

Asia Oceania Group on Earth Observations - Networking networks -

Hiroyuki Muraoka

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Chair, ILTER East Asia and Pacific regional network

Technical Advisor, MEXT - Japan

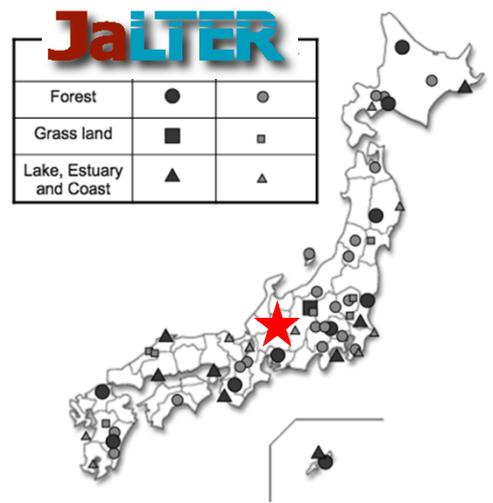
Coordination Board, AOGEO

Programme Board, GEO



11th APBON Workshop / 26-28 June 2019 / Kuala Lumpur, Malaysia

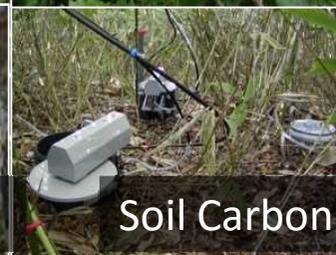
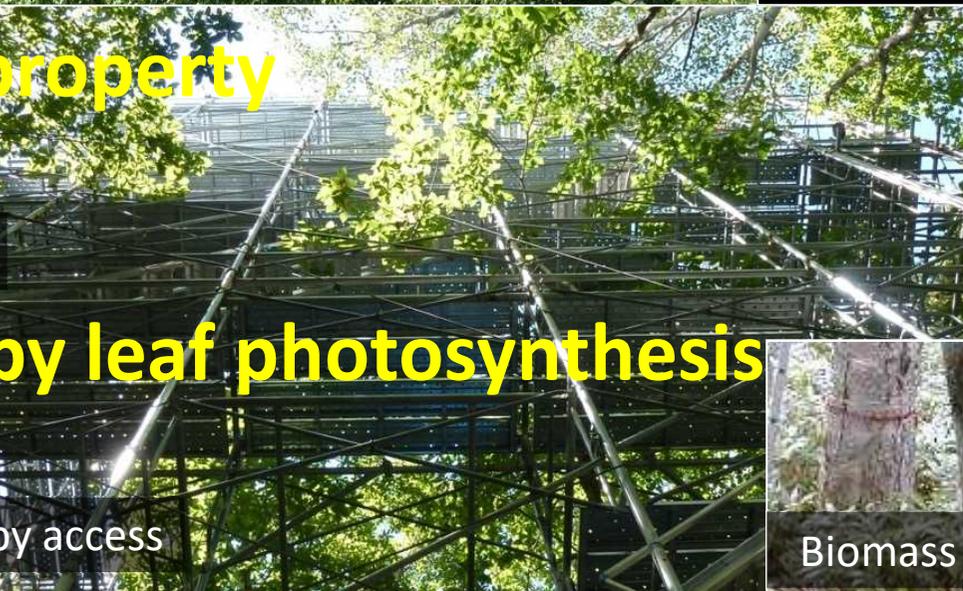
“Takayama” site (Gifu University & AIST, Japan)



Canopy spectral property



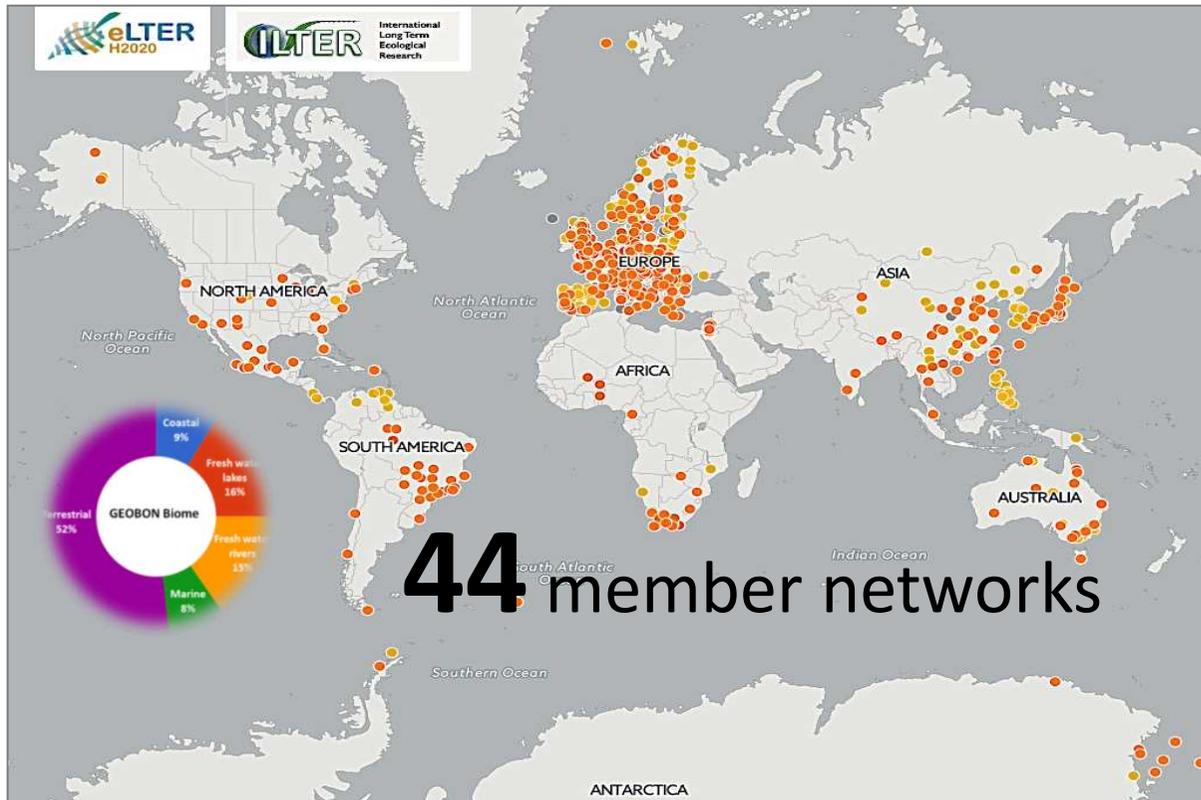
Canopy leaf photosynthesis



International Long-Term Ecological Research Network

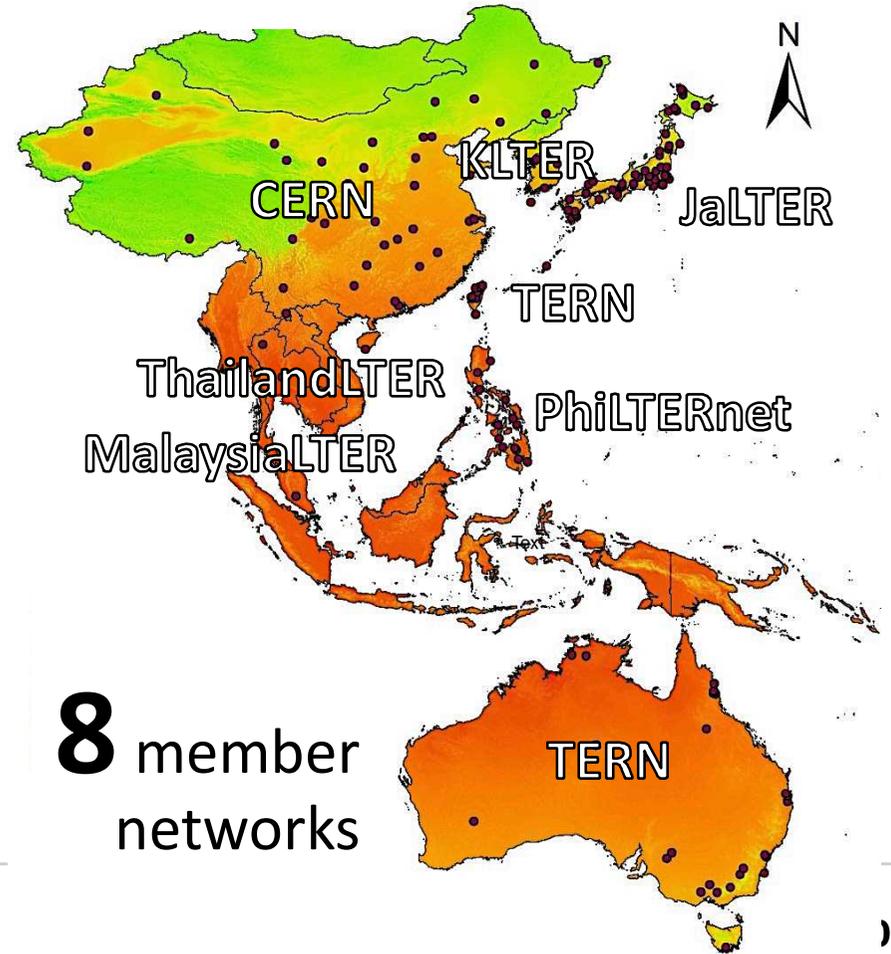


Participating
Organization of GEO



Mirtl et al. (2018) STOTEN

ILTER-EAP East Asia and Pacific regional network



Kim et al. (2018) Ecol Res

Vietnam is preparing to join.

Group on Earth Observations (GEO)

GEO Vision

To realize a future wherein decisions and actions, for the benefit of humankind, are informed by coordinated, comprehensive & sustained Earth observations & information.

Member states (105)



Africa: 27 - Asia/Oceania - 21, Europe: 34 - C.I.S: 7 - Americas: 16 Total: 105

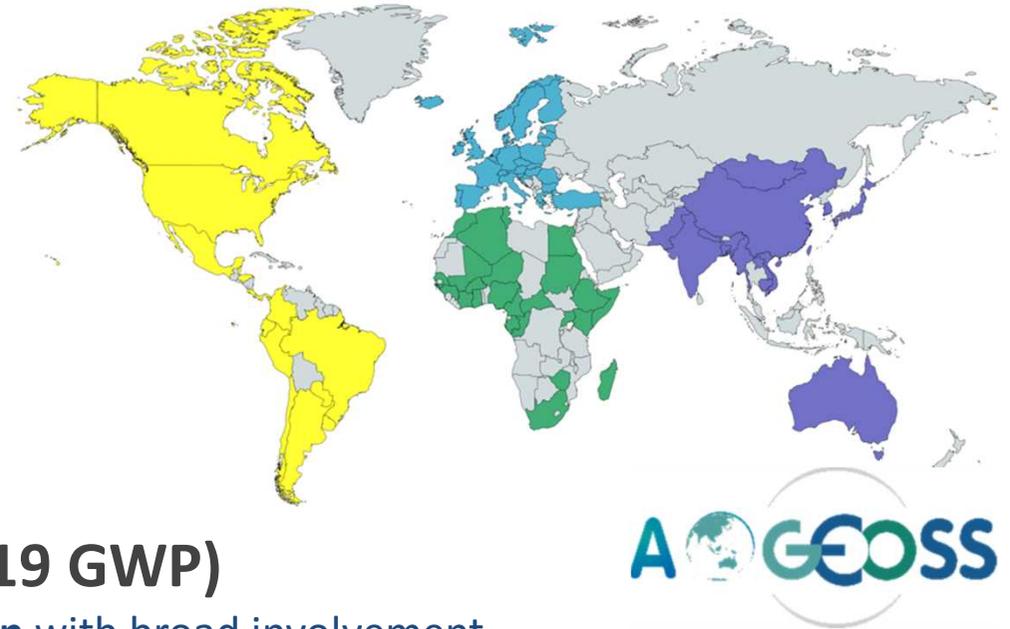
Participating Organizations (127)



Asia Oceania Group on Earth Observations (AOGEO)

Asia-Oceania region

- Complex geographic characteristics
- Large population (60% of the world)
- Climate change drastically
- Natural disasters occur frequently
- Unbalanced socioeconomic development
- Deteriorating ecosystems



Asia-Oceania GEOSS Initiative (2017-2019 GWP)

A regional cooperation program on **Earth observation** with broad involvement
Strengthen comprehensive ability of Earth observation and applications for
sustainable development at regional level.

