

- Day-2 Afternoon-1 (14:00-15:00):  
Session-3. Linkage with M-BON (1hr joint session with AP-BON)

By Yamakita & Ando

3.1 Coastal physical data from satellite and assimilation (Aiki)

3.2 Coastal biological data from satellite (Ishizaka)

3.3 Introduction of AP-MBON and BioDiversity data (Yamakita)

3.4 Progress and network of Coral research (tentative) (Yamano)

3.5 Discussion

# Introduction of AP-MBON and Biodiversity data

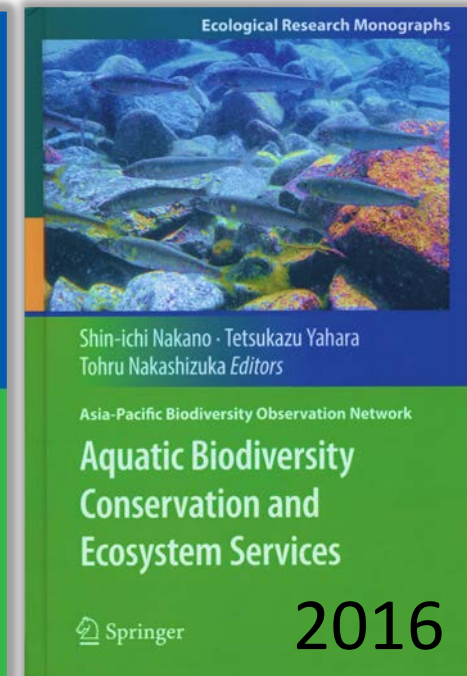
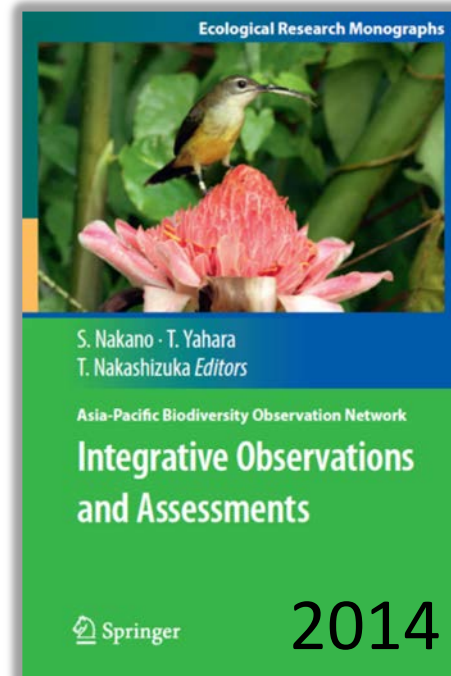
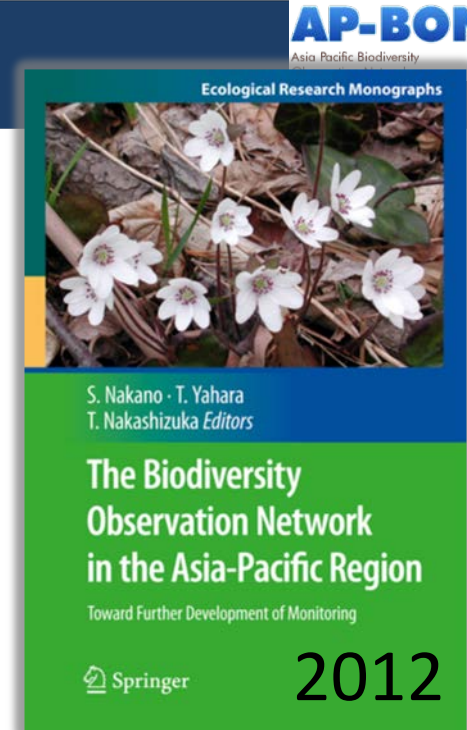
T Yamakita (JAMSTEC)

# History of AP BON and other network activities

Year	GEOSS AP Symposia	GEO BON	AP BON Meetings	National BONs	CBD COPs	IPBES
2007	1st GEOSS AP					
2008	2nd GEOSS AP	GEO BON Workshop (April, Potsdam)			COP9	
2009	3rd GEOSS AP (Kyoto, February)		1st AP BON (July, Japan) 2nd AP BON (December, Japan)	Japan BON (May)		
2010	4th GEOSS AP (a session, Bali, March)	GEO BON Meeting (February, USA)	3rd AP BON (CBD COP10 Preconference, March, Japan)		COP10 (Japan, Side-event)	
2011			4th AP BON (December, Japan)			
2012	5th GEOSS AP (Tokyo, April)	GEO BON Meeting (December, USA)	WCC of IUCN (September, Korea)	Korea BON, Nepal BON, Bangladesh BON	COP11 (India, Side-event)	
2013	6th GEOSS AP (Ahmedabad, February)		5th AP BON (November, ACB, Philippines)	Philippines BON		Plenary-1
2014	7th GEOSS AP (Tokyo, May)	IC and AB (June, Germany)	6th AP BON (October, NIBR Korea)		COP12 (Korea, Side-event)	Plenary-2
2015	8th GEOSS AP (Beijing, September)	IC and AB (June, Germany)		Sino BON, Indonesia BON		Plenary-3
2016	2016-2025 A New GEO Strategy Plan Initiated	All-Hands Meeting (July, Germany)	7th AP BON (ACB, Thailand) 8th AP BON (Taipei, Taiwan)	WCC of IUCN (September, USA)	COP13 (Mexico)	Plenary-4
2017	9th GEOSS AP (Tokyo, January) 10th GEOSS AP (Hanoi, September)	IC and AB (July, Germany)				Plenary-5
2018	11th GEOSS AP (Tokyo, October)		9th AP BON (Bangkok, February)		COP14 (Egypt)	Plenary-6

