Integration of marine ecological data from different sources = added-value for data, science and policy

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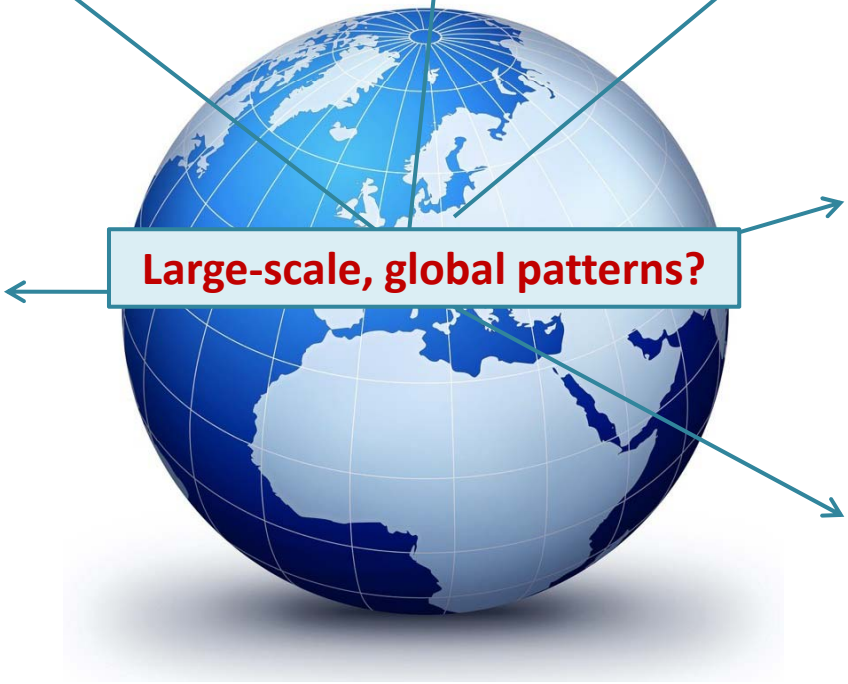
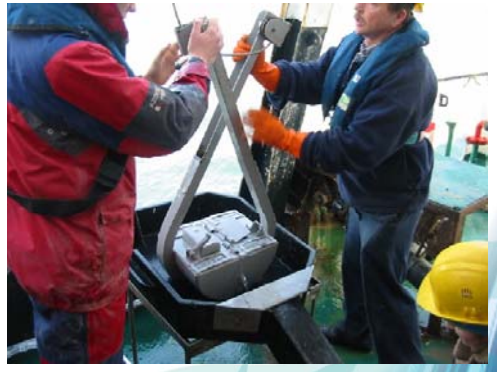
Scattered data and information ….

- Research projects / PhD
- Temporal boundaries
- Spatial boundaries
- Financial limitations



Large-scale, global patterns?



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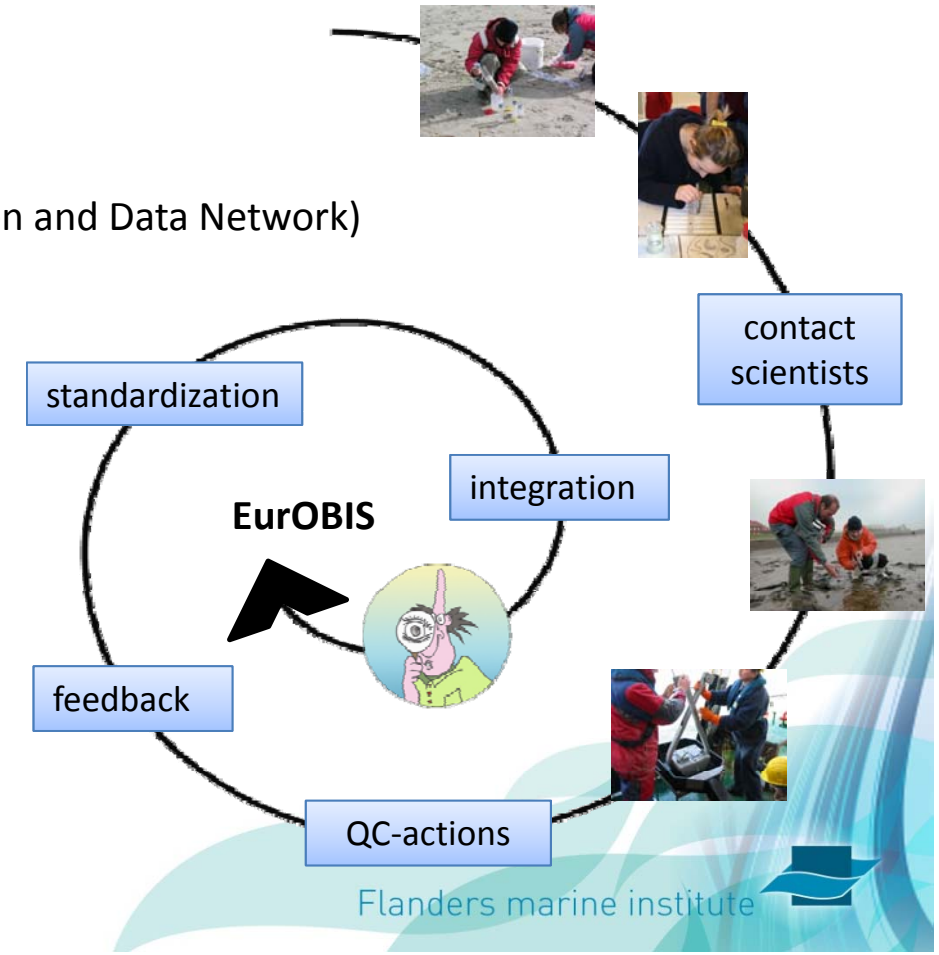
… brought together into one system