Development of Earth Observations, Community of Practice, Capacity Building and Engagement in Asia Oceania region

GEOSS-AP Symposia

GEOSS Asia Pacific Symposium

- 1st GEOSS-AP Symposium (Jan 2007, Tokyo)
- 2nd GEOSS-AP Symposium (Apr 2008, Tokyo)
- 3rd GEOSS-AP Symposium (Feb 2009, Kyoto)
- 4th GEOSS-AP Symposium (Mar 2010, Bali)
- 5th GEOSS-AP Symposium (Apr 2012, Tokyo)
- 6th GEOSS-AP Symposium (Feb 2013, Ahmedabad)
- 7th GEOSS-AP Symposium (May 2014, Tokyo)
- 8th GEOSS-AP Symposium (Sep 2015, Beijing)
- 9th GEOSS-AP Symposium (Jan 2017, Tokyo)
- 10th GEOSS-AP Symposium (Sep 2017, Hanoi)
- 11th GEOSS-AP Symposium (Oct 2018, Kyoto)
- 12th AOGEO Symposium (Nov 2019, Canberra)

AOGEOSS Workshop

- 1st AOGEOSS Workshop (May 2018, Deqing)
- 2nd AOGEOSS Workshop (Apr 2019, Jakarta)

2005-2015



2016-2025

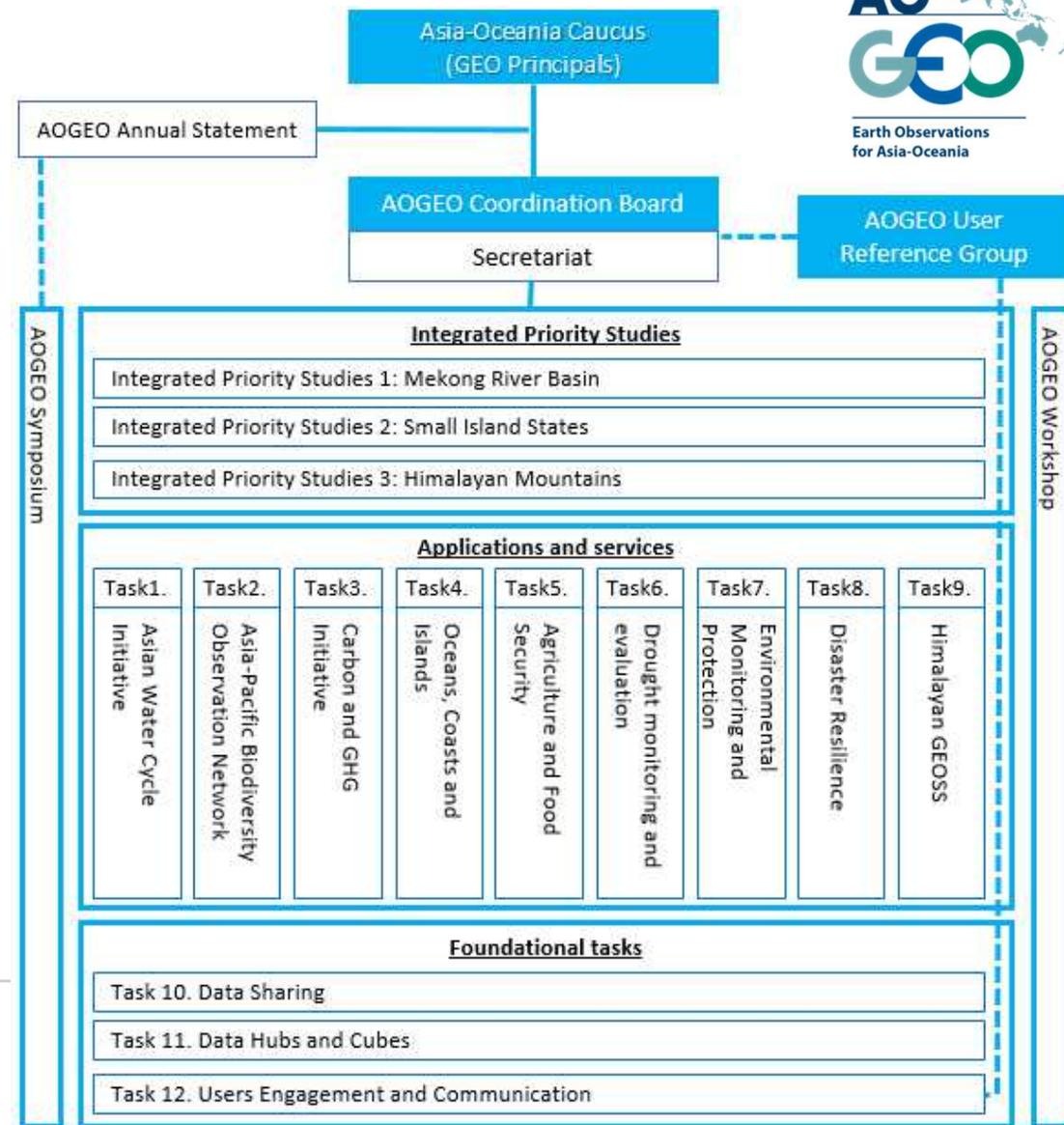
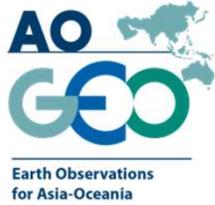


Asia Oceania GEO (2020-2022)

AOGEO will engage regional stakeholders, including national agencies and regional intergovernmental organizations, in global GEO activities and coordinate implementation of GEO activities within the AO region.

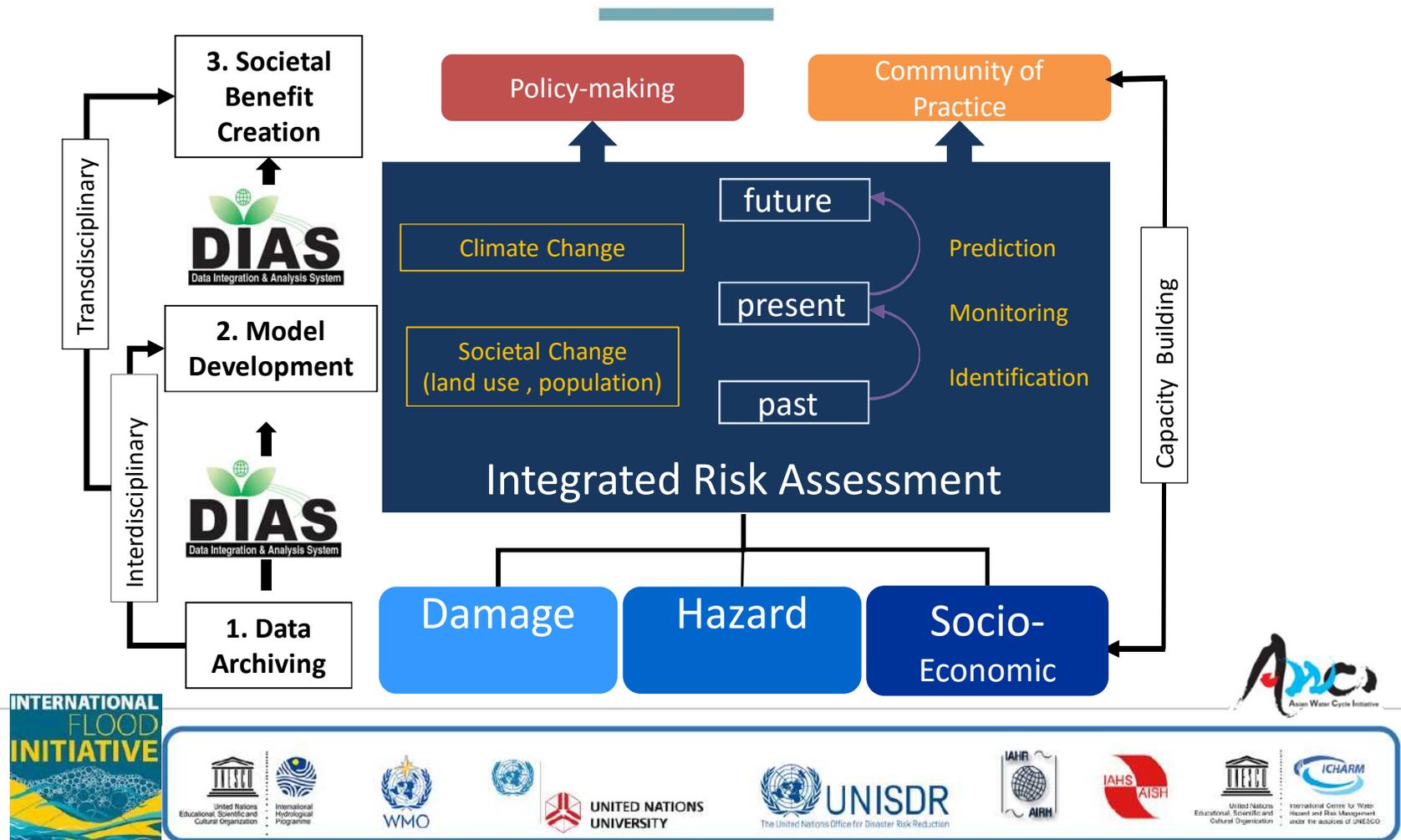
AOGEO will also:

1. identify regional needs for EO applications and conveying these to global GEO activities;
2. facilitate regionally coordinated EO activities and utilize available infrastructure, resources and capacity to develop integrated and sustained observations in the AO region;
3. provide a platform for regional countries to advance data sharing and services;
4. promote dialogue, communications and cooperation among the AOGEO Members and other participants, as well as with other Regional GEOs; and
5. support sound decision-making at local, national and regional scales by making maximum use of EO data and information.

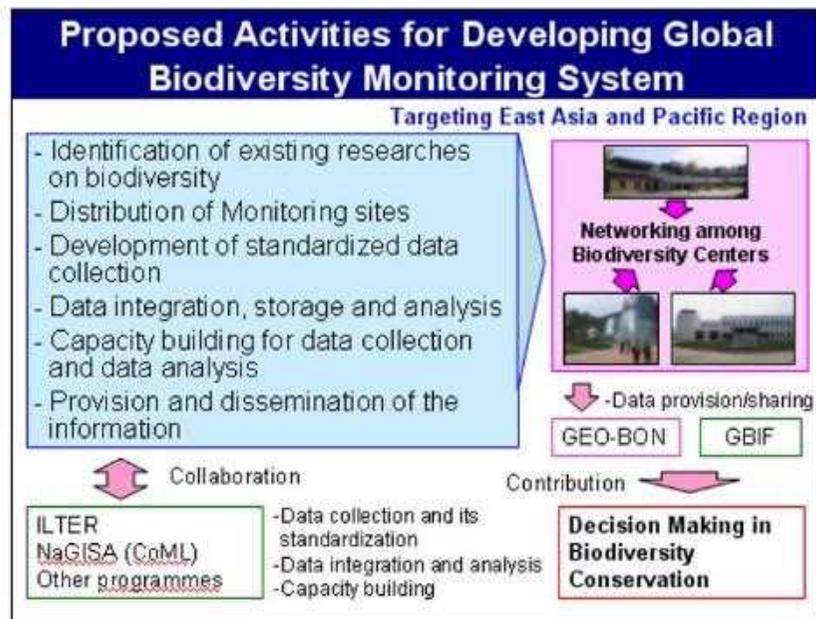


TG1: GEOSS Asian Water Cycle Initiative (AWCI)

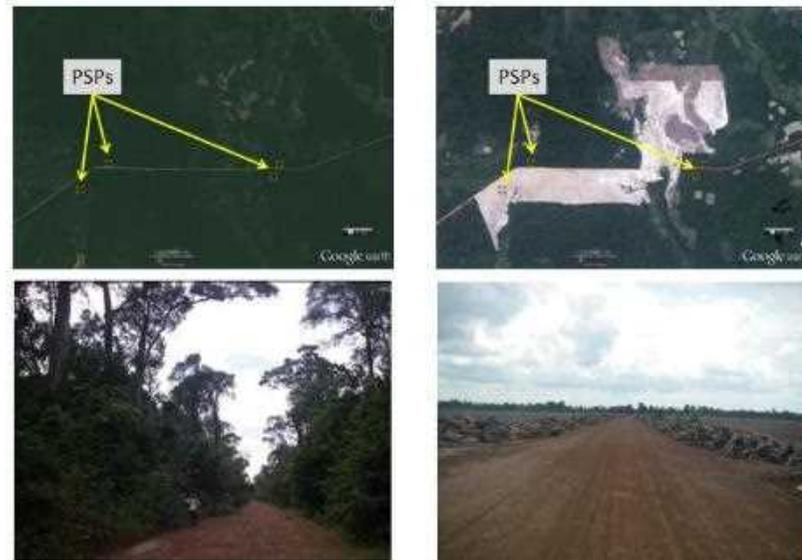
Platform on Water Resilience and Disasters



