



**fust**  
OCEAN

**OCEAN SCIENCE**  
FOR A SUSTAINABLE DEVELOPMENT AGENDA

 **Flanders**  
State of the Art  
20th Anniversary of  
UNESCO-Flanders  
Cooperation Agreement



# **DIPS-4-OCEAN ASSESSMENTS**

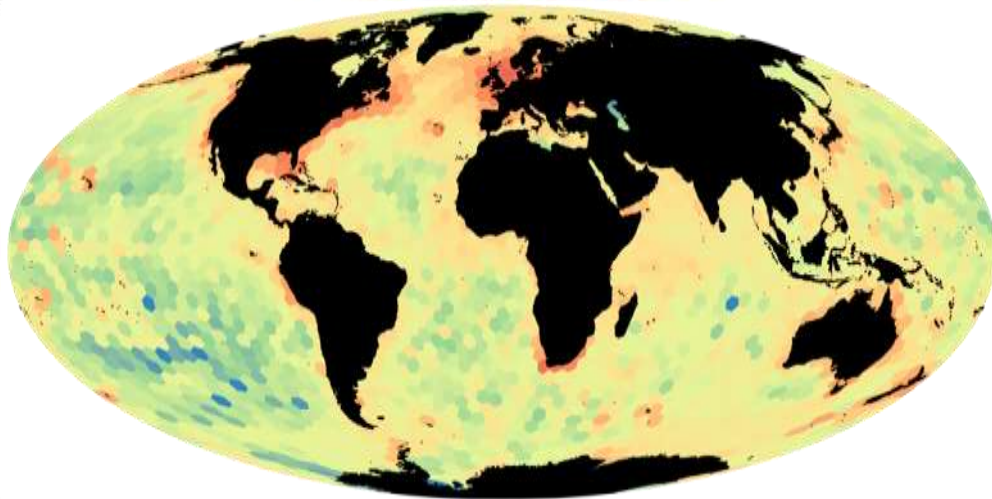
## **Development of Information Products and Services for ocean assessments**

**Dr Adriana Zingone**

Stazione Zoologica Anton Dohrn, Naples, Italy

# Building the infrastructure for Biodiversity Data at the IOC Ostend office to support policy relevant assessments on the state of the ocean

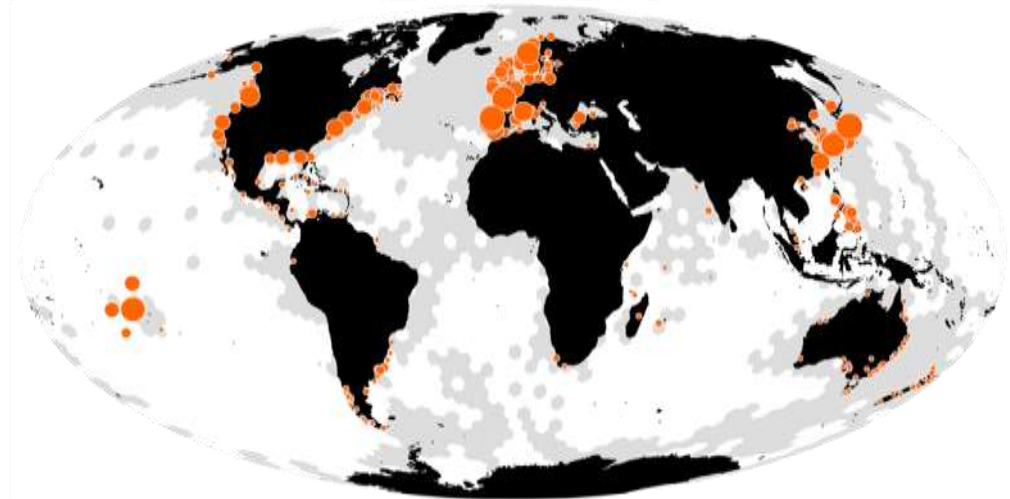
All marine species - **OBIS**



OBIS holds **>50 million records** of **120,000 marine species**, integrated from >2,500 databases provided by >600 institutions

[WWW.OBIS.ORG](http://WWW.OBIS.ORG)

Harmful Algal Blooms - **HAEDAT**



This map shows the 200,000 occurrences of 99 HAB species in OBIS (grey) and the 6,000 HAB events in HAEDAT (orange)

[HAEDAT.IODE.ORG](http://HAEDAT.IODE.ORG)

OBIS builds a global alliance that collaborates with scientific communities to facilitate free and open access to biogeographic data

## Explore OBIS

### Taxon search

### Dataset search

### Country statistics

### Marine World Heritage Sites

### Common name search

### Institute search

### ABNJ statistics

### EBSA statistics

## News

### 5th OBIS Steering Group report published

The meeting report of the 5th session of the OBIS Steering Group is online. 44 decisions and recommendations were adopted including the election of a new co-chair: Mr Sky Bristol (USGS/OBIS-USA), who will support co-chair Prof Eduardo Klein (USF-Venezuela/Caribbean OBIS).

November 30, 2016 • OBIS steering group community

### Extracting and Enriching OBIS Data with R

Programmatic access to biodiversity data is revolutionising large-scale, reproducible biodiversity research. In this series of tutorials we show how OBIS data can be accessed programmatically from within the Open Source statistical computing environment R. This exposes OBIS data to the full range of manipulations, visualisations, and statistical analyses provided by R. It also makes it possible to link and enrich OBIS data, combining it with other environmental, geographic, and biological data sets to better understand the distribution and dynamics of marine biodiversity.

November 22, 2016 • Tim Webb data access R data products

### Visualisation of biodiversity richness, gaps and completeness

Proposed new OBIS visualisation of marine species richness, gaps and completeness. Using Belgium as a test case.

## Tweets by OBIS

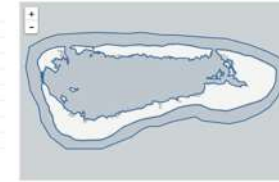
OBIS @OBISNetwork  
Preparing for @IocUnesco phytoplankton T-S WG #TrendsPO. 2.5M records, 2326 spp, 229 datasets, from 1754-2014, MAP: [jode.carto.com/viz/16cb8f1e-b...](http://jode.carto.com/viz/16cb8f1e-b...)



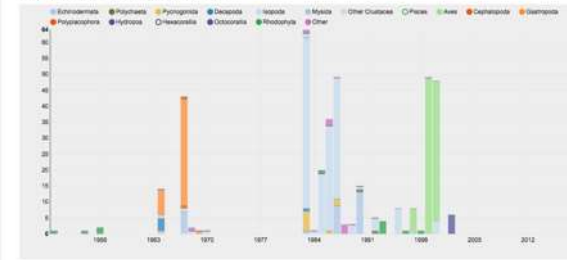
## Aldabra Atoll

### Overview

Records	2,492
Datasets	23
Contributing institutions	13
Taxa	1,078
Species	1,013
Red List species	458
Invasive species	2
Harmful microalgae	0
Only observed here	11



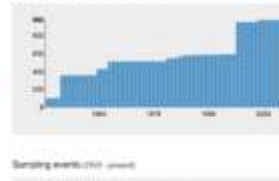
### Records per year and taxonomic group (1910 - present)



### Species per taxonomic group



### Species accumulation (1910 - present)



### Red List species (from IUCN)

Species	Group	Status	Records	Datasets
Phaenocarpa carolinensis	Actinoptera	LC	1	1
Chrysomelidae	Chrysomelidae	LC	17	1
Crucian carp	Pisces	LC	14	1
Chrysomelidae	Chrysomelidae	LC	10	1
Chrysomelidae	Chrysomelidae	LC	10	1
Chrysomelidae	Chrysomelidae	LC	10	1
Chrysomelidae	Chrysomelidae	LC	10	1
Chrysomelidae	Chrysomelidae	LC	10	1
Chrysomelidae	Chrysomelidae	LC	10	1
Chrysomelidae	Chrysomelidae	LC	10	1

### Invasive species (from IUCN)

Species	Group	Status	Records	Datasets
Chrysomelidae	Chrysomelidae	LC	1	1
Chrysomelidae	Chrysomelidae	LC	1	1

### Harmful microalgae (from IUCN)

Species	Group	Status	Records	Datasets
Chrysomelidae	Chrysomelidae	LC	1	1
Chrysomelidae	Chrysomelidae	LC	1	1

### Observed in this area only

Species	Group	Status	Records	Datasets
Chrysomelidae	Chrysomelidae	LC	1	1
Chrysomelidae	Chrysomelidae	LC	1	1

### Newest species in this area

Species	Group	Status	Records	Datasets
Chrysomelidae	Chrysomelidae	LC	1	1
Chrysomelidae	Chrysomelidae	LC	1	1

### No longer observed in this area since 1950

Species	Group	Status	Records	Datasets
Chrysomelidae	Chrysomelidae	LC	1	1
Chrysomelidae	Chrysomelidae	LC	1	1

