



# Ocean based solutions to climate variability and change

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4-7 April 2023, Jakarta, Indonesia



# Presentation outline



- Ocean and climate change and variability
- Why ocean research matters
- Our effort in addressing climate issues and its effects
- A summary of key achievement
- Key activities since the last Session (April 2021)
- Problems encountered and recommendation for future development in this thematic area
- Planned activities for May 2023- March or April 2025

# Ocean and Climate



## Ocean Forecasting System for the Kingdom of Thailand (OFS V1.0)



>> Home

>> Contact

>> Forecast Results

>> Detailed Results

>> Background

>> Research Team

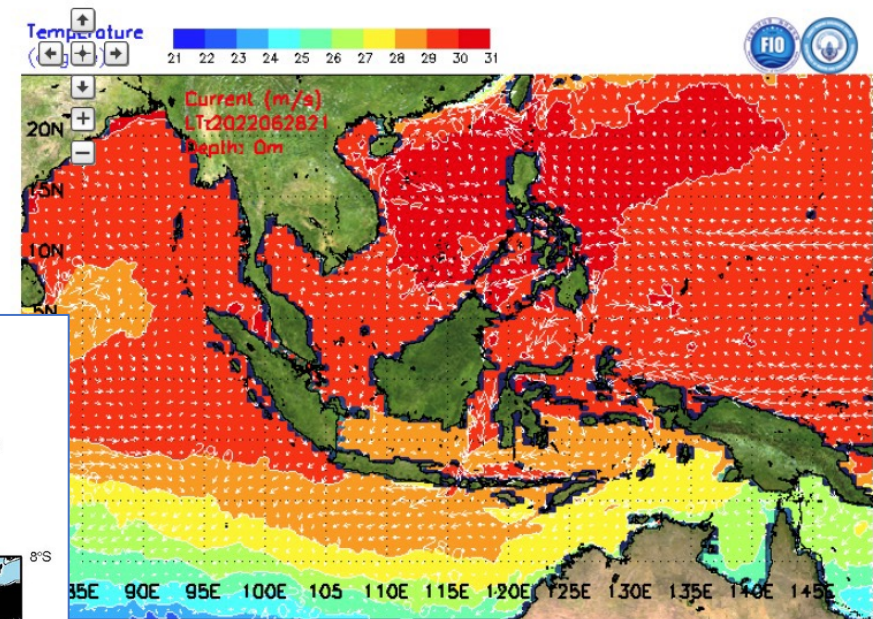
>> Numerical Model

>> Model Validation

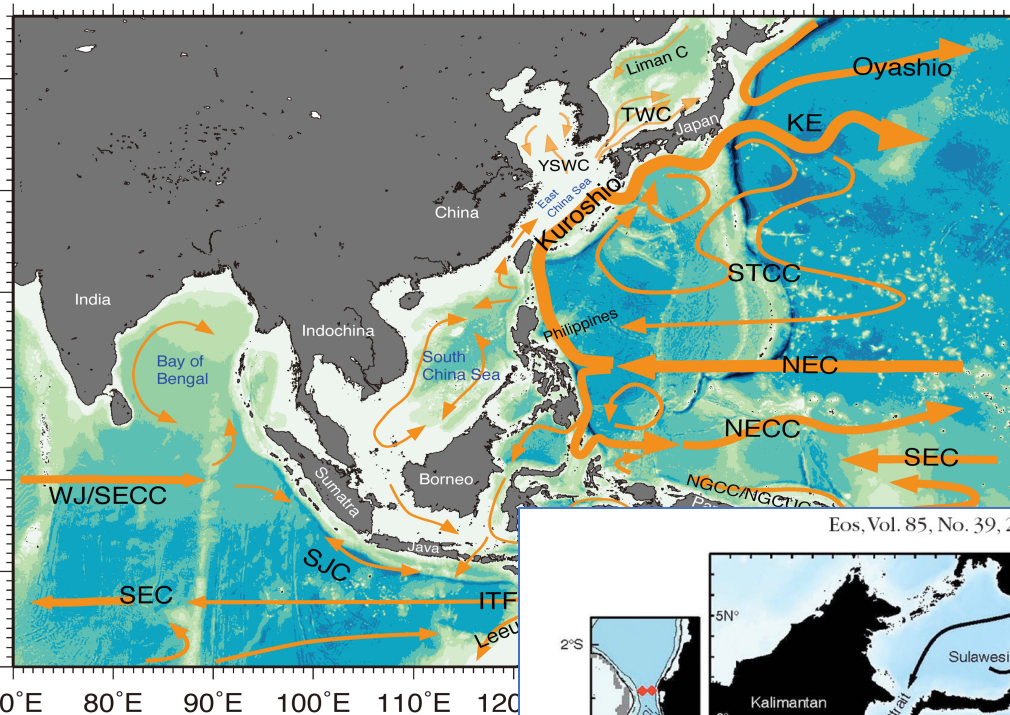
>> Publication

>> Archives

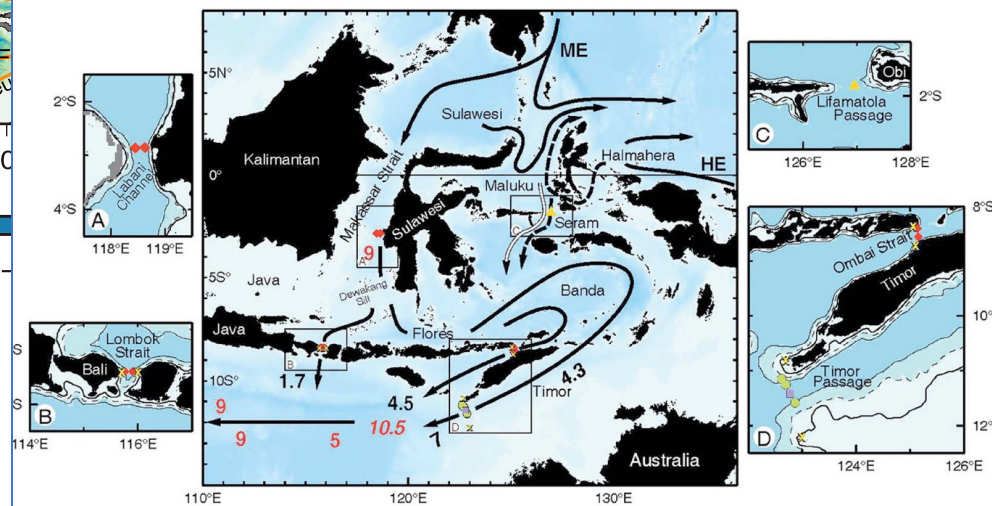
### Forecast Results



Indonesia

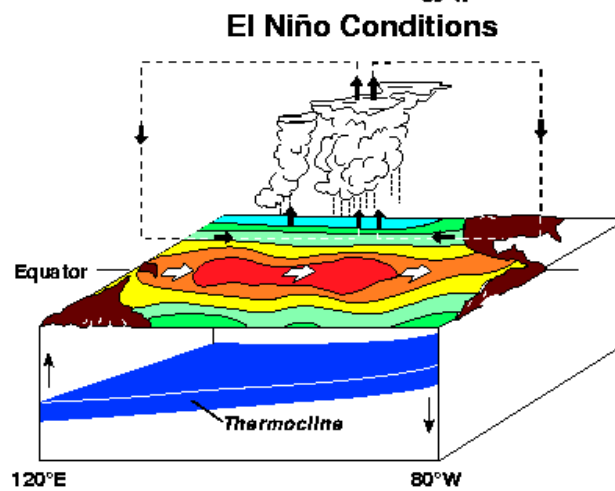
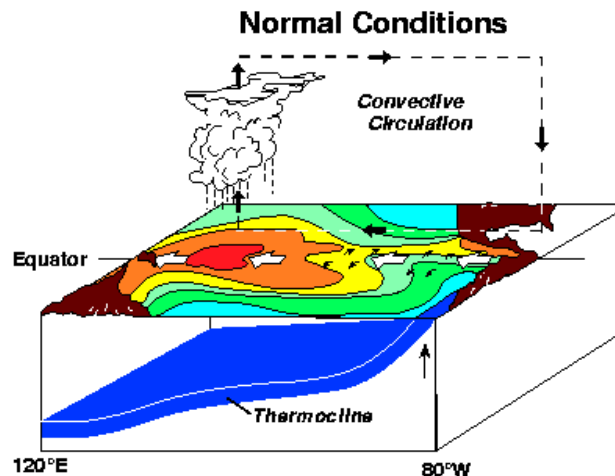
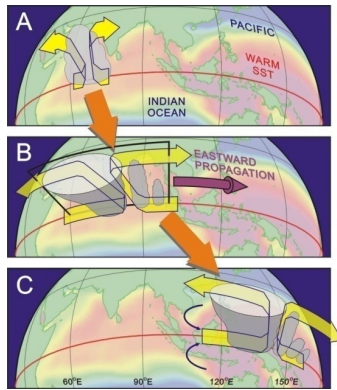


Eos, Vol. 85, No. 39, 28 September 2004

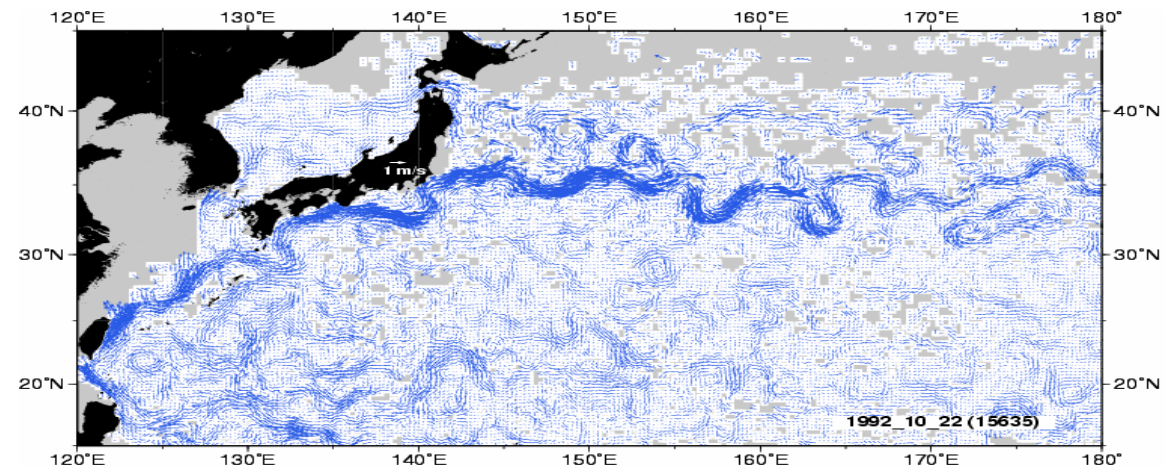
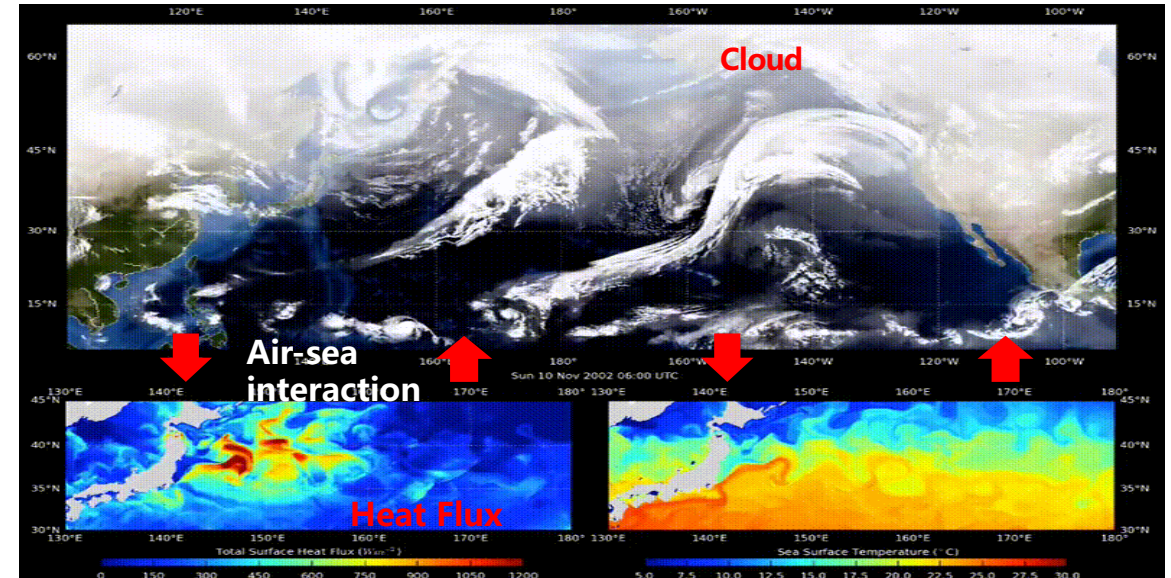
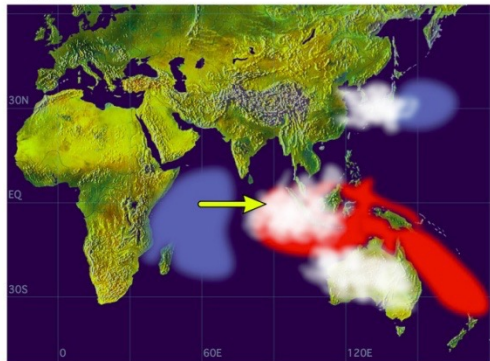


