NaGISA and DIWPA ---- as examples for strategic implementation plan of global-scale and long-term biodiversity monitoring program

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GEO and Biodiversity

- Biodiversity is the most difficult target to carry out long-term global-scale observation
  - Impossible to apply satellites
  - Impossible to apply monitoring censers
  - Heavily dependent on human power
  - Specialized knowledge to identify species is prerequisite

Key issue

- International collaboration
- Participation of none scientists
- Commitment of governmental body

DIWPA: DIVERSITAS in Western Pacific and Asia

Promoting biodiversity research in Western Pacific and Asia

- Newsletters and website
  http://diwpa.ecology.kyoto-u.ac.jp/index.htm
- Promoting DIWPA-IBOY (Internat'l biodiversity observation year)
- Establishing a database
- Fostering young scientists/seeding projects
- Internat'l symposium for education and dissemination
- Linkage with global change programs

14 Steering Committee Members

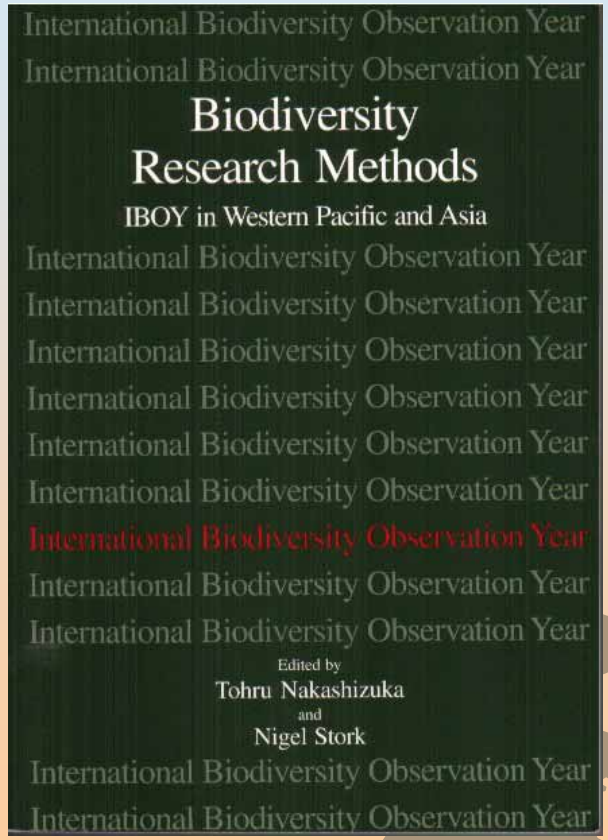
Charters

400 members from 41 countries

Secretary Office
C/o Center for Ecological Research
Kyoto University

DIWPA-IBOY (2000-2001)
Promoting standardized sampling & monitoring of ecosystems and biodiversity

Forest ecosystems
Fresh water ecosystems
Coastal marine ecosystems
Island ecosystems



Protocol manuals
@ **DIWPA website**

DIWPA future direction:

Partnership with global-change programs

“Biodiversity/ecosystem changes

feeds back to global environments”

New unifying projects:

Carbon and Biodiversity

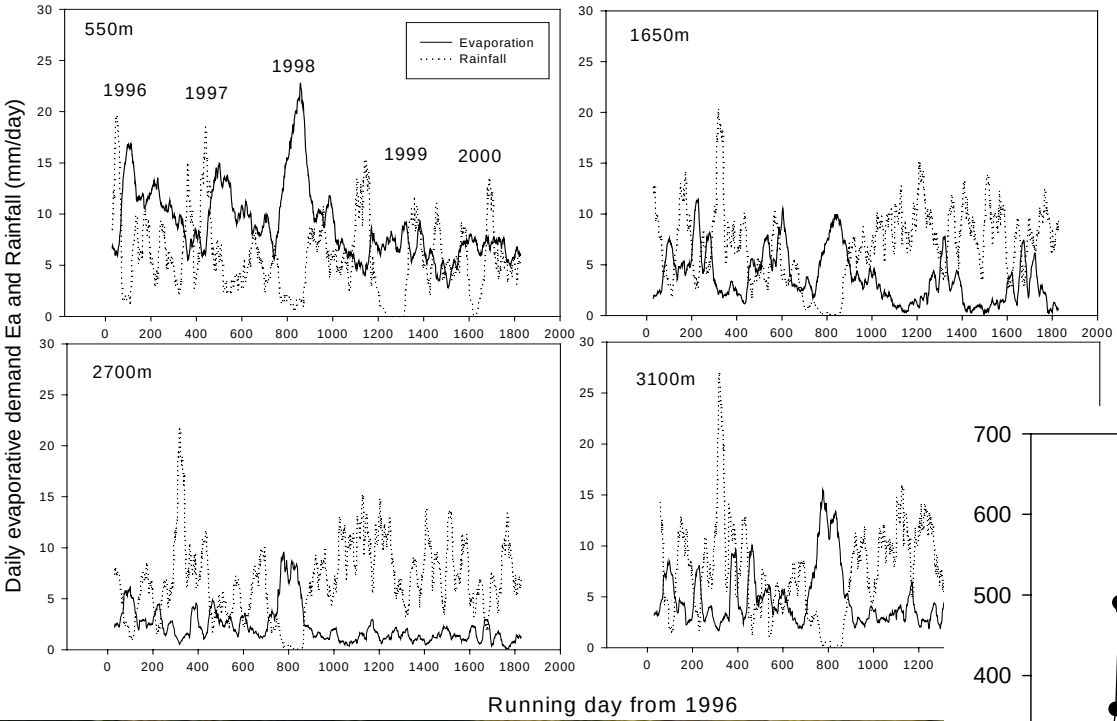
(Relating to REDD in GEOSS)