# 7 Key Activities of JapanBON & AP-BON

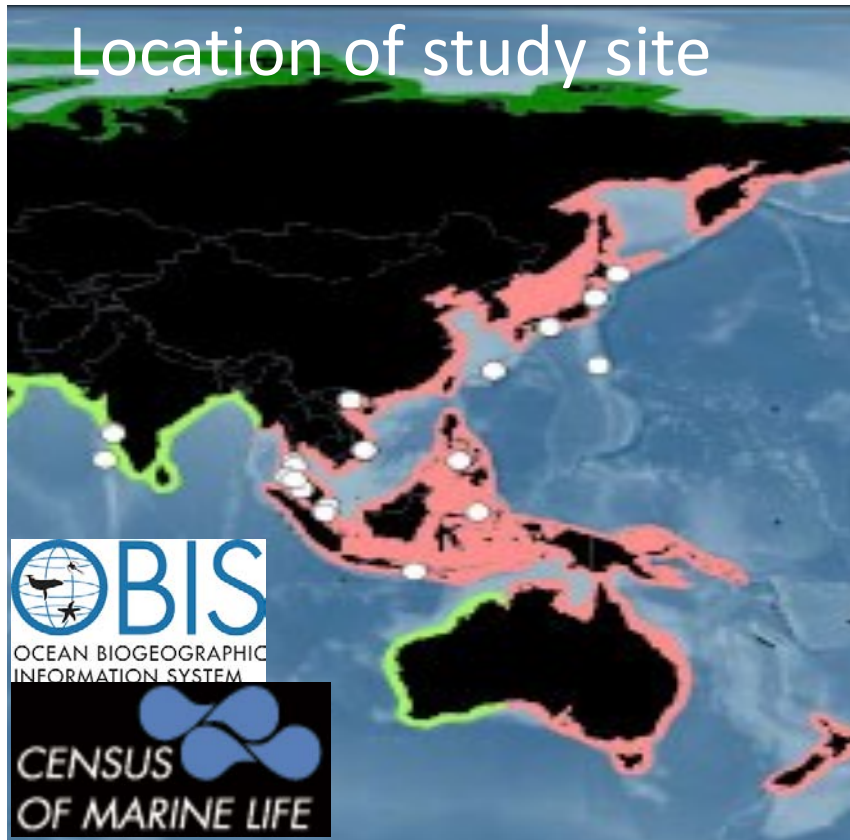
- Species Recording
- Mapping Biodiversity
- Detect Changes of Biodiversity
- Assessing Risks on Biodiversity
- Prioritizing actions
- Publishing together
- Networking sites / people / institutes / data / communities



1. **Some BONs are operational** at the national and sub-regional levels but there is need to organize more National BONs and organize a network of BONs facilitated by GEOBON
2. **Training courses** available through GBIF as funded by BIFA; need to expand to other areas (other parts of Asia and Pacific)
3. **Threats to biodiversity identified**
  - Drivers of Biodiversity Loss
  - Drivers of Mangrove Loss
  - Drivers of wetland loss
  - Anthropogenic actions that hamper achievement of SDGs identified
4. **Biodiversity databases** established through various accessible platforms such as GBIF, ABCDNET, National CHMs and the ASEAN CHM.
5. **Data shared have been used to:**
  - **Monitor** various biodiversity for many organisms
  - **Contribute** to global data holdings including such as CForBio
  - **Increase** data paper publications
  - **Populate databases**, contribute to regional platforms (e.g., ABCDNet, GBIF), and prepare distribution maps
  - **Analyze** projects that answer specific questions
  - **Conduct** surveys and **Prepare assessments** (e.g., regional mangrove assessment)
  - **Develop models** to predict CC impacts, DRR, inform decision making and prepare ecosystem service evaluation
  - **Develop policies and guidelines**
6. **Technology is available**
  - Large coverage high resolution observation technology
  - Forest Crane, Drones and LIDAR that facilitate assessments in various ecosystems

# ■ Natural Geography In Shore Areas

a Census of Marine Life Ocean Realm Field Project



**Focus:** soft-bottom seagrass beds and macroalgal covered rocky shore communities.

## **Achievements:**

- DATA has been updated on OBIS, which is over at 27.7 million records & 817 datasets.
- The DATA supports to analyze of scientists the state of knowledge of marine biodiversity based on the geographic distribution of georeferenced species records and regional taxonomic lists.
- Members have described new species
- Parts of protocol was applied in monitoring 1000 long-term national census by the Ministry of the Env. of Japan



# Monitoring 1000 and JaLTER

## Ecosystems and Indicators

Ecosystem		Sites	Main survey items	Surveyor
Marine shore	Sandy shore	41	Vegetation, Sea turtle egg-laying	Citizen
	Rocky shore	6	Benthos	Scientist
	Tidal flat	144 (10)	Benthos, Sand grains, <b>Shorebirds</b>	Scientist / Citizen
	Eelgrass bed	6	Eelgrass vegetation, Benthos	Scientist
	Seaweed bed	6	Seaweed vegetation, Benthos	Scientist
	Coral reef	24	Coral coverage, Crown-of-thorns starfish, Bleaching, substratum turbidity	Scientist
	Small island	30	Vegetation, Seabirds	Scientist