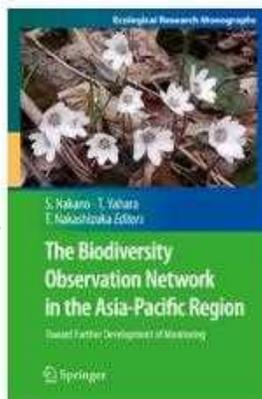
TG2: Asia Pacific Biodiversity Observation Network (AP-BON)



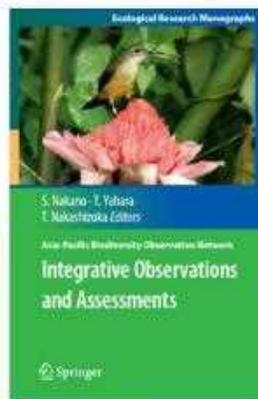
Forest loss in Cambodia



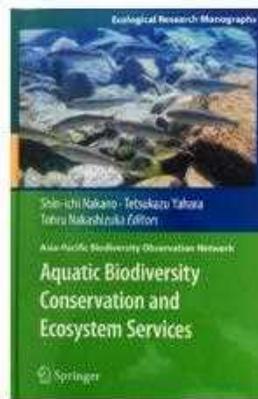
2012



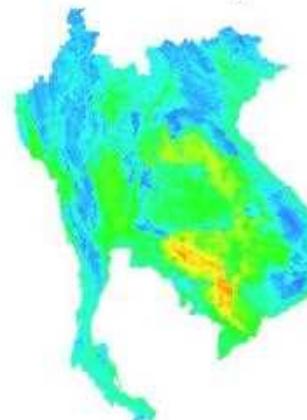
2014



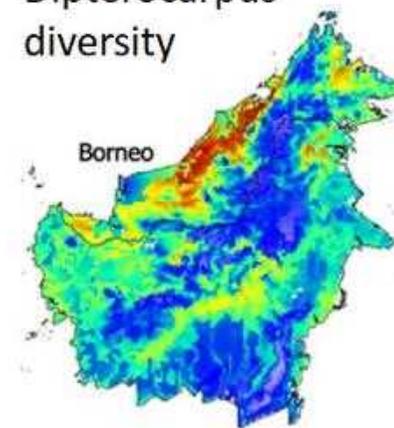
2016



Fish diversity

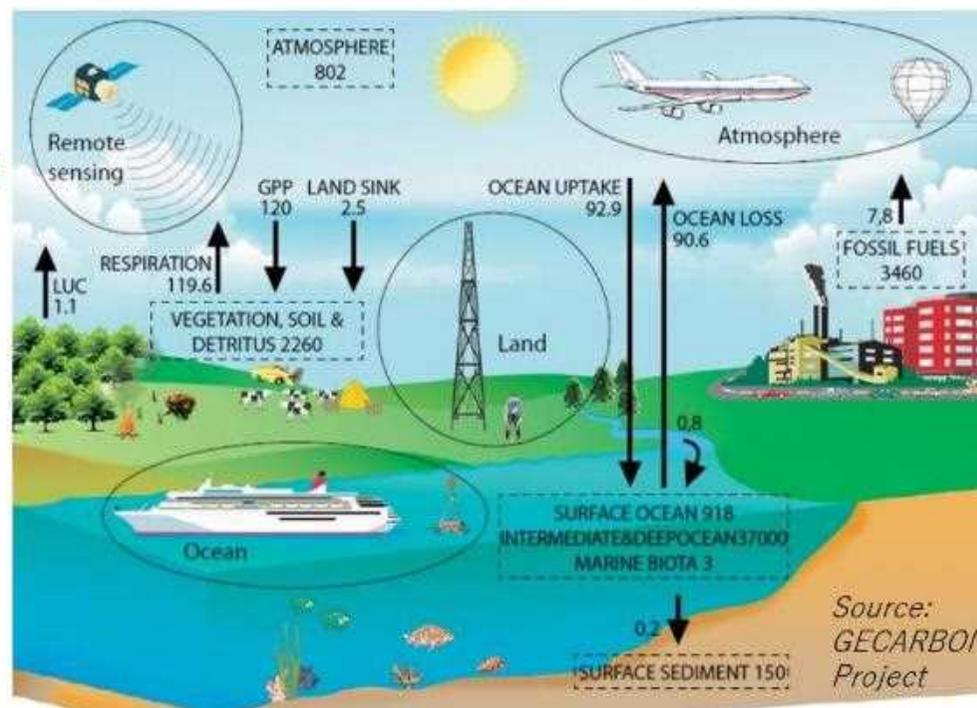


Dipterocarpus diversity



TG3: The GEO Carbon and GHG Initiative (GEO-C)

The Global Carbon Cycle: a complex interaction of different systems in different domains – directly linked to climate change



Original slide:
Bombelli et al., 2015
The 8th GEOSS AP
Symposium, Beijing

UNFCCC Paris Agreement <Article 7.7>

c) Strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making.

TG4: Ocean, Coasts and Islands

GEOSS-AP Ocean Data Networking System

Data site of Asia Pacific countries:

- | | | | |
|--|--|---|--|
|  Japan | <ul style="list-style-type: none">• NEAR-GOOS Regional Real Time Data Base• NEAR-GOOS Regional Delayed Mode Data Base |  India | <ul style="list-style-type: none">• Indian National Centre for Ocean Information Services |
|  Australia | <ul style="list-style-type: none">• Coastal Data Portal• Coastal Research |  Thailand | <ul style="list-style-type: none">• Central Database System and Data Standard for Marine and Coastal Resources |
|  China | <ul style="list-style-type: none">• NEAR-GOOS Real Time Data Base• China Delayed Mode Database for NEAR-GOOS |  Vietnam | <ul style="list-style-type: none">• Not yet have Data site. Inquire by E-mail.• Vietnam's META-data is published in this web portal |
|  Korea | <ul style="list-style-type: none">• Korea Real Time Database for NEAR-GOOS• NEAR-GOOS Korea National Delayed Mode Data Base | | |

GEOSS-AP Ocean Data Networking System Web Portal:

Web data portal build via core framework(GYRE-System).
To encourage ocean research activities by searching the oceanographic data easily and speedily.
To give opportunities the countries which don't have the public data base site to disclose their meta information about their oceanographic data.



Extension of the current Ocean Data Networking, which will ensure national security and help efforts of individual observation projects for data exchanges through collaborative works. In particular, we seek possible extension to biogeochemical and ecosystem observation (e.g. ocean acidification)

TG 5: Agriculture and Food Security – Asia-RiCE

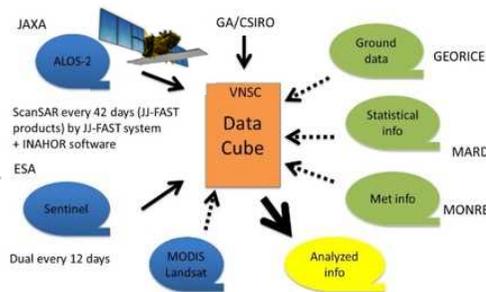
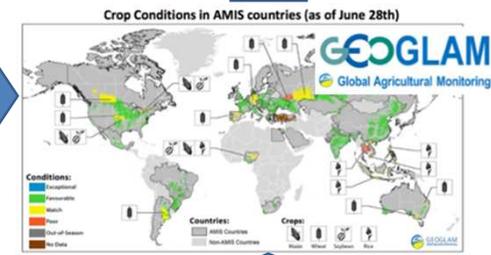


Market Monitor is published by FAO.AMIS on monthly basis to assess international agricultural market situation and outlook of wheat, maize, rice, and soybeans.

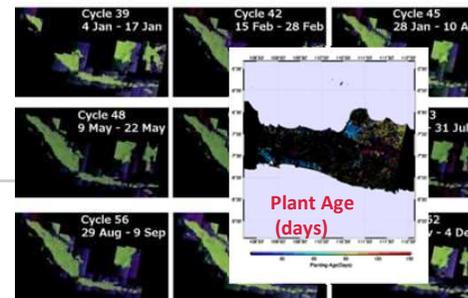
Asia-RiCE (Asia Rice Crop Estimation & Monitoring) program led by JAXA with CNES and more than 20 Asian Space agencies and Ministries of Agriculture with International organization such as ASEAN/AFSIS, UN/FAO, IRRI from 2013 to enhance rice production estimates through the use of Earth observation satellites data (POC: Sobue.shinichi@jaxa.jp, ohyoshi.kei@jaxa.jp, Thuy.letoan@cesbio.cnes.fr)

ID	Target Agricultural Products	Requirements of EO data for operational use
P1	Rice Crop Area Estimates/Maps	Wall-to-wall observation with SAR dual polarization with Optical (week – bi-weekly - monthly) : Indonesia, Vietnam/Cambodia and Thailand/Lao projects
P2	Crop Calendars/Crop Growth Status	Mid/coarse resolution optical frequent observation (MODIS, GCOM-C, Landsat, Sentinel-2, etc.) with SARs weekly
P3	Crop Damage Assessment	Very High resolution SAR and Optical timely under international disaster charter, Sentinel Asia, etc.
P4	Agro-meteorological Information Products	Daily Mid/coarse resolution optical, passive microwaver and PR with geostationary met sat frequent observation (MODIS, Sentinel, GCOM-C/W, GPM, Himawari, etc.)
P5	Production Estimation and Forecasting	Data fusion, data integration with ground base observation / statistical information and crop models

GEOGLAM was endorsed by the G20 Summit, aims to enhance regional and global agricultural production estimates through the use of Earth observations



Vietnam Data Cube starting from GROSS-AP (Hanoi, September 2017) by VNSC/VAST



Time series rice crop growth monitoring for top 10 Indonesia main rice regions by ALOS-2 with MOA



Rice crop monthly outlook using agro-met information and agriculture expert knowledge



Key Joint Activities in 2017-2019

Meetings and Capacity building

9th, 10th, 11th GEOSS Asia Pacific Symposium
1st and 2nd AOGEOSS Workshop

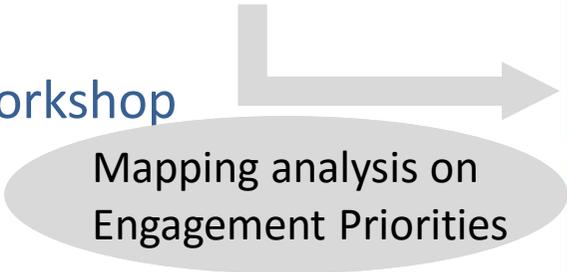
Pilot case studies

Mekong River Basin
Himalayas
Pacific islands

11th GEOSS-AP Symposium (Oct 2018, Kyoto)



2nd AOGEO Workshop (Apr 2019, Jakarta)



Mapping AOGEOSS Initiative TG Activities with GEO Priorities

GEO Priorities		Cross-Cutting Areas	TG1	TG2	TG3	TG4	TG5	TG6	TG7	TG10	TG11	TG12
SDGs	1.NO POVERTY		3	3	0	0	3	1	0	1	1	1
	2.ZERO HUNGER		3	3	0	0	3	1	0	1	1	2
	3.GOOD HEALTH AND WELL-BEING		1	3	1	1	2	1	0	1	1	1
	4.QUALITY EDUCATION		1	2	2	2	0	1	0	0	0	1
	5.GENDER EQUALITY		2	1	0	0	0	1	0	1	1	2
	6.CLEAN WATER AND SANITATION		3	3	2	1	2	1	1	2	2	3
	7.AFFORDABLE AND CLEAN ENERGY		2	3	2	0	1	1	1	1	1	1
	8.DECENT WORK AND ECONOMIC GRO		1	2	1	1	3	1	0	1	1	1
	9.INDUSTRY, INNOVATION AND INFRASTRUCTURE		2	1	1	0	2	1	0	1	1	1
	10.REDUCED INEQUALITIES		1	2	0	0	2	1	0	1	1	1
	11.SUSTAINABLE CITIES AND COMMUN		3	3	2	1	0	1	1	1	1	3
	12.RESPONSIBLE CONSUMPTION AND PRODUCTION		1	3	0	1	0	1	0	1	1	1
	13.CLIMATE ACTION		3	3	3	3	3	1	2	1	1	3
	14.LIFE BELOW WATER		2	3	2	3	0	1	0	1	1	1
	15.LIFE ON LAND		3	3	2	1	3	1	3	1	1	2
	16.PEACE, JUSTICE AND STRONG INSTITUTIONS		1	1	0	0	0	1	0	0	0	1
	17.PARTNERSHIP FOR THE GOALS		3	3	2	2	3	1	2	1	1	3
Paris Agreement	Adaptation		3	3	2	1	3	1	0	1	1	2
	Loss & Damage		3	3	1	1	0	1	0	1	1	2
	Capacity Development/Technology Tra		3	3	2	2	0	2	2	2	2	3
	National Reporting/Global Stocktake		0	2	3	2	0	1	1	2	2	1
Sendai Framework	Mitigation		2	3	3	1	0	1	0	1	1	1
	Understanding disaster risk		3	3	3	1	0	2	0	2	2	2
	Strengthening disaster risk governance manage disaster risk		3	3	0	1	0	2	0	1	1	2
	Investing in disaster risk reduction for		3	3	0	1	0	1	0	2	2	2
	Enhancing disaster preparedness for ef response, and to "Build Back Better" in recovery, rehabilitation and reconstruction		3	3	0	0	0	1	0	2	2	2
	Data Sharing Infrastructure		3	3	3	3	3	2	2	3	3	3
	User Engagement and Communication		3	3	2	3	3	2	2	3	3	3
Total:			64	74	39	32	36	33	17	36	36	51