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# Ocean and Climate

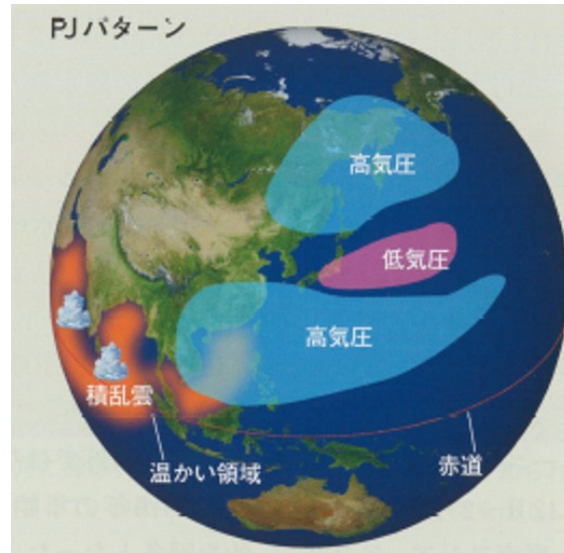
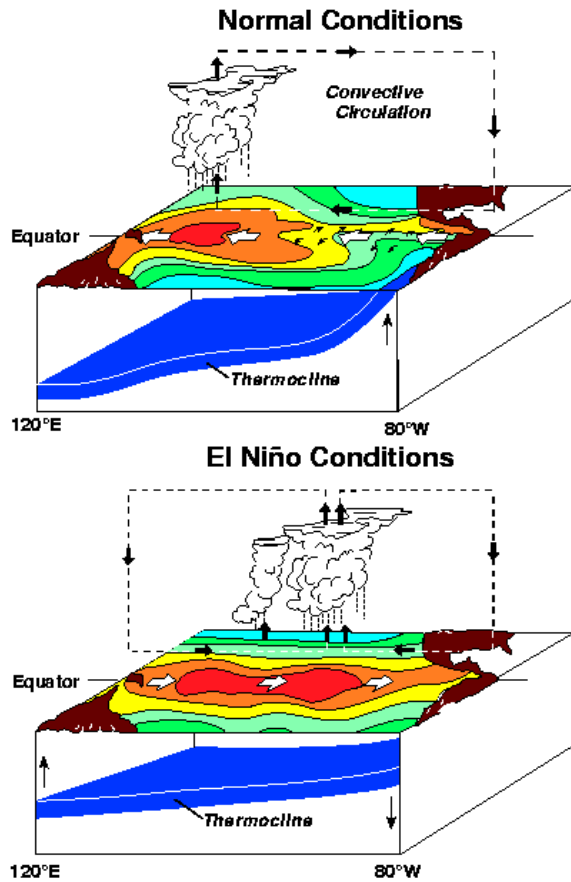


Negative Dipole Mode



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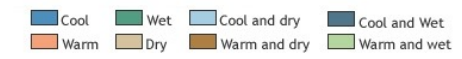
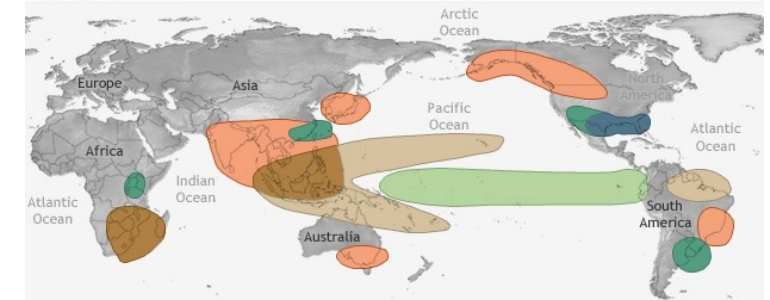
# Why ocean research for climate matters



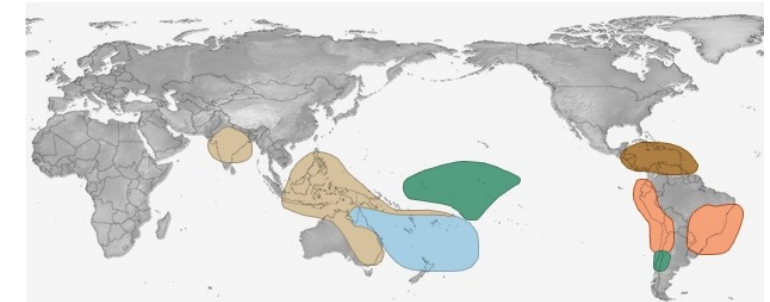
PJ pattern:  
Atmospheric teleconnection after the decay of El Niño (boreal summer)

## EL NIÑO CLIMATE IMPACTS

December-February



June-August



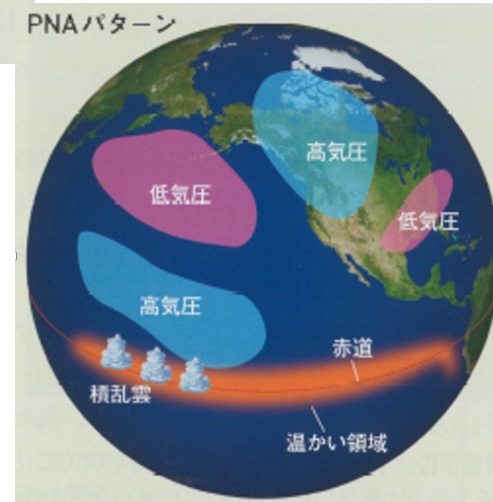
Boom - spring 2005.