### Datasets

Name	Group	Records	Year	Records
South African Institute for Aquatic Biodiversity - Non-Indigenous	OBIS	40000	2012	100
OBIS Network Group - Non-Indigenous	OBIS	40000	2012	100
OBIS Network Group - Non-Indigenous	OBIS	40000	2012	100
OBIS Network Group - Non-Indigenous	OBIS	40000	2012	100
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### Contributing institutions

Name	Records	Species	Records	Species
South African Institute for Aquatic Biodiversity	40000	40000	2012	100
OBIS Network Group - Non-Indigenous	40000	40000	2012	100
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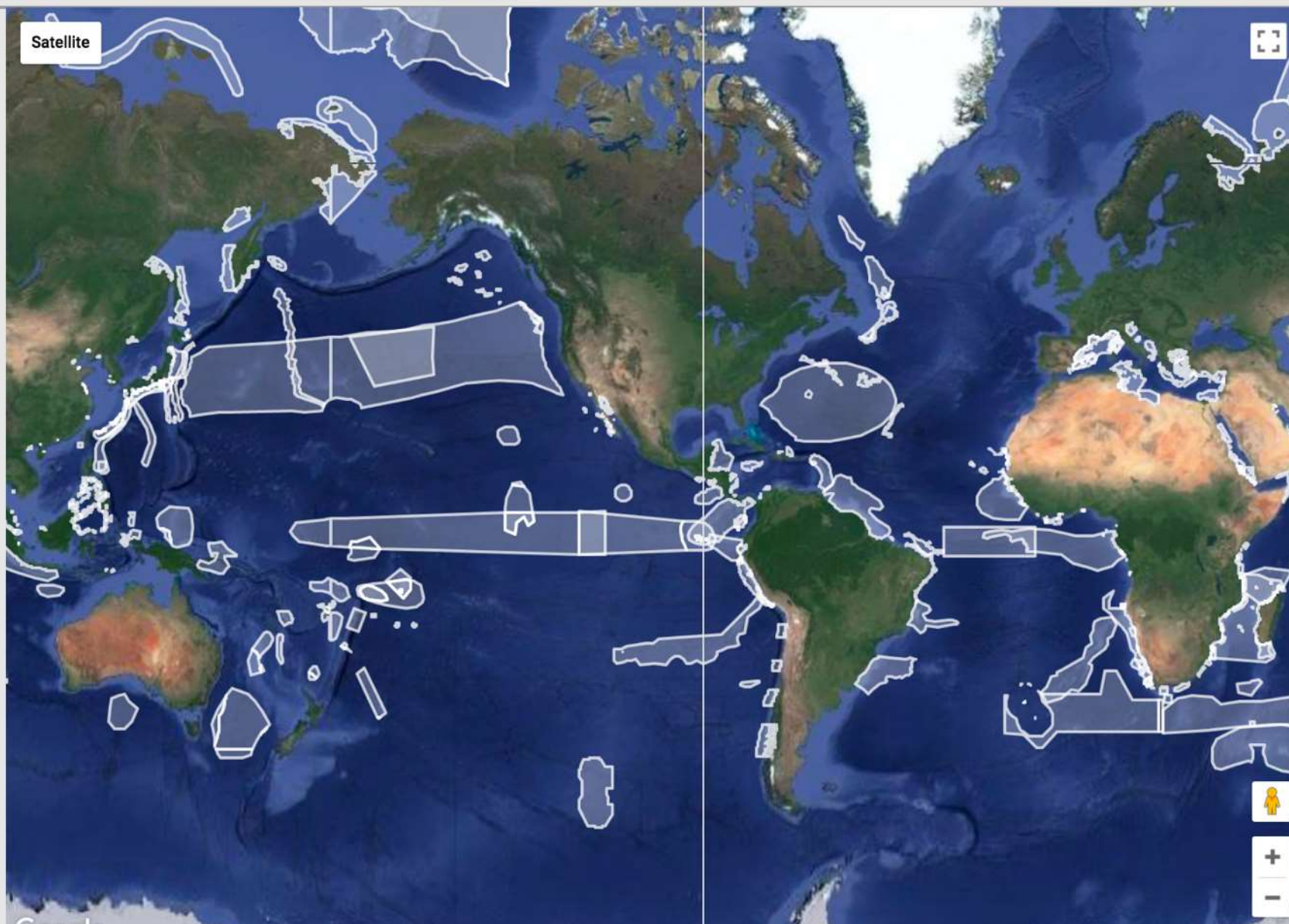






## View Areas Meeting the EBSA Criteria

### All Regions

[Arctic](#)[East Asian Seas](#)[Eastern Tropical and Temperate Pacific](#)[Mediterranean](#)[North Pacific](#)[North-East Indian Ocean](#)[North-west Atlantic](#)[North-West Indian Ocean and Adjacent Gulf Areas](#)[South-Eastern Atlantic](#)[Southern Indian Ocean](#)[Western South Pacific](#)[Wider Caribbean and Western Mid-Atlantic](#)

Convention on  
Biological Diversity

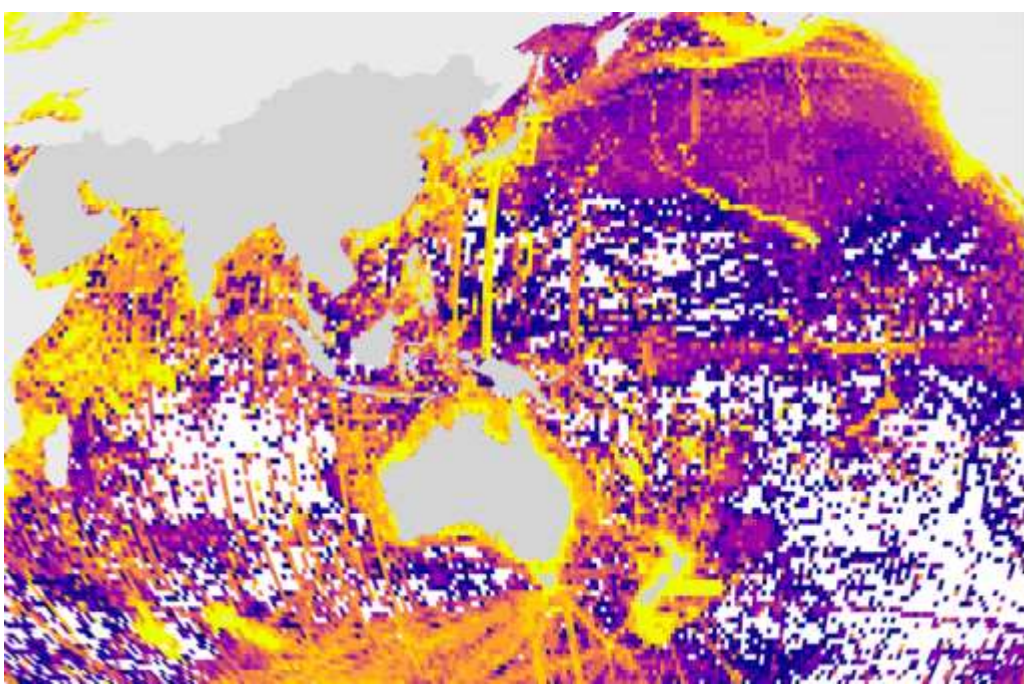


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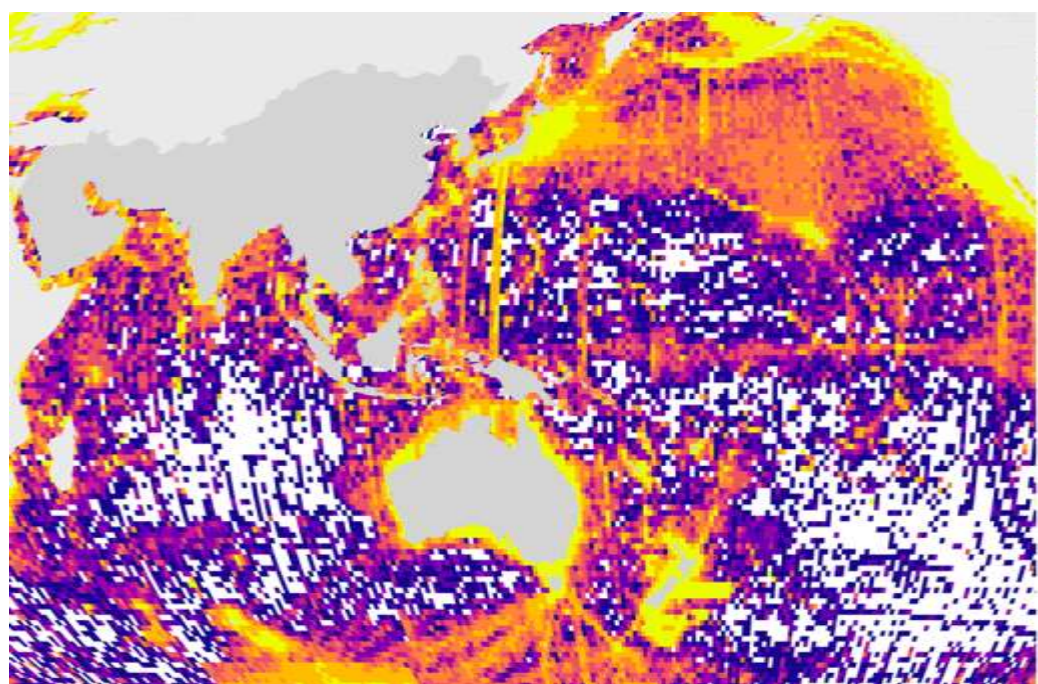
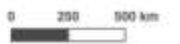