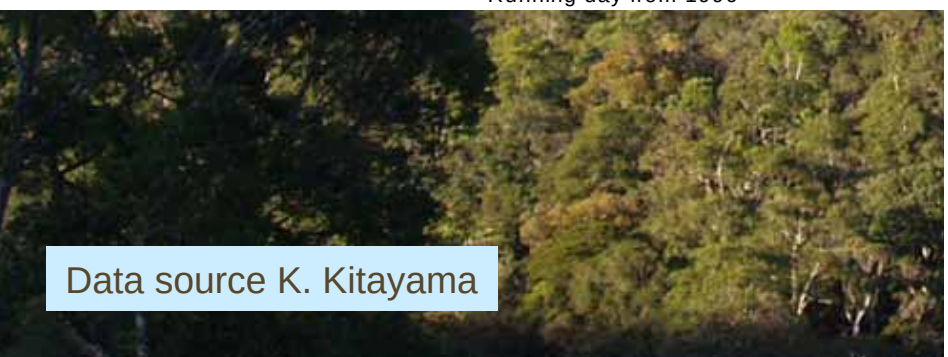
Landscape change and biodiversity

(Relating to monitoring in GEOSS

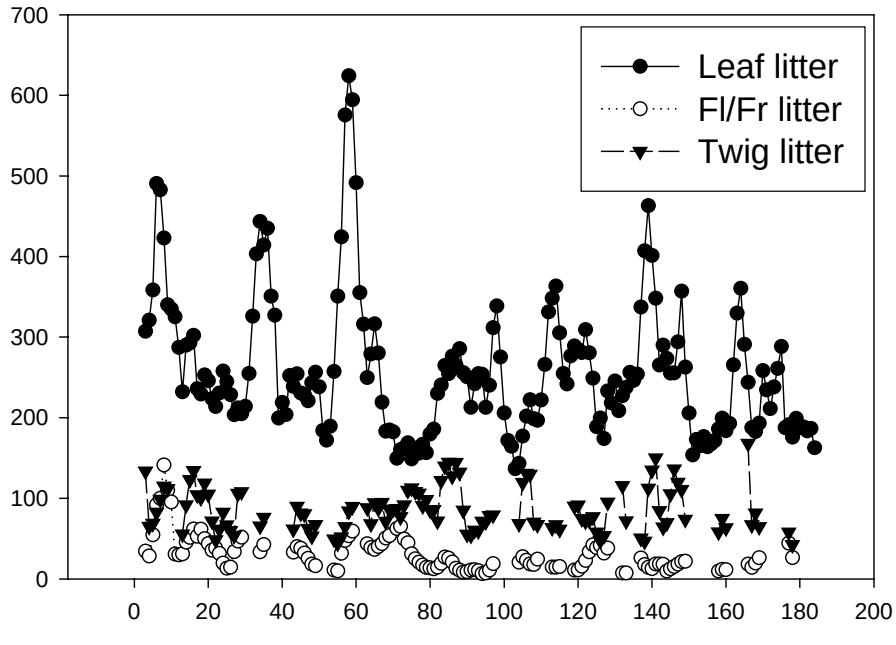
Mount Kinabalu (4095m) in Borneo

Air Dryness





Data source K. Kitayama



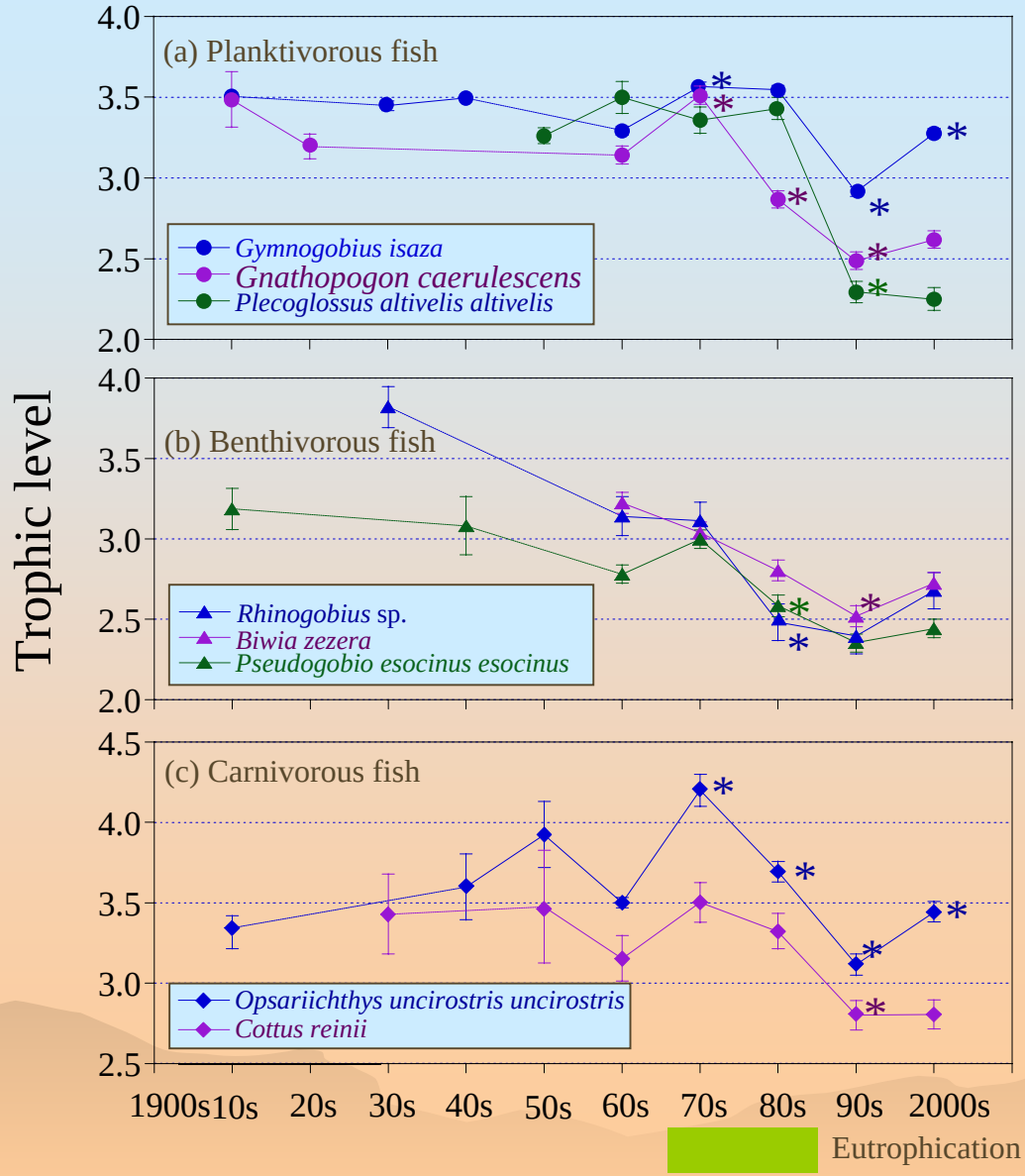
Lake Biwa: Long-term monitoring with biological archives (specimens)