European Ocean Biogeographic Information System – EurOBIS

- MarBEF NoE, 2004
- Centralize largely scattered European biogeographical marine data
- Make data freely and widely available
- Offer a searchable database on marine species
- EMODnet Biology (European Marine Observation and Data Network)

Getting organized …

1) Scientists & their data
2) Quality control procedures
3) Feedback to provider
4) Standardization & integration
5) Make data online available



Added value for data: QC & communication

- ***Taxonomy***

  Match with World Register of Marine Species (WoRMS)

Table 3 Diversity indices for rocky shore and pelagic data, per geographic region

	Species names before quality control					Species names after quality control				
	# Species	# Rare species	H'	$1 - D$	ES50	# Species	# Rare species	H'	$1 - D$	ES50
Rocky shore data										
ANE	219	15								
Arctic	646	69								
Mediteranean	1,120	238								
North Sea	251	29								

Species = number of distinct species; # Rare species = number of distinct species with only 1 distribution record; H' = Shannon's diversity index; $1 - D$ = Simpson's diversity index; ES(50) = Hurlbert's diversity index for 50 individuals. ANE = North-East Atlantic

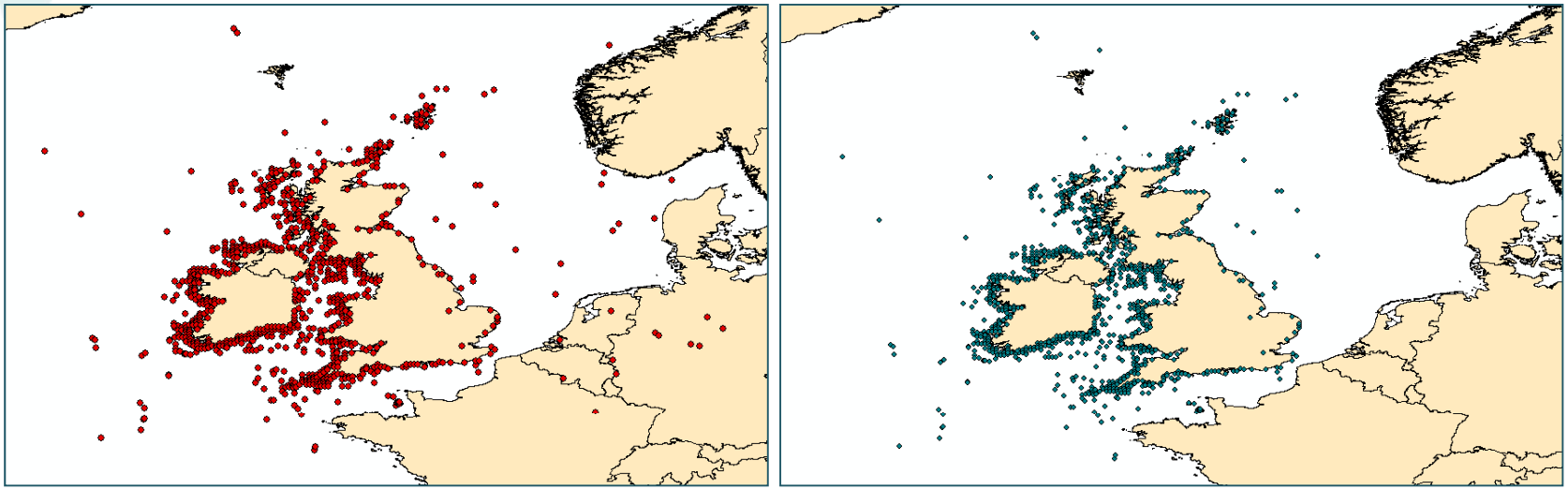
"… In total, 6,172 unique taxon names were submitted ….
After a thorough QC, however, this number was reduced to 4,525, mostly due to spelling variations and synonymy."