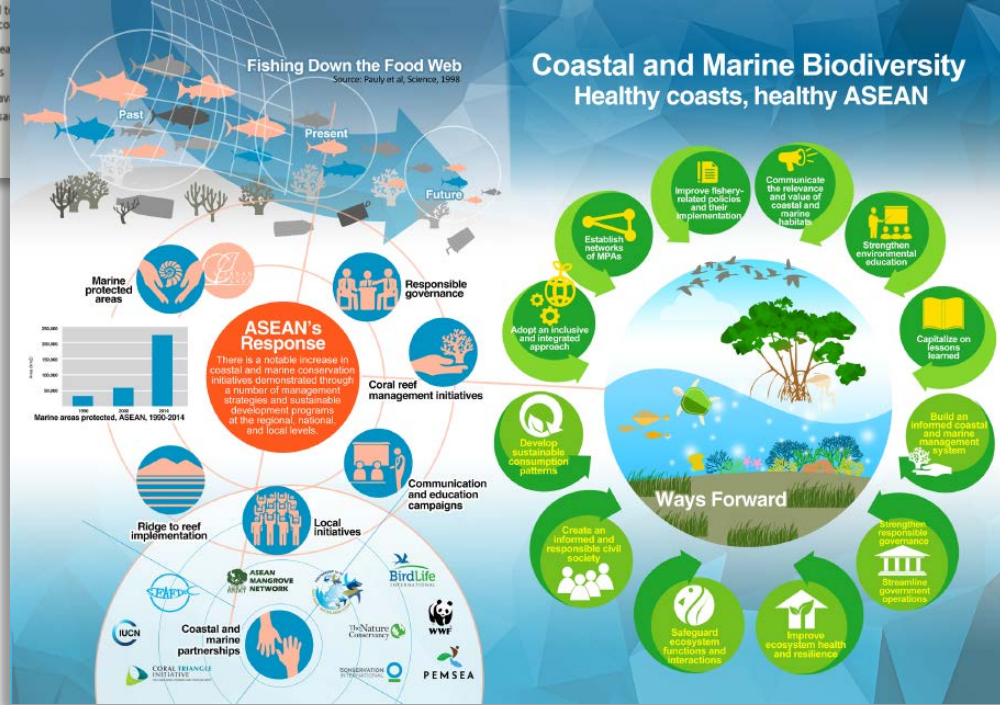
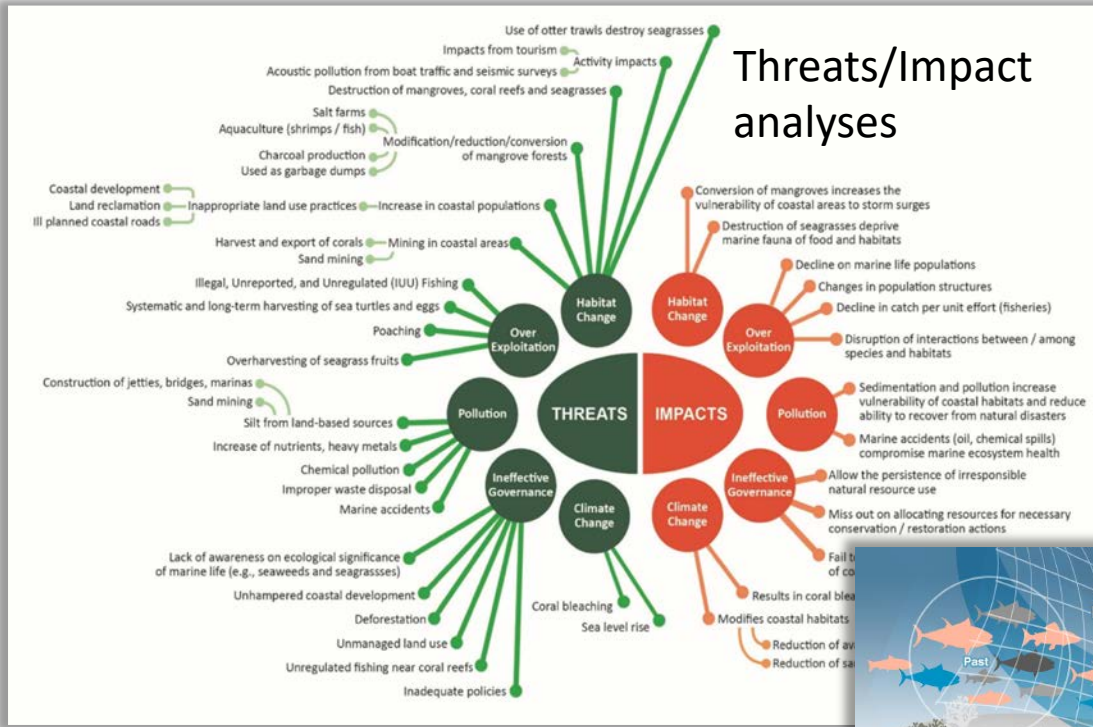
[https://www.restec.or.jp/geoss\\_ap2/pdf/0415/wg3/biodiversity/03.pdf](https://www.restec.or.jp/geoss_ap2/pdf/0415/wg3/biodiversity/03.pdf)

Program **planning to monitor over 100 years** conducted by the Ministry of the Env. of Japan

- Assessing the impact of global climate changes
- Early detecting the degradation of regional natural environments
- providing more concrete information to take policy for the conservation and sustainable resource use