*Scoring: 0=Do nothing, 1=less active, 2=active, 3=very active

Mapping APBON contribution to SDGs and Paris Agreement on Climate Change (11th GEOSS-AP symposium, October 2019, Kyoto, Japan)

THE GLOBAL GOALS For Sustainable Development



Paris Agreement



Earth Observations (including science and research)

Diagram:

© Paris Agreement subgroup
GEO Programme Board

@GEOSEC2025
www.earthobservations.org

Mapping APBON contribution to SDGs and Paris Agreement on Climate Change (11th GEOS-AP symposium, October 2019, Kyoto, Japan)

THE GLOBAL GOALS

Paris Agreement

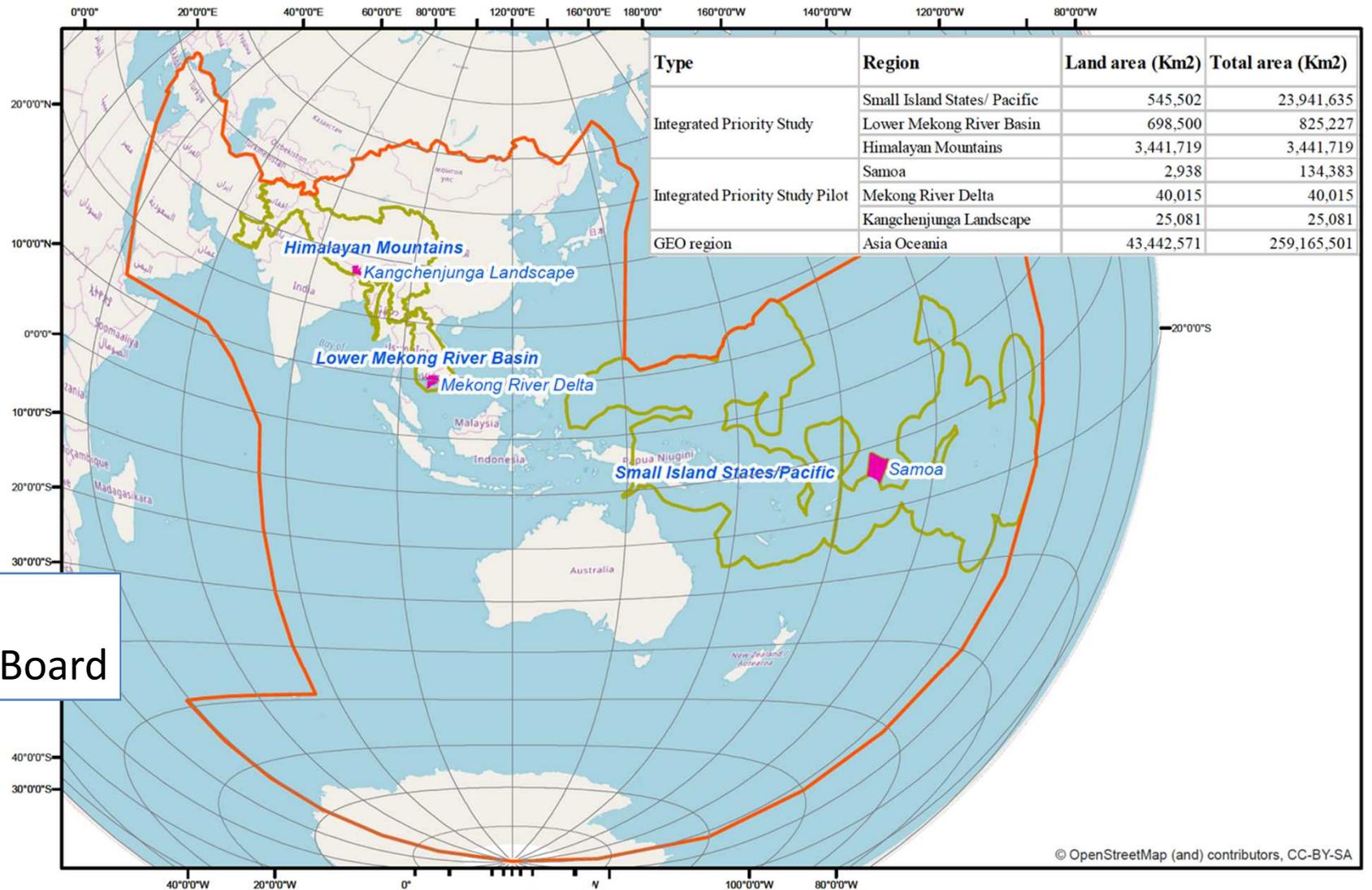
Mitigation

- ✓ What are the actual delivery (or contribution) to these goals?
- ✓ Opportunities of cross-disciplinary activities in Asia and Oceania region?
- ✓ How do we proceed/promote at local and regional scales, and then share with other regions?



Earth Observations
(including science and research)

AOGEO Integrated Priority Studies



Type	Region	Land area (Km2)	Total area (Km2)
Integrated Priority Study	Small Island States/ Pacific	545,502	23,941,635
	Lower Mekong River Basin	698,500	825,227
	Himalayan Mountains	3,441,719	3,441,719
Integrated Priority Study Pilot	Samoa	2,938	134,383
	Mekong River Delta	40,015	40,015
	Kangchenjunga Landscape	25,081	25,081
GEO region	Asia Oceania	43,442,571	259,165,501

Map: AOGEO
Coordination Board



- Integrated Priority Study
- Integrated Priority Study Pilot
- AOGEO Region

Coordinate System: South Pole Lambert Azimuthal Equal Area
 Projection: Lambert Azimuthal Equal Area
 Datum: WGS 1984
 False Easting: 0.0000
 False Northing: 0.0000
 Central Meridian: 120.0000
 Latitude Of Origin: 20.0000
 Units: Meter

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AOGEO Integrated Priority Studies

Thematic areas

Water resources and management
 Disaster resilience
 Biodiversity and ecosystems
 Food security
 ... and their interactions

Methodology

Field observation

- survey
- sensors

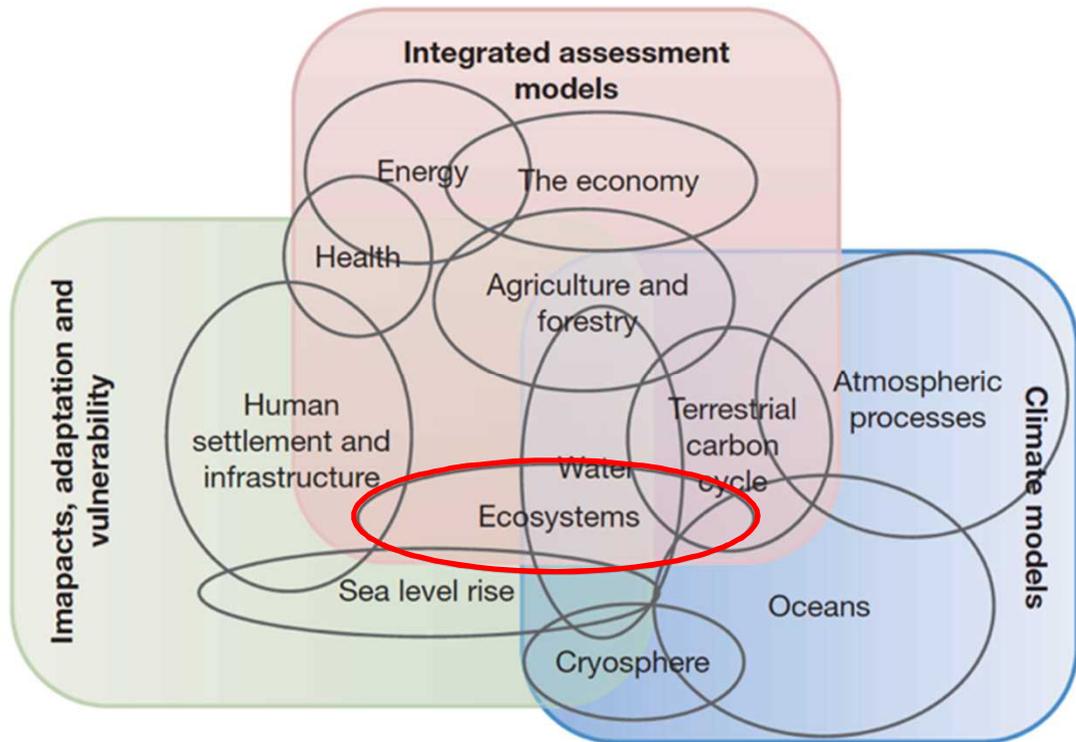
 Satellite observations
 Models

Please put any keywords/existing information of products etc. on this table (or any other styles) which might be helpful to discuss and communicate with AOGEO

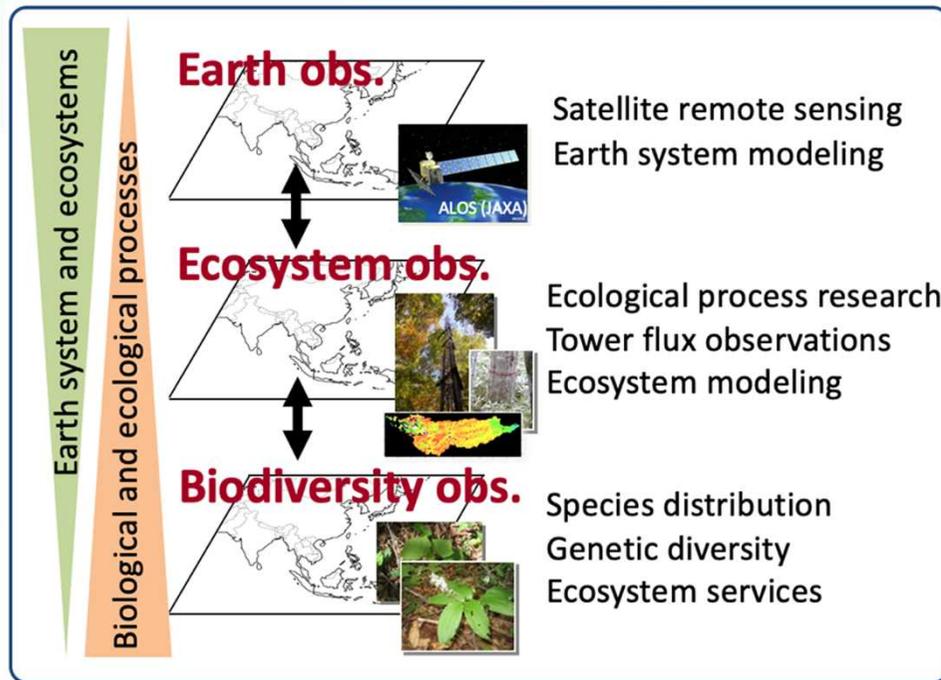
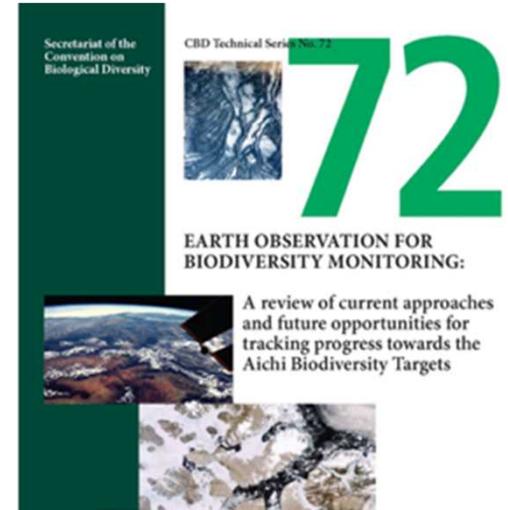
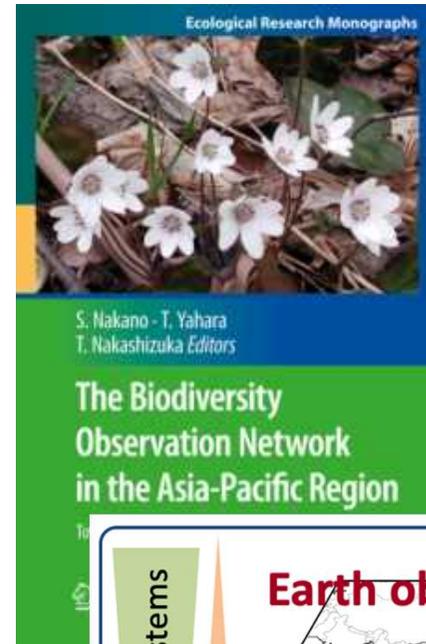
	Terrestrial	Fresh water	Marine and coasts
Mekong River Basin		<ul style="list-style-type: none"> • Dam and fish species diversity 	
Pacific islands			
Himalayas	<ul style="list-style-type: none"> • Plant and animal biodiversity hotspots 		

The ideas will be shared with AOGEO at **12th AOGEO Symposium (2-4th November 2019, Canberra)**

Collaborations of communities for shared objectives



Moss et al. (2010) *Nature*



Muraoka et al. 2012

Your ideas, participation and
collaborations are welcome.