Bust - Autumn 2006



PNA pattern:  
Atmospheric teleconnection at the mature phase of El Niño

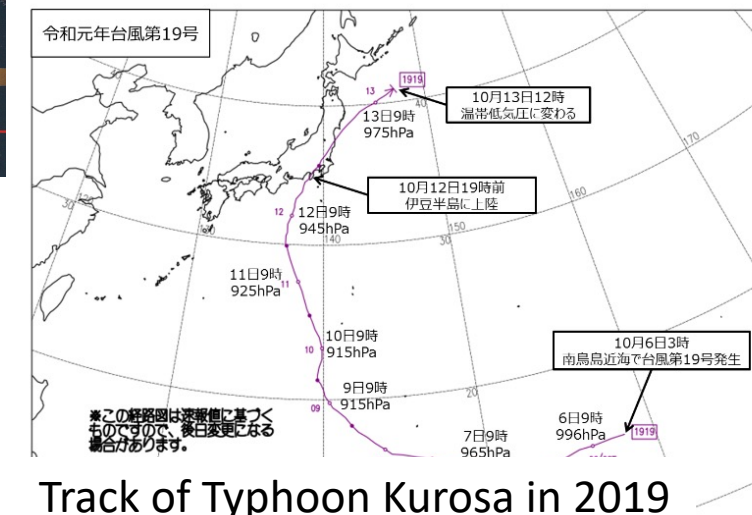
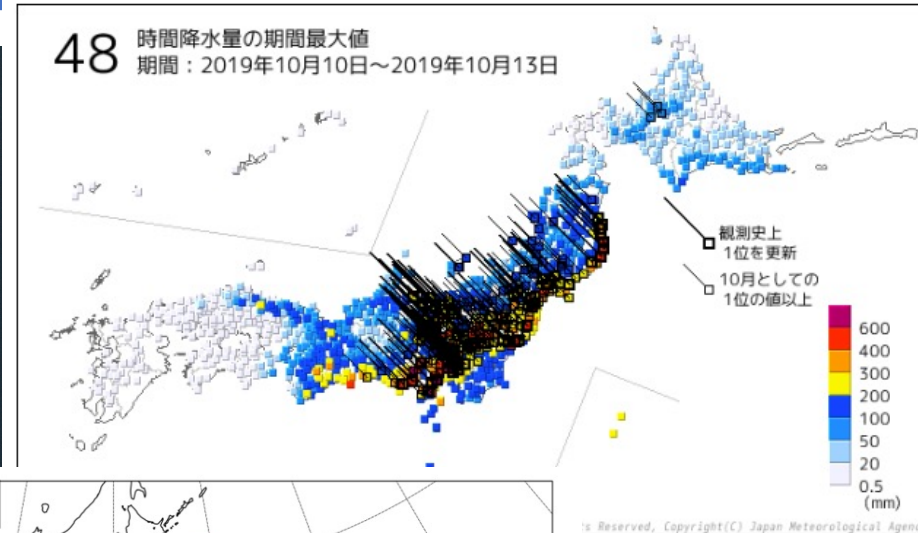


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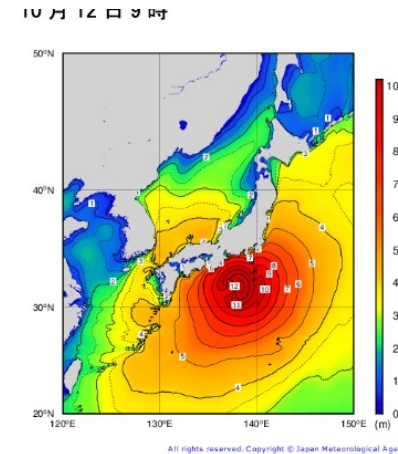
# Why ocean research for climate matters



48 時間降水量の期間最大値の分布図(10月10日0時~10月13日24時)



Track of Typhoon Kurosa in 2019



## 台風19号被害～長野県千曲川・千葉県鋸南町からの現場報告

By - NEWS ONLINE 編集部 公開：2019-10-15 更新：2019-10-15

ニュース 飯田浩司のOK! Cozy up! 飯田浩司

ニッポン放送「飯田浩司のOK! Cozy up!」（10月14日放送）にジャーナリストの須田慎一郎が出演。台風19号による被害状況を現場からのレポートを交えて解説した。



台風19号 千曲川（左）の決壊現場。濁流が長野市側の住宅地（右）を襲った=2019年10月13日午前11時47分、長野市写真提供：産経新聞社



# Our efforts in addressing climate change



## 5.1 Ocean processes and climate in the Indo-Pacific

**#1: North East Asian Regional-GOOS**

**#2: Ocean Forecasting System (OFS) of SEAGOOS**

**#3: Monitoring the Ecological Impact of Ocean Acidification on Coral Reefs of SEAGOOS**

**#4: Changing Asian Marginal Seas and their Response to Climate Change**

**#5: South China Sea Fluvial Sediments and Environmental Changes**

**#6: Indo-Pacific Ocean Environmental Variations and Air-Sea Interactions**

**#7: Upwelling studies through ocean data integration towards sustaining ocean health**

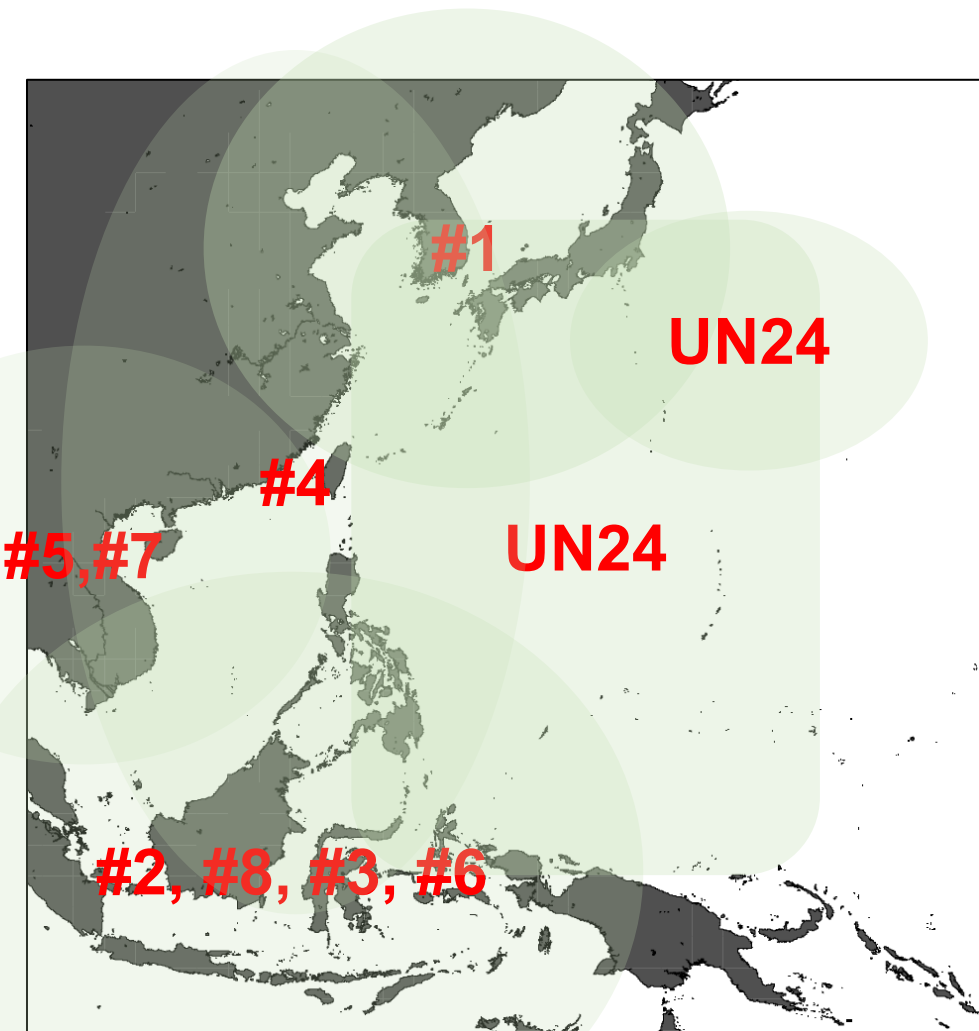
**#8: Monsoon Onset Monitoring and its Social & Ecosystem Impact (MOMSEI) of SEA-GOOS**