" … Such [taxonomic] quality control is highly needed, since a misspelled or obsolete name could be compared to the introduction of a rare species, with adverse effects on further (biodiversity) calculations…"

Source: Vandepitte *et al.* (2010). *Hydrobiologia 644: 1-13*

- ***Geography***

Sightings and strandings of marine turtles around the coast of UK and Ireland



Left: coordinates as received; right: corrected. Errors due to missing minus sign

- ***Other:***
  - Check for impossible and missing data
  - Document completeness of a record
  - Check for outliers

- ***Communication with provider***

Added value for science: new findings

Large-scale patterns in harpacticoid copepod community composition and diversity

Distinct patterns of species richness, biodiversity, communities, ecological range size and biogeography between 6 regions

British Isles (and North Sea) as faunistic links between the separated Baltic & Arctic communities

Extreme environmental conditions in the intertidal favour a specialised community, which is more stable over larger distances than the studied subtidal communities.

Species richness hotspot in the North Sea, with a gradual decline in species numbers towards the north and the south.

Veit-Köhler *et al.* (2010). Marine Biology 157: 1819-1835.

MANUELA
Meiobenthic And Nematode biodiversity
Unravelling Ecological and Latitudinal Aspects

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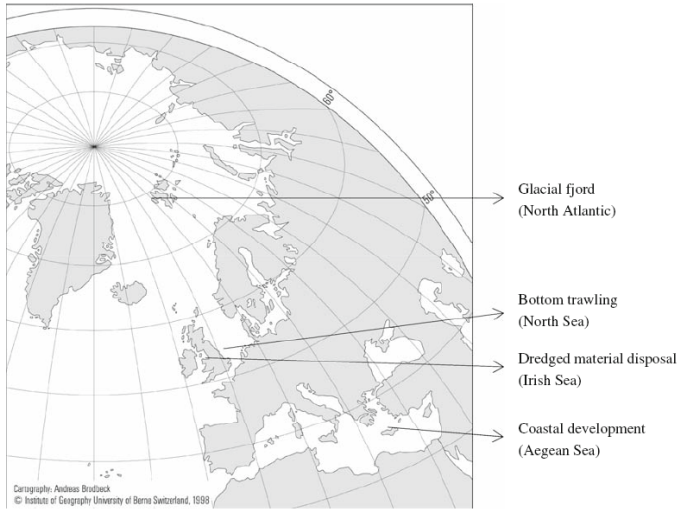
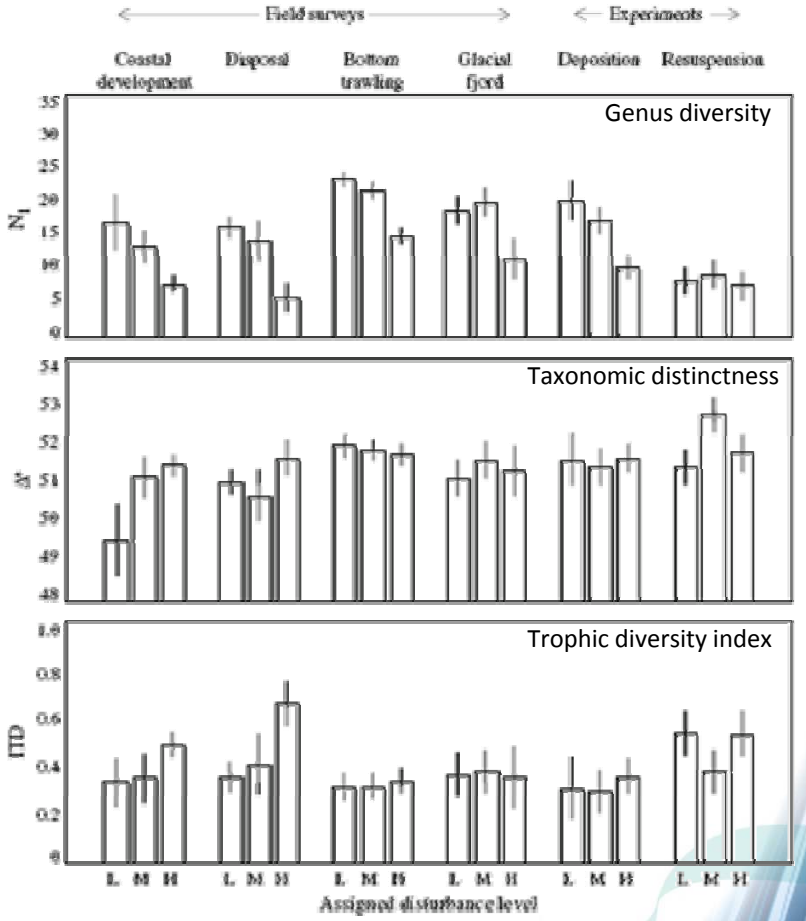
Added value for science: test hypotheses on larger scale