Hiroyuki Muraoka
(muraoka@green.gifu-u.ac.jp)

Coordination Board, Asia Oceania GEO
<https://aogeoss.org/en/>

Climate observations and biodiversity & ecosystem observations

GCOS (Global Climate Observing System)
Essential Climate Variables

GEO BON
Essential Biodiversity Variables

Ecosystem functions

Ecosystem Integrity

Essential Biodiversity Variables

	Atmosphere	Terrestrial	Ocean
Energy and temperature	Surface radiation budget, Earth radiation budget, surface temperature, upper-air temperature, surface and upper-air wind speed	Albedo, latent and sensible heat fluxes, land surface temperature	Ocean surface heat flux, sea surface temperature, subsurface temperature
Other physical properties	Surface wind, upper-air wind, pressure, lightning, aerosol properties		Surface currents, subsurface currents, ocean surface stress, sea state, transient traces
Carbon cycle and other GHGs	Carbon dioxide, methane, other long-lived GHG, ozone, precursors for aerosol and ozone	Soil carbon, above-ground biomass	Inorganic carbon, nitrous oxide
Hydrosphere	Precipitation, cloud properties, water vapour (surface), water vapour (upper-air), surface temperature,	Soil moisture, river discharge, lakes, groundwater,	Sea surface salinity, subsurface salinity, sea level, sea surface temperature
Snow and ice		Glaciers, ice sheets and ice shelves, permafrost, snow	Sea Ice
Biosphere		Land cover, LAI, FAPAR, fire	Plankton, oxygen, nutrients, ocean colour, marine habitat properties
Human use of natural resources		Water use, GHG fluxes	Marine habitat properties

	Components I	Components II	Basic Ecological Integrity Indicators III
Ecosystem structure		Biotic diversity	Flora diversity
			Fauna diversity
			Within habitat structure
		Abiotic heterogeneity	Soil
			Water
			Air
		Habitat	
			Additional variables when indicated
Ecosystem processes		Energy budget	Input
			Storage
			Output
			Other state variables when indicated
		Matter budget	Efficiency measures
			Input
			Storage
			Output
		Water budget	Other state variables when indicated
			Efficiency measures
			Input
			Storage
			Output
			Other state variables when indicated
			Efficiency measures

EBV	EBV Classes
Co-ancestry	Genetic composition
Allelic diversity	
Population genetic differentiation	
Breed and variety diversity	Species populations
Species distribution	
Population abundance	
Population structure by age/size class	Species traits
Phenology	
Body mass	
Natal dispersal distance	
Migratory behaviour	Community composition
Demographic traits	
Physiological traits	
Taxonomic diversity	Ecosystem function
Species interactions	
Net primary productivity	
Secondary productivity	
Nutrient retention	Ecosystem structure
Disturbance regime	
Habitat structure	
Ecosystem extent and fragmentation	
Ecosystem composition by functional type	

Haase et al. (2018) STOTEN

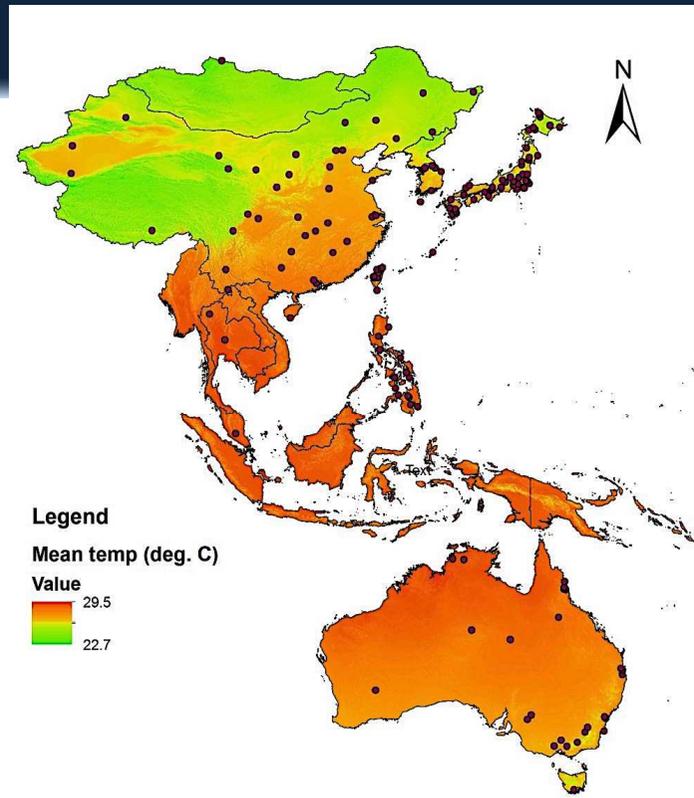
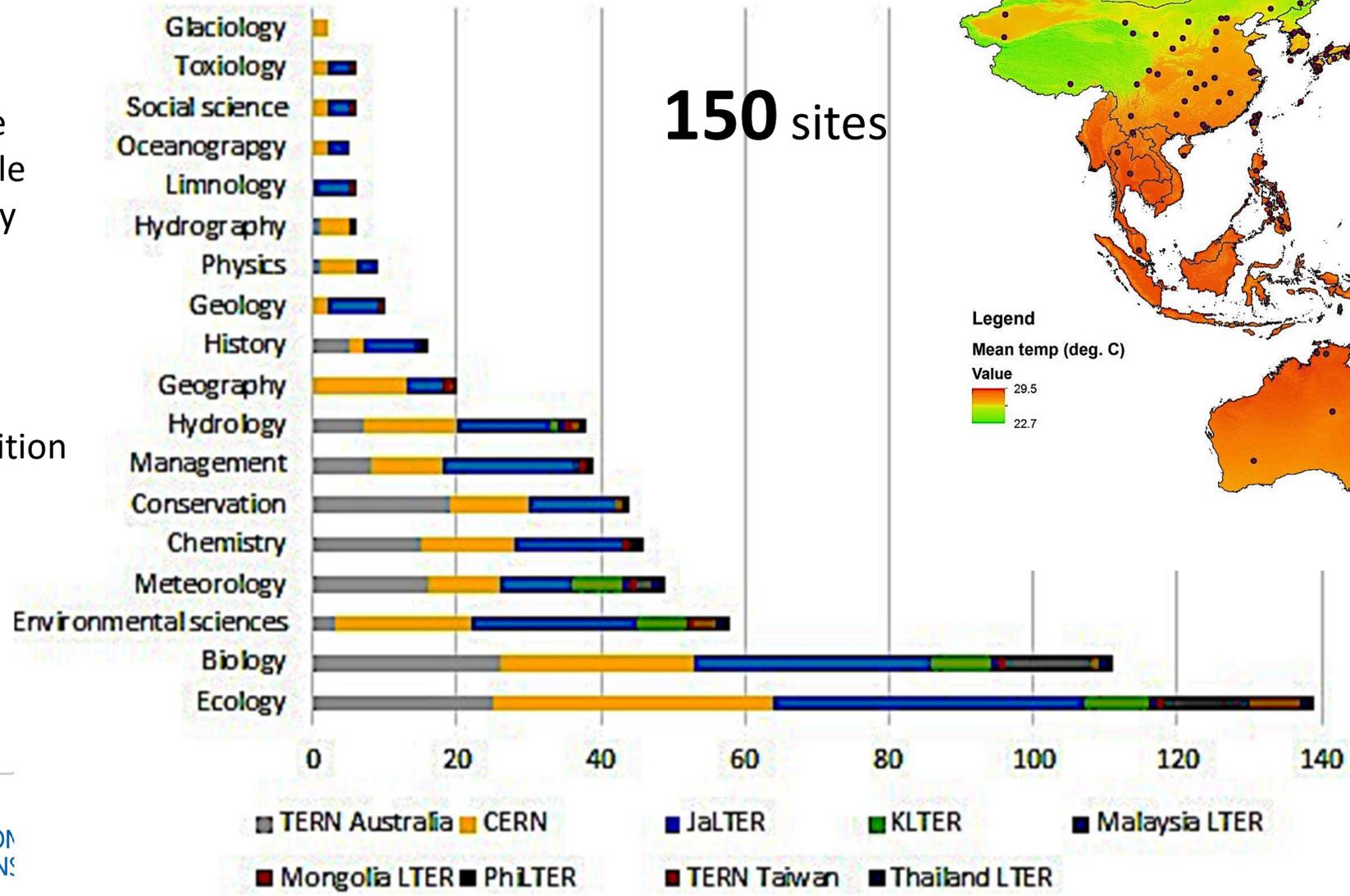
ILTER - East Asia and Pacific regional network

Topics

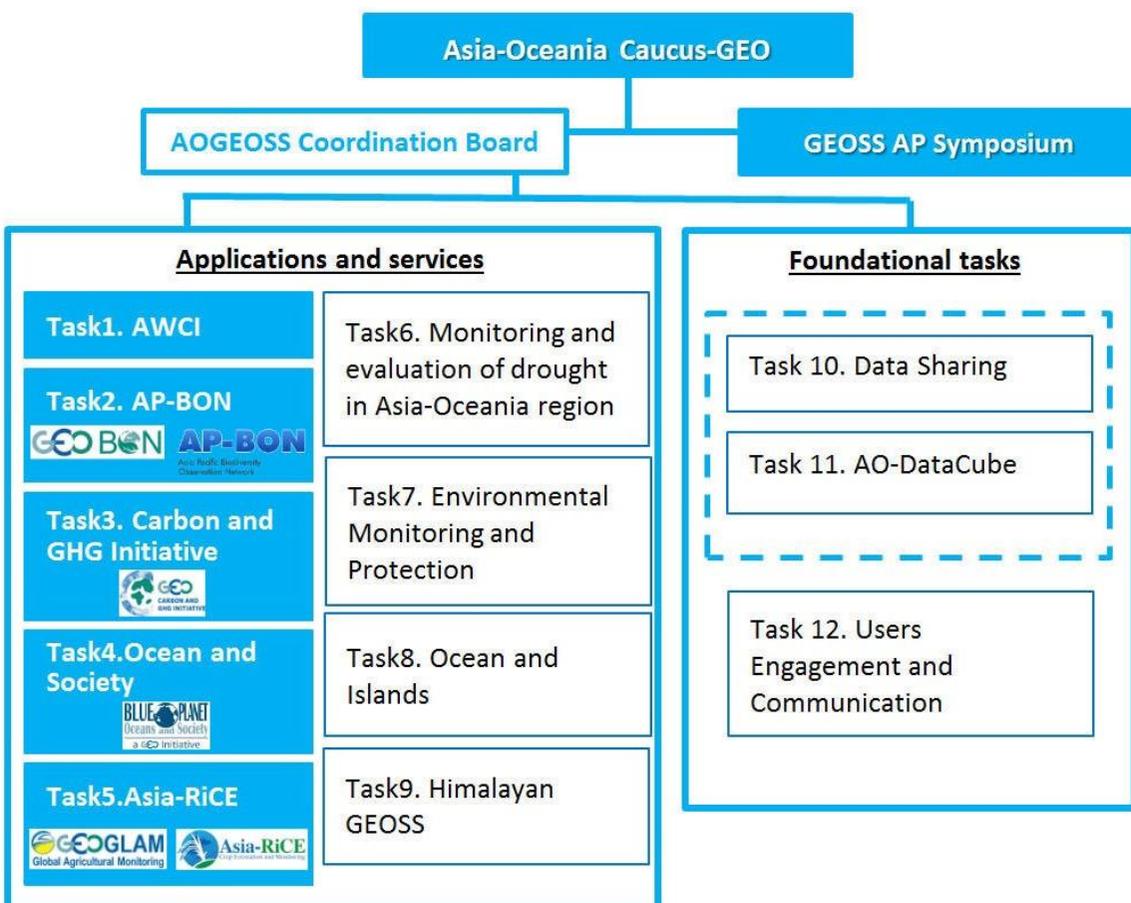
- Biodiversity
- Carbon cycle
- Nutrient cycle
- Ecohydrology
- ...etc.