**UN24: 2nd Cooperative Study of Kuroshio and its Adjacent Regions**

**UN24: Air-Sea Interaction in the Kuroshio Extension and its Climate Impact**

**# number corresponds to 5-1-#, UN24 corresponds the UN24 in Indonesia**

**4.2.2**



# Effects of the efforts (#1 to #5) (1/2)



Title of the Programme/Projects of WESTPAC	Effects of the efforts
#1 NEAR-GOOS (North East Asian Regional-GOOS)	Data system maintenance, <b>Operational forecasting system</b>
#2 Ocean Forecasting System (OFS) of SEAGOOS	Provide forecast data, transfer technology, applications for coral breaching, oil spill incidents, etc. → <b>Initiate UN Ocean Decade Programme OSF (Ocean to climate Seamless Forecasting system)</b>
#3 Monitoring the Ecological Impact of Ocean Acidification on Coral Reefs of SEAGOOS	More monitoring sites and accurate data along the coast, via CD workshops, Webinars and Incubator, and <b>inter-calibration experiments</b> etc.
#4 Changing Asian Marginal Seas and their Response to Climate Change	Develop the strategy, and <b>establish two pilot projects</b> on the impact of ground water and on mixing processes for the footprint of nutrient, and CD activities
#5 South China Sea Fluvial Sediments and Environmental Changes (FluSed)	CD via training, scientific papers, and <b>high-level platform</b> for cooperation and exchanges on fluvial sediment research.



# Effects of the efforts (#6 to #8 and UN24) (2/2)



Title of the Programme/Projects of WESTPAC	Effects of the efforts
#6 Indo-Pacific Ocean Environmental Variations and Air-Sea Interactions	<b>New parameterization scheme for surface layer.</b> Typhoon model, ESM, and predictability of Asian Monsoon system. <b>To be closed at the session.</b>
#7 Upwelling studies through ocean data integration towards sustaining ocean health	Preparation of <b>scientific papers</b> , and enhancement partnership.
#8 Ecosystem Impact (MOMSEI) of SEA-GOOS	The MOMSEI project has fulfilled its goals, <b>and will be quitted once</b> in April 2023.
#UN24 2nd Cooperative Study of Kuroshio and its Adjacent Regions	Established International Steering Group (ISG), UN-24 Action Programme, <b>eleven (11) projects were set up, planning to establish a support office.</b>
#UN24 Air-Sea Interaction in the Kuroshio Extension and its Climate Impact	<b>Merged into CSK-2</b> as a project with new perspectives.



(one UN24) – Merged into (UN24), (#8) is to be quitted, and (#6) will be closed and merged into (#2)  
Number will be from ten(10) to seven (7)

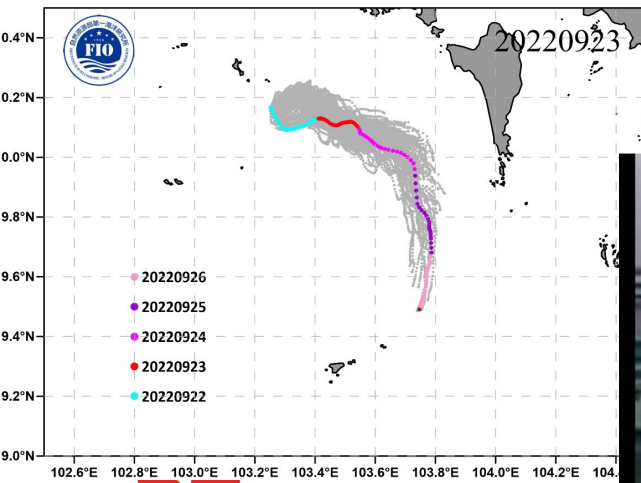
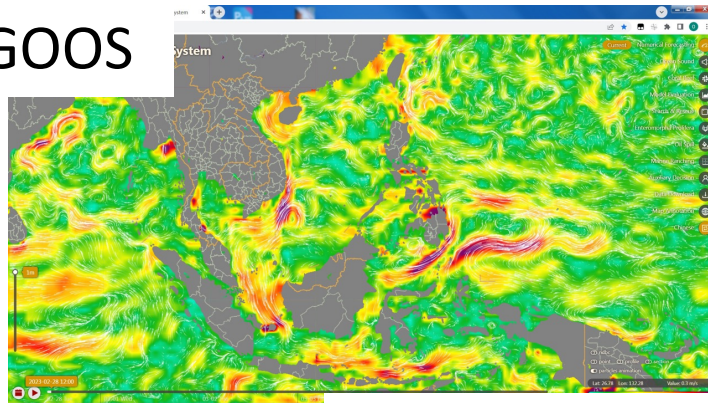
# number corresponds to 5-1-#, UN24 corresponds the UN24 in 4.2.2

# A summary of key achievement (1/3)



## Services via Provision of Data and Information from the GOOS related projects

### #2 OFS/SEAGOOS



Forecasted key searching area for the missing people



東中時報 The Cambodia China Times

### #1 NEAR-GOOS

#### Japan

**NEAR-GOOS Regional Real Time Data Base**

**JMA Products**  
The OPMs of JMA products such as SSTs, subsurface temperatures, and currents with its sample images can be found here. Please refer to Data catalog of JMA Products to access to files stored on our database.