- Starting from 1914
- Over 3000 specimens from aquatic ecosystems

Lake Biwa

The Kyoto University Museum

Decadal changes in trophic levels of three functional feeding groups in fishes



Data source N. Okuda

Use of stable isotopes and radiocarbon for ecosystem monitoring

Mainly Chronology

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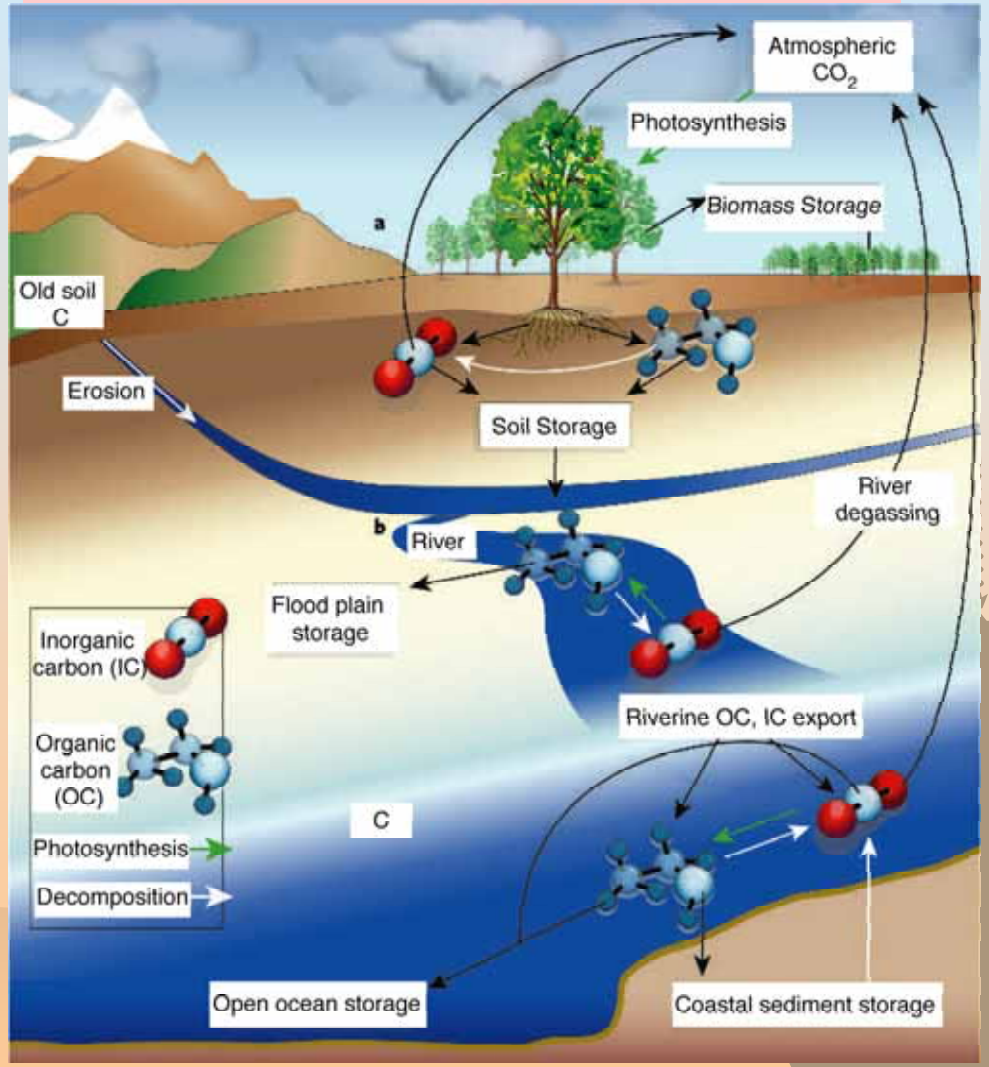
Environmental science under global warming
Carbon turnover

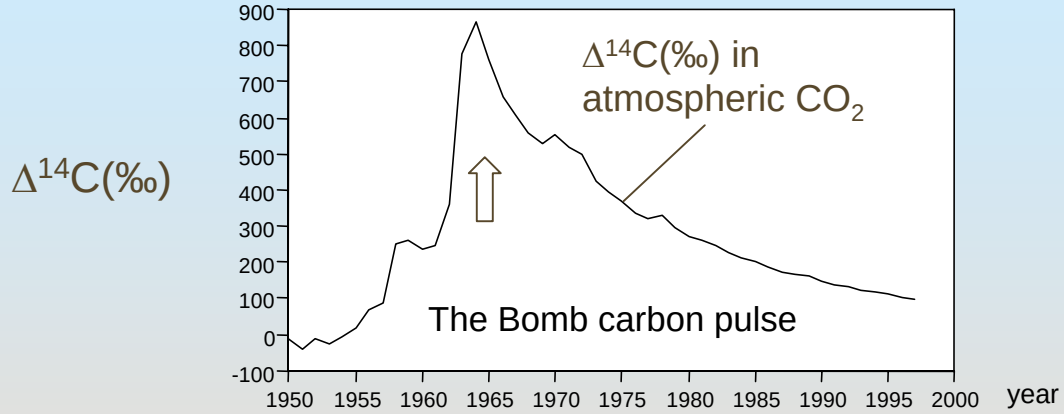
e.g. Organic and inorganic carbon transfer from terrestrial to aquatic ecosystems.

Study of carbon cycling using $\Delta^{14}C$

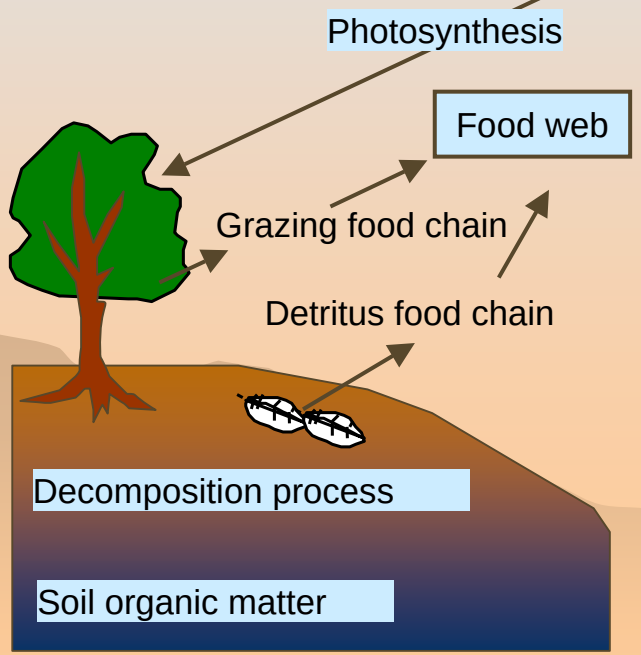


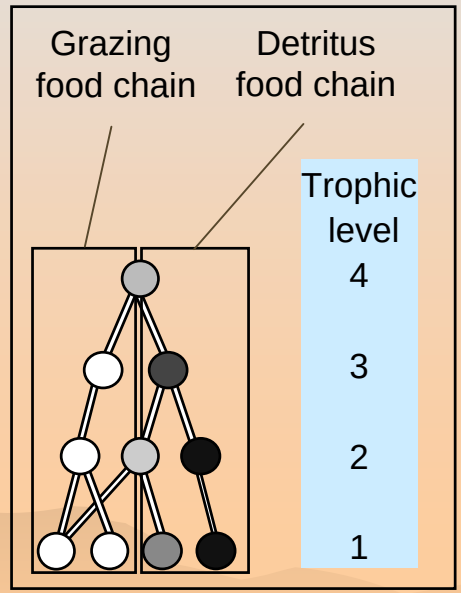
Raymond, P.A. (2005) *Nature* **436**: 469-470