Universal response of meiobenthos to disturbance



- Adaptive strategies of genera to physical disturbance of anthropogenic and natural origin might differ.
- Man-induced community changes might be intrinsically different from those of natural origin



Schratzberger *et al.* (2009). Marine Biology 156: 709-724.

No universal response to disturbance!

Generalisations about the effects of disturbance must be carefully qualified by the origin of the disturbance and the conditions under which it occurs.

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Added value for policy: EMODnet & MSFD

- ***European Marine Observations and Data Network***
  - ✓ Improve access to high quality marine data for private bodies, public authorities and researchers
  - ✓ Enable implementation of the integrated Maritime Policy for Europe

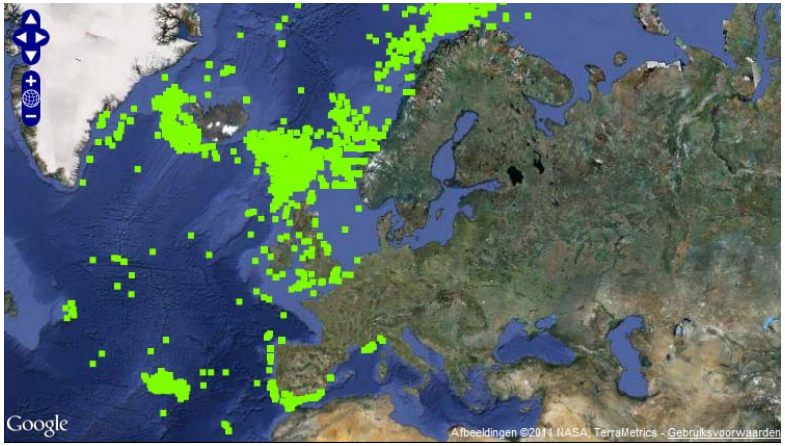
- ***Basic design principles***
  - ✓ Collect data once, use them many times
  - ✓ Recognise that marine data is a public good & discourage cost-recovery pricing from public bodies
  - ✓ Build upon existing efforts where data communities have already organized themselves (e.g. EurOBIS, SeaDataNet)

- ***Marine Strategy Framework Directive***
  - ✓ 2012: initial assessment by Member States for marine (sub)regions
  - ✓ Define and maintain GES
  - ✓ EMODnet Biology (EurOBIS) has relevance for at least 4 descriptors
    - 1: Maintenance of biological diversity (distribution & abundance)
    - 2: Levels of non-indigenous species
    - 4: Normal abundance and diversity of marine food web elements
    - 6: Sea-floor integrity (benthic ecosystems)

  Monitoring data of the Member States can be complemented with (research) data freely available through EurOBIS / EMODnet

Added value for policy: mapping species distributions

- European distribution of *Balaenoptera physalus*, presence map



EurOBIS information

Range map (source: IUCN)

- ✓ IUCN Red List: status “Endangered”
- ✓ IUCN range description
  - ✓ Resident in central and western Mediterranean
  - ✓ Rare in eastern Mediterranean