**Analyzed Oceanic Conditions**

- Sea Surface Temperature (SST)
- Daily Sea Surface Temperature in the global ocean
- Daily mean Sea Surface Temperature in the western north Pacific
- 10-day mean Sea Surface Temperature in the western north Pacific
- Sea Surface Temperature (COSE-OST)
- Monthly mean Sea Surface Temperature in the global ocean
- Subsurface Temperature and Surface Currents (MOM/RSR COM)
- Daily Subsurface Temperature in the seas adjacent to Japan
- 10-day mean Subsurface Temperature in the seas adjacent to Japan
- Monthly mean Subsurface Temperature in the seas adjacent to Japan
- Daily Surface Currents in the seas adjacent to Japan

#### Russia

**NEAR-GOOS Delayed Mode Data Base (DMDB) of POI, Russia**

under reconstructions

Average by 10 degree squares data set of temperature and salinity

Distribution of oceanographic station data on NEAR-GOOS area observed in 1955-2000

Other NEAR-GOOS Data Bases

NDMDB

#### China

**NEAR-GOOS China RTDB**

Real Time Data Base

Overview

Home

Real Time Data Base

Real Time Products

Info and File

Initialization Project

Contact Us

#### China

**Japan Oceanographic Data Center**

Home

Real Time Data Base

Real Time Products

Info and File

Initialization Project

Contact Us

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Other NEAR-GOOS Data Bases

NDMDB

#### Korea

**NEAR-GOOS Korea RTDB**

Real Time Data Base

Overview

Home

Real Time Data Base

Real Time Products

Info and File

Initialization Project

Contact Us

#### Korea

**Korea Oceanographic Data Center**

Home

Real Time Data Base

Real Time Products

Info and File

Initialization Project

Contact Us

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# A summary of key achievement (2/3)



## #6 IPOVAI

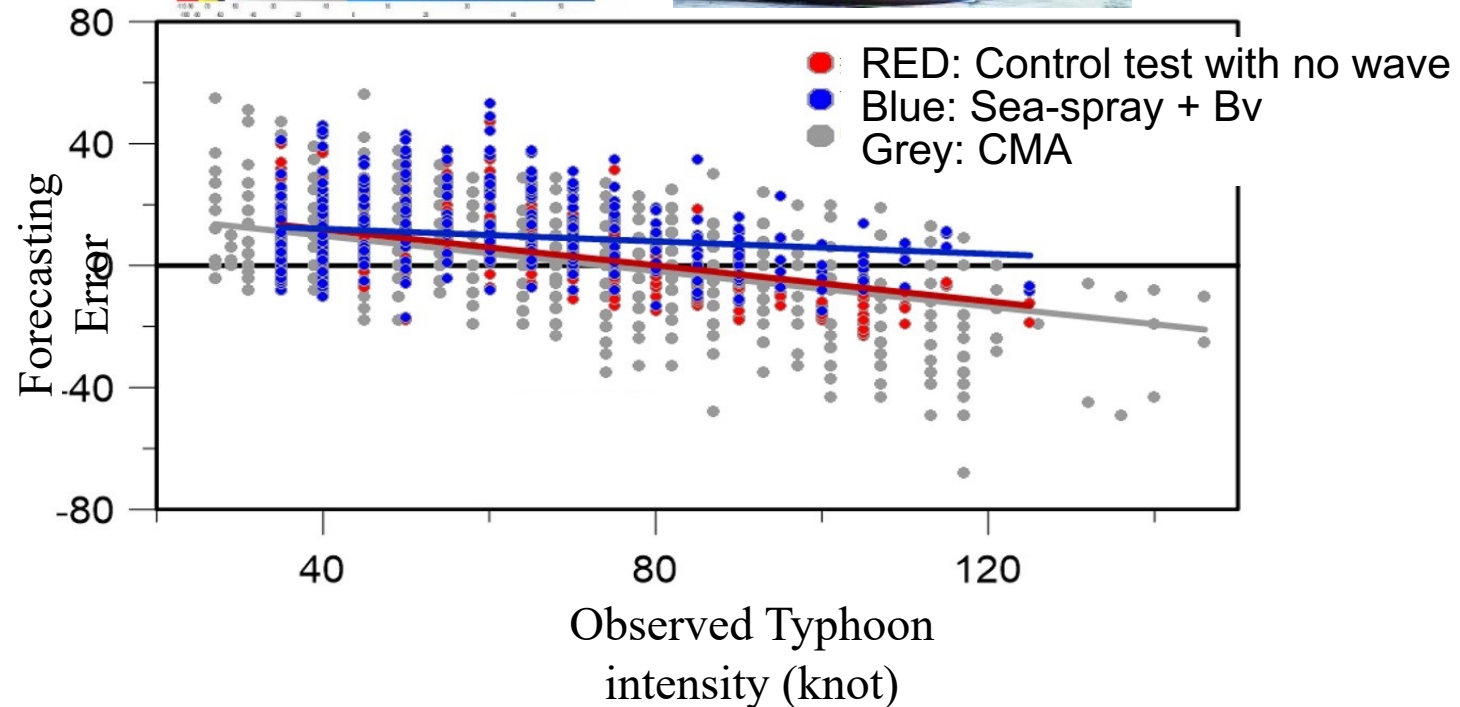
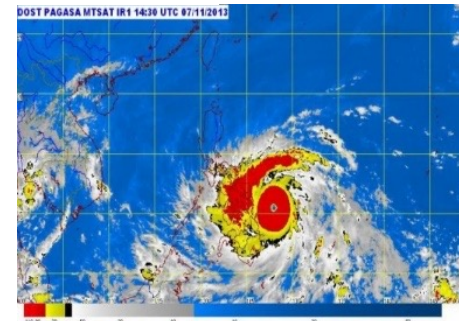
## #3 Ocean Acidification/SEAGOOS