Food web structure using carbon and nitrogen stable isotopes and radiocarbon



Δ14C dating using bomb pulse

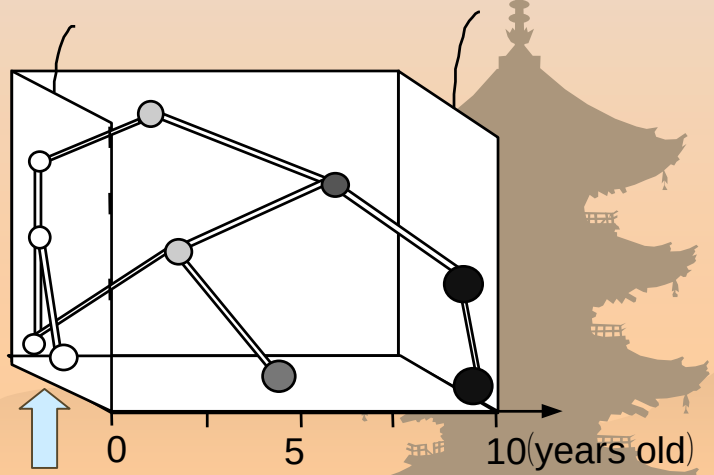




"Static" food web

Depending on the current year photosynthesis

Depending on photosynthesis 10 years ago



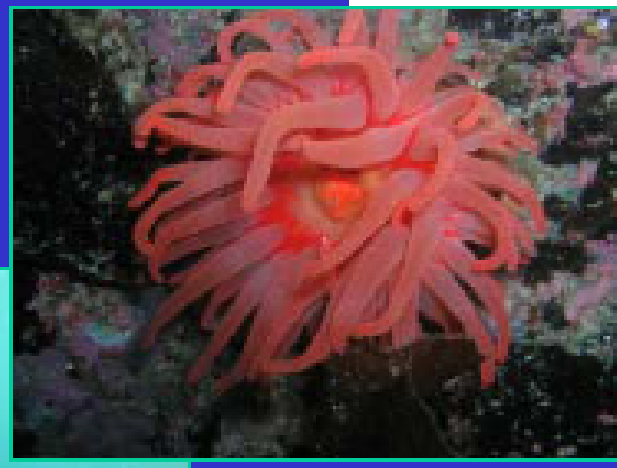
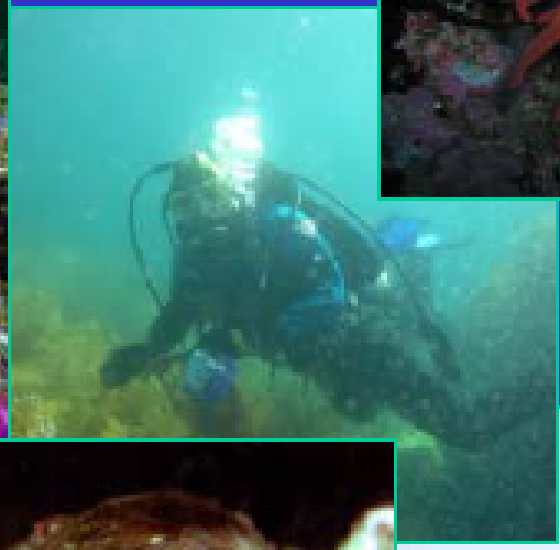
Food web considering carbon "age"

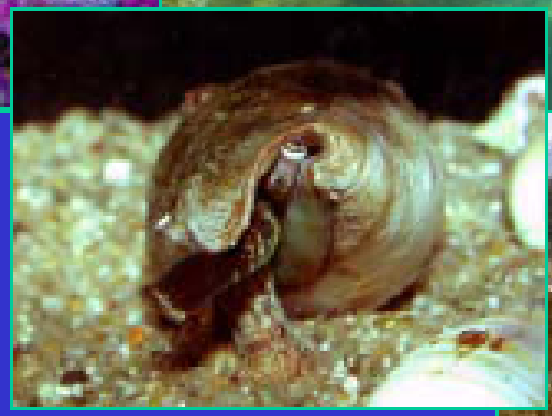
Natural Geography In Shore Areas

A Census of Marine Life Field Project

http://www.nagisa.coml.org/






Produced by Seto Marine Biological Laboratory, Field Science Education & Research Center, Kyoto University

Natural Geography In Shore Areas

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Natural **G**eography **I**n **S**hore **A**reas

nagisa is the Japanese word for the area where the ocean meets the shore, it implies the whole shore ecosystem

Mission Statement

To discover, describe and record the biodiversity of the worlds costal zones and the changes in it over time

Discover the Worlds Near Shore

Project Description

- A collaborative initiative aimed at establishing an initial baseline of biodiversity in the near shore
- Promoting wide-scale, standardized sampling
- To highlight patterns and changes in biodiversity of the worlds coast
- Dedicated to involving local researchers and communities
- To create a capable foundation for long-term coastal monitoring programs

Basic Idea of NaGISA

Even closer

…iota following the same protoc…

- Why t…

Protocol

- habitat: macroalgae (hard bottom), seagrass bed (soft bottom)
- protocol as simple as possible
  - to let non-scientists and developing country people to join
  - to sample for a long time to monitor environmental change

Problems to be overcome

- Need many sampling sites
  - Participation of citizens

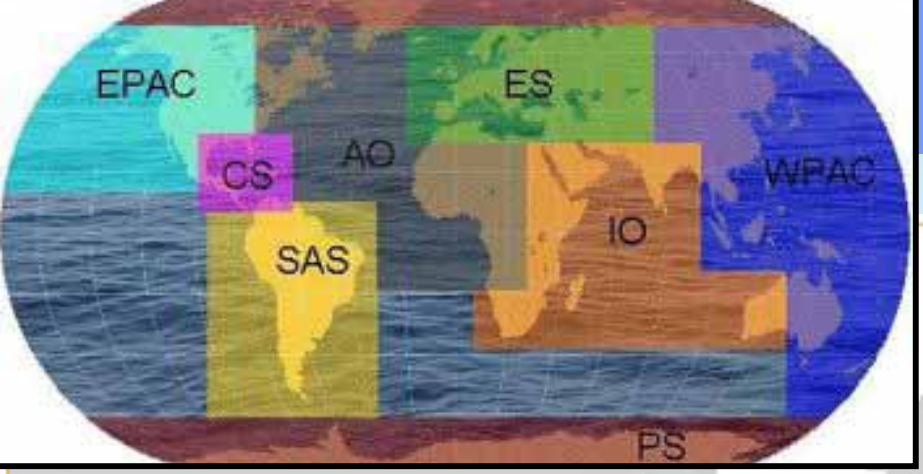
Joint sampling with developing country scientists