**-Sampling protocols are partially follow the NAGISA protocol in marine system**

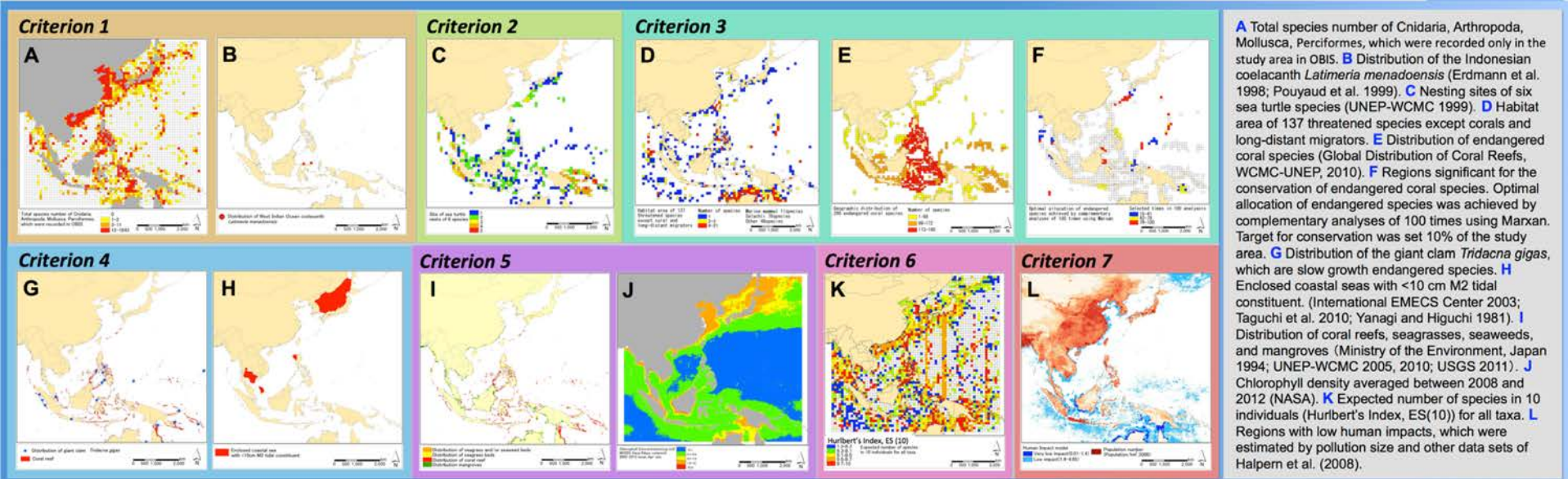
# S. Vergara (ASEAN Center of Biodiversity)





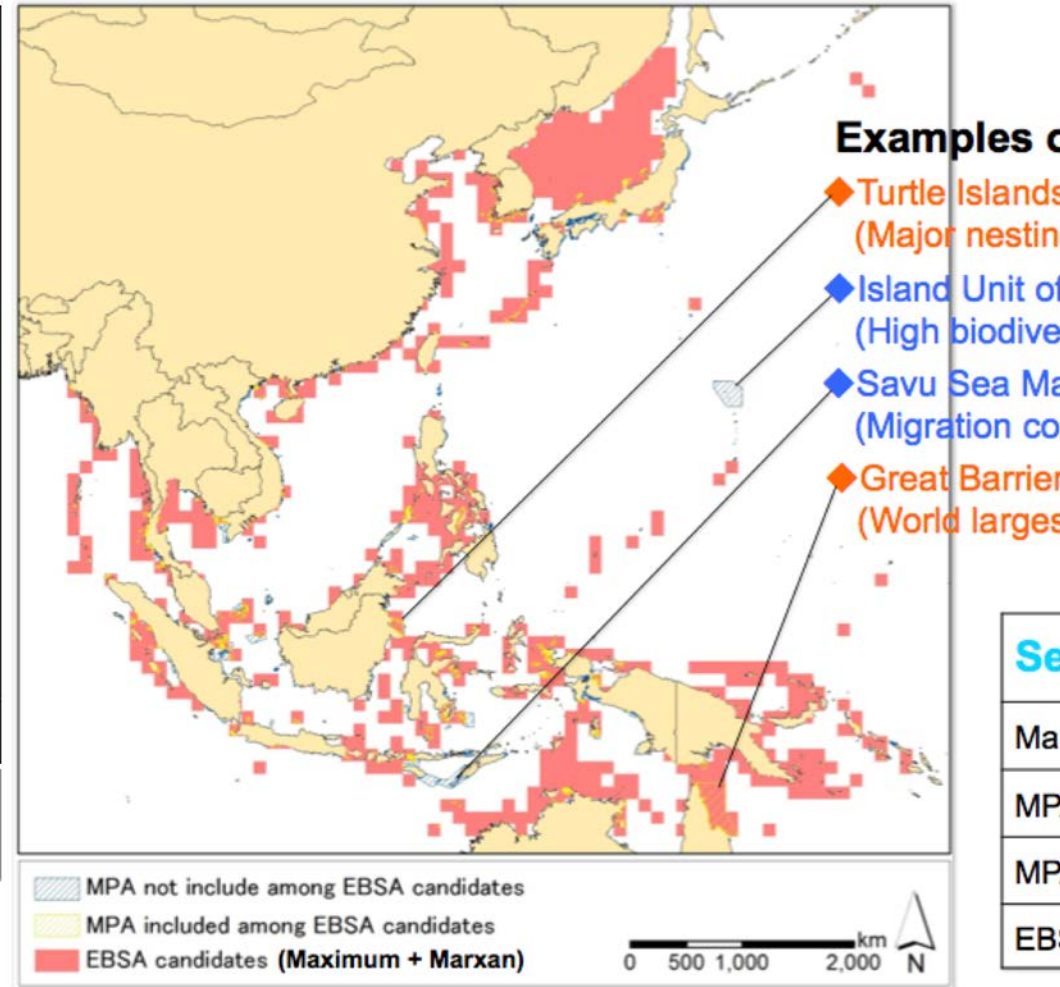
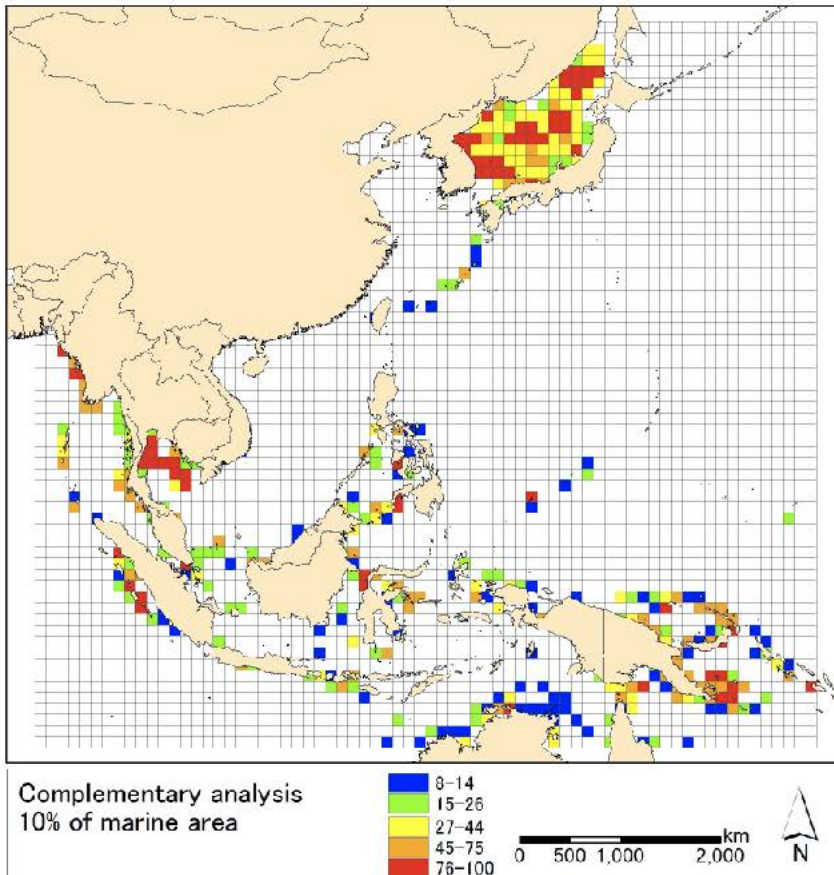
# Past activities of the member of AP-BON EBSA identification trials for Asia region