Fin whale, *Balaenoptera physalus*

Added value for policy: mapping species distributions

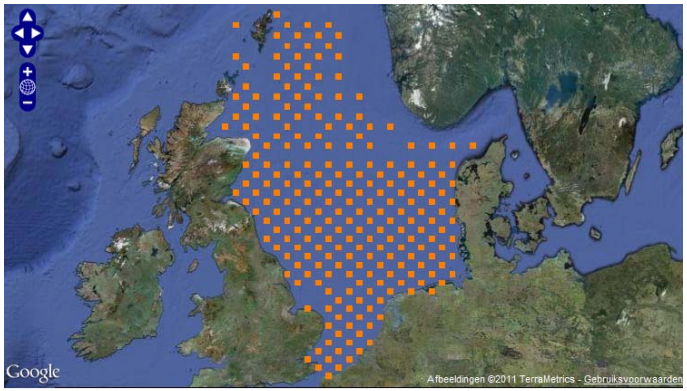
- European distribution of *Nucella lapillus*, presence map

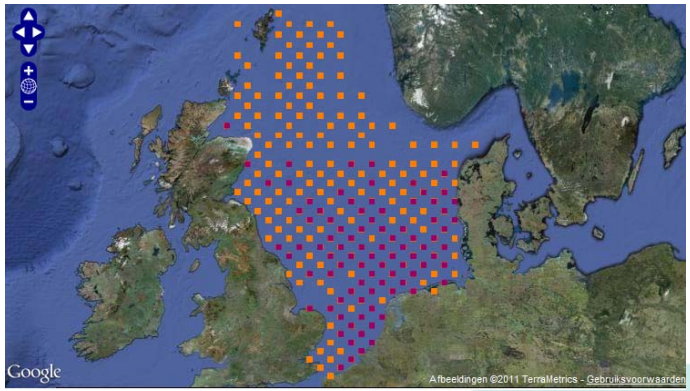
EurOBIS information

Habitat map (source: Oceana)

Dogwhelk, *Nucella lapillus*

- North Sea distribution of *Echinocardium cordatum* in 1986, presence-absence map