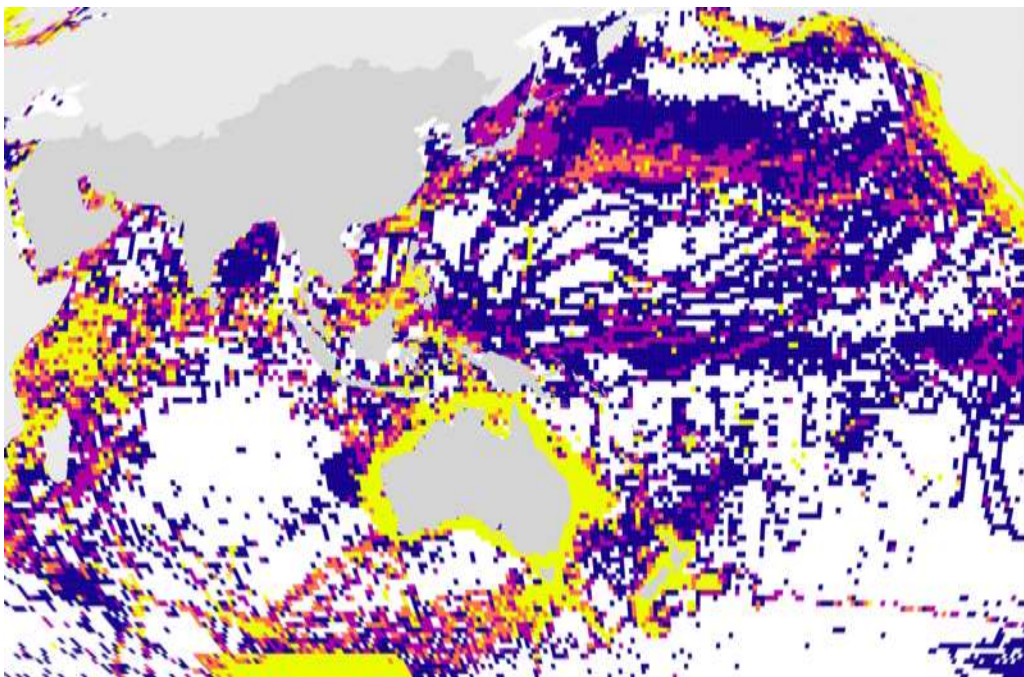




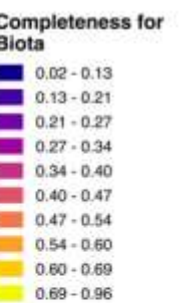
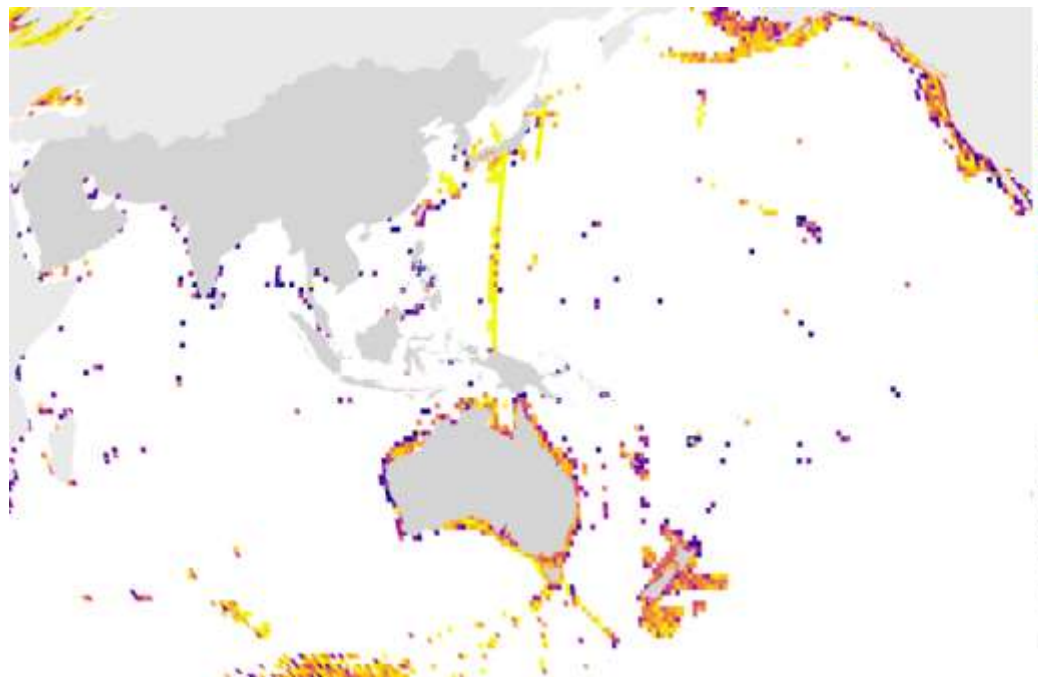
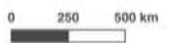
OBIS (2017) Map showing "Number of records" in 1° cells in the Robinson sphere projection with a Pacific Central Meridian. (Available: Ocean Biogeographic Information System, Intergovernmental Oceanographic Commission of UNESCO, [www.lobis.org/data/maps](http://www.lobis.org/data/maps), Accessed: 2017-09-18)