Lacking of specialists in taxonomy

- Training parataxonomists through workshop
- 1st workshop on Polychaetes held in 27-29 September, 2003
- 9 workshops have been held

Supervising identification

Global Scope



NaGISA Centers & the Countries Involved
(October 2007)

Arctic (multinational)

Canada

Norway

Atlantic Ocean Admin. Center
Huntsman Marine Science Center, Canada

England

Estonia

Ireland

Poland

East Pacific & Polar Seas Admin. Center
University of Alaska Fairbanks

Russia

Japan

USA

Italy

Portugal

Korea

Greece

International HQ & West Pacific Admin. Center
University of Kyoto

China

Taiwan

European Admin. Center
University of Pisa, Italy

Egypt

Cuba

Jamaica

India

Mexico

Curacao

Barbados

Vietnam

Sir Lanka

Thailand

Colombia

Trinidad & Tobago

Senegal

Seychelles

Malaysia

Philippines

Kenya

Singapore

Indonesia

Venezuela

South American & Caribbean Admin. Center
Simon Bolivar University, Venezuela

Tanzania

Ecuador

Comoros

Peru

Brazil

Angola

Mauritius

Reunion

Australia

Mozambique

Madagascar

Uruguay

South Africa

Chile

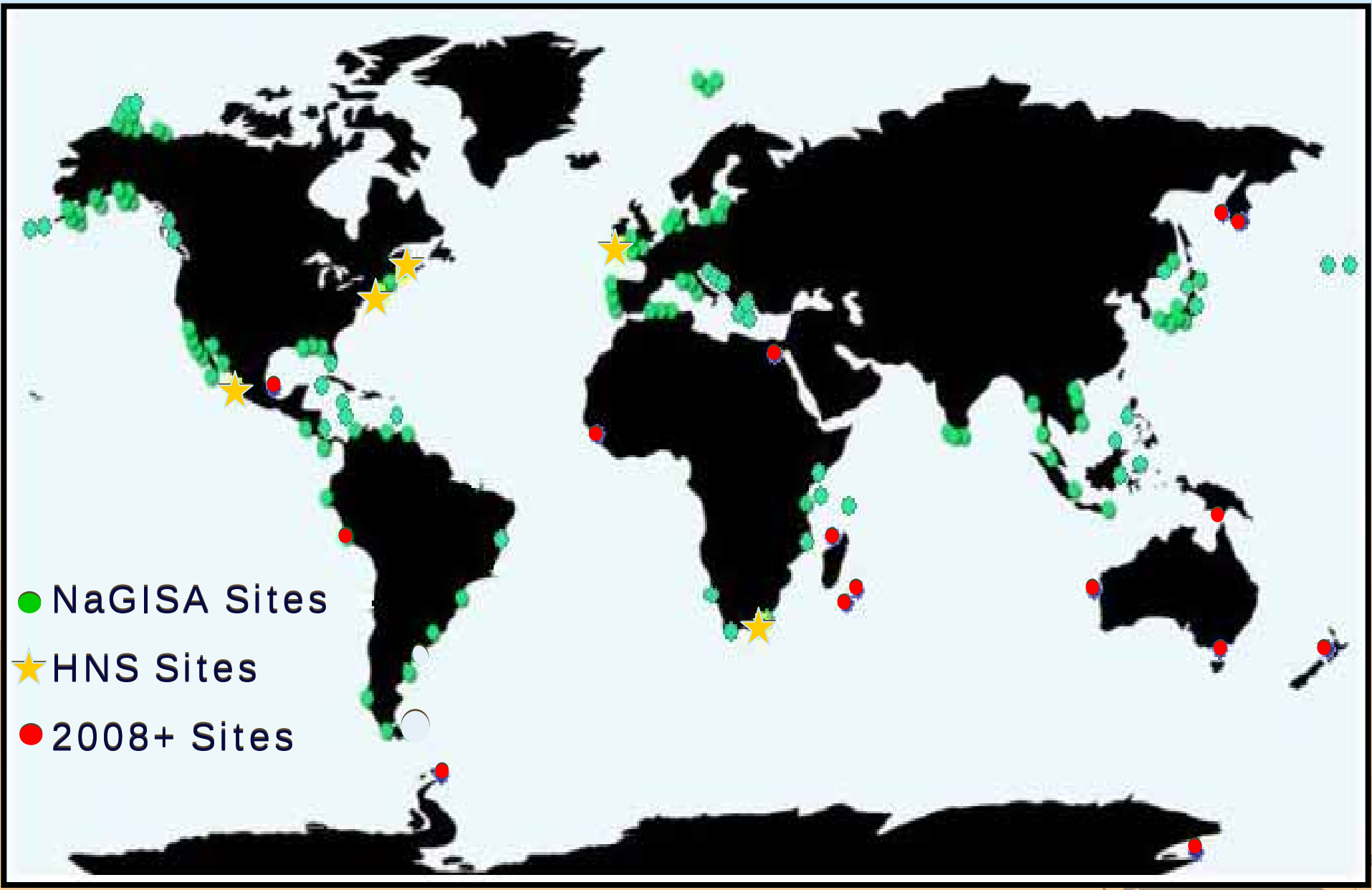
Indian Ocean Admin.Center
Kenyan Marine Fisheries Institute, Kenya

Argentina

New Zealand

Antarctica (multinational)