ILTER Initiatives

- N Initiative
- Tea Composition
- ...etc.

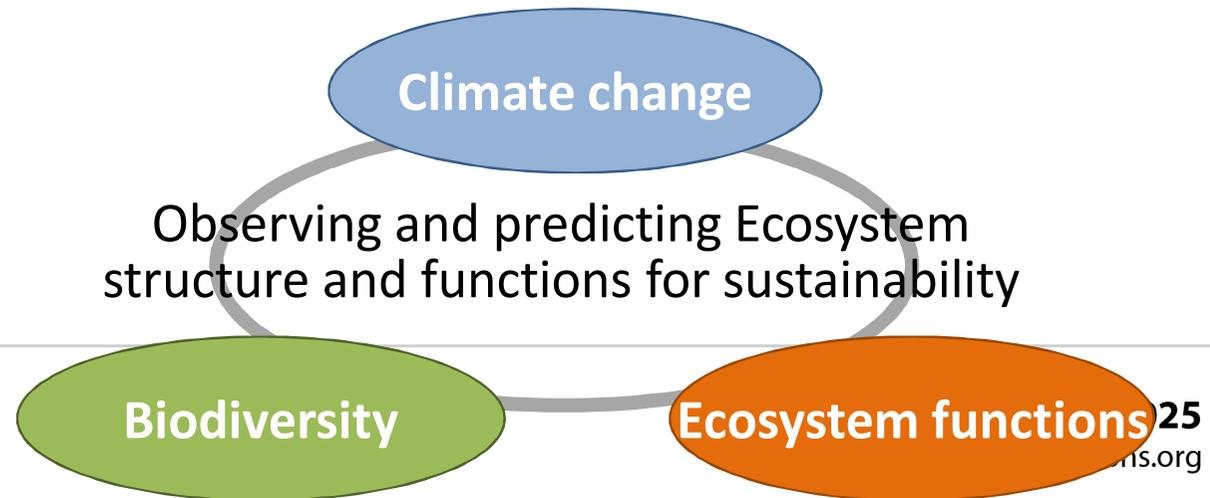
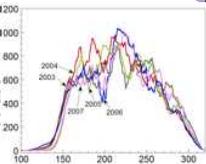
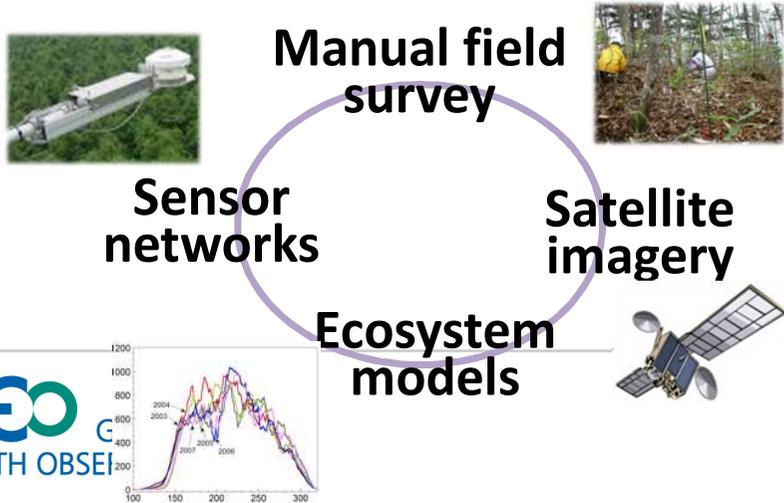
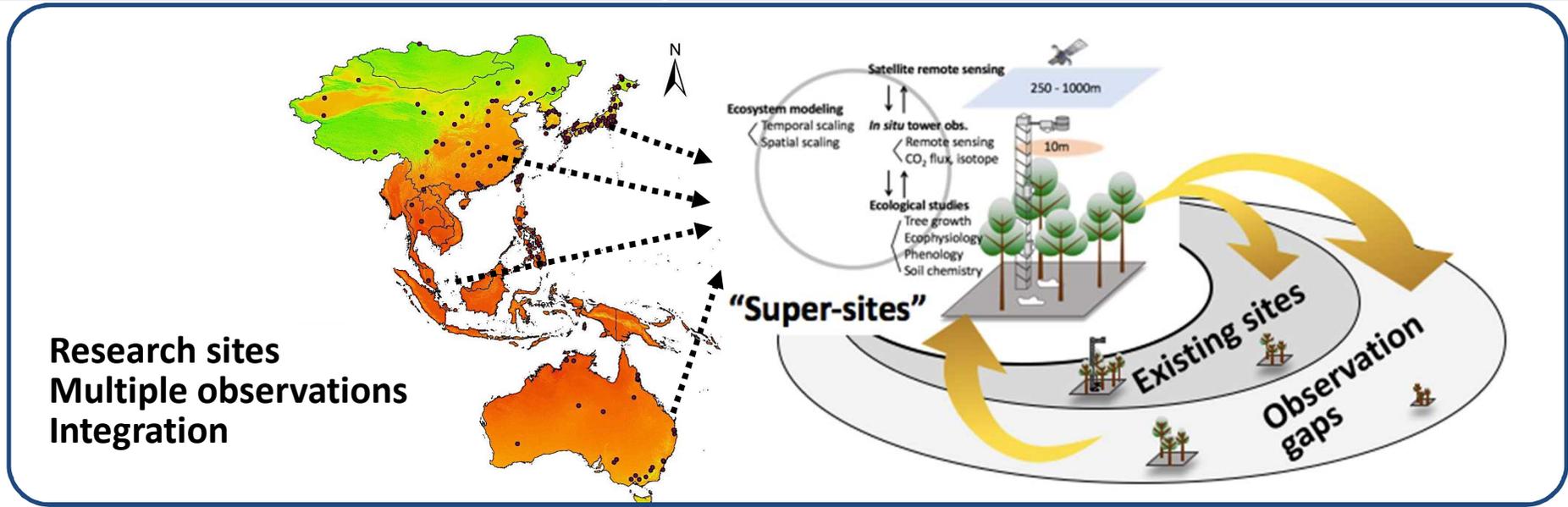


Key Thematic Activities in 2017-2019 : Task Groups



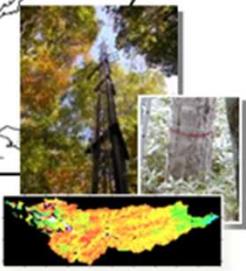
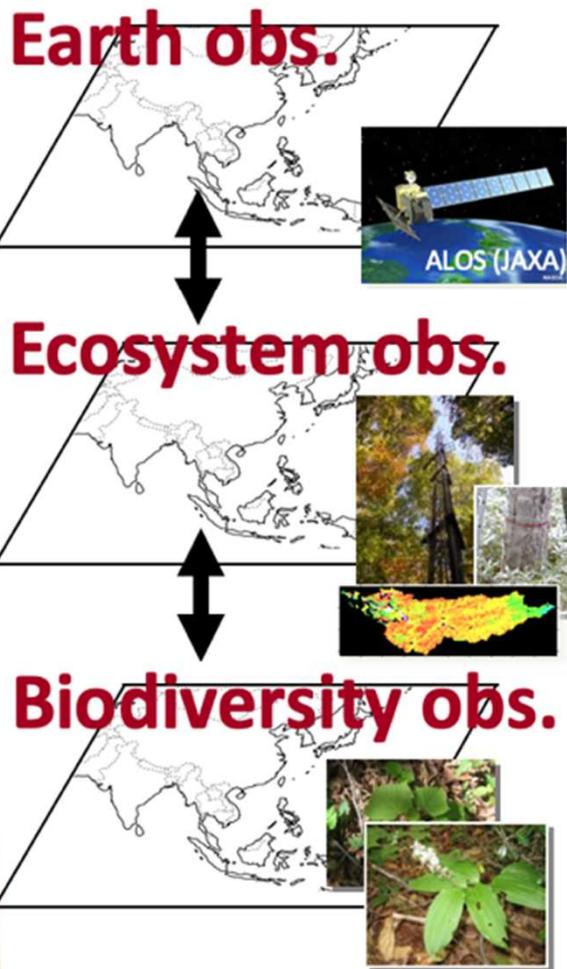
AOGEO Task Groups	Global programs
Asian Water Cycle Initiative (AWCI)	GEOGLOWS
Asia Pacific Biodiversity Observation Network (APBON)	GEO BON
GEO Carbon and GHG Initiative (GEO-C)	GEO-C
Ocean, Coasts and Islands (OCI)	Blue Planet
Asia Rice Crop Estimation & Monitoring (Asia-RiCE)	GEOGLAM
Environmental Monitoring and Assessment	
Disaster Resilience	GEO-DARMA
Himalayan GEOSS	GEO-GNOME
DIAS	GCI
ODC	GCI

Concerted, operational biodiversity and ecosystem



Earth system and ecosystems

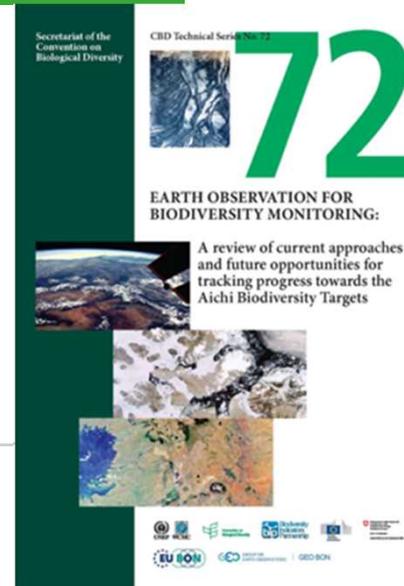
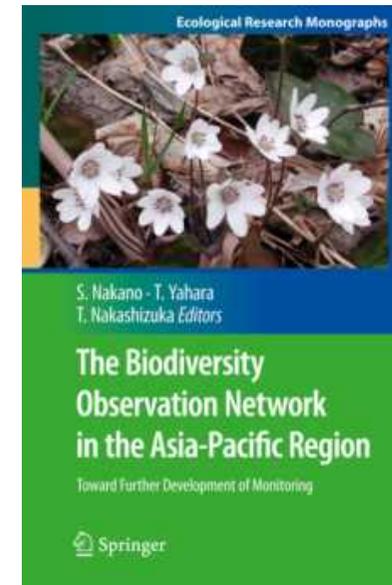
Biological and ecological processes