Yamakita and Sudo et al. EBSAs in East and South East Asia (Marine Policy 2017)



Source of records for species occurrence		Years	Records collected
Database	OBIS	1748~2013	1,120,974
	GBIF	1700~2013	842,569
	NaGISA	2002~2010	2,928
	COPEPOD	1974~1981	1,475
	PANGAEA	2005	19,100
Cruise reports	H.M.S. Challenger Expedition	1874~1875	2,375
	Hakuho-Maru Cruise	1972~2006	15,668
	Snellius-II Expedition	1984~1985	3,319
	Rumphius Biohistorical Expedition	1990	1,989
	Anambas Expedition	2002	2,127
Published papers		1939~2012	23,792
Total count of records			2,036,316

# Integration and GAP analysis

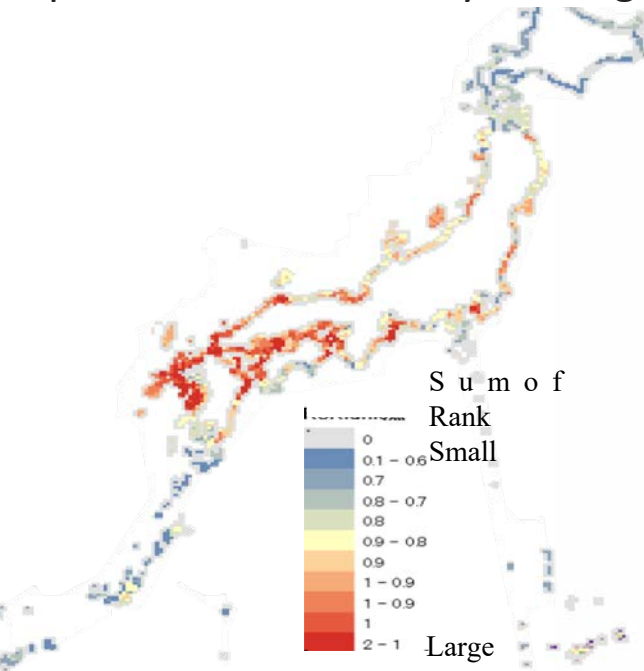


Total area of EBSAs became 14.4% of the stu  
Only 45% of MPAs overlapped with EBSA can

# Examples of ES quantified on national scale

## Fish Catch

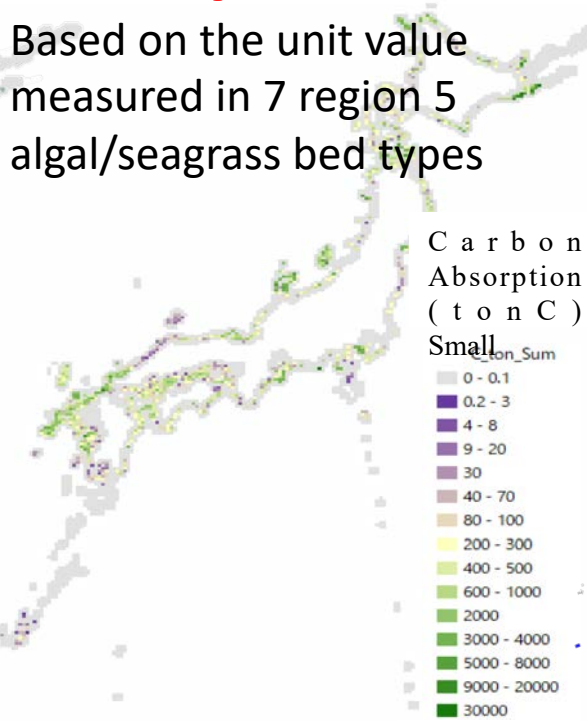
about fish related with coastal natural capital was evaluated by ranking