Global Scope of Project 2



NaGISA Deliverables Scientific

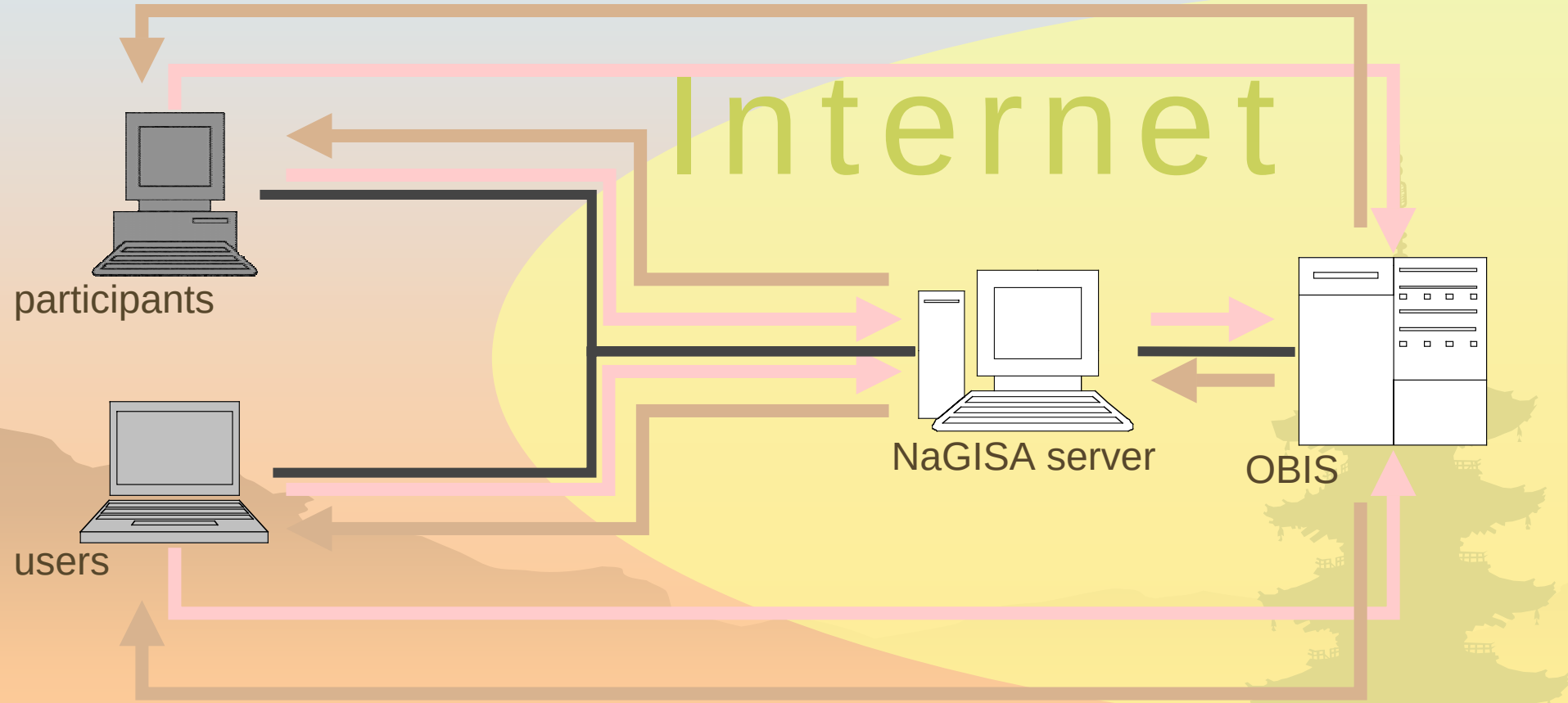
- Provide basic information: a global pattern of biodiversity based on comparable data
- The frame work for a long term monitoring program for biodiversity (invasive species)
- Enhance global taxonomic studies
- Accelerate the study of Meiofauna

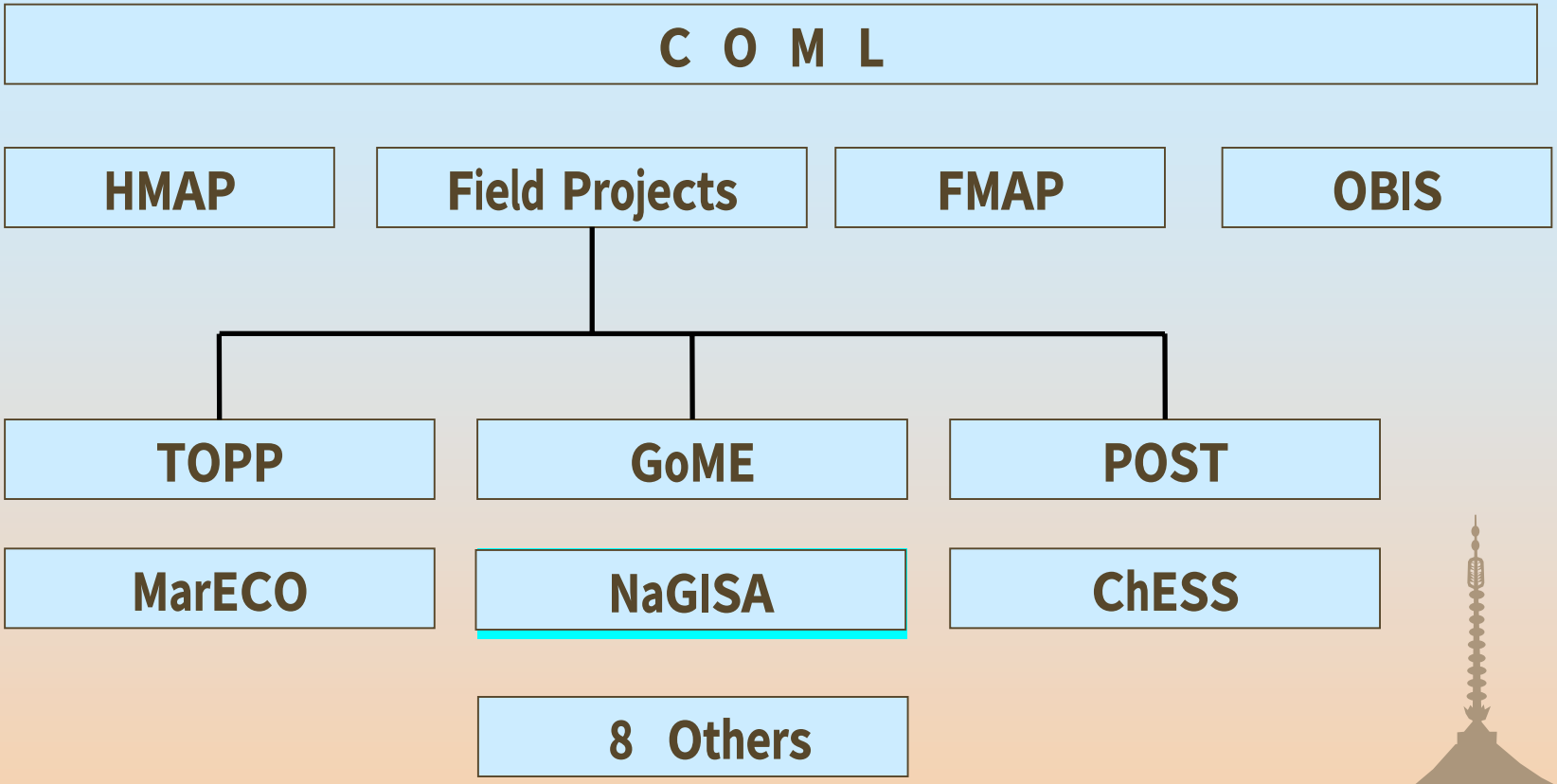
NaGISA Deliverables Education

- Taxonomic and para-taxonomic training
- Enhance public awareness of marine organisms and marine diversity
- Make pertinent timely information (data) available through NaGISA online and OBIS for researchers, decision makers, stake-holders and the general public (management success, sustainability)

Work Locally Study Globally

Data becomes available for research, education and decision making around the world




C O M L
HMAP
Field Projects
FMAP
OBIS
TOPP
GoME
POST
MarECO
NaGISA
ChESS
8 Others