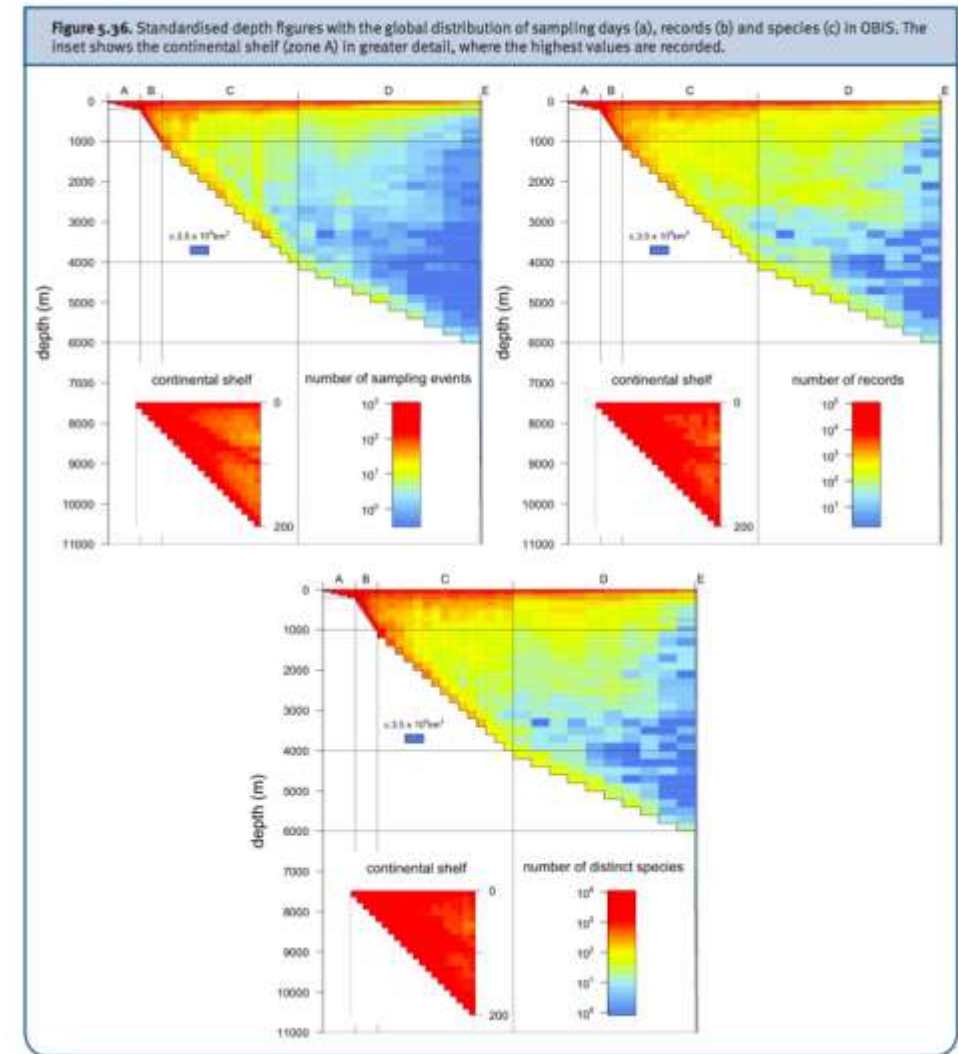
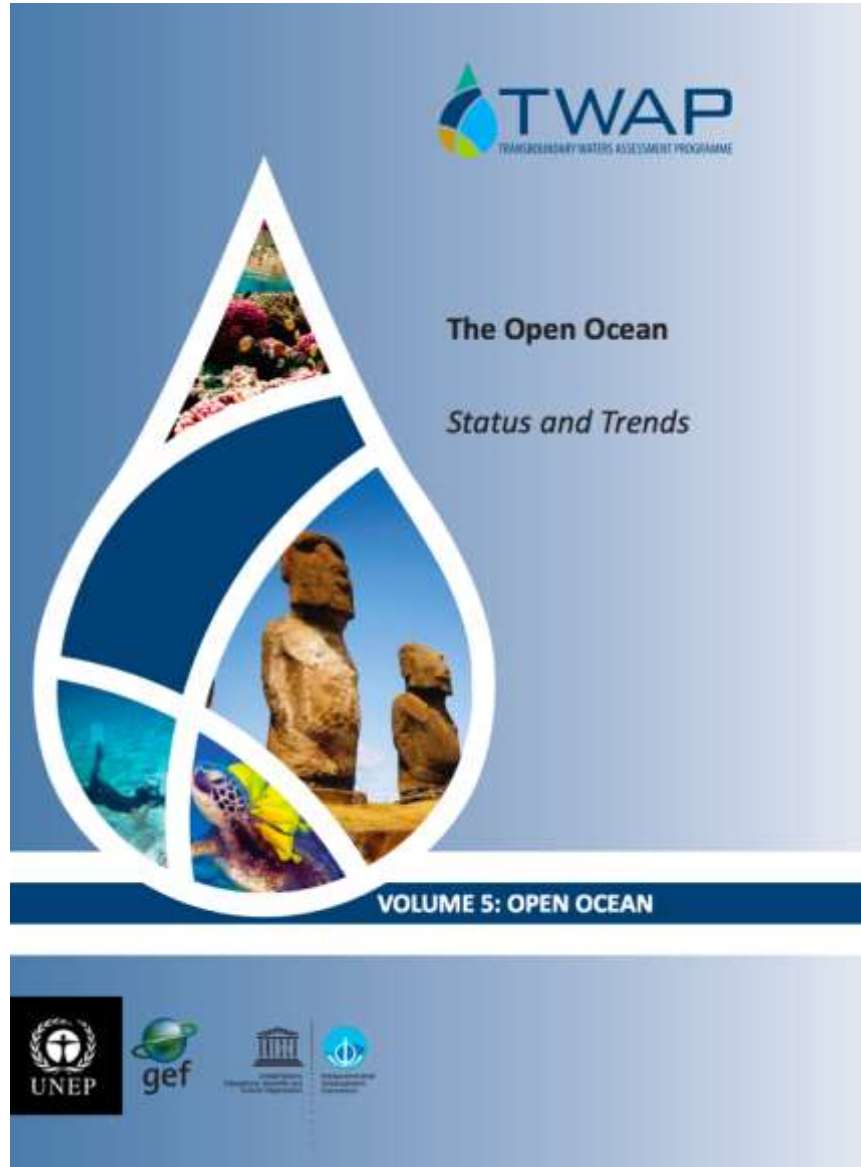
OBIS (2017) Map showing "Sampling effort (individual days with observations)" in 1° cells in the Robinson sphere projection with a Pacific Central Meridian. (Available: Ocean Biogeographic Information System, Intergovernmental Oceanographic Commission of UNESCO, [www.lobis.org/data/maps](http://www.lobis.org/data/maps), Accessed: 2017-09-18)



OBIS (2017) Map showing "Red List species" in 1° cells in the Robinson sphere projection with a Pacific Central Meridian. (Available: Ocean Biogeographic Information System, Intergovernmental Oceanographic Commission of UNESCO, [www.lobis.org/data/maps](http://www.lobis.org/data/maps), Accessed: 2017-09-18)







*Hundreds of scientists from many countries ... indicate that the oceans' carrying capacity is near or at its limit. It is clear that urgent action on a global scale is needed to protect the world's oceans.'*

**BAN KI-MOON,**  
Former Secretary-General of the  
United Nations

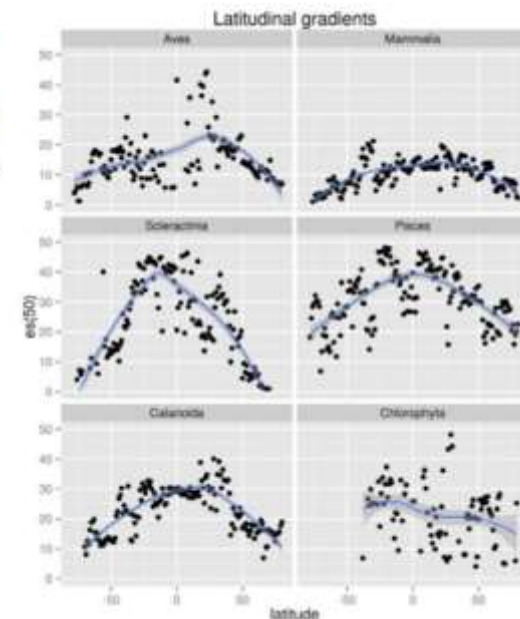
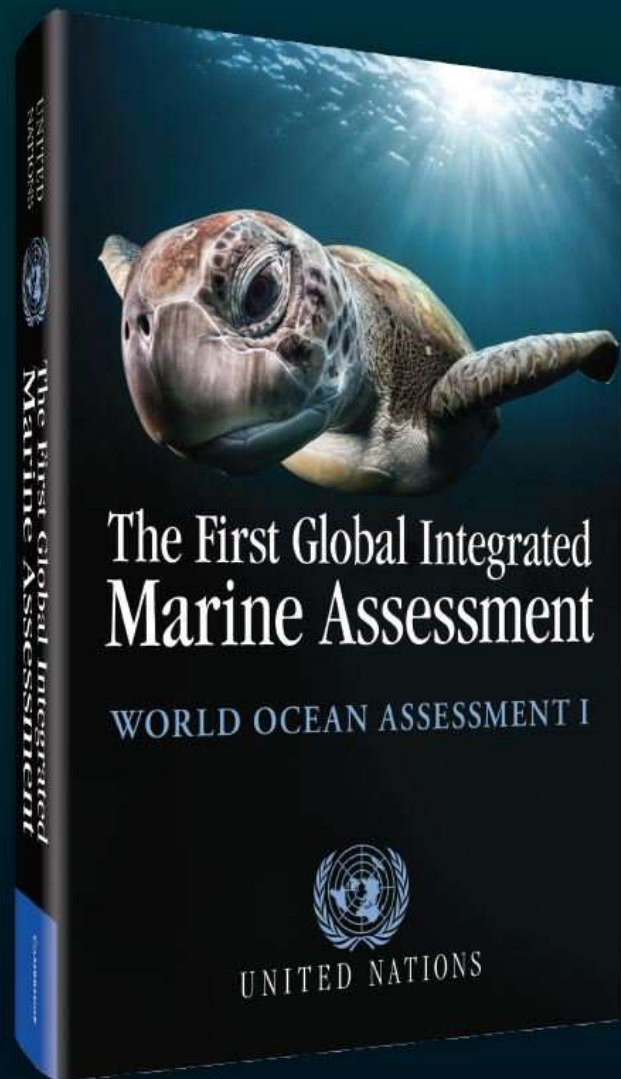
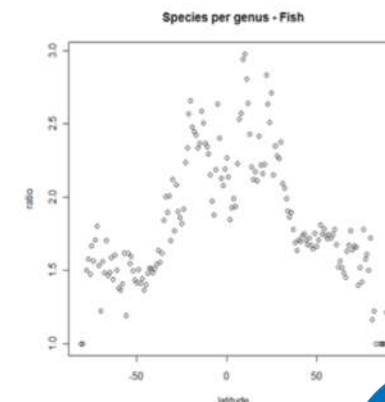


Figure 5. ESDI calculated for various groups, from the data as available in OBIS as of the end of 2012.



Number of species of fish per genus, in each latitudinal band of 1° latitude. Data available in OBIS on 26 September 2011.



