



European Ocean Biogeographic Information System: background, content & possibilities

Leen Vandepitte
Flanders Marine Institute (VLIZ)



IOPAN workshop – Sopot, Poland – 19-20 October 2010



Flanders marine institute

Overview

- EurOBIS in a nutshell
- EurOBIS in numbers
- International data flow
- Quality control procedures
- Searching EurOBIS
- EurOBIS as backbone of EMODnet
- Why contribute data to EurOBIS?
- Why make use of EurOBIS?



EurOBIS in a nutshell

- EurOBIS – European Ocean Biogeographic Information System
- Developed within framework of EU FP6 MarBEF NoE in 2004
- Biogeographic data on marine species: name – place – date
- Integration of individual datasets into 1 large database
- Distributed system: local managers follow up on own data
- Quality controlled data and information
- Freely available
- International data flow (EMODnet, OBIS, GBIF)



- Goal:

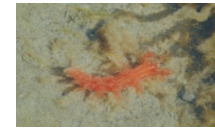
Allow users to have rapid & free access to the system to search multiple datasets simultaneously for biogeographic information on marine organisms

- Available data: very mixed

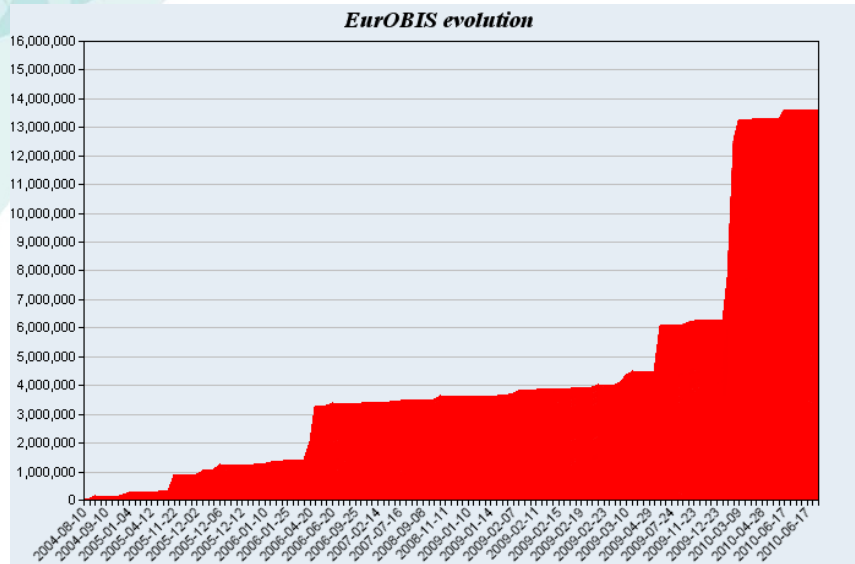
- ✓ Monitoring data (e.g. L4 plankton monitoring programme)
- ✓ Research data
- ✓ Literature data (e.g. Taxonomic Information System for the Belgian coastal area)
- ✓ Museum collections (e.g. Zoological Museum Amsterdam – Porifera)
- ✓ All taxonomic groups