Satellite remote sensing
Earth system modeling

Ecological process research
Tower flux observations
Ecosystem modeling

Species distribution
Genetic diversity
Ecosystem services



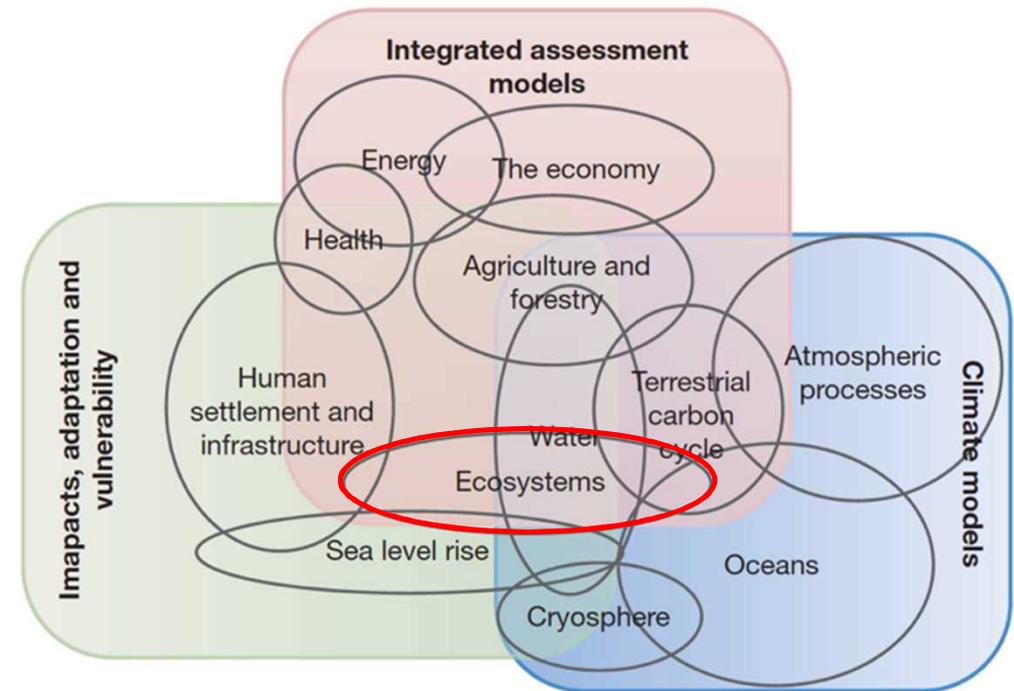
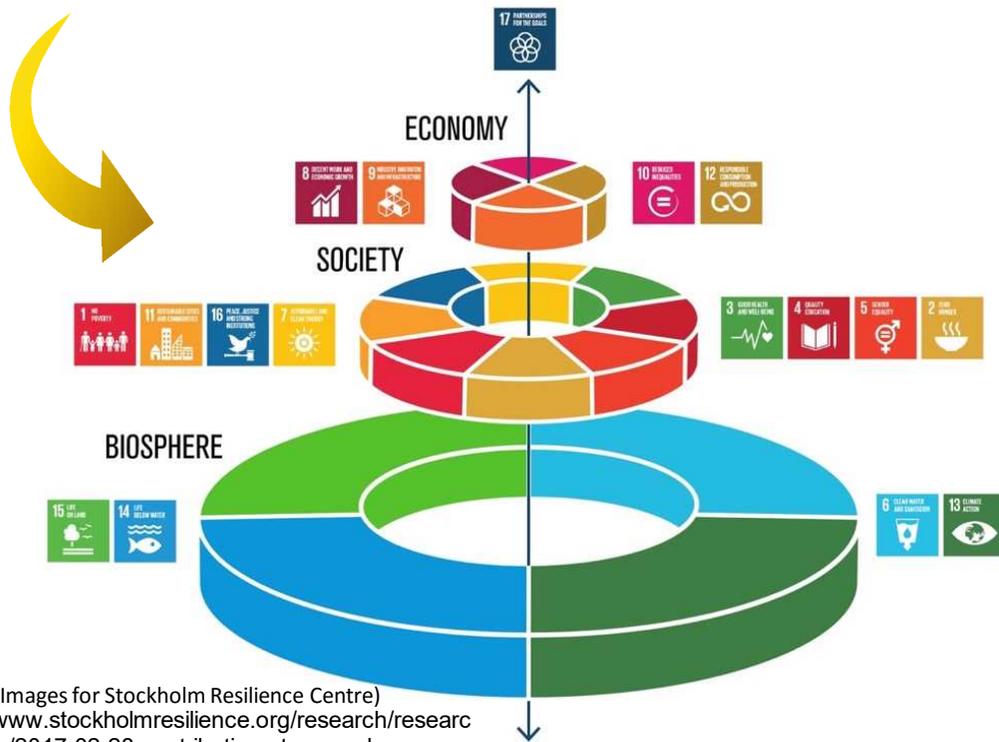
THE GLOBAL GOALS
For Sustainable Development



Biodiversity and ecosystems are the basis of our environment

→ Tackling cross-cutting issues by networking

Moss et al. (2010) *Nature*



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Societal Benefit Areas

Biodiversity and
Ecosystem
Sustainability

Disaster
resilience

Energy and Mineral
Resources
Management

Climate cuts across
these areas



Water
Resources
Management

Sustainable
Urban
Development

Public Health
Surveillance

Food Security and
Sustainable
Agriculture

Infrastructure
and Transport
Management



PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

Aichi Targets and SDGs



Cross-mapping of the indicators within the Biodiversity Indicators Partnership to Aichi Biodiversity Targets and SDGs

In this table the current suite of indicators brought together under the Biodiversity Indicators Partnership (BIP) have been mapped to both the Aichi Biodiversity Targets (ABTs) and the Sustainable Development Goals (SDGs) to support the identification of indicator synergies between the processes.

In this table the indicators under the BIP have been mapped to their primary ABTs only. Many of these indicators also map to further ABTs and these links can be explored further via the BIP website. This is a working table and will be further updated as the BIP expands.

The Biodiversity Indicators Partnership (BIP) website

All of the indicators in this cross-mapping document can be explored in more detail on the BIP website www.bipindicators.net. Each indicator has a dedicated web page, which includes information on the methodology, current storyline, national use, alignment with targets and SDGs and provides contact points for indicator providers. The website also allows you to browse which indicators fall under certain targets, SDGs, MEAs and themes such as species, agriculture and policy.

www.bipindicators.net

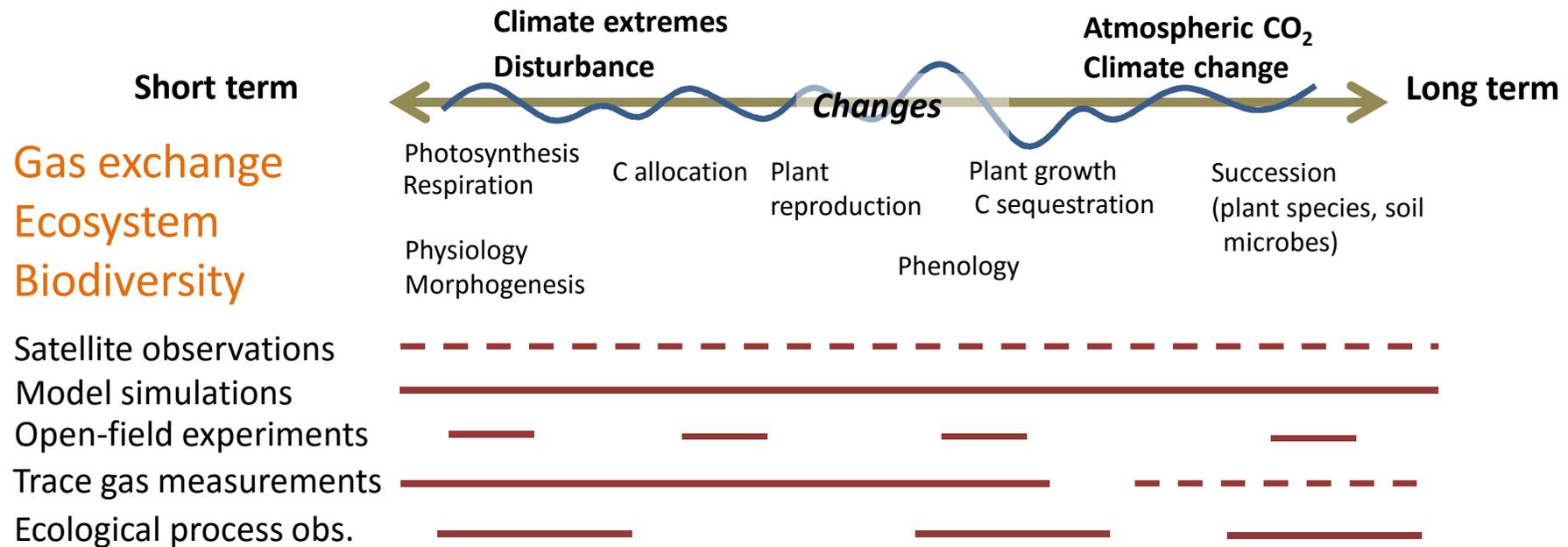
	Operational BIP Indicators	Aichi Biodiversity Targets	SDGs and Targets	
Strategic Goal A	Biodiversity Barometer			Y
	WAZA bio-literacy survey (Biodiversity literacy in global zoo and aquarium visitors)			
	Trends in potentially environmentally harmful elements of government support to agriculture (producer support estimate)			
	Number of countries with biodiversity-relevant taxes			
	Number of countries with biodiversity-relevant charges and fees			
	Number of countries with biodiversity-relevant tradable permit schemes			
	Ecological Footprint			
	Red List Index (impacts of utilisation)			
	Human Appropriation of Net Primary Production			
	Percentage of Parties with legislation in Category 1 under CITES National Legislation Project			
Strategic Goal B	Wetland Extent Trends Index			
	Forest area as a percentage of total land area			
	CGMFC-21 - Continuous Global Mangrove Forest Cover for the 21st Century			
	Biodiversity Habitat Index			
	Marine trophic index			
	Marine Stewardship Council certified catch			
	Proportion of fish stocks within biologically sustainable levels			
	Red List Index (impacts of fisheries)			
	Living Planet Index (trends in target and bycatch species)			
	Area of forest under sustainable management: total FSC and PEFC forest management certification			
Strategic Goal C	Wild Bird Index			
	Living Planet Index (farmland specialists)			
	Trends in loss of reactive nitrogen to the environment			
	Trends in nitrogen deposition			
	Red List Index (impacts of pollution)			
	Red List Index (impacts of invasive alien species)			
	Trends in the numbers of invasive alien species introduction events			
	Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species			
	Trends in invasive species vertebrate eradications			
	Climatic impacts on European & American birds			
Strategic Goal D	Cumulative human impact on marine ecosystems			
	Live coral cover			
	Protected area coverage			Y
	Protected area coverage of Key Biodiversity Areas			Y
	Protected area coverage of ecoregions			
	Protected Area Management Effectiveness			
	Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type			Y
	Protected Area Representativeness Index (PARC-Representativeness)			Y
	Protected Area Connectedness Index (PARC-Connectedness)			Y
	Wildlife Picture Index			Y
Strategic Goal E	Wildlife Picture Index in tropical forest areas			Y
	Living Planet Index			Y
	Living Planet Index (forest specialists)			Y
	Red List Index			Y
	Red List Index (internationally traded species)			Y
	Red List Index (forest specialist species)			Y
	Proportion of known species assessed through the IUCN Red List			Y
	Number of extinctions prevented			Y
	Number of species extinctions (birds and mammals)			Y
	Biodiversity Intactness Index			Y
Strategic Goal F	Genetic diversity of terrestrial domesticated animals			Y
	Red List Index (species used for food and medicine)			Y
	Ocean Health Index			Y
	Red List Index (pollinating species)			Y
	Coverage by protected areas of important sites for mountain biodiversity			Y
	Proportion of land that is degraded over total land area			Y
	Number of Parties to the CBD that have deposited the instrument of ratification, acceptance, approval or accession of the Nagoya Protocol			Y
	Number of countries with developed or revised NBSAPs			Y
	Index of linguistic diversity			Y
	Growth in species occurrence records accessible through GBIF			Y
Strategic Goal G	Official development assistance for biodiversity			Y

Our interests and approach

What are the hypotheses for long-term research under conditions of increasing atmospheric CO₂, climate change and societal change?

How do we develop our research to tackle those hypotheses?

What are the gaps and challenges of cross-scale and multidisciplinary approach?

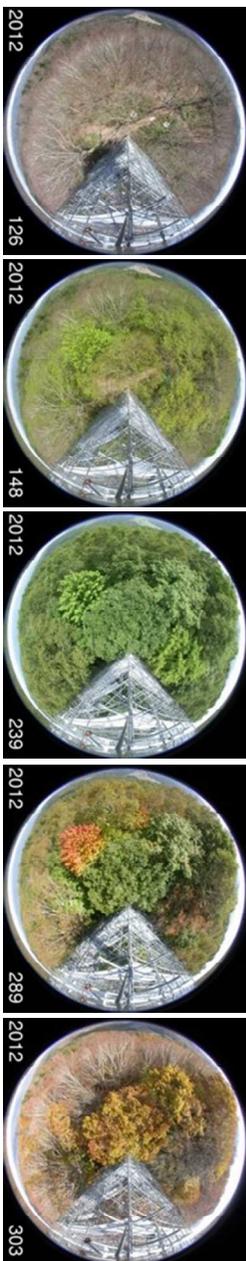


What and how do we deliver our scientific findings to the broad Earth Observation community and contribute to sound decision making?

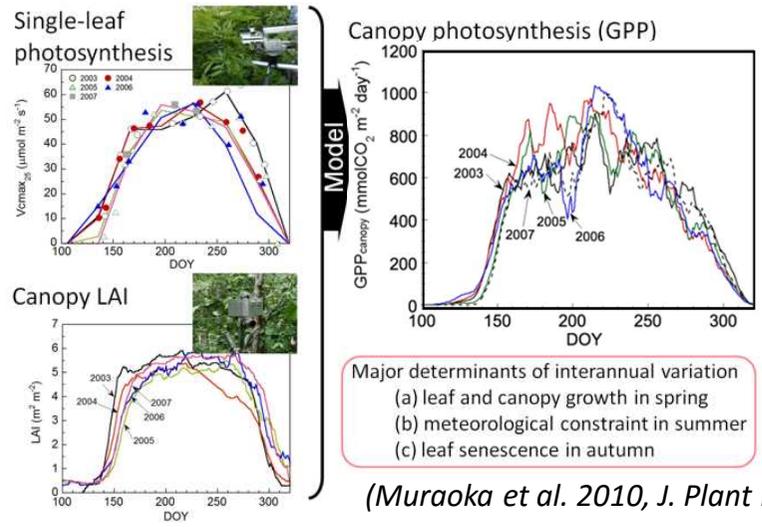


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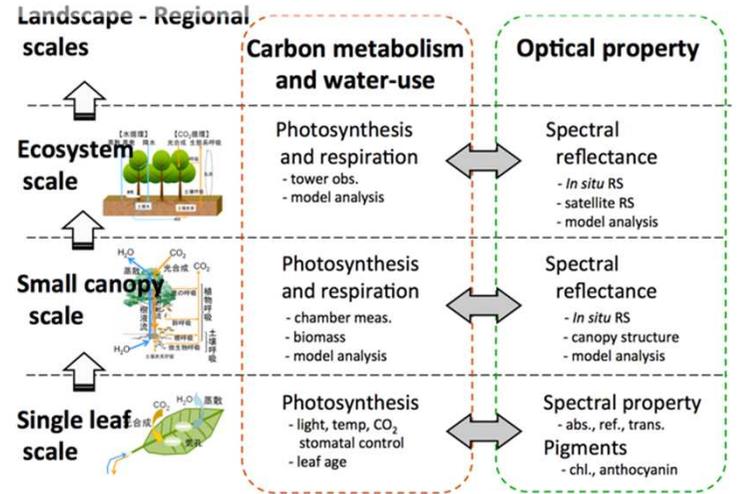
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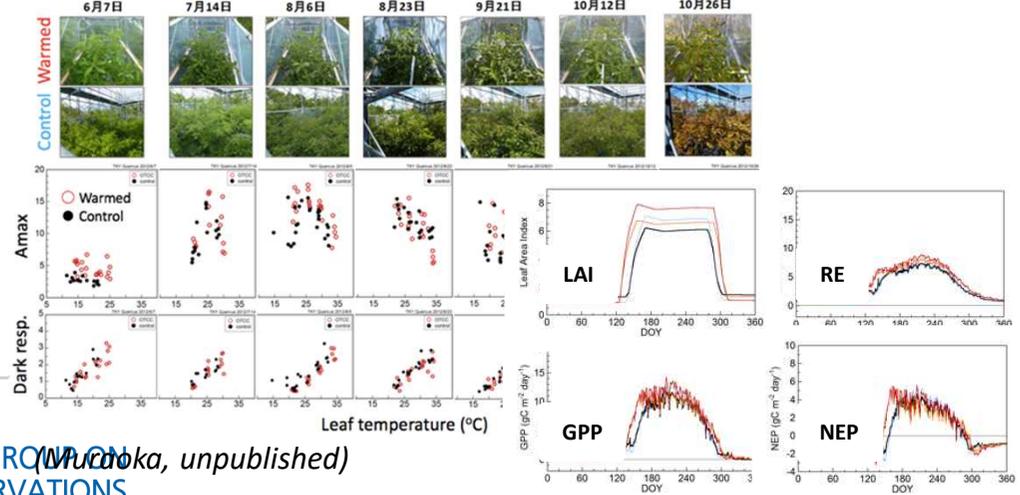
Phenology of leaf and canopy photosynthesis



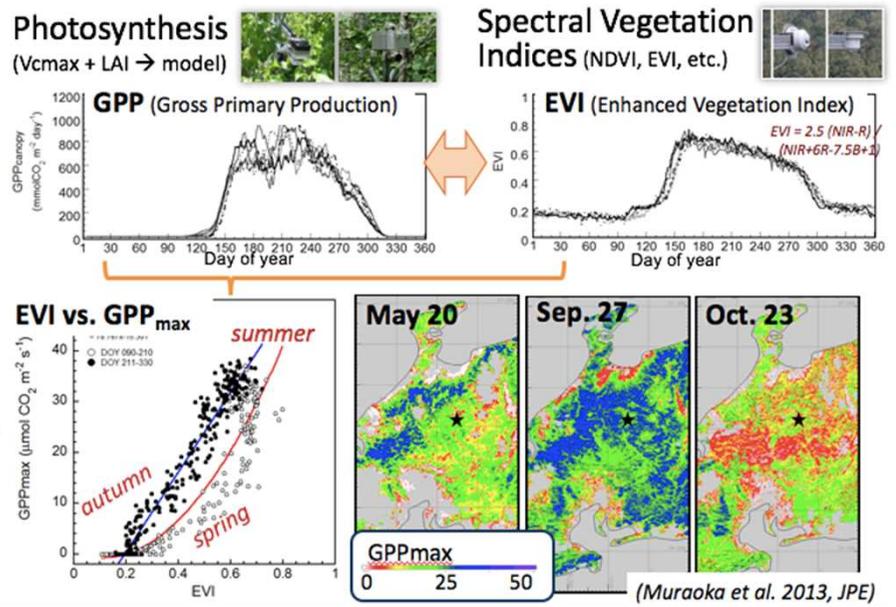
Forest canopy obs. by in-situ and satellite RS



Future prediction (warming exp. and model)



(Kuribayashi et al. 2016, Int. J. Biometeorology)



ILTER site network & data

DEIMS: Dynamic Ecological Information Management System

Repository for Research Sites and Datasets

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Welcome to DEIMS

DEIMS, the (Drupal Ecological Information Management System), is the unique place where you can find information about sites and data sets of networks dealing with ecological long term observation and experimentation in Europe and globally. It is the central platform to register, discover and edit related information. [Read more ...](#)

Login & Contribute

<https://data.lter-europe.net/deims/>

Available Resources

Sites Find out about the international

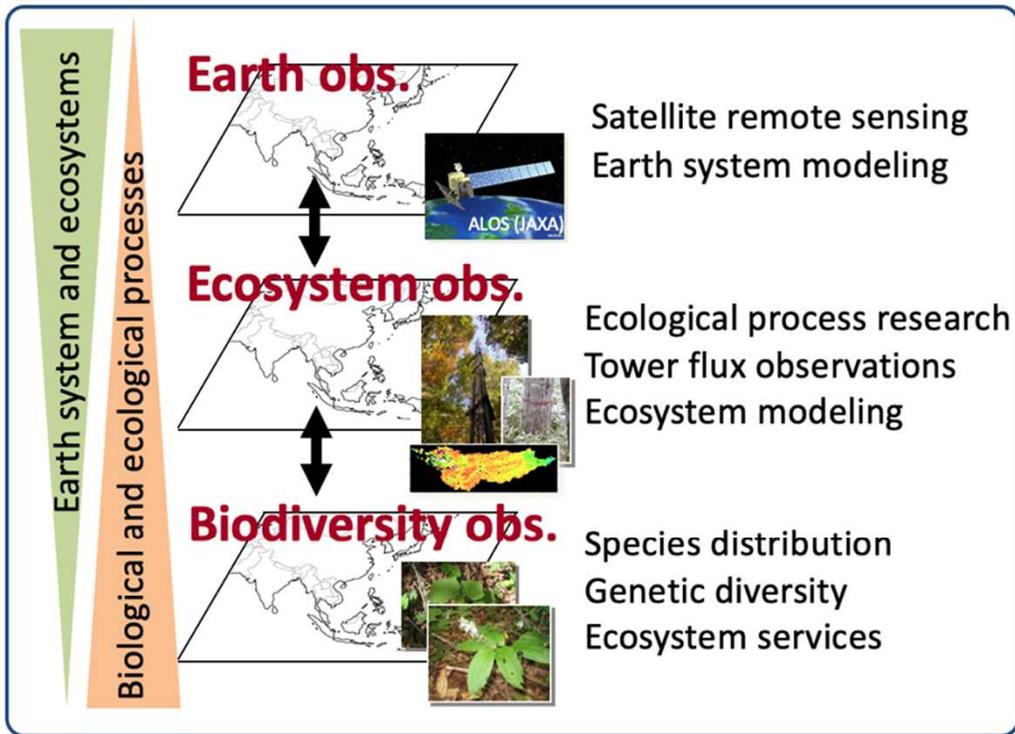
Datasets Find out about the available dataset

Tweets by @eLTER_EU

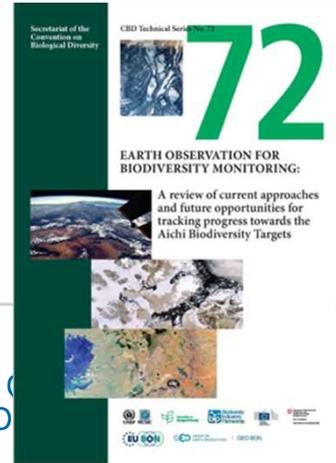
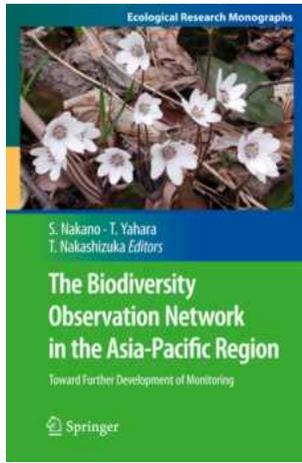
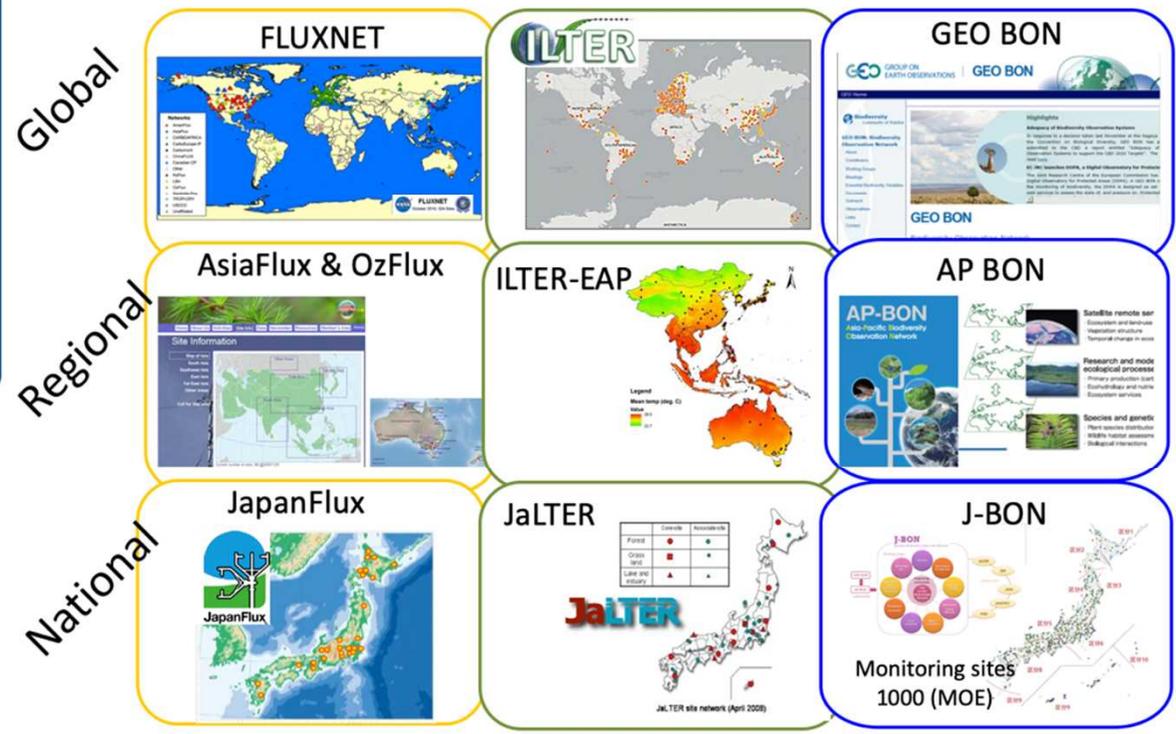
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GEO GROUP ON EARTH OBSERVATIONS



Connecting observations by linking networks



Muraoka et al. (2012)
Yamano et al. (2014)

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