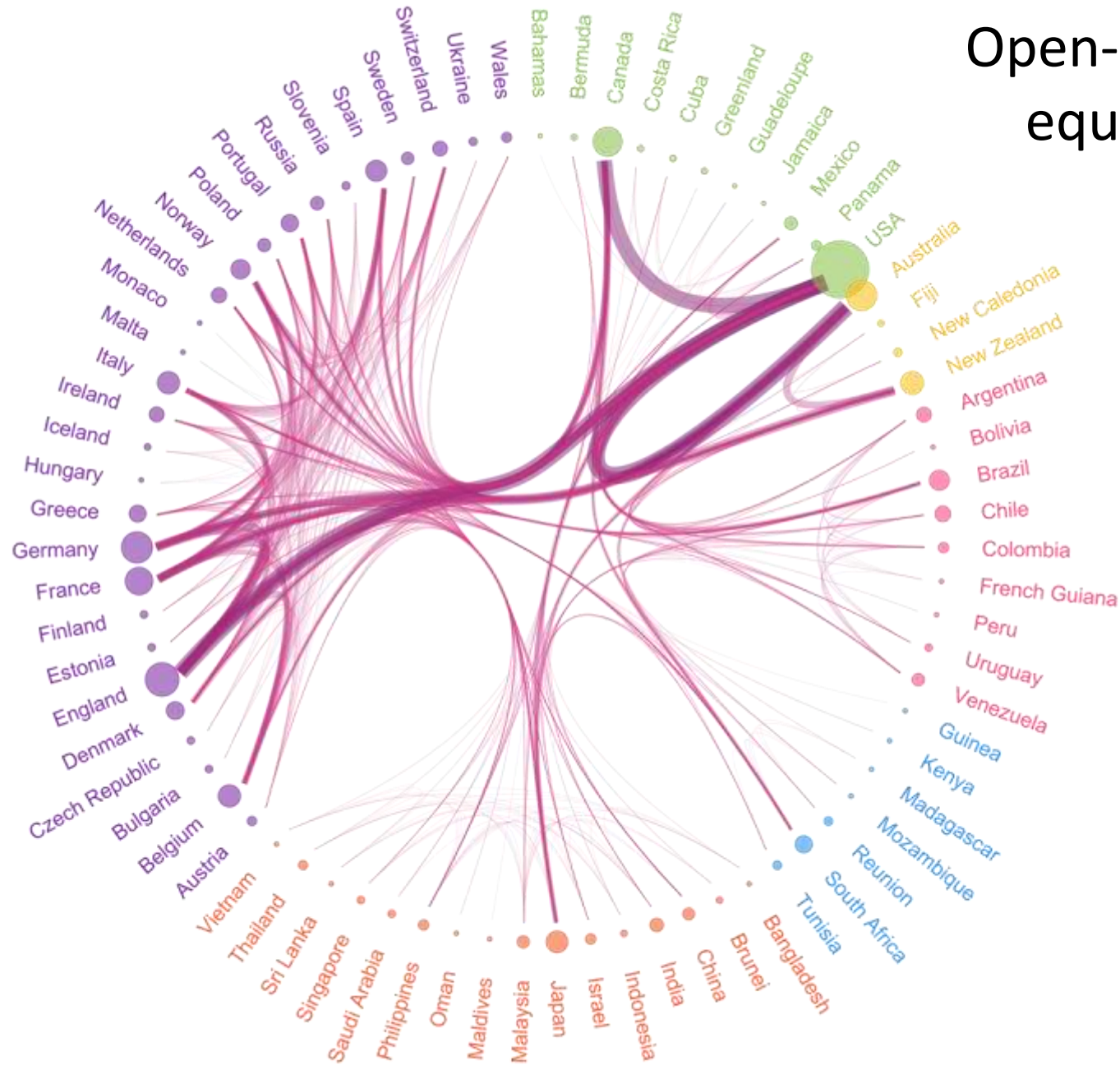


# In 2017: 151 people in 7 OBIS training courses





Open-access to research data supports  
equitable access and benefit sharing  
and enhances international  
collaboration



UNGA  
appreciated  
the  
contribution  
of OBIS to  
Marine  
Scientific  
Research

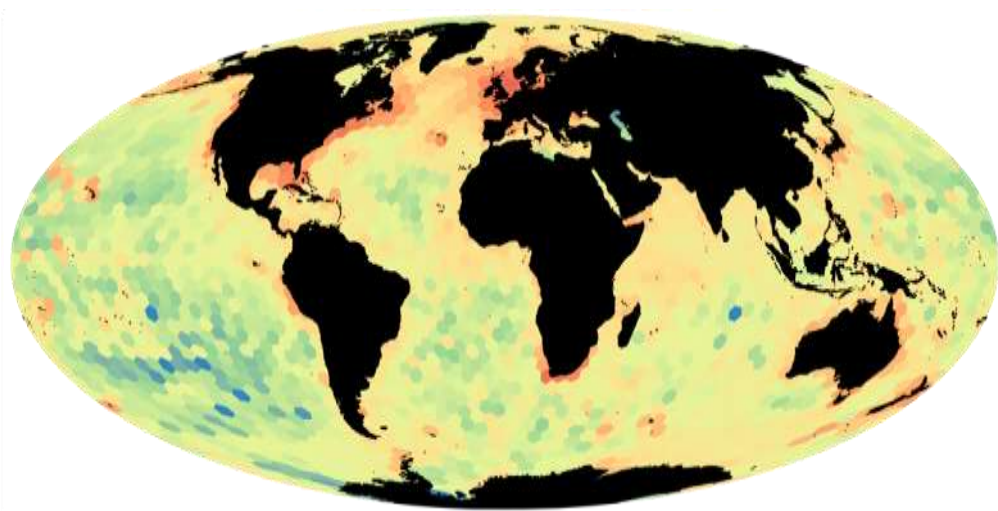
**2700 scientists from 73 countries  
collaborated on >1000 papers citing  
OBIS  
(based on Web of Science, in  
collaboration with VLIZ)**





## Building the infrastructure at the IOC Ostend office to support policy relevant assessments on the state of the ocean

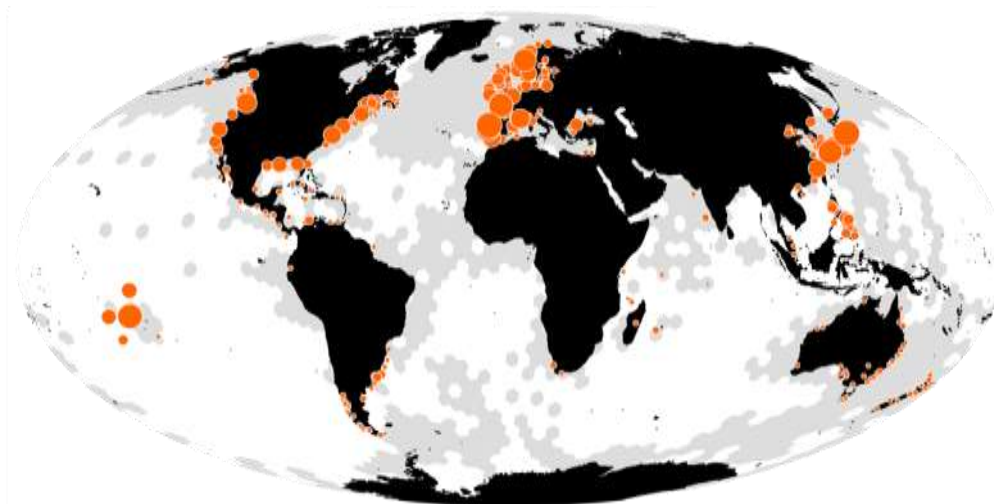
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Harmful Algal Blooms - **HAEDAT**



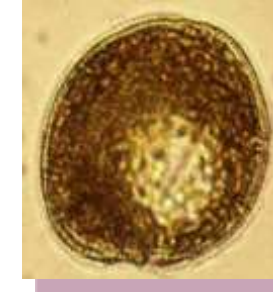
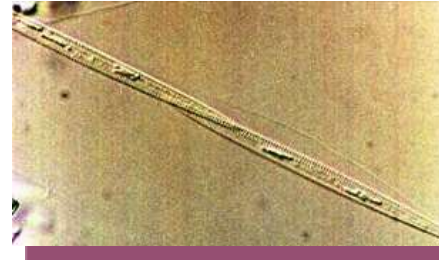
This map shows the 200,000 occurrences of 99 HAB species in OBIS (grey) and the 6,000 HAB events in HAEDAT (orange)

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~150 marine microalgae produce toxins

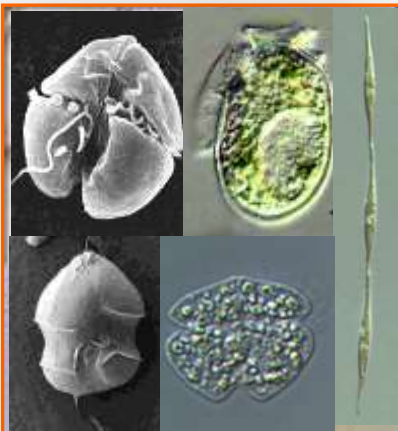
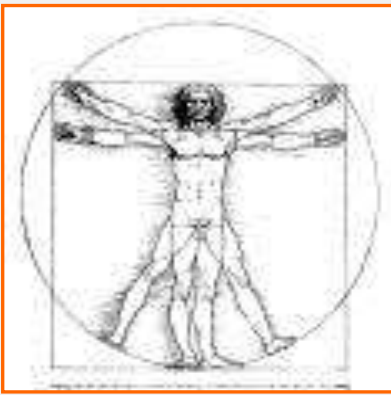
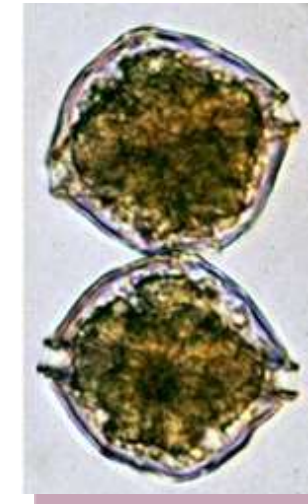