Provisoning

## Carbon absorption

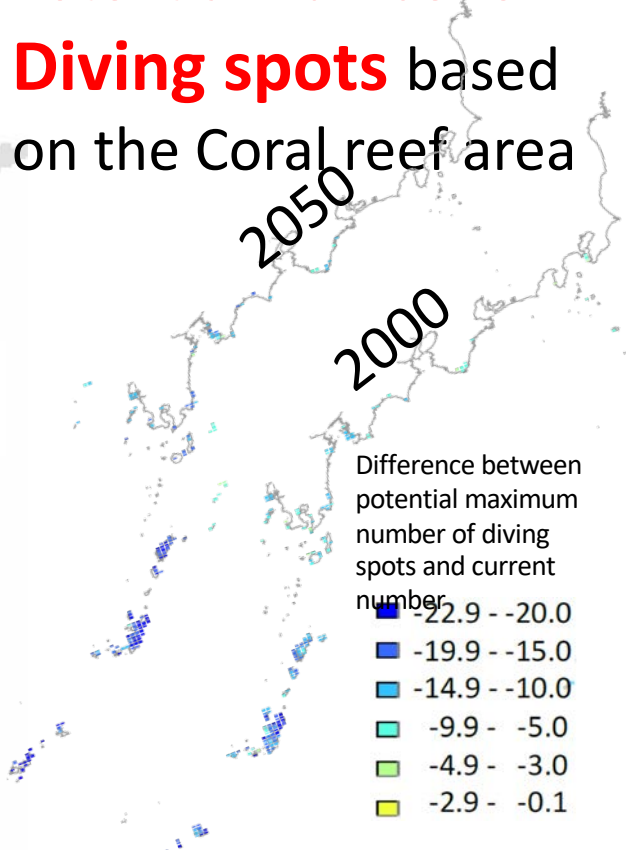
Based on the unit value measured in 7 region 5 algal/seagrass bed types



Regulating

## Potential Number of Diving spots

based on the Coral reef area



Cultural





# MBON

Marine Biodiversity  
Observation Network



Frank Muller-Karger  
University of South  
Florida



Isabel Sousa-Pinto  
University of Porto



Mark Costello  
University of Auckland

1. Developing an MBON Implementation Plan
2. Data Management
3. Developing EBVs



## The Global Ocean Observing System



[Click on each EOVS for their respective spec sheets]

PHYSICS	BIOGEOCHEMISTRY	BIOLOGY AND ECOSYSTEMS
Sea state	Oxygen	Phytoplankton biomass and diversity
Ocean surface stress	Nutrients	Zooplankton biomass and diversity
Sea ice	Inorganic carbon	Fish abundance and distribution
Sea surface height	Transient tracers	Marine turtles, birds, mammals abundance and distribution
Sea surface temperature	Particulate matter	Hard coral cover and composition
Subsurface temperature	Nitrous oxide	Seagrass cover
Surface currents	Stable carbon isotopes	Macroalgal canopy cover
Subsurface currents	Dissolved organic carbon	Mangrove cover
Sea surface salinity	Ocean colour ( <i>Spec Sheet under development</i> )	Microbe biomass and diversity (*emerging)
Subsurface salinity		Benthic invertebrate abundance and distribution (*emerging)
Ocean surface heat flux		



J. Emmett Duffy



# A Global Collaboration: OBIS + GOOS (IOC) and MBON

GEO BON/MBON – GOOS BioEco – OBIS partnership

Building a globally coherent, consistent and coordinated sustained global ocean observing system to assess the state of the ocean's biological resources and ecosystems

Requirements



- Focus on sustained observations
- Bring selected EOVs from pilot to mature
- Link with platforms and observing systems of GOOS and GRAs

Observations



- R&D focus
- Bring new EOVs from concept to pilot
- Assist with the establishment of national and regional BONs

Data & Products



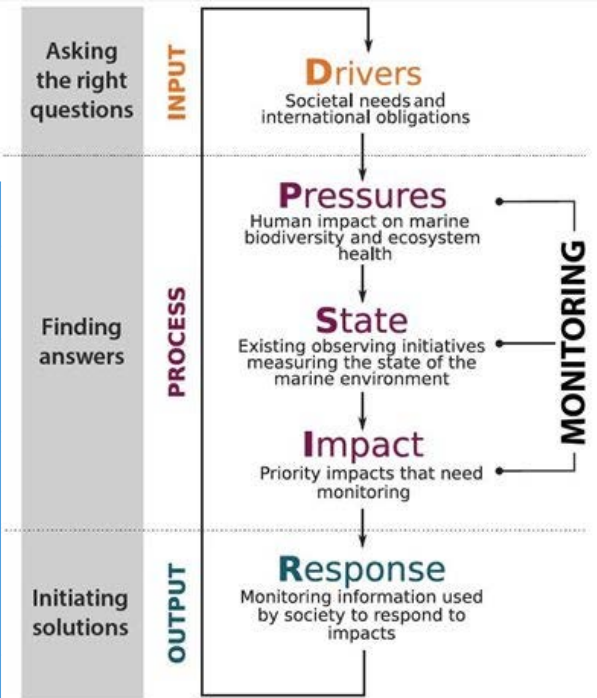
- Open data sharing
- Data integration
- Data quality control
- Data harmonization
- Tools for data exploration, visualization and analysis

Products,  
Indicators,  
Assessments

e.g.: <http://iobis.org/2016/12/15/goosgeobonobis/>



	PHYSICS	BIOGEOCHEMISTRY	BIOLOGY AND ECOSYSTEMS
	<a href="#">Sea state</a>	<a href="#">Oxygen</a>	<a href="#">Phytoplankton biomass and diversity</a>
T	<a href="#">Ocean surface stress</a>	<a href="#">Nutrients</a>	<a href="#">Zooplankton biomass and diversity</a>
0	<a href="#">Sea ice</a>	<a href="#">Inorganic carbon</a>	<a href="#">Fish abundance and distribution</a>
1.	<a href="#">Sea surface height</a>	<a href="#">Transient tracers</a>	<a href="#">Marine turtles, birds, mammals abundance and distribution</a>
a	<a href="#">Sea surface temperature</a>	<a href="#">Particulate matter</a>	<a href="#">Hard coral cover and composition</a>
2.	<a href="#">Subsurface temperature</a>	<a href="#">Nitrous oxide</a>	<a href="#">Seagrass cover</a>
re	<a href="#">Surface currents</a>	<a href="#">Stable carbon isotopes</a>	<a href="#">Macroalgal canopy cover</a>
3.	<a href="#">Subsurface currents</a>	<a href="#">Dissolved organic carbon</a>	<a href="#">Mangrove cover</a>
a	<a href="#">Sea surface salinity</a>	<a href="#">Ocean colour</a> ( <i>Spec Sheet under development</i> )	Microbe biomass and diversity (*emerging)
	<a href="#">Subsurface salinity</a>		Benthic invertebrate abundance and distribution (*emerging)
	<a href="#">Ocean surface heat flux</a>		

