**

  Forum (Perry) Triton XLX ROV system (3000 m, 150 HP, 2 manipulators)

- **Coring :** *KleyFrance* giant piston corer (12-15 m)

  Geo Vibra-corer (up to 3 m)

- **Large-Offset Multi-channel Seismic Survey:** *SERCEL* 3 km long streamer ; 240 channels / 3,200 in^3 volume high pressure air (2.5 m vertical resolution / 8 km max penetration depth)
- **Container Accommodation :** 20’ x 8 or 40’ x 1 + 20’ x 6
- **Under Water Positioning System :** *Kongsberg* HiPAP 102 (slant range : 10,000 m)
- **Dynamic Positioning System :** *Kongsberg* DP1



Ocean Bottom Seismometer (OBS)

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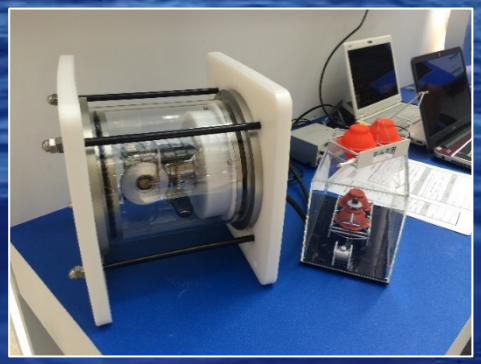
- Since 2008
- # of OBS: 30+
- Cooperation with Tokyo University

Instrument Sphere


Sensor with Auto Leveling

Maximum depth capability: 5,000meters

Near Real-Time Data Buoys

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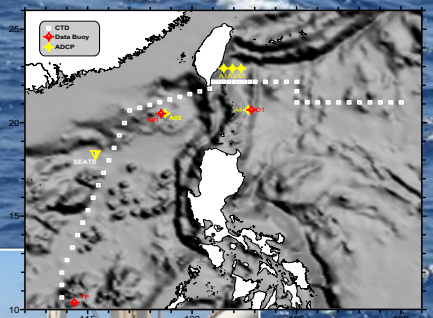
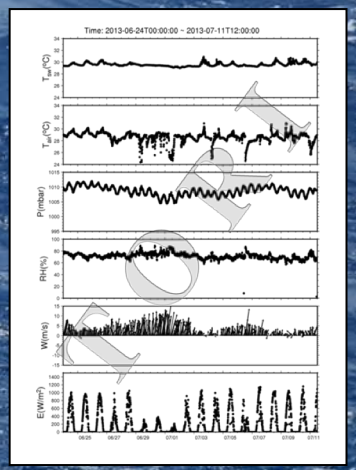
Near real-time, long-term ocean and atmosphere monitoring in open ocean by moorings.



Air
Temperature,
Pressure,
Humidity,
Wind vector,
Solar radiation

Water
Temperature,
Salinity



Summary

- Establish global partnerships and online platforms to pursuit "Global Excellence, Local Impact"
- Promote innovative R&D efforts and a range of international collaboration
- Share the technologies and experiences with international society
- Enhance the contribution of Earth observation database and integrate into global community

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National Applied Research Laboratories