**The toxins can be accumulated in seafood  
causing different poisoning syndromes**

**HABs: Harmful Algal Blooms**

Paralytic shellfish poisoning (PSP)  
Diarrhetic shellfish poisoning (DSP)  
Neurotoxic shellfish poisoning (NSP)  
Amnesic shellfish poisoning (ASP)  
Ciguatera fish poisoning (CFP)  
Azaspiracid shellfish poisoning (AZP)

Respiratory problems and dermatitis  
Hepatotoxicity  
Clupeotoxism





Not only toxins and **human health** problems, but also discolourations, foams, slimes, anoxia, with damages to **tourism, aquaculture and fisheries**



aquaculture

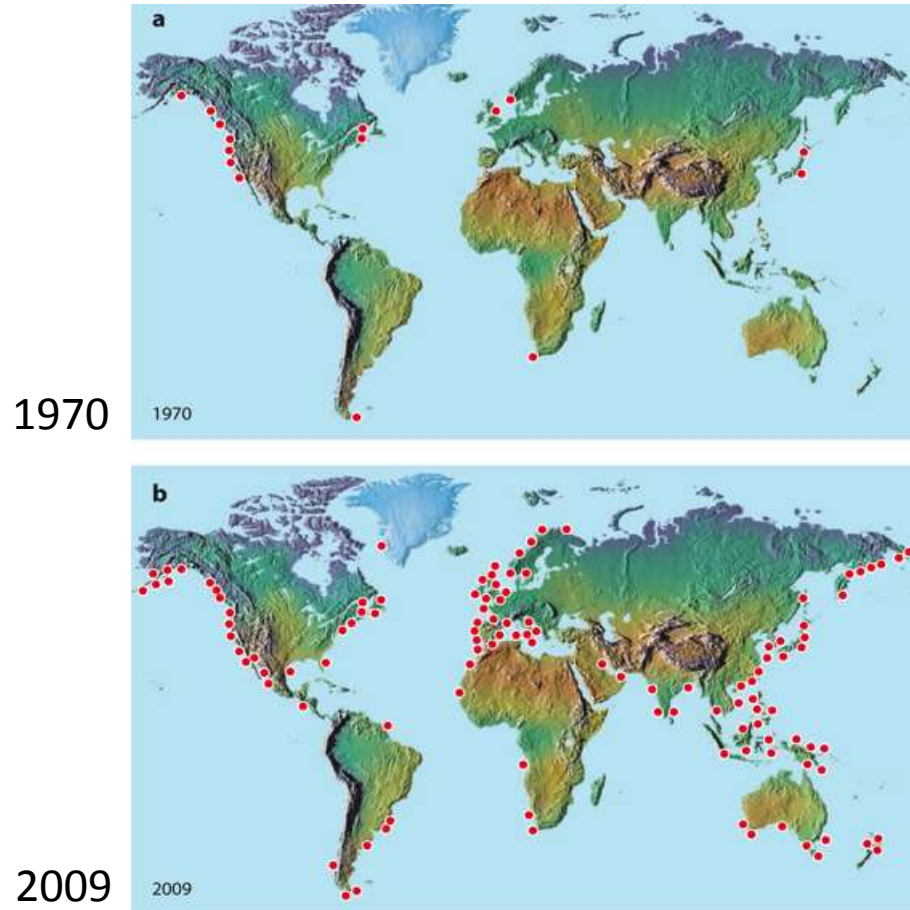


Red Tide caused by *Noctiluca scintillans*  
occurred in Seto Inland Sea, Japan (May 6, 1976)

WESTPAC-HAB R0002



## Paralytic shellfish poisoning toxins- global distribution



Global PST from National Office for HABs at Woods Hole Oceanographic Institution;  
European PST from ICES IFREMER.

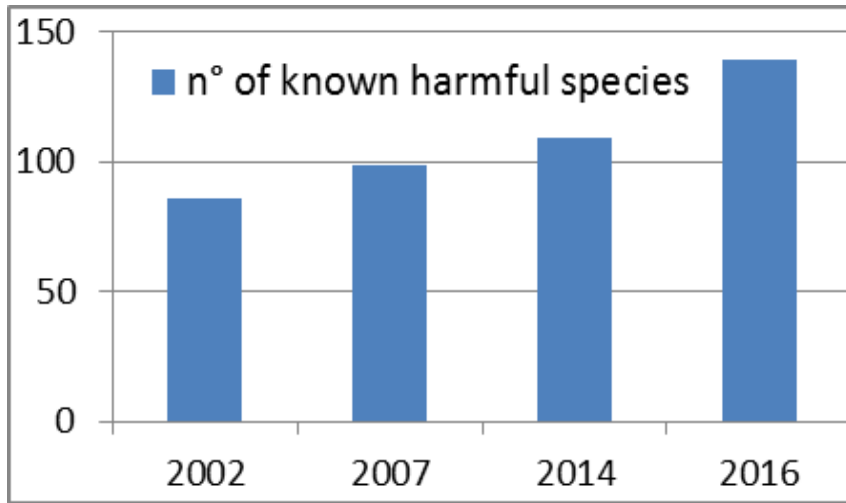
## Are HABs increasing?

...because of :

- Eutrophication
- Climate change
- Alien harmful species via ballast waters

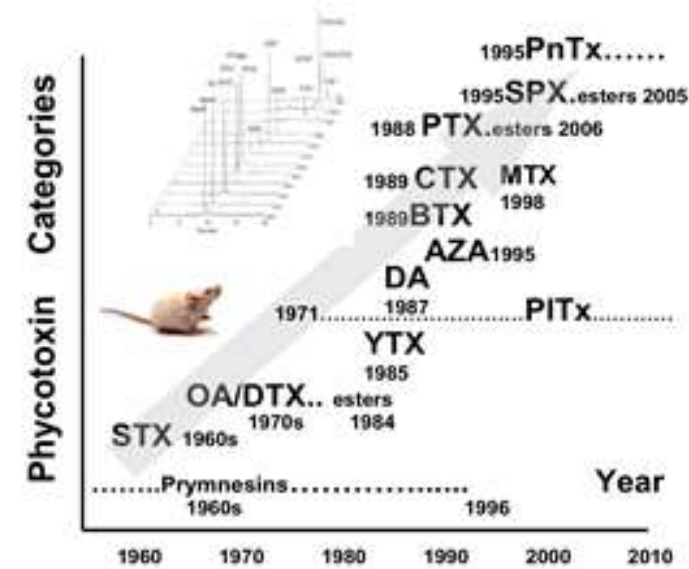


## New harmful species



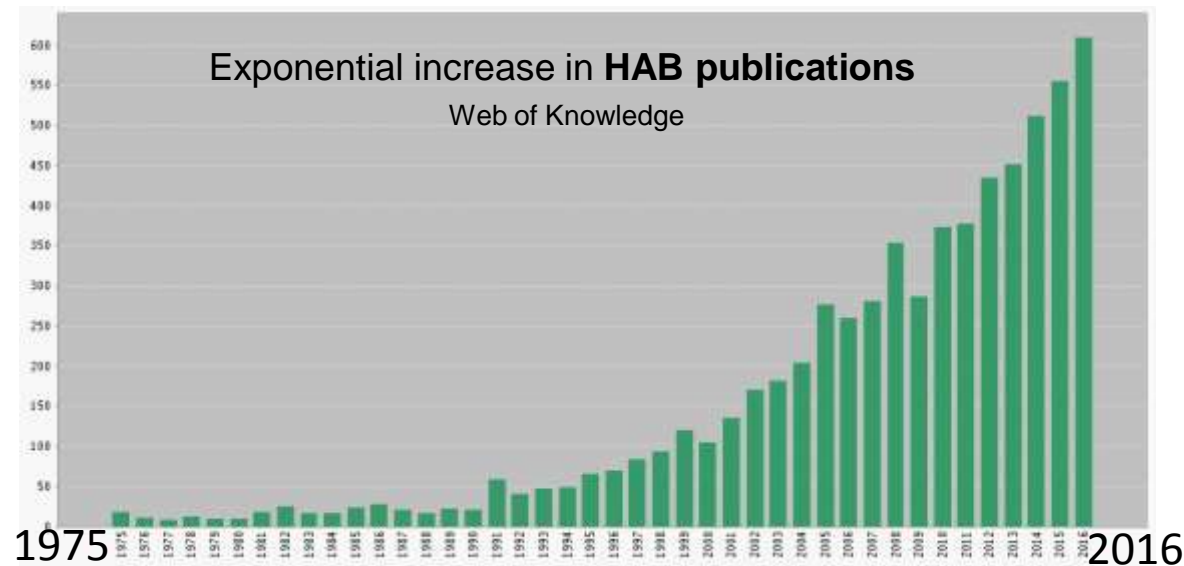
IOC-UNESCO Taxonomic Reference List of Harmful Micro Algae. accessed in different years

## New toxins discovered



Timeline of algal toxins discovered (modified from Hesse)

## More research



HAB-related costs to human society may have increased simply because of **our increasing human population** and **ever increasing need to exploit marine resources**.