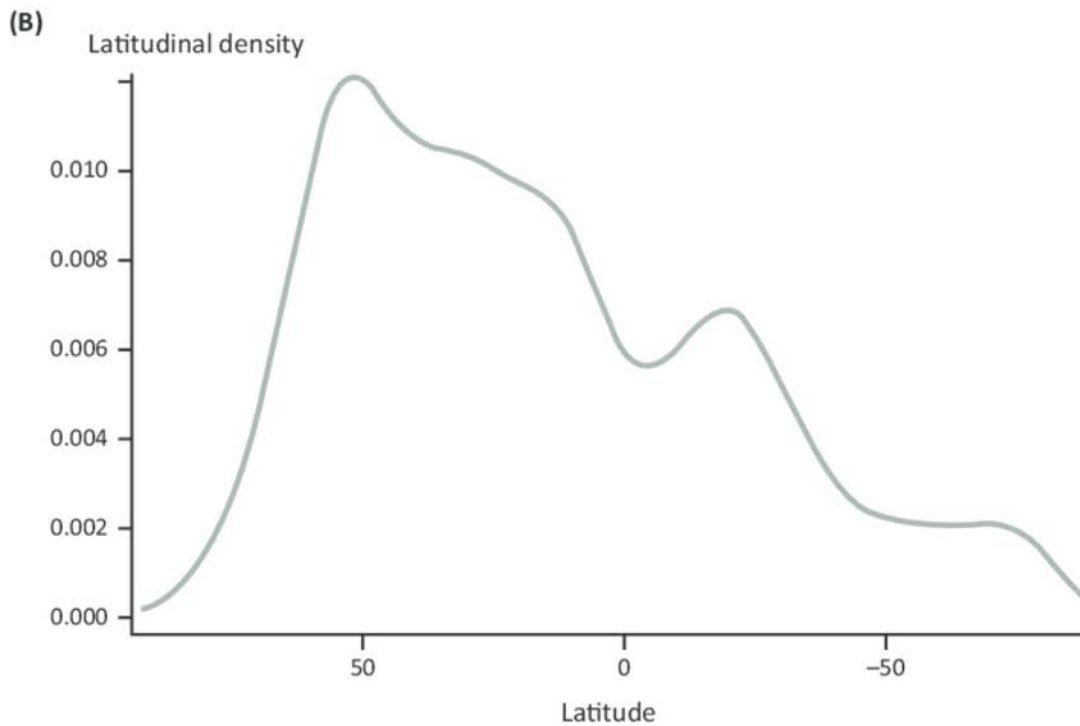
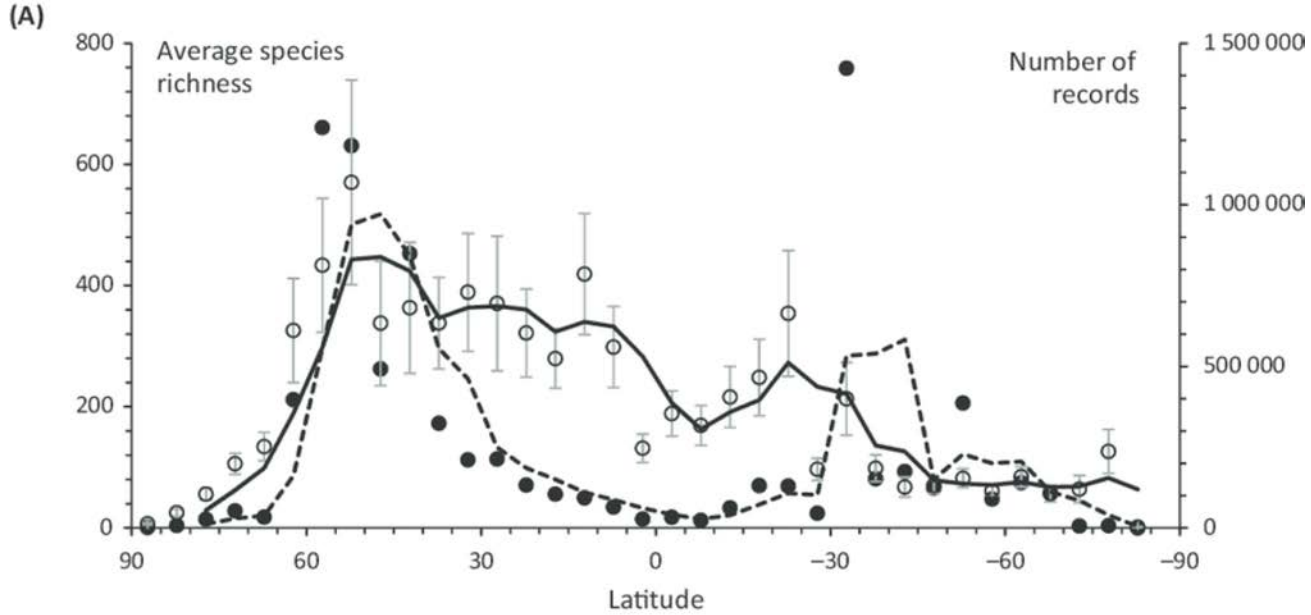


LIVING ECOSYSTEMS

and composition

opy cover

- Microbe biomass and diversity (\*emerging)
- Benthic invertebrate abundance and distribution (\*emerging)