- Data gathering: goodwill of scientists & institutes

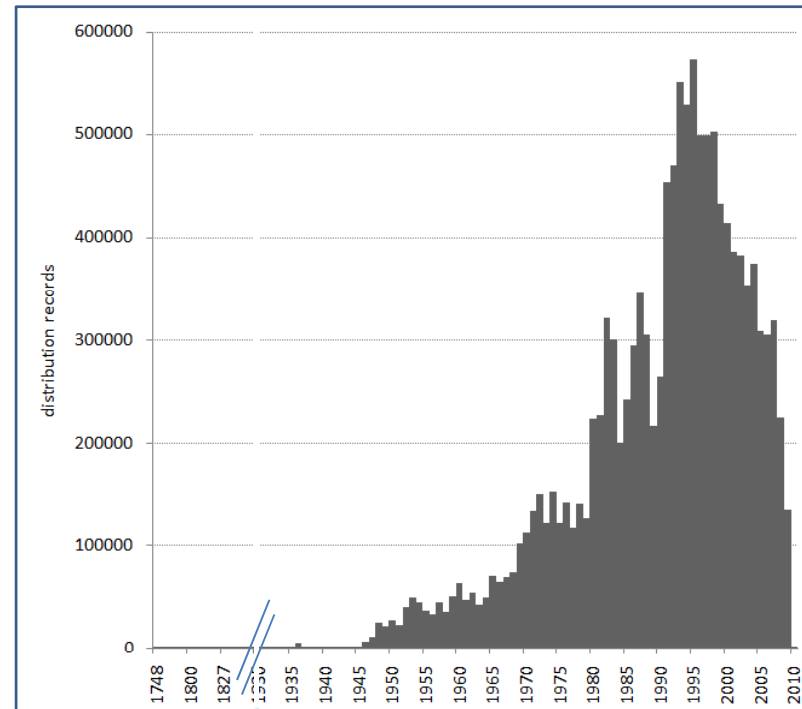
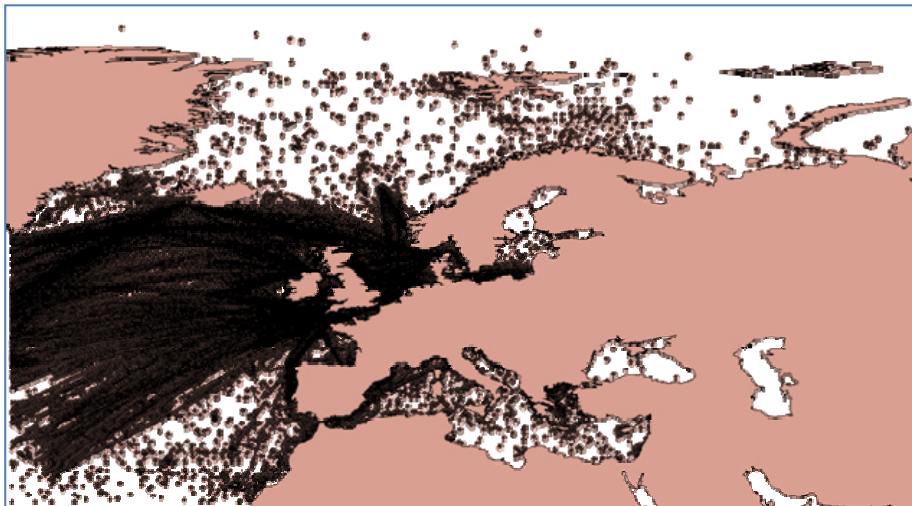
- ✓ Everyone can contribute
- ✓ Minimum required info: taxon – location – date (+ metadata)
- ✓ Additional info: abundance, biomass, sampling depth, temperature, ...



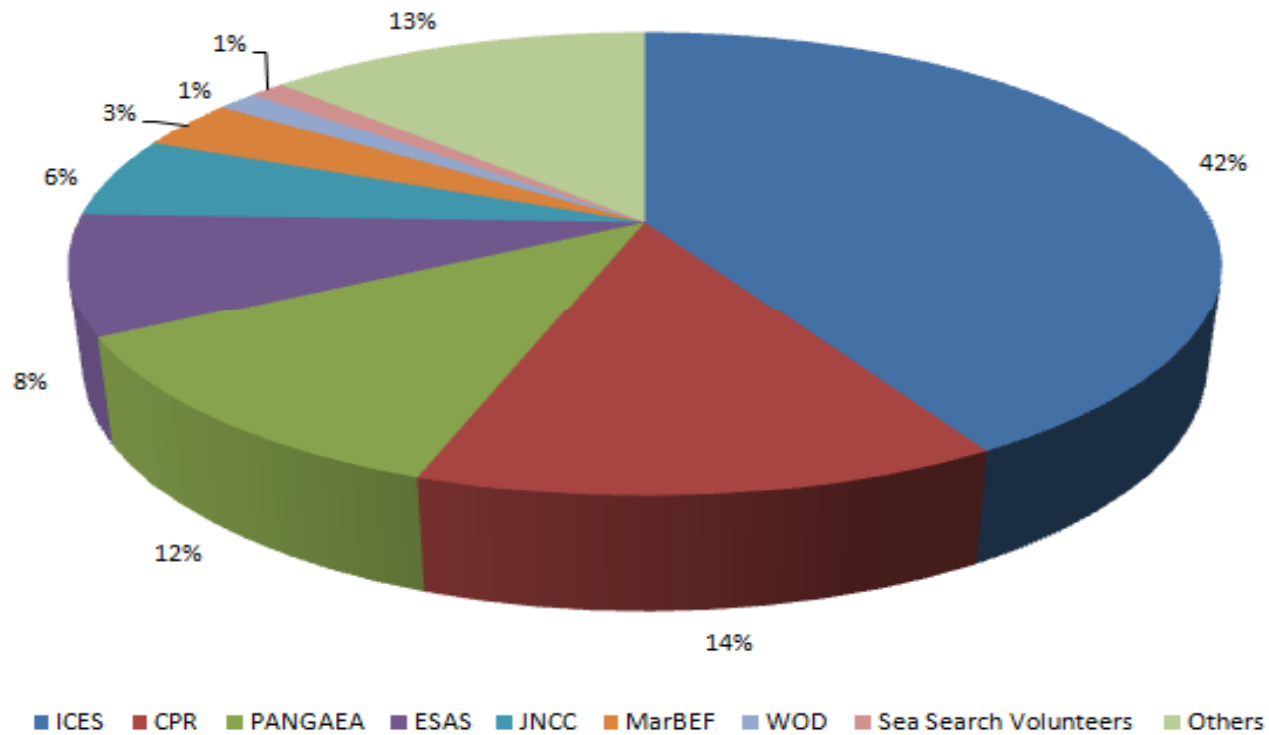
EurOBIS in numbers



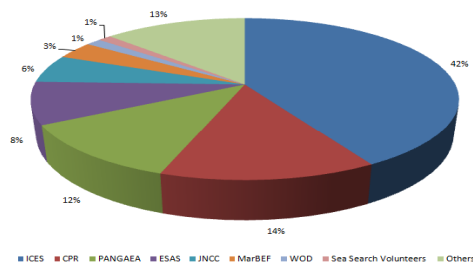
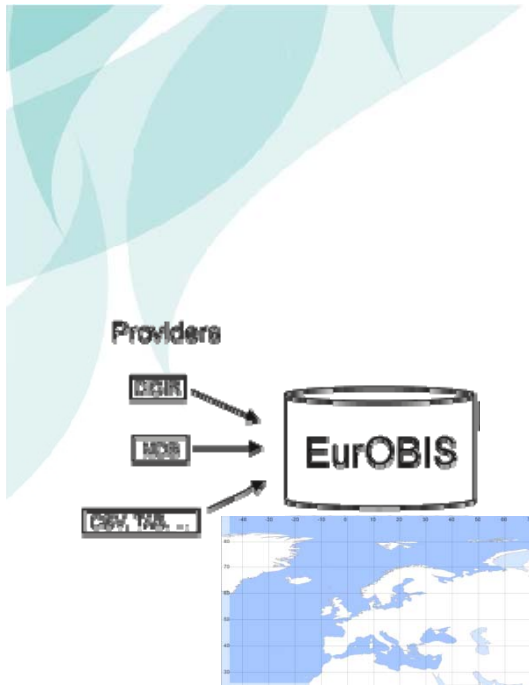
- 229 datasets
- 13.6 million distribution records, of which 12.5 million involve species
- > 75 data contributing institutes



- Relative contribution of the large data providers to EurOBIS



International data flow

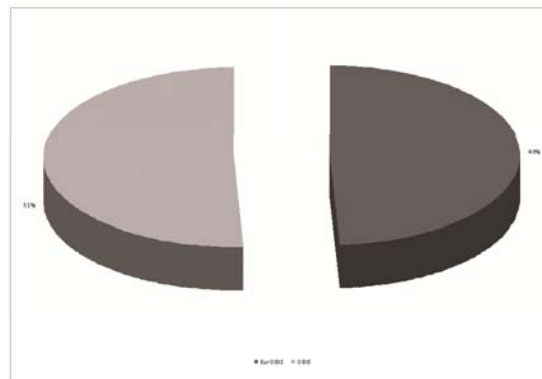


Marine data from

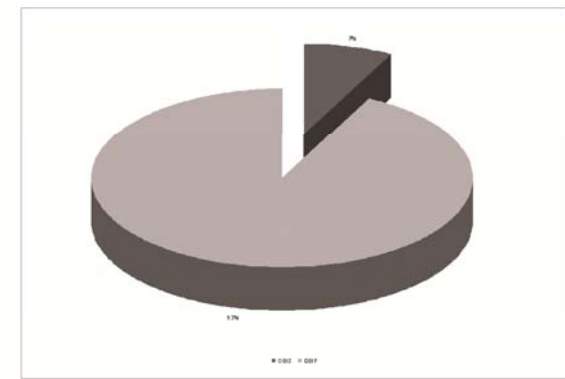
- Europe
- outside Europe, by European institutes

Data delivery:

- Through email: excell, access, CSV, ...
- Through servers: DIGIR, IPT toolkit



EurOBIS: one of the 13 regional nodes of the Ocean Biogeographic Information System (OBIS)



OBIS: marine thematic sub-network of the Global Biodiversity Information Facility (GBIF)

Flanders marine institute



Taxonomic quality control

- Link taxon names with World Register of Marine Species
- WoRMS:
 - ✓ Standard list of marine taxon names
 - ✓ First authoritative list of names of all marine & brackish water taxa worldwide
 - ✓ Managed by VLIZ, directed by taxonomic experts
 - ✓ Taxonomic backbone for (Eur)OBIS
 - ✓ Marine contribution to Species2000 & ITIS' Catalogue of Life
 - ✓ Currently: 202 766 valid species names
- If no link possible:
 - ✓ Consult with data provider(s)
 - ✓ Consult with taxonomic expert(s)



www.marinespecies.org



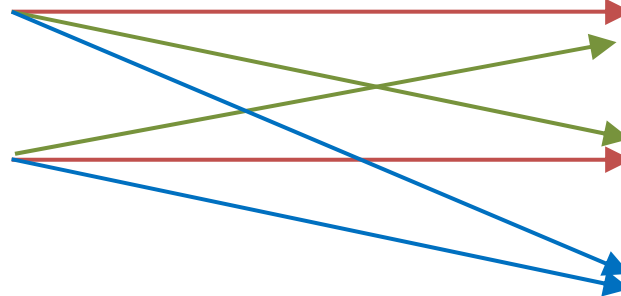
Dataset	Before tax. check		After tax. check
1	<i>Amphiura sunderali</i>	}	
2	<i>Amphiura sundevali</i>		<i>Amphiura sundevalli</i>
3	<i>Amphiura sundvali</i>		
4	<i>Amphiura sundevalli</i>		



Dataset A (Spain)

Acantholaimus sp. 1

Acantholaimus sp. 2



Dataset B (Greece)

Acantholaimus sp. 1

Acantholaimus sp. 2

?

- Which equals which?
- Specimen comparison!?
- Reduction of information till genus level (*Acantholaimus*)
= loss of biodiversity, but underestimation is preferred to overestimation



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	# Species	# Rare species
Rocky shore data				
ANE	219	15	187	11
Arctic	646	69	378	44
Mediterranean	1,120	238	834	159
North Sea	251	29	163	25
Pelagic data				
ANE	288	7	180	4
Baltic	592	94	483	82
Mediterranean	420	103	249	66
North Sea	118	15	64	9

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 to LargeNet. After a thorough quality control, 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). Data integration for European marine biodiversity research: creating a database on benthos and plankton to study large-scale patterns and long-term changes. *Hydrobiologia*.



Geographic quality control

2. Level: Quality control of geographic information			
Transformation of all given geographic information into WGS 84 decimal degrees			
Checking the correctness of georeference by plotting and comparison with meta data			
Correct location after conversion and plotting?			
NO		YES	
Latitude and Longitude were switched?			
NO		YES	
Signs for North/South/West/East were wrong?		Latitude and Longitude data were switched as correction	
NO		YES	
Communication with provider	northern Latitude = + southern Latitude = - eastern Longitude = + western Longitude = -		
		Record was used as correct	

Before quality control	After quality control
18°30'25"N – 5°15'E	18.51 ; 5.25
54,23N – 16.5S	54.23 ; -16.5

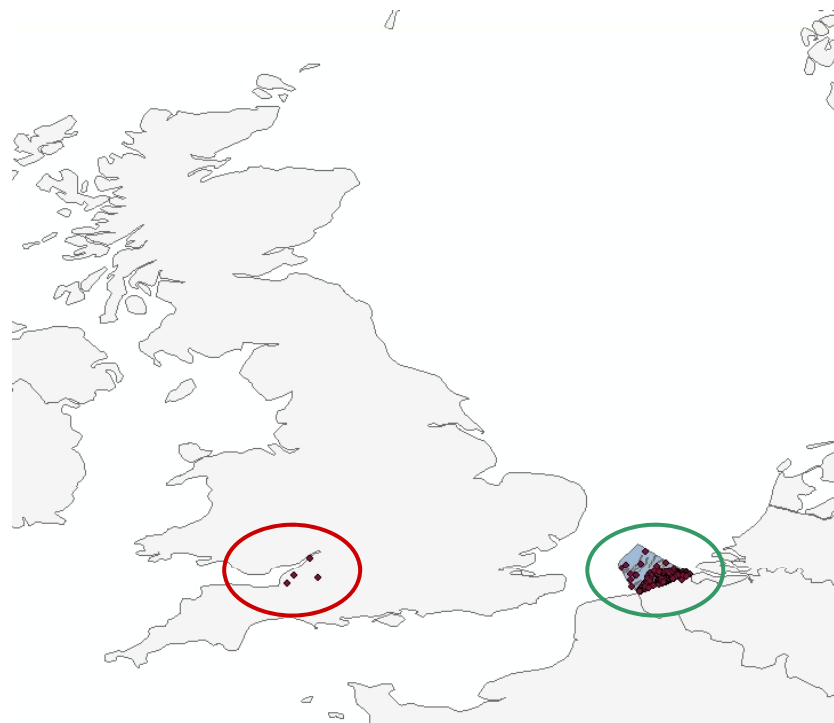


“Monitoring in Kongsfjorden area”



Latitude & longitude switched

“Monitoring in Belgian part of the North Sea”

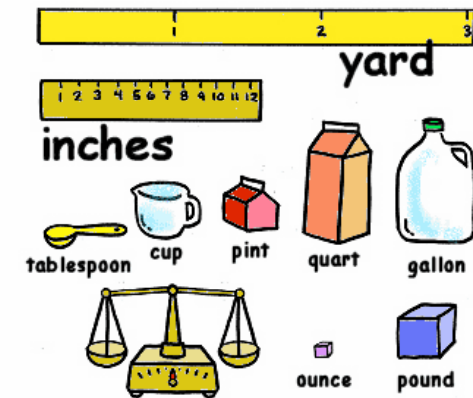


“+” & “-” signs switched



Quality control on units & parameters

- EurOBIS can capture
 - ✓ Abundance
 - ✓ Biomass
 - ✓ Depth
 - ✓ Temperature
- Are units defined?
 - ✓ Densities: individuals per m^2 , cm^2 , liter, m^3 , ...
 - ✓ Biomass: wet weight, dry weight, ash free dry weight?
 - ✓ Depth: meter, centimeter?
- Significance:
 - ✓ Needs thorough documenting
 - ✓ Know what you are dealing with
 - ✓ Comparison



Length Conversion

kilometer (km)	→	miles (mi)
kilometer (km)	→	feet (ft)
meter (m)	→	feet (ft)
centimeter (cm)	→	inches (in)
millimeter (mm)	→	inches (in)
inches (in)	→	centimeter (cm)
inches (in)	→	millimeter (mm)
feet (ft)	→	meters (m)
yards (yd)	→	meters (m)
yards (yd)	→	kilometers (km)
miles (mi)	→	kilometers (km)



Searching EurOBIS

EurOBIS Providers

- Current total number of distribution records: **13,601,812**
- Current datasets/dataproviders (229):
 - A Biotic Database of Indo-Pacific Marine Mollusks (234 records) [[view data](#)]
 - A comparison of benthic biodiversity in the North Sea, English Ch... (2,589 records) [[view data](#)]
 - Alaska Ocean Observing System (21,681 records) [[view data](#)]
 - AlgaeBase (56,899 records) [[view data](#)]
 - Baltic Sea benthic meiofauna and macrofauna mid 1990s (611 records) [[view data](#)]
 - Benthic fauna in the Pechora Sea (1,324 records) [[view data](#)]
 - Biocean (29,954 records) [[view data](#)]
 - Biogeographic data from BODC - British Oceanographic Data Centre (124,043 records) [[view data](#)]
 - Biogeography Scheldt Estuary (31,747 records) [[view data](#)]
 - BioMar - Ireland: benthic marine species survey (93,003 records) [[view data](#)]
 - Brachiopoda from sampling campaigns in the French part of the Med... (468 records) [[view data](#)]
 - CeDAMar database for benthic biological sampling on the abyssal p... (12,337 records) [[view data](#)]
 - CephBase (272 records) [[view data](#)]
 - Checklist of benthic marine algae and cyanobacteria of northern P... (1,756 records) [[view data](#)]
 - Cold water corals (3,365 records) [[view data](#)]
 - Continuous Plankton Recorder (Phytoplankton) (632,473 records) [[view data](#)]
 - Continuous Plankton Recorder (Zooplankton) (1,206,382 records) [[view data](#)]
 - Cross Sands broadscale survey 1998 (557 records) [[view data](#)]
 - Cysts from plankton from the South Adriatic Sea (146 records) [[view data](#)]
 - DASSH Data Archive Centre Academic surveys (62,099 records) [[view data](#)]
 - DASSH Data Archive Centre expert sighting records (781 records) [[view data](#)]
 - Discovery Collections Midwater Database (68,000 records) [[view data](#)]
 - Fishbase Version 2000 (89,817 records) [[view data](#)]
 - Galathea II, Danish Deep Sea Expedition 1950-52 (1,825 records) [[view data](#)]
 - Hexacorrallians of the world (5,964 records) [[view data](#)]
 - Historical benthic data from the southern Baltic Sea (1839-2001) (41,422 records) [[view data](#)]**
 - Historical benthos data from the North Sea and Baltic Sea from 19... (6,399 records) [[view data](#)]
 - Historical data on invertebrates from the Baltic Sea and Gdansk B... (270 records) [[view data](#)]
 - Historical hyperbenthos data (1987-2001) from the North Sea and s... (35,153 records) [[view data](#)]
 - Historical quantitative benthos grab samples from the Southern Ba... (7,547 records) [[view data](#)]
 - Historical quantitative benthos grab samples from the Southern Ba... (8,039 records) [[view data](#)]
 - Historical zooplankton records from the Black Sea (65,418 records) [[view data](#)]
 - History of marine animal populations database (100,815 records) [[view data](#)]
 - Holsatia-expedition 1887 - animals collected with a dredge during... (64 records) [[view data](#)]
 - IBSS historical data from different cruises (86,192 records) [[view data](#)]
 - ICES ICES Biological community (17,683 records) [[view data](#)]
 - ICES ICES contaminants and biological effects (736,839 records) [[view data](#)]
 - ICES ICES Database of trawl surveys (4,703,244 records) [[view data](#)]
 - Baltic Sea Marine Biodiversity Studies (1990-2001) (1,000 records) [[view data](#)]

www.eurobis.org

Based on IMIS:

Integrated Marine Information System

(ISO 19115 compliant)

Historical benthic data from the southern Baltic Sea (1839-2001)

[Report an error in this record](#)

[Responsibles](#) | [Parameters](#) | [Instance](#) | [MarBEF related publications](#) | [URL](#)

Details:

Type: Literature-based
Status: Completed
Access constraint: Unrestricted
Version: 29 Nov 2004
Size reference: 43,513 distribution records, 5,500 stations, 471 species
Citation: Zettler M.L. (2001). Historical benthic data from the southern Baltic Sea (1839-2001). Baltic Sea Research Institute Warnemünde (IOW), Germany.

Abstract: Biodiversity of macrozoobenthos of German Baltic waters between Fehman and Usedom, literature data from 1839 to 2001

Habitat: Marine, Brackish water
Theme: Biology > Benthos
Keywords: Abundance, Biodiversity, Biomass, Macrozoobenthos, Taxonomy

Description:

This database was created as a project of the Federal Agency (Bundesanstalt für Gewässerkunde). It includes the analysis of almost all literature data published from the beginning of macrozoobenthic studies in 1839 until 2001. The investigation area lies in German Baltic waters between Fehman and Usedom. Following informations are included: which species was found when and where (coordinates) in which abundance and biomass, which methods were used and who published this information.

Responsibles (2) [Top](#) | [Parameters](#) | [Instance](#) | [MarBEF related publications](#) | [URL](#)

- [Zettler, Michael](#), contact | IOW: Baltic Sea Research Institute, [details](#) |
- [Zettler, Michael](#), database developer | IOW: Baltic Sea Research Institute, [details](#) |

Temporal coverage:

- 1842 - 2001
Periodicity: Daily

Geographical cover:

- ANE, Baltic [[gazetteer](#)]
Coordinates: MinLong: 53,72; MinLat: 10,75 - MaxLong: 56,37; MaxLat: 14,62 [wgs84]

Parameters: [Top](#) | [Responsibles](#) | [Instance](#) | [MarBEF related publications](#) | [URL](#)

- Parameter: Biomass
- Parameter: Counts
- Parameter: Density
- Parameter: Ecological parameters
- Parameter: Presence
- Parameter: Taxonomy

Parent datasets:

- European Ocean Biogeographic Information System, [details](#)
- LargeNet database, [details](#)

Instance: [Top](#) | [Responsibles](#) | [Parameters](#) | [MarBEF related publications](#) | [URL](#)

Medium: Server
Location: marine data archive (MDA)
Storage insitute: vliz; Vlaams Instituut voor de Zee, [details](#)
Contact: Hernandez, Francisco | vliz; Vlaams Instituut voor de Zee, [details](#) |
URL: Archived file: mda.vliz.be/mda/directlink.php?fid=VLIZ_00000014_1219144942

MarBEF related publications (2) [Top](#) | [Responsibles](#) | [Parameters](#) | [Instance](#) | [URL](#)

Based on this dataset:

- Zettler, M.L.; Röhrner, M. (2004). Die Biodiversität in der deutschen Nord- und Ostsee: 3. Verbreitung und Entwicklung des Makrozoobenthos der Ostsee zwischen Fehmambelt und Usedom - Daten von 1839 bis 2001. *Bericht BfG*, 3, BfG-1421. Bundesanstalt für Gewässerkunde: Koblenz, Germany. 175, maps pp., [details](#)
- Zettler, M.L.; Böhnech, R. et al. (2000). Distribution of macrozoobenthos in the Mecklenburger Bight (western Baltic Sea): current situation and historical review [Verbreitung des Makrozoobenthos in der Mecklenburger Bucht (südliche Ostsee): rezent und im historischen Vergleich]. *Meereswiss. Ber., Warnemünde* 42: 1-144, [details](#)

URL: [Top](#) | [Responsibles](#) | [Parameters](#) | [Instance](#) | [MarBEF related publications](#)

- www.marbef.org/data/eurobisearch.php?dataprovider=53, Online dataset

Add distribution data

The lifetime of the layers you add is defined by the time your browser window is open (the one that shows the map).

Choose or type the name of the taxon you want to map. Genus and subgenus names should be included for species. Leave blank for all species.

Scientific name [\[lookup\]](#)

mytilus edulis

Include synonym records ([what's this?](#))

Include child records ([what's this?](#))

Fill in the date and specify in what season they should occur. Leave default for all.

year month day Seasons
 startdate 1800 1 1 winter
 enddate 2009 10 30 spring
 summer
 fall

Define the geographic location via the selection you made on the map, or fill in the coordinates manually. (in degrees and minutes)

Upper Latitude
 90 0
 Right Longitude
 70 0
 Left Longitude
 -45 0
 Lower Latitude
 26 0

Add data

Layer name
 myti

Symbol
 circle
 Symbol color [\[Pick\]](#)
 Symbol size
 400
 Symbol outline only

Dataproviders - select all

Taxonomic Inform... CephBase
 Fishbase Version... NeMys
 Benthic fauna in... N3 data of Kiel ...
 MedOBIS Bioccean
 BioMar - Ireland... Biogeography Sch...
 Long term trends... meiobenthos of s...
 A comparison of ... Arctic soft-sedi...
 ZMA-Porifera Ostracoda
 Marine Nature Co... 70 samples data ...
 Polish Arctic Ma... Bay of Puck data...
 Marine Life Info... Marine Life Surv...
 Marine Benthic d... Marine Benthic d...

MarBEF Data System: Locality details

Distribution records for specimens belonging to 'Mytilus edulis' observed between 1800-1-1 and 2009-10-30 during winter.spring.summer.fall at locality 'Pommernbucht(Prorer Wiek bei Binz)'

Locality "Pommernbucht(Prorer Wiek bei Binz)"	
Latitude	54°24,6
Longitude	13°38,4
Country	n/a

Click on the CatalogNumber to view the complete record. When the taxon is clickable, it means the taxon is indexed in ERMS. Click on Institution to view the original dataprovider record (if available). The CollectionCode is the name of the database inside the institution. Click on Dataset to go to the metadata record of Dataprovider.