**Increased awareness of HABs**



## DIPS-HAEDAT

- Organise data on **blooms and their impact**, and make them accessible for research, statistical analyses, and assessments on HABs
- Gather all information about **toxic species distributions** around the world, to identify biogeographical patterns and their changes, define risk areas, and trace alien species
- A service to:
  - scientists
  - managers of regulatory monitoring programmes
  - policy administrators



## Diarrhetic toxins in the North Atlantic Area

1989



1990 – 1994



1995 – 1999



2000 – 2004



2005 – 2009



2010 – 2014



2015 –

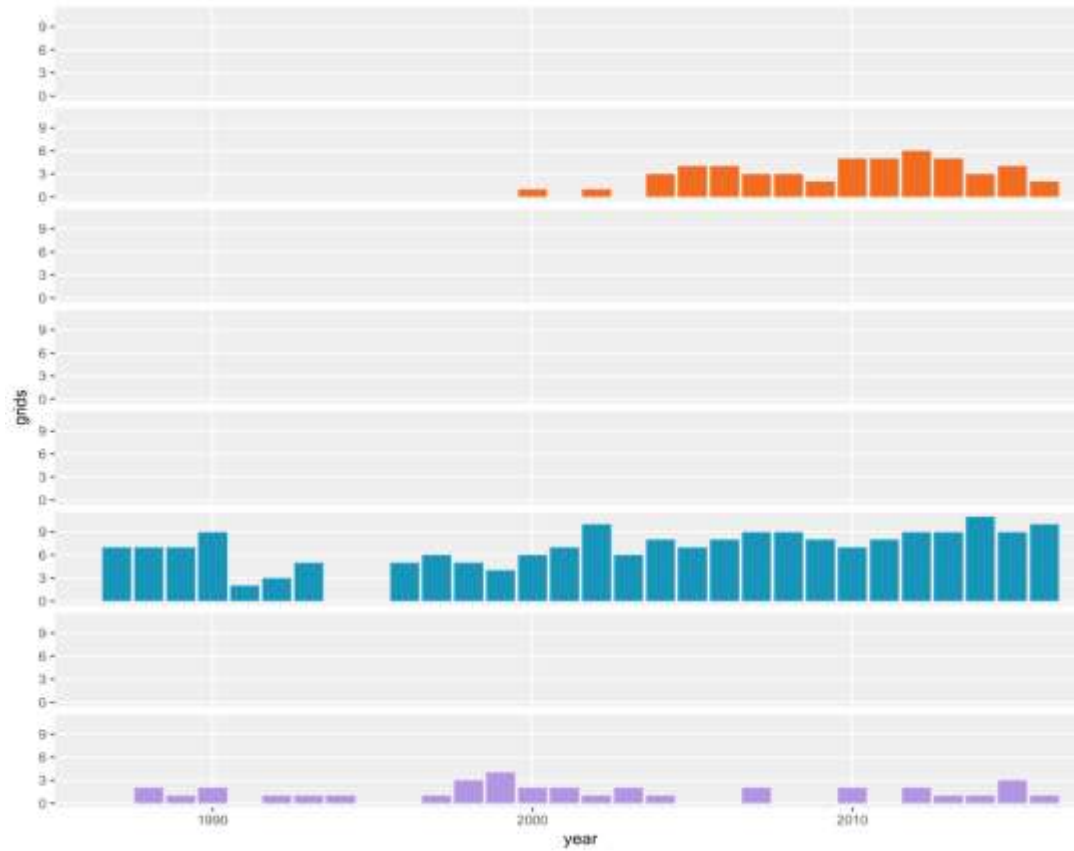


Compiling and analysing a database of Harmful Events  
to trace their trends in different areas:

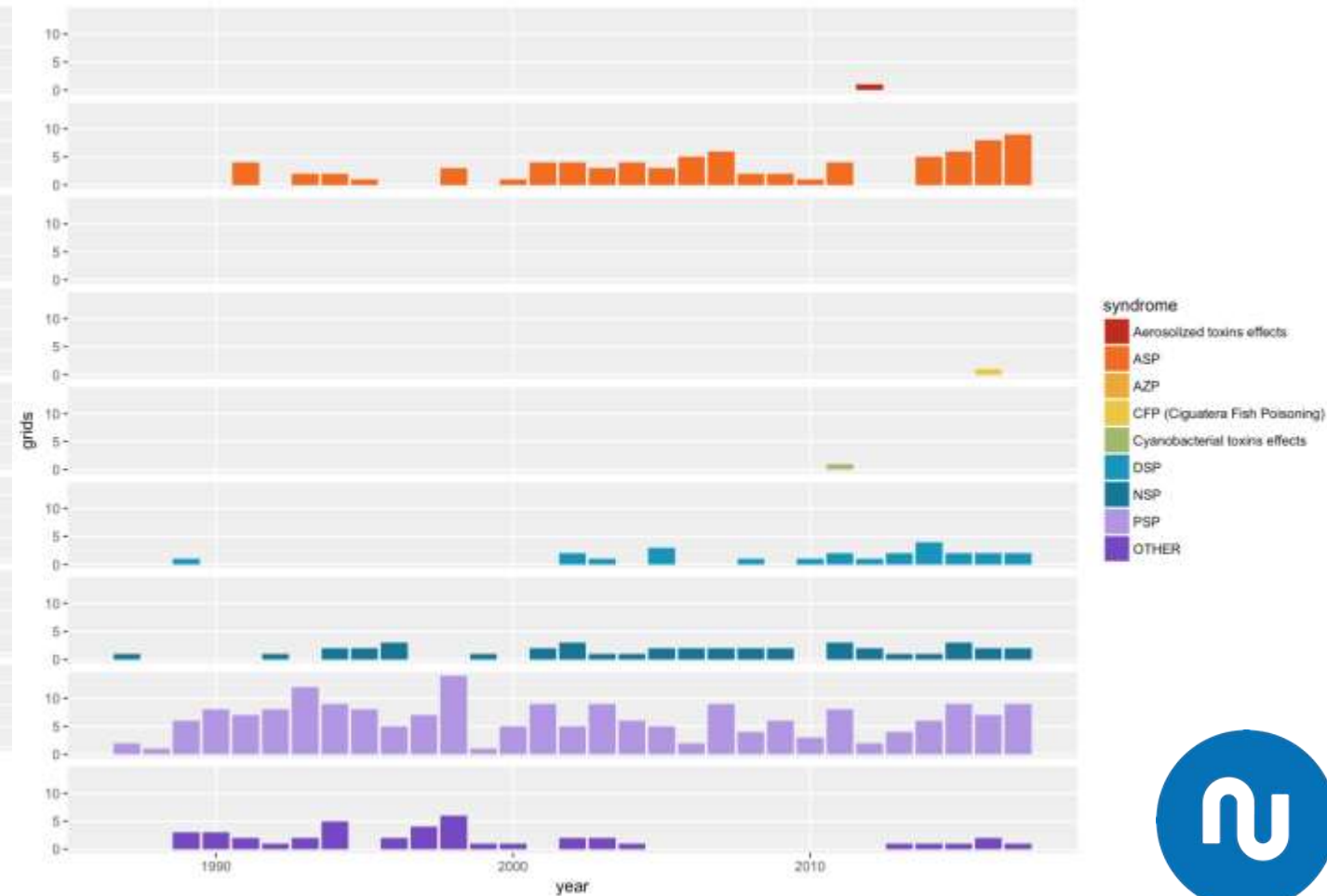
[A tool for scientistis and managers](#)