**WESTPAC Webinar Series on OCEAN ACIDIFICATION**

May 2021 (Virtual) Register for event

5 May 2021 (UTC+7)	12 May 2021 (UTC+7)
<p>13:00-13:30 Underway Measurement of Dissolved Inorganic Carbon (DIC) in Estuarine Waters <i>Dr. Liyang Zhan, Third Institute of Oceanography, China</i></p> <p>13:30-14:00 On-going observation of ocean acidification in coastal waters in Thailand <i>Dr. Chalermrat Sangmanee, Department of Marine and Coastal Resources, Thailand</i></p> <p>14:00-14:30 Effect of ocean acidification on growth, lipid and carotenoid content of a widely used green microalgae in aquaculture <i>Chlorella vulgaris</i> Beyerinck (Beyerinck) 1890 <i>Dr. Wa'iba, University of Halu Oleo Kendari, Indonesia</i></p> <p>14:30-15:00 Q/A</p>	<p>13:00-13:30 Integrative effects of deoxygenation and acidification along the sub-estuaries in the Upper Gulf of Thailand <i>Ms. Khanitha Uthaipan, Xiamen University, China</i></p> <p>13:30-14:00 Coastal acidification, the other eutrophication problem in mariculture areas <i>Prof. Maria Lourdes McGlone, University of the Philippines</i></p> <p>14:00-14:30 Effects of Ocean Acidification on Oyster Aquaculture <i>Prof. Aileen Tan Shau-Hwai, Universiti Sains Malaysia</i></p> <p>14:30-15:00 Q/A</p>
19 May 2021 (UTC+7)	26 May 2021 (UTC+7)
<p>13:00-13:30 Coral reefs and ocean acidification: impact and adaptive capacity in Thailand and southeast Asia <i>Dr. Suchana Chavanich, Chulalongkorn University, Thailand</i></p> <p>13:30-14:00 Coral calcification in the southern part of Vietnam, studied with a new method <i>Mr. Vo Tran Tuan, Limb, Institute of Oceanography, Vietnam</i></p> <p>14:00-14:30 Influence of acidification and associated stressors on coral reef resources in the Philippines <i>Dr. Patrick Caballan, University of the Philippines</i></p> <p>14:30-15:00 Q/A</p>	<p>13:00-13:30 Hard coral diversity of the tropical shallow reef in the vicinity of an underwater vent exposed to a lowered pH gradient <i>Ms. Nithiya Nilamini, Universiti Sains Malaysia</i></p> <p>13:30-14:00 Porites colonies get smaller in CO<sub>2</sub> vent-associated coral communities of SW Luzon, Philippines <i>Ms. Rame Cabreira, University of the Philippines</i></p> <p>14:00-14:30 A suggested model on the future ocean acidification programme of IOC-WESTPAC: A national and regional approach to understanding <i>Dr. Arif Zulfajar, Universiti Sains Malaysia</i></p> <p>14:30-15:00 Q/A</p>

For more information: <https://ioc-westpac.org>



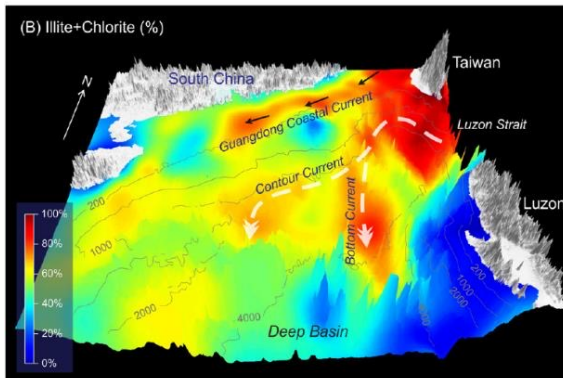
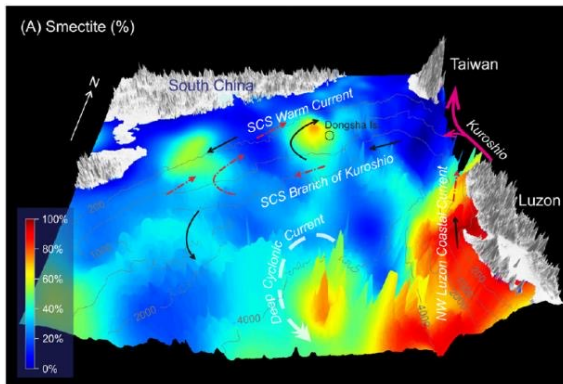
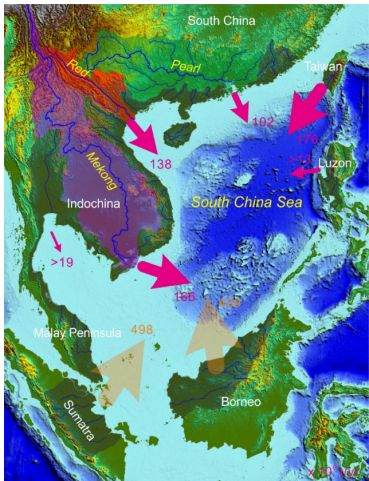
Zhao et al, 2022, JGR

# A summary of key achievement (3/3)

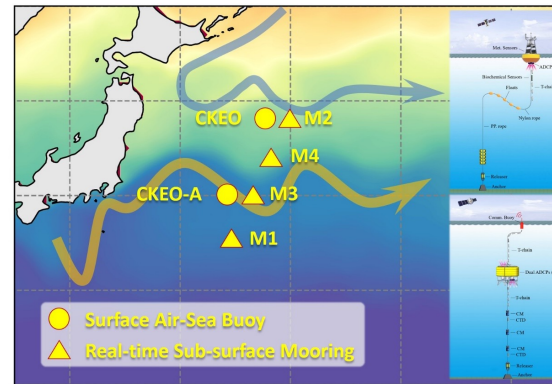


## Sustained long term efforts brought good collaborations

### #5 FluSed



### Kuroshio Extension Mooring System (KEMS)



Mooring	Lat	Lon	Time	Description
CKEO	39N	149.25E	2019.09-	Surface Air-Sea Buoy
CKEO-A	35N	146.75E	2019.11-	Surface Air-Sea Buoy
M1	32.4N	146.2E	2015.11-	Sub-surface Mooring (real-time from 2019.09)
M2	39N	150E	2016.04-	Sub-surface Mooring (real-time from 2019.09)
M3	35N	147.6E	2017.10-	Sub-surface Mooring (real-time from 2019.11)
M4	37N	148.8E	2019.11-	Sub-surface Mooring (real-time from 2020.06)