OBIS
OCEAN BIOGEOGRAPHIC INFORMATION SYSTEM

Search | Using OBIS | About the Data | About OBIS | | News |

EXPLORE DATA ON LOCATIONS OF MARINE ANIMALS AND PLANTS

Obtain data tables, maps and predict distributions using environmental information

13.7 million records of 80000 species from 238 databases

SEARCH BY NAME

"Great white shark" or "Carcharodon" or "Carcharodon carcharias"

Search »

Advanced Search including date, depth, dataset Browse by taxonomic groups

SEARCH BY GEOGRAPHY

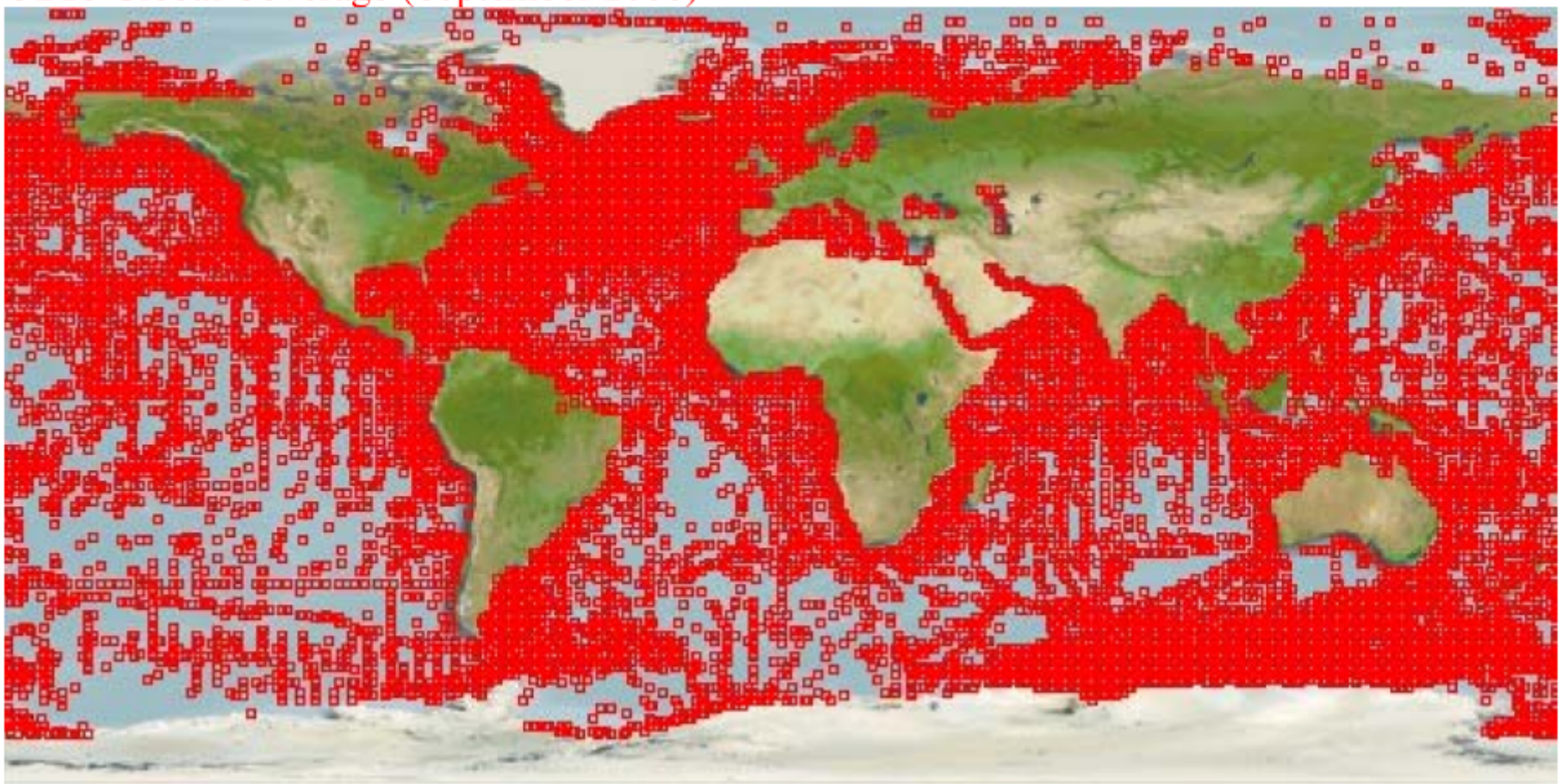
Click on the map to set the query box 5° search area

Search »

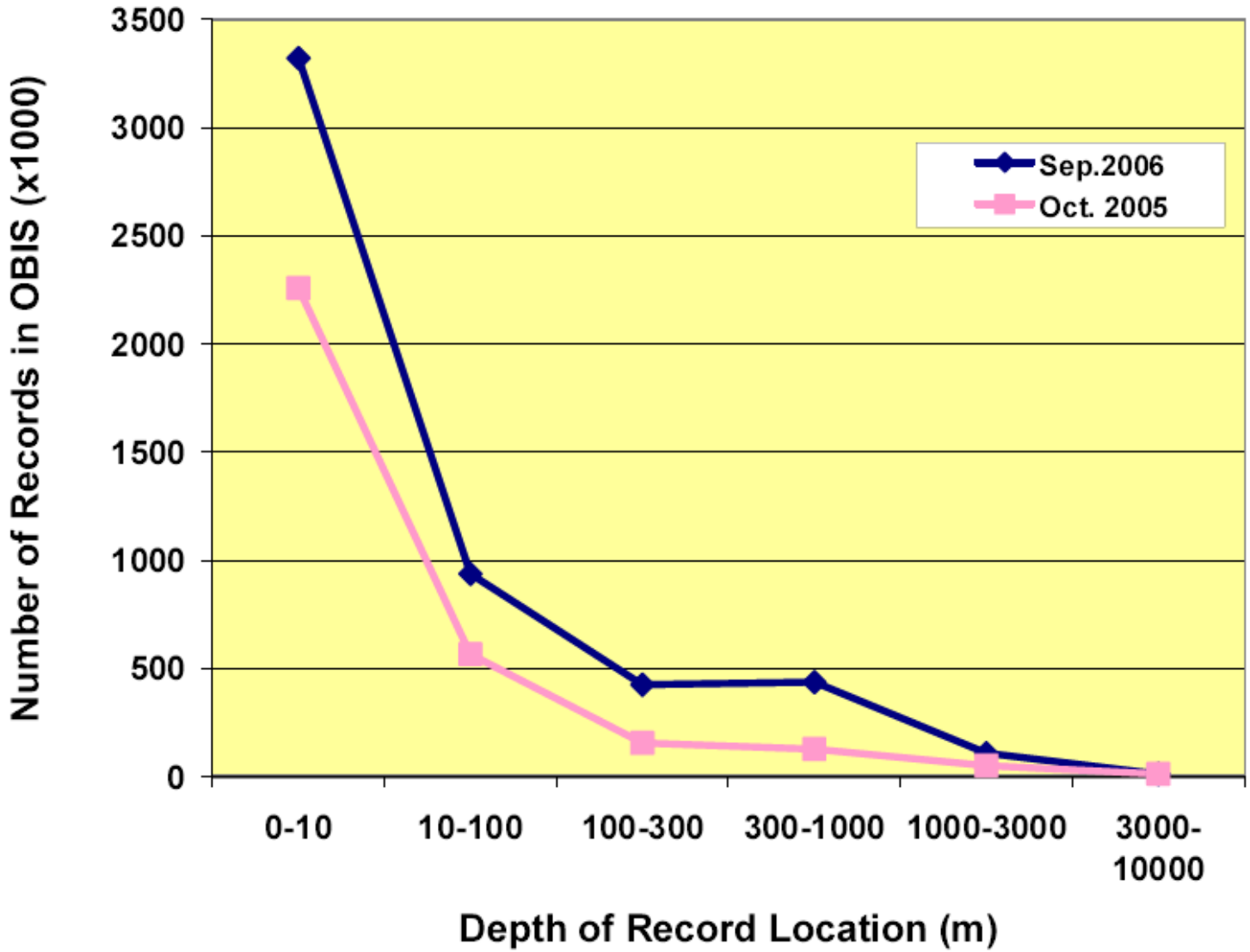
OBIS is a project of the CENSUS OF MARINE LIFE