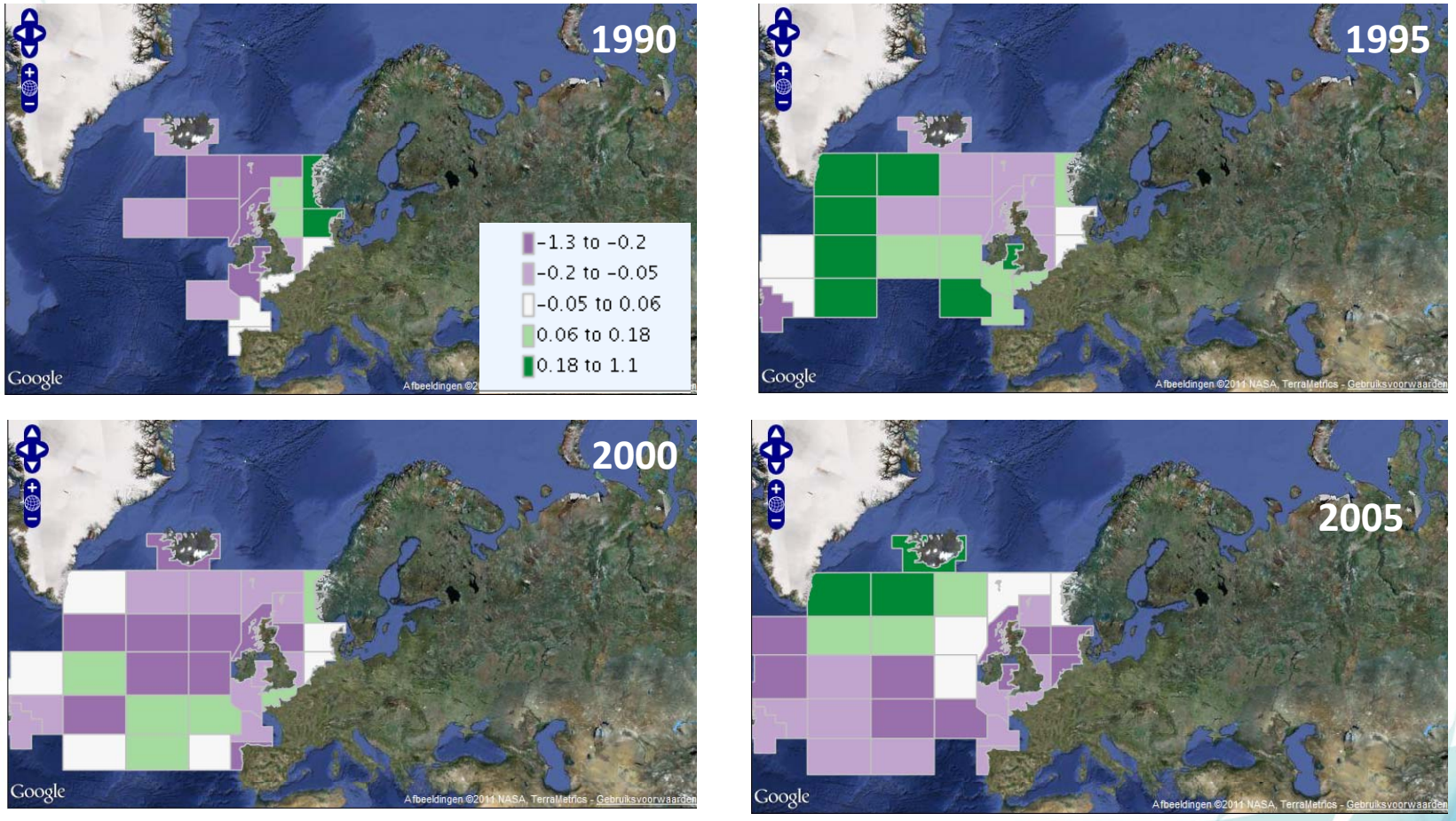




Sea-potato, *Echinocardium cordatum*

Added value for policy: mapping trends

Annual anomalies (*deviation from the long term copepod abundance average*) of the copepod abundances in European marine waters.



Data from the Continuous Plankton Recorder (CPR), contributed by SAHFOS & COPEPOD

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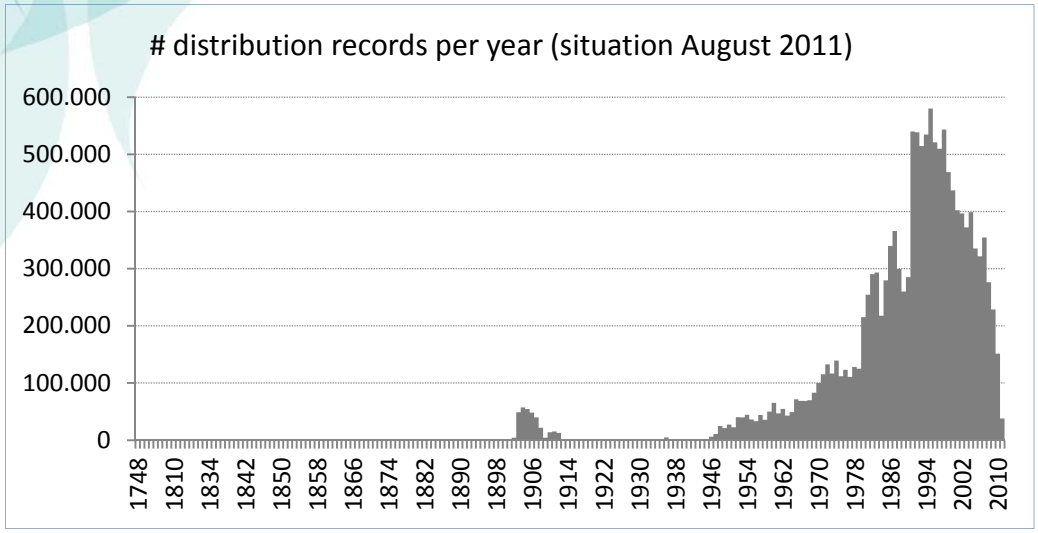
Added value for policy: identifying gaps in knowledge



Map from Vandepitte *et al.* (2011). *Hydrobiologia* 667: 1-14.

- EMODnet design principle:
  make data freely available!
- Temporal:
  - ✓ Historical data (pre-1950)
  - ✓ Recent data
- Spatial:
  - ✓ Relatively good coverage
- Taxonomical:
  - ✓ ≠ higher taxonomic groups
  - ✓ Rare species occurrences
- Combination spatial-taxonomical
  - ✓ Room for improvement

In summary

- ***Added value for data***
  - ✓ Quality control
  - ✓ Second life of data
  - ✓ Higher quality data, both for provider & system

- ***Added value for science***
  - ✓ Larger-scale analyses, re-testing of established theories
  - ✓ Collaborations & publications

- ***Added value for policy***
  - ✓ Mapping species distributions & trends in marine biodiversity
  - ✓ Identifying data-gaps
  - ✓ Act accordingly

Thank you

Questions?

http://www.eurobis.org
http://bio.emodnet.eu/portal

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