Near real time data will be released. at <http://cn-kems.net/> by UN24 AIKEC

### UN24 CSK-2

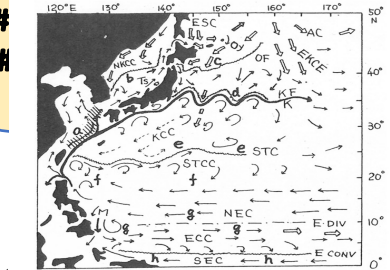
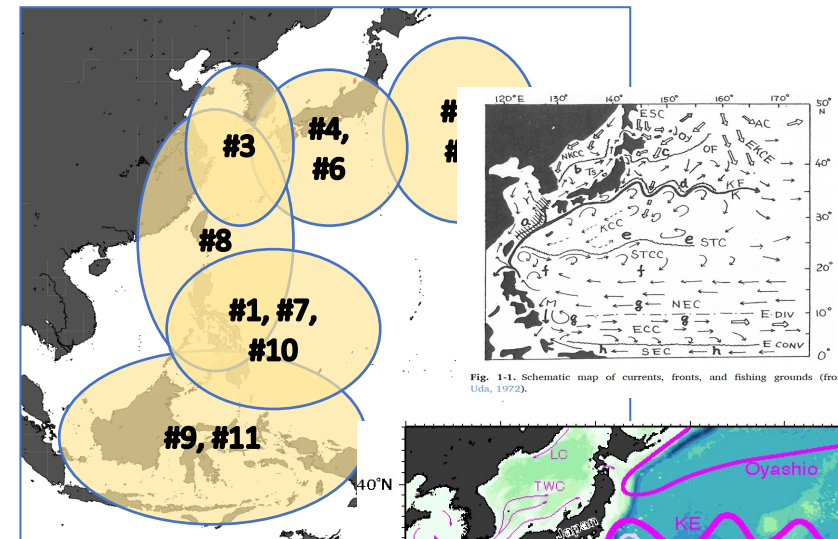
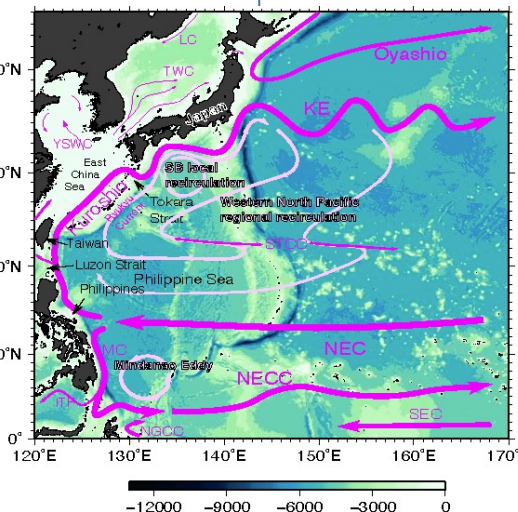


Fig. 1-1. Schematic map of currents, fronts, and fishing grounds (from Uda, 1972).



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# Key activities since the last Session

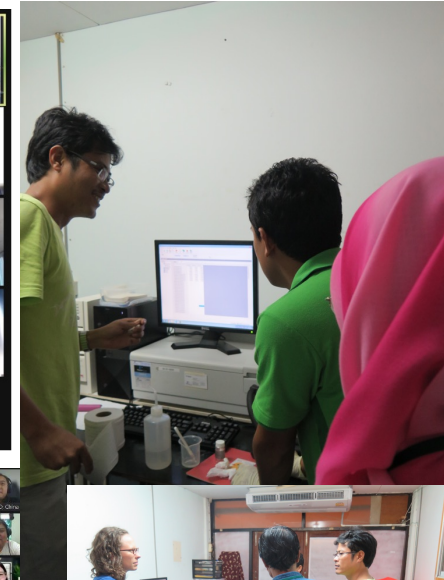
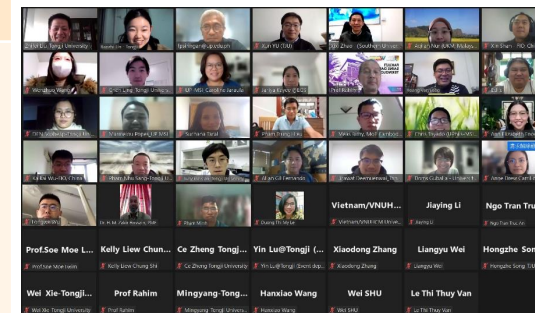
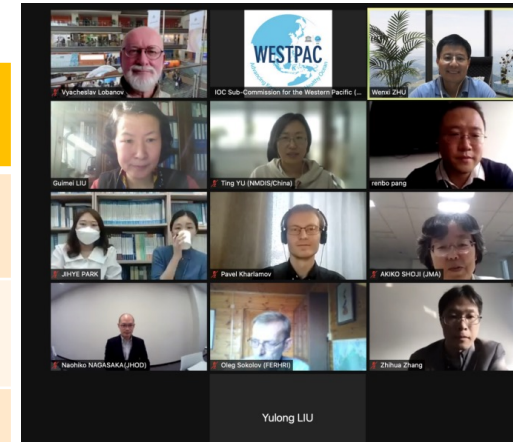


Date	Name of Programme/Project	Activities
Intersessional period	NEAR-GOOS (#1)	Provision of observed data and forecast data operationally
Intersessional period	OFS/SEAGOOS (#2)	Provision of OFS (Ocean Forecasting System) data to public operationally
February 2023	CSK-2 (UN24)	The first International CSK-2 science symposium
May 2022	Acid/SEAGOOS (#3)	Webinars on Ocean Acidification (5 times)
Fall 2021 to 2022	Acid/SEAGOOS (#3)	Inter-calibration experiment
December 2021 & 2022	FluSed (#5)	International workshops (1 times per year)
May 2021, and August 2022	FluSed (#5)	Joint Cruises (2 times)

# Stats of activities since the last Session



Activities	Total number
Steering meeting	5 times
Science meeting	9 times
Cruises, fieldtrips, experiments	5 times
Training opportunity, materials provision for Capacity Developments	8 times



Total 27 times per 10 projects  
(2.7 times per project in average)



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# Planned activities for May 2023- April 2025



- Continuous data provisions to public (#1 NEAR-GOOS, #2 OFS/SEAGOOS)
- Initiate an operational coral reef early warning system (#2 OFS/SEAGOOS)
- Extension of OFS to climate forecasting (#2 OFS/SEAGOOS)
- 2<sup>nd</sup> call for UN-24-CSK-2 projects (UN-24 CSK-2 Programme)
- Science meetings (UN-24 CSK-2, #4 AMS, #3 SEAGOOS, #5 FluSed, #7 Upwelling)

Activities	total number
Steering meeting	7 times/7 projects
Science meeting	13 times/7 projects
Cruises, fieldtrips, experiments	7 times/7 projects
Training opportunity, materials provisions for capacity development	6 times/7 projects

33 times per 7 projects  
(4.7 times per project is planned in average)



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# Problems encountered and recommendations - From the progress reports submitted -

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Problems	Correspondences and comments by PIs
Communications	Commitments from members
On-line meeting or postpone of cruises by COVID	Closer communication, requests to implement observations by coastal member states
Long-term financial support	Member states be aware of the needs of financial support
Difficult to conduct international cooperation due to geopolitical and economic issues	Establish core activities to promote the entire programme effectively
High cost for maintaining the operation of OFS	Apply more financial support for OFS, and combine with the UN Ocean Decade OSF for sharing resources





# Summarized Recommendations

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- Communications and networking, engagement with member states
  - (PI) promote communications to conduct physical or hybrid events
  - (PI) conduct regular seminars and workshops
- Continuous and Add-on Fundings
  - (AG) Find opportunities of new fundings in addition to from the governments
  - (PI) Show gaps in actions to goals and its feasibility plan
  - (MS) Consider the gaps if valued to fulfil, and consider further the feasibility plan if suitable to invest



# Thank You

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