# Project 3: Coastal biodiversity assessment

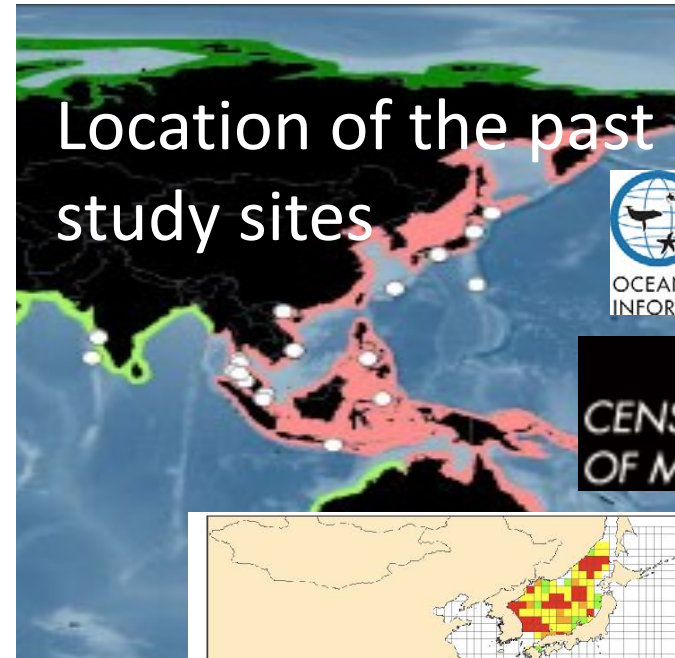
Revive past activities to

Over 100 years observe temporal changes since CoML...

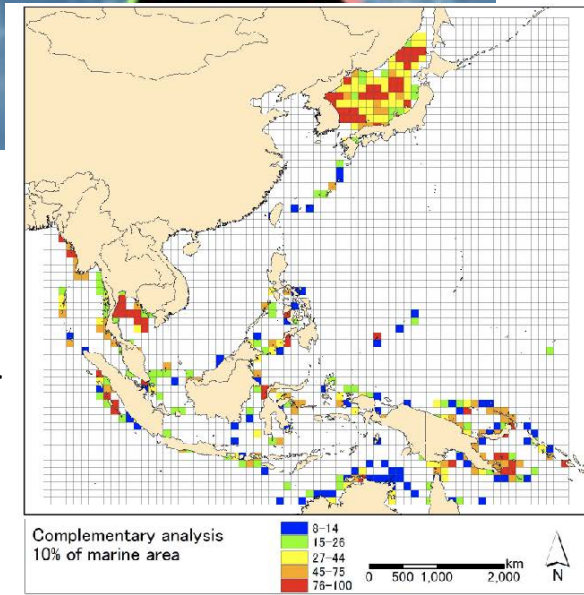
- temporal change?
- improve of the technique (such as DNA & Camera)
- Pole to Pole biodiversity pattern

Use of the information such as

- ecosystem services
- EBSA
- indicator of the threat



Proposed EBSA using existing & literature extracted data





# Project 3: Coastal biodiversity assessment

researches and production of

Present data... infrastructure

- Some are still not good enough
- Some need temporal data

Ways to improve

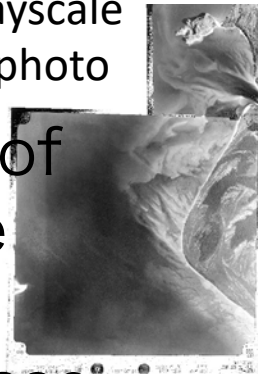
- image recognition
- eDNA
- survey using drone
- literature
- ... etc

- Update the maps of seagrasses, algae and coral reefs & build GIS database

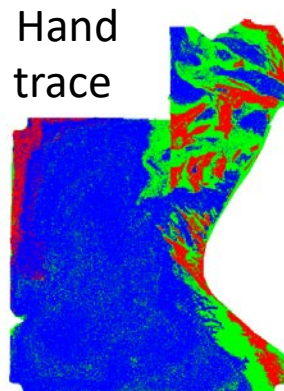


**Coral reef habitat data** in AP region using ALOS/AVNIR2 (National Institute for Environment Studies (NIES) and Asia Air Survey Co.,Ltd)

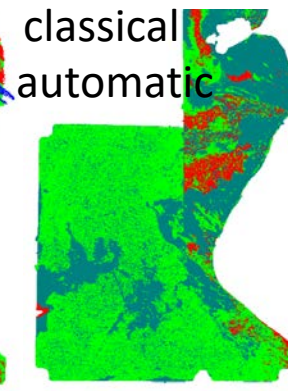
Grayscale  
Airphoto



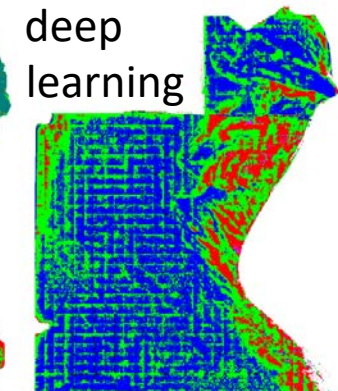
Hand  
trace



classical  
automatic



deep  
learning



More accurate classification of seagrass Yamakita et al. under review

# Statement to establish AP-MBON

- SUMMARY
- Marine activities in AP-BON have begun. During two 2018 AP-BON workshops, several marine scientists, including the Co-Chair of the global Marine Biodiversity Observation Network (MBON), met and discussed how to develop an AP-marine BON. AP BON is separate from GEO BON in funding, administration and governance, and has its own independent identity and profile. The founding members agreed that the marine group would be called “AP MBON”. In this report, we note particular activities that are underway and make the case for a more substantive AP MBON in the future. A first priority to take this forward will be an AP MBON secretariat to lead and coordinate activities.