# Occurrence of different types of HAB events

## France



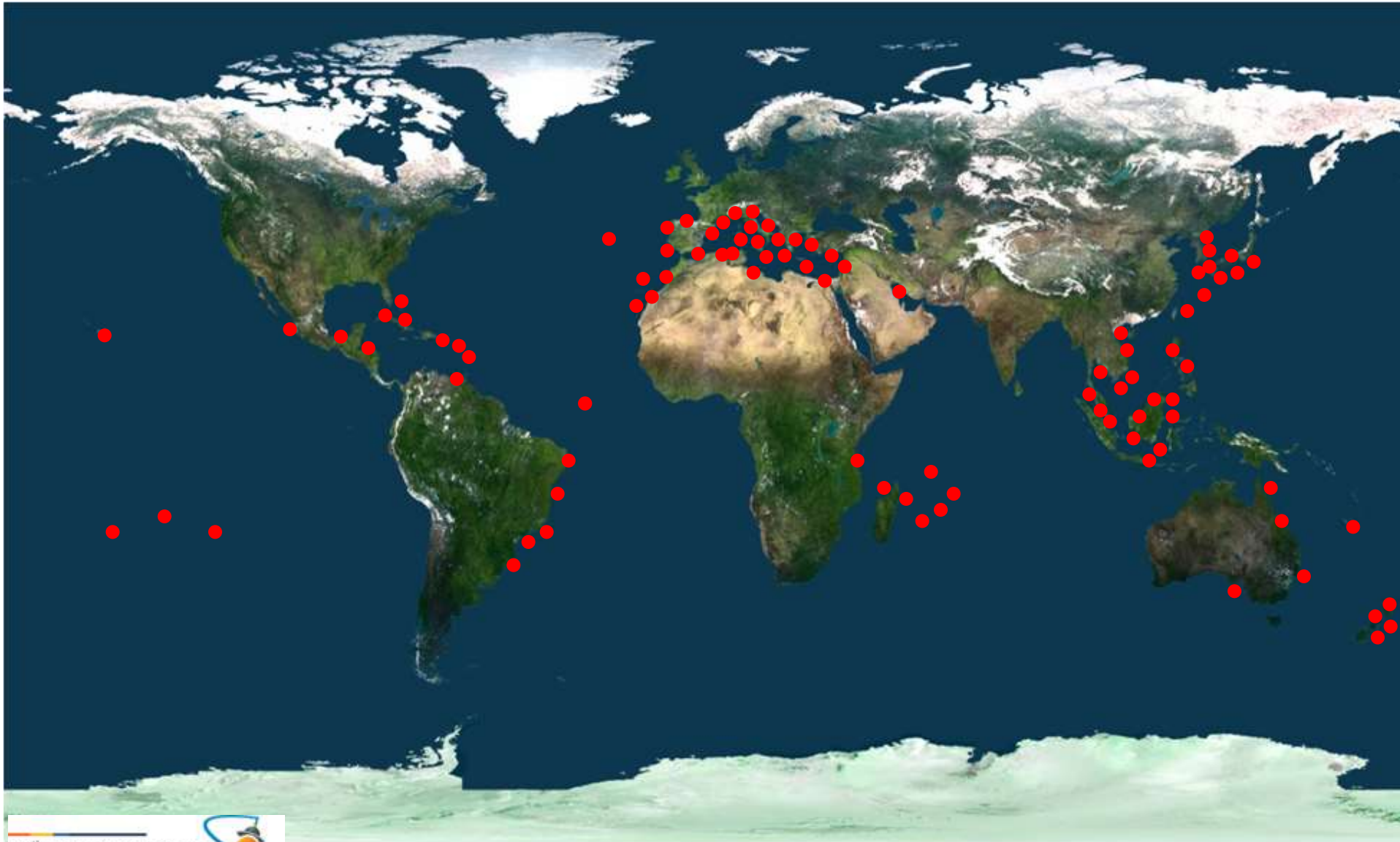
## USA

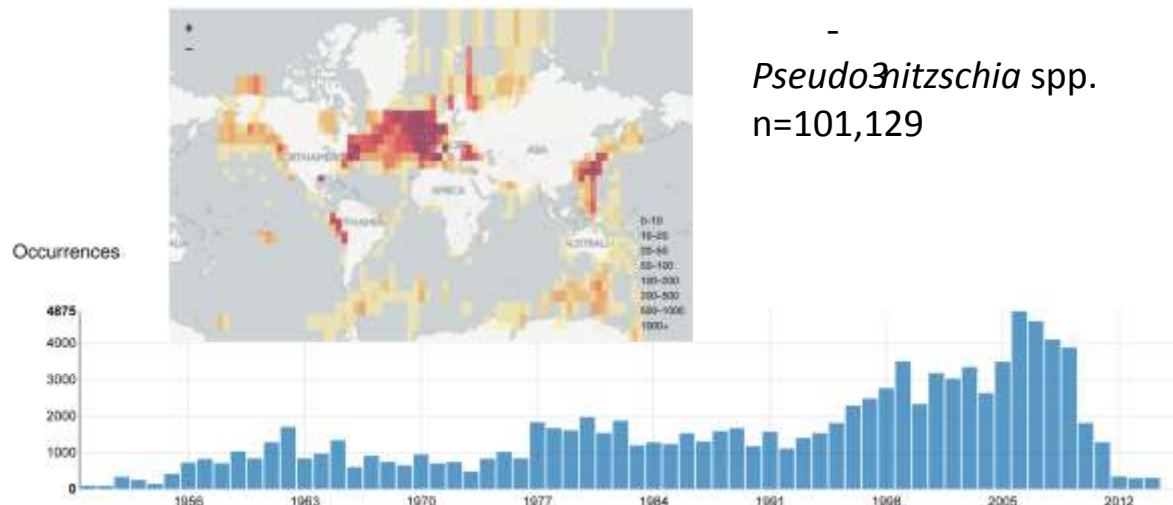
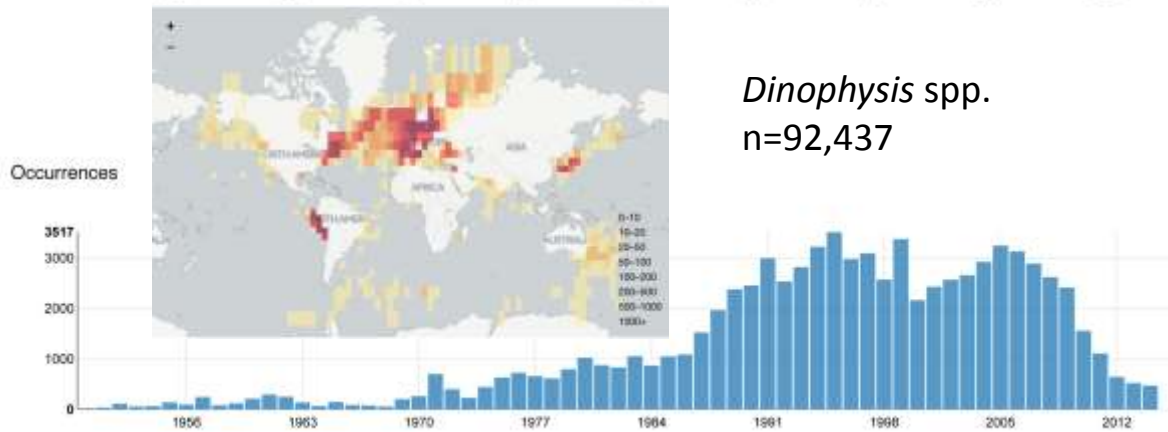
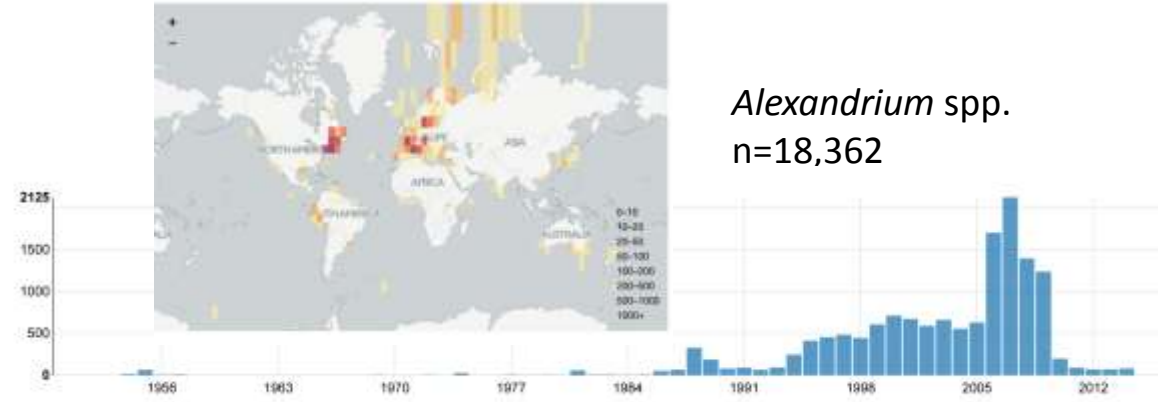




*Ostreopsis* spp.

2011 – to date





## Mapping harmful species

to identify **biogeographical patterns** and their changes,  
define **risk areas**, and trace **alien species**





# A Global HAB Status Report



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FOR A SUSTAINABLE DEVELOPMENT AGENDA

 **Flanders**  
State of the Art  
20th Anniversary of  
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# FOR MORE INFORMATION CONTACT



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