OBIS Datapoints

OBIS Global Coverage (September 2006)



OBIS Vertical Coverage

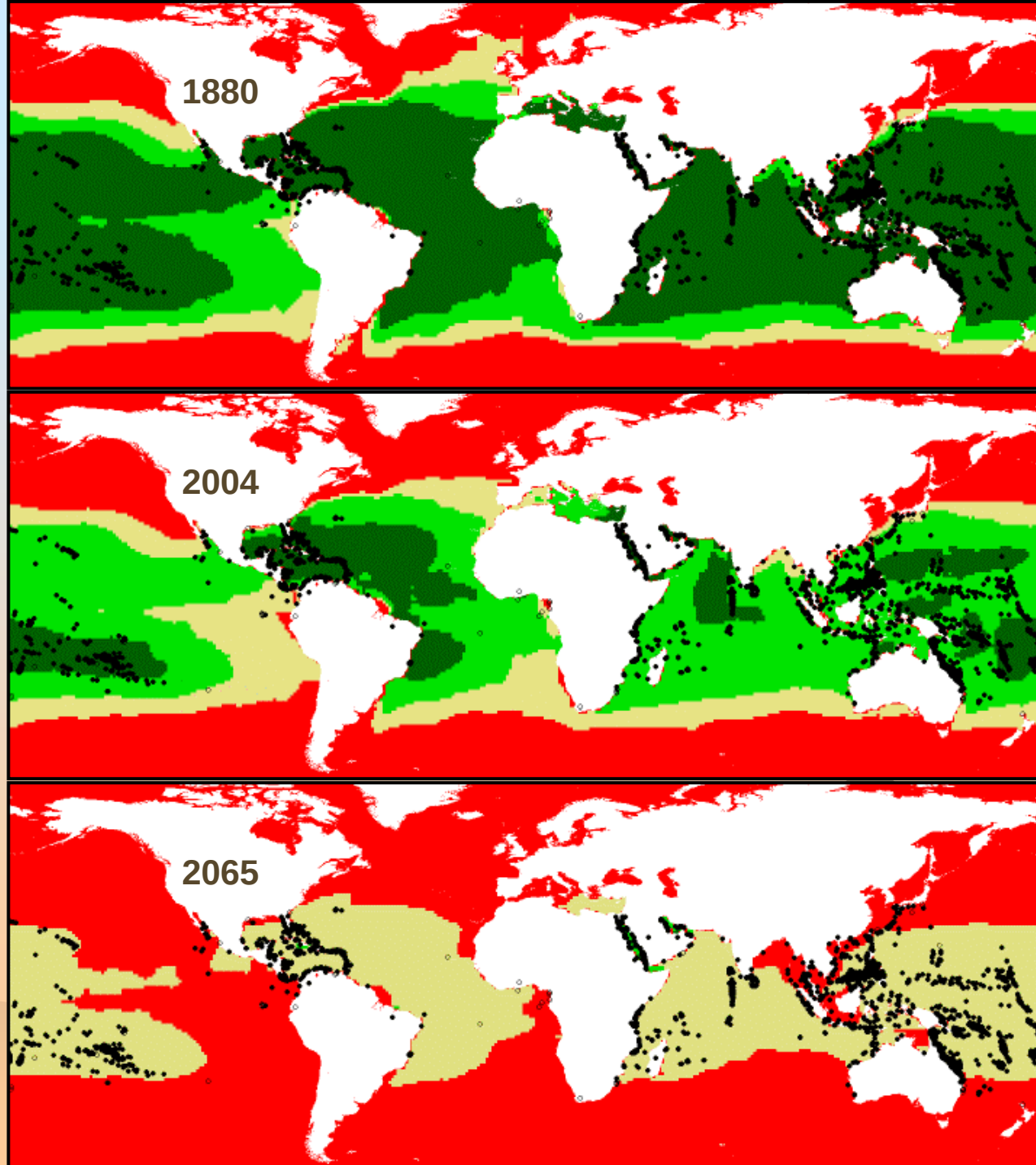


Numbers of species

	Total OBIS	Total world	% in OBIS	
Vertebrata	13,887	14,272	97%	vertebrates
Nematoda	2,004	4,200	48%	round worms
Cnidaria	3,516	7,598	46%	anemones+corals+
Annelida	2,594	8,080	32%	worms *
Other	629	2,197	29%	other
Tunicata	241	1,286	19%	tunicates
Crustacea	5,584	30,472	18%	crustaceans
Mollusca	5,708	32,813	17%	molluscs
Pycnogonida	141	940	15%	sea spiders *
Echinodermata	802	6,700	12%	echinoderms
Bryozoa	528	5,700	9%	mat animals *
Nemertea	115	1,250	9%	ribbon worms *
Porifera	310	6,000	5%	sponges
Platyhelminthes	0	6,795	0%	flatworms *

Maximizing Coral Reef Biodiversity

by conserving sites with long-term optimal temperature & pH conditions for calcification



> 4.0	Optimal
3.5 - 4	Adequate
3 - 3.5	Marginal
< 3.0	Extremely Low

www.iobis.org

Conclusion

- Global-scale, long-term monitoring of biodiversity can be implemented by international collaboration
- Current data will serve as a baseline for monitoring change of biodiversity
- Database is essential to utilize the data obtained
- Analyses of data will contribute prediction of ecosystem change in the future

Thank you