Sustaining Long-Term Ocean Observations in the Context of LMEs: A Role for GOOS

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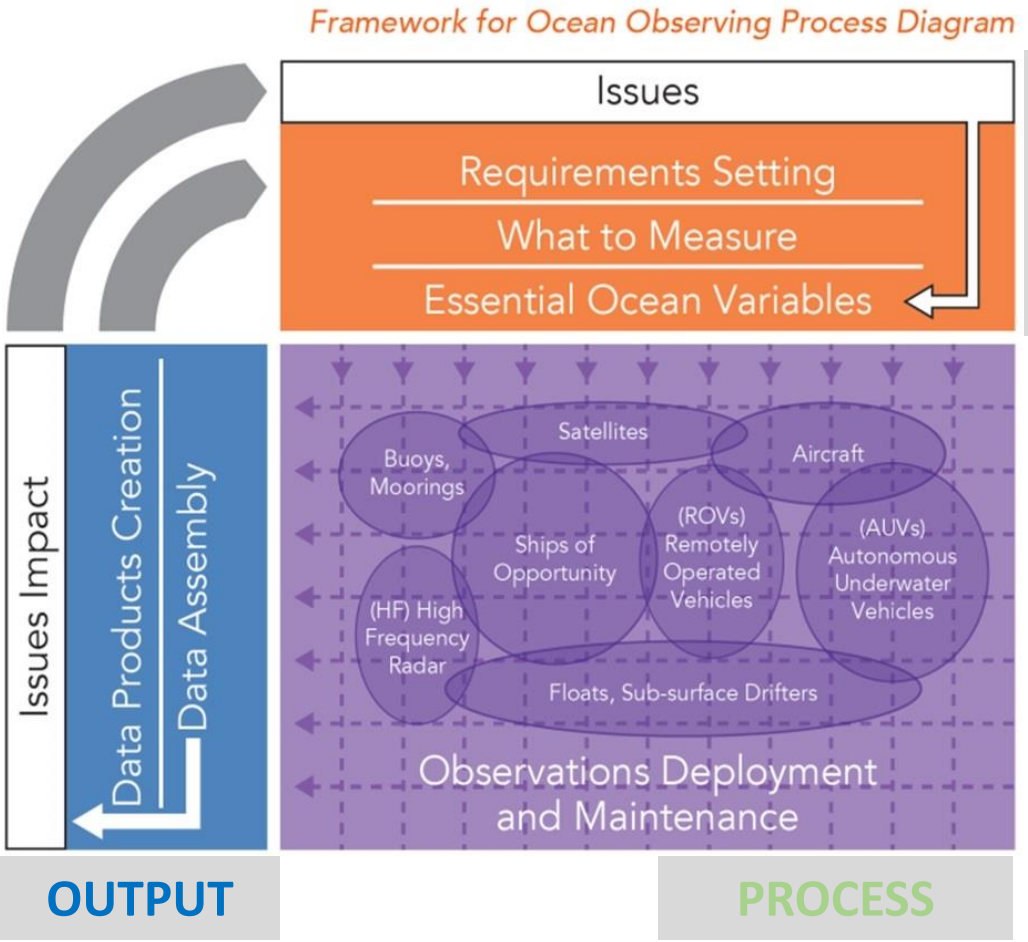
GOOS (US Marine Mammal Commission)

Session 8
Thursday 8th December 2016

How GOOS works

- Conforms to the Framework for Ocean Observing
- Facilitates international collaboration
- Builds on global and diverse expertise
- Develops community capacity from regional to global



The Global Ocean Observing System

Scientific Steering Committee

Scientific Oversight

Expert Panels

Physics

GCOS • GOOS • WCRP OOPC

Biogeochemistry

International Ocean Carbon Coordination Project IOCCP

Biology and Ecosystems

BioEco GOOS

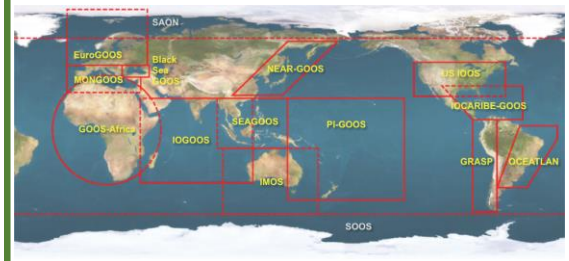
Observation coordination

Global observing networks and platforms

jcomm Oceanography & Marine Meteorology

Regional and national organizations

GOOS Regional Alliances (GRAs)



Project development

Improving through innovation and renovation

TPOS 2020 Tropical Pacific Observing System

AtlantOS

Deep Ocean Observing Strategy

GOA-ON Global Ocean Acidification Observing Network

GOOS Expert Panels

Physics – Biogeochemistry – Biology and Ecosystems

Tasks

- Identification of and requirement setting for **Essential Ocean Variables (EOVs)**
- Development of EOV implementation **strategies and coordination of observations**
- Promotion of standards and interoperability of **data and information products**




The Global Ocean Observing System

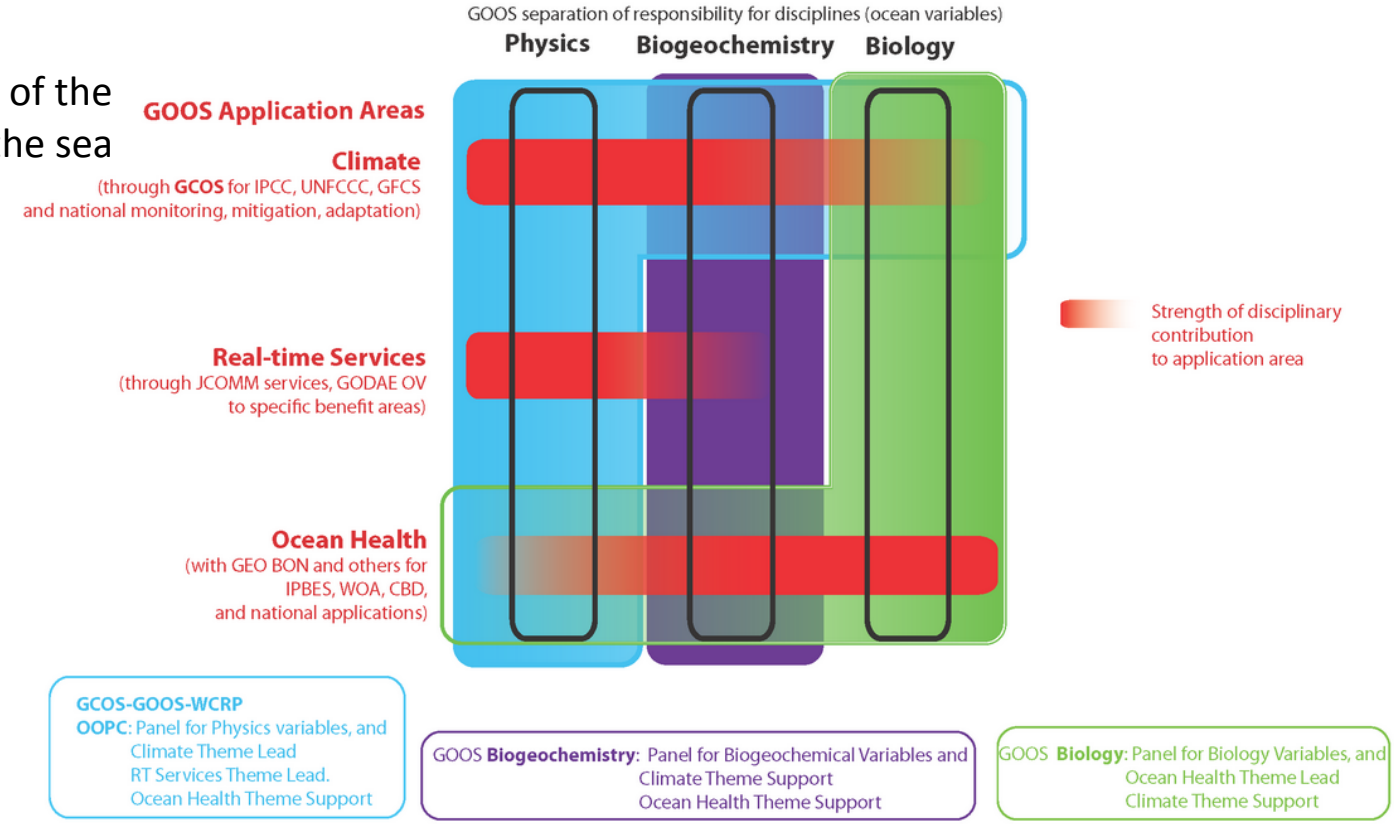
A permanent global system for observations, modelling and analysis of marine and ocean variables to support operational ocean services worldwide

Provides:

- Accurate descriptions of the present state of the oceans
- Continuous forecasts of the future conditions of the sea

Major areas:

1. Climate
2. Real time services
3. Ocean health



How to define “Essential”? The Biology and Ecosystems Panel process

Relevant changes

Marine biodiversity, ecosystem function, and their services

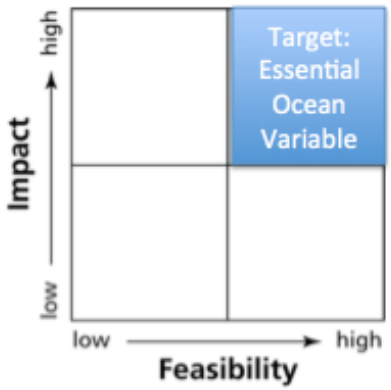
Essential variables

Global sustained implementation

Impact

-Relevant to help solve science questions and address societal needs

-Contribute to improve management of marine resources



Feasibility

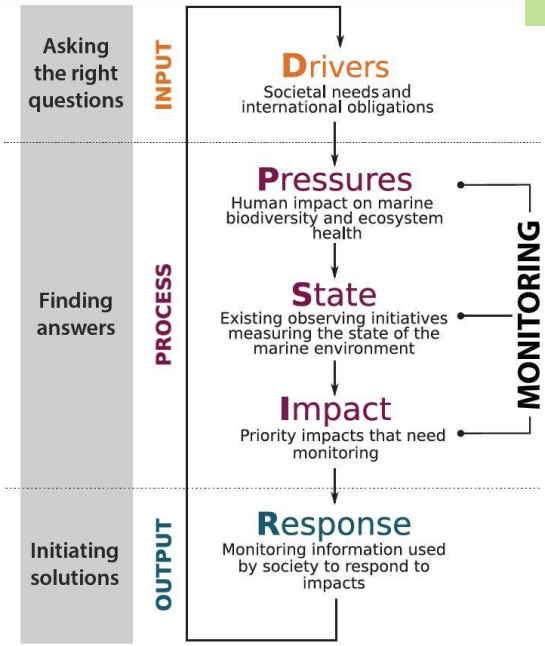
-Scientifically credible

-Technically practical, cost effective and within human capabilities

-Enduring

How to identify Biological and Ecological EOVs?

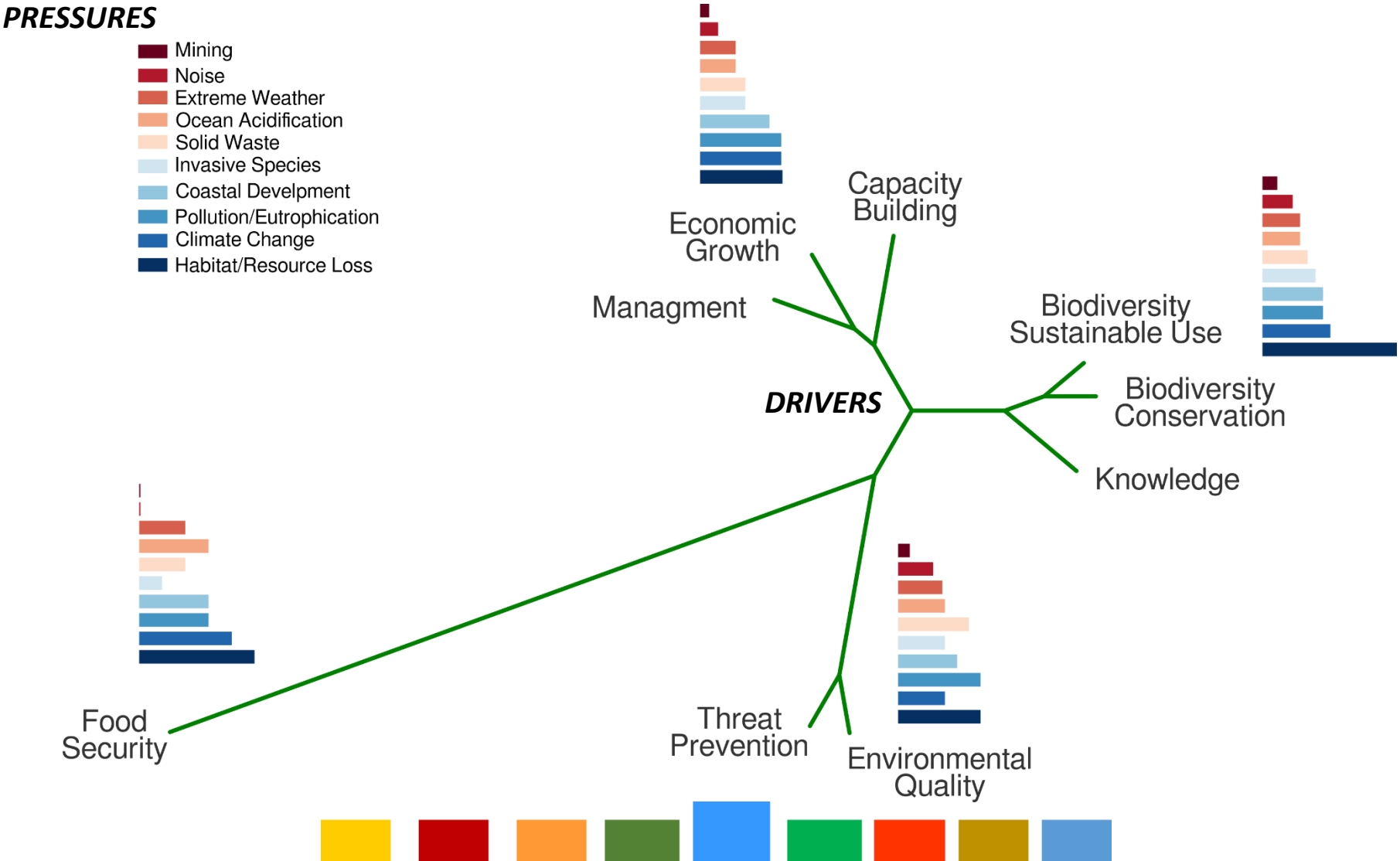
Based on the Framework for Ocean Observing:



The drivers and the pressures

N=24 conventions

Societal drivers and pressures: analysis from international conventions



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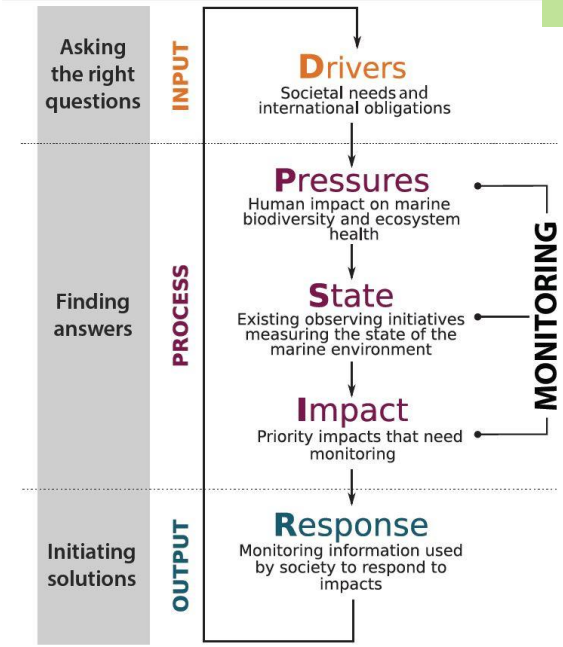


The drivers and the pressures

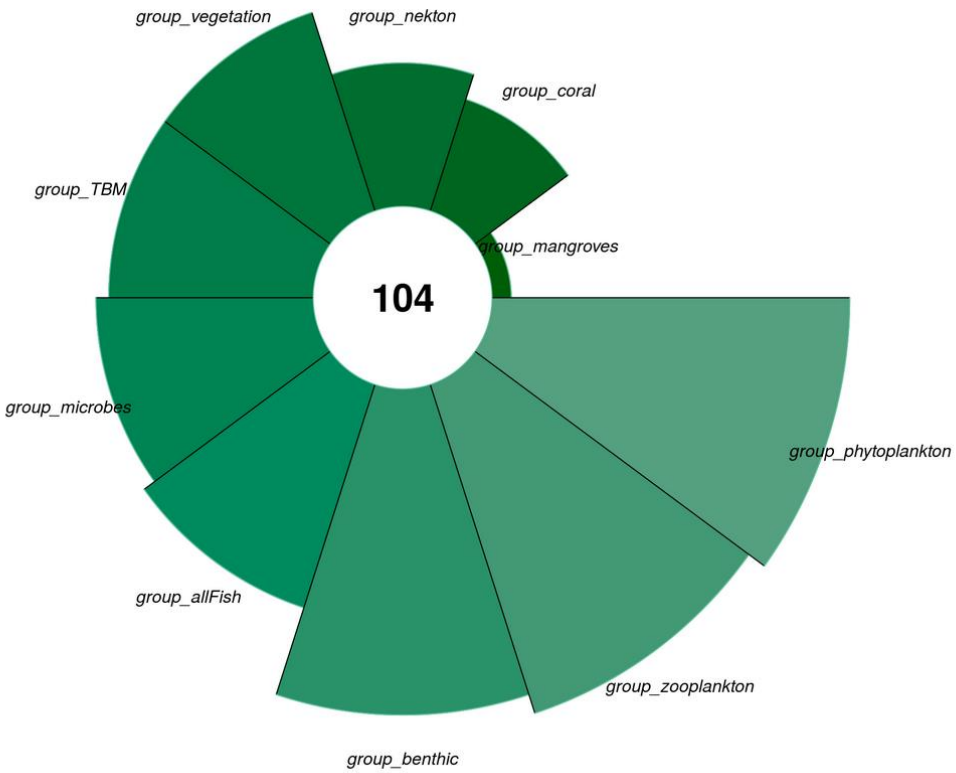
N=24 conventions

The state

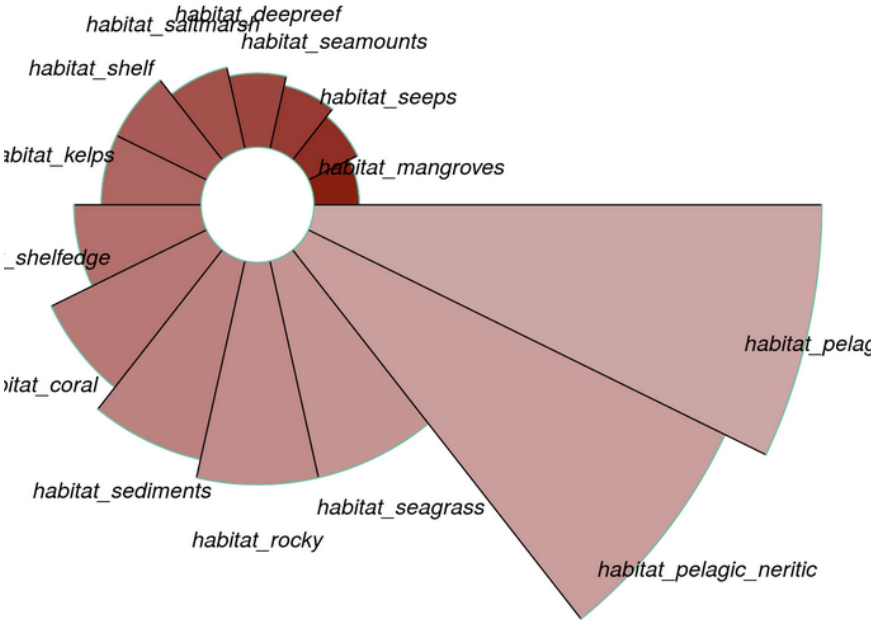
N=104 observing programs

What are the observing programs measuring the most?

Taxonomic groups



Habitats



EOVs

*also ECV [sometimes aggregated]

Biology and Ecosystems

- Phytoplankton* biomass and diversity (HABs)
- Zooplankton* biomass and diversity
- Fish abundance and distribution
- Marine turtle, bird and mammal abundance and distribution
- Live coral*
- Seagrass cover*
- Mangrove cover*
- Macroalgal canopy*

Emerging EOVs:

- Benthic invertebrates
- Microbes
- Sound (acoustic environments)

Building on existing frameworks

Examples:

- ***IOC Expert workshop***
- ***US IOOS***
- ***Australia IMOS***
- ***Southern Ocean SOOS***
- ***GEO BON (EBVs)***
- ***Panel Integrated Coastal Observations PICO***
- ***GCOS (ECVs)***

GOOS EOVs and LME Indicators

*also ECV [sometimes aggregated]

Physics

- Sea State*
- Ocean surface vector stress*
- Sea Ice*
- Sea level*
- SST*
- Subsurface temperature*
- Surface currents*
- Subsurface currents*
- Sea surface salinity*
- Subsurface salinity*
- Heat flux*

Biogeochemistry

- Oxygen*
- Inorganic macro nutrients*
- Carbonate system*
- Transient tracers*
- Suspended particulates
- Nitrous oxide*
- Carbon isotope (^{13}C)
- Dissolved organic carbon
- Ocean colour and light*

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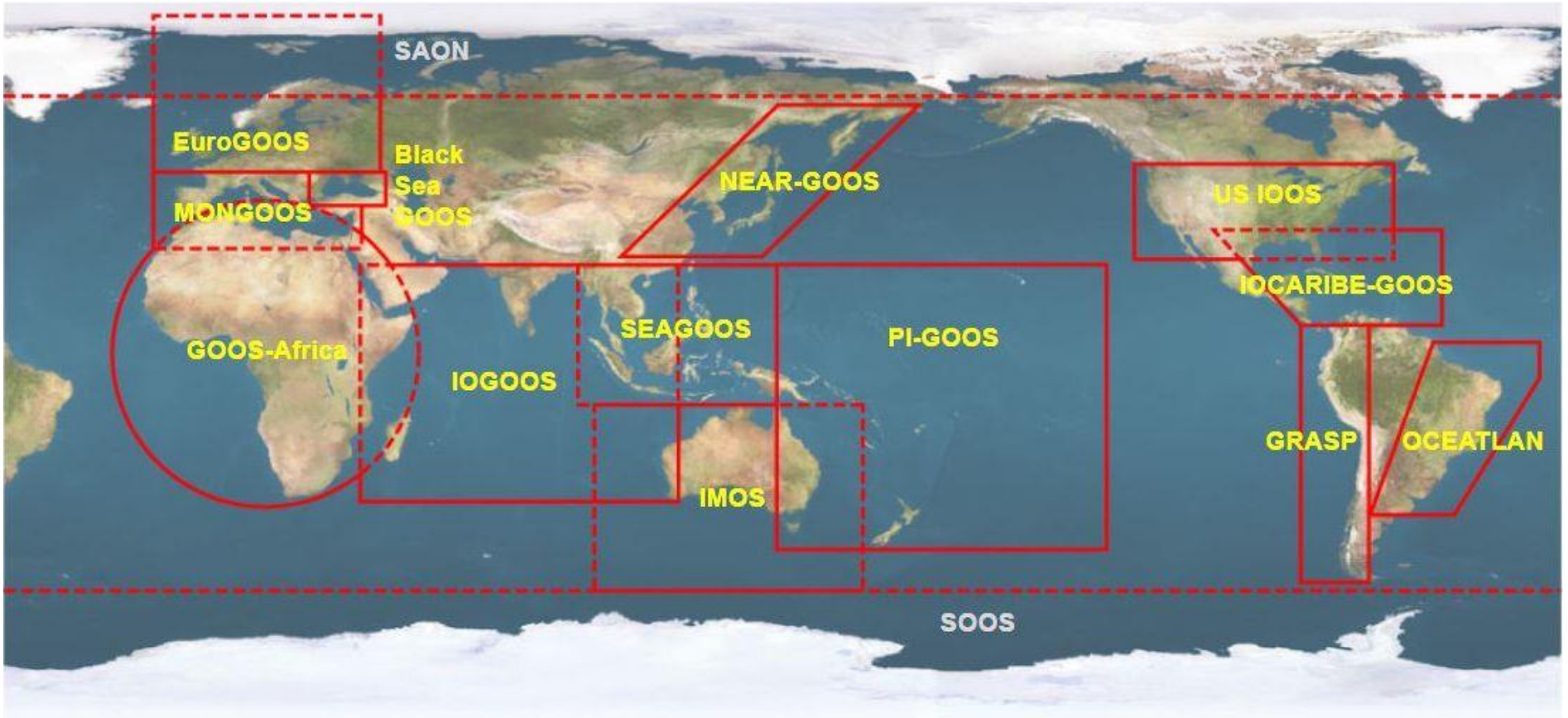
GOOS Regional Alliances (x 13)



GRAs are different
- this presents challenges, and opportunities

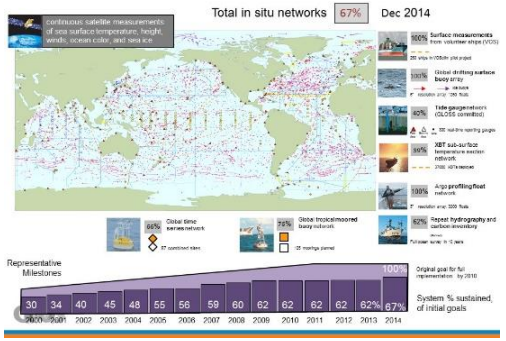
GOVERNANCE

	Program funded	*Project funded*	*Unfunded*
Intergov Network		SEAGOOS PIGOOS NEARGOOS GRASP	GOOS Africa IOCARIBE
Assocn under MOU		OCEATLAN MONGOOS IOGOOS Black Sea G.	
Multinational not-for-profit		EuroGOOS	
National program	US IOOS IMOS		

FUNDING

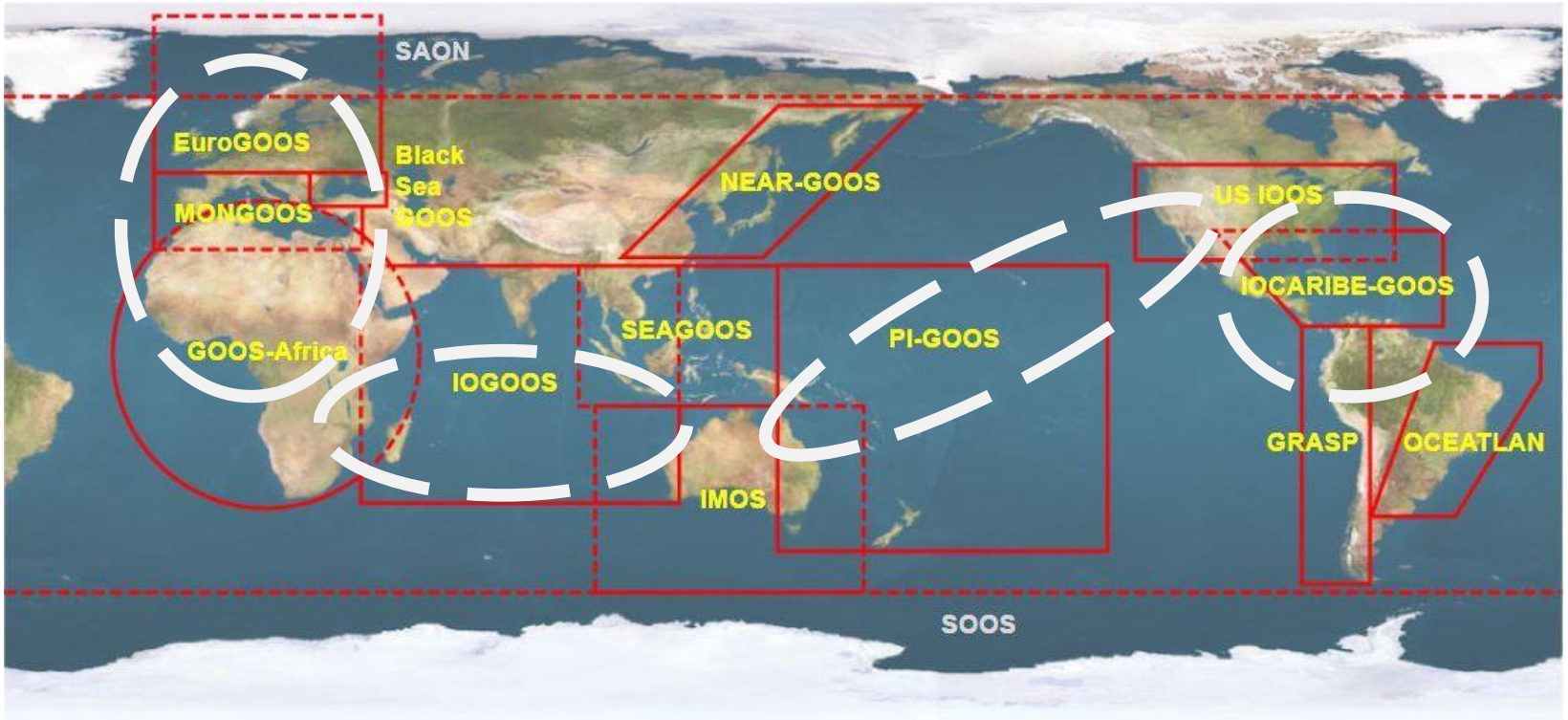
GRAs have embraced BGC and BioEco networks

(results from a 2013 self-Assessment of all GRAs)



	Argo Floats	Ships of Opportunity	Buoys	Ocean Gliders	Water Level Network	Drifters	Ocean Radar HF Radar	Animal Tagging & Monitoring	Water Quality Gauges	Satellite Remote Sensing	Ocean Acidification Sensors
Black Sea GOOS	X		X		X					X	
EuroGOOS	X	X	X	X	X	X	X	X		X	X
GOOS Africa	X	X	X		X					X	
IMOS	X	X	X	X	-	-	X	X	X	X	X
IOCARIBE			X		X		X		X	X	
IOGOOS	X	X	X	X	X	X		X		X	X
MONGOOS	X	X	X	X	X	X				X	
OCEATLAN	X	X	X		X	X				X	
PIGOOS	X	X	X	X	X	X				X	X
SEAGOOS	X	X	X	X	X	X	X	X	X	X	X
US IOOS	X	X	X	X	X	X	X	X	X	X	X
	10/11	9	10	7	10	7	5	4	4	11	6

GRAs want to be part of growing GOOS
- more realistic for sub-groups of GRAs to engage



Opportunities: GOOS and LME collaboration

- EOV observations and coordination
  - on the ‘wet’ and the ‘dry’ side
- Connections through data repositories
- Capacity building
- Connections through existing networks
  - e.g. GRAs, GOA-ON, GACS
- Review of EOV specification sheets (Dec/Jan)

Questions?

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GRA point of Contact

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Emmett Duffy – Smithsonian - USA

Lisandro Benedetti-Cechi –UP - Italy

John Gunn – AIMS - Australia

Francis Marsac – IRD - France

Albert Fischer – IOC – France

Eduardo Klein – USB – Venezuela

Patricia Miloslavich, Ward Appltans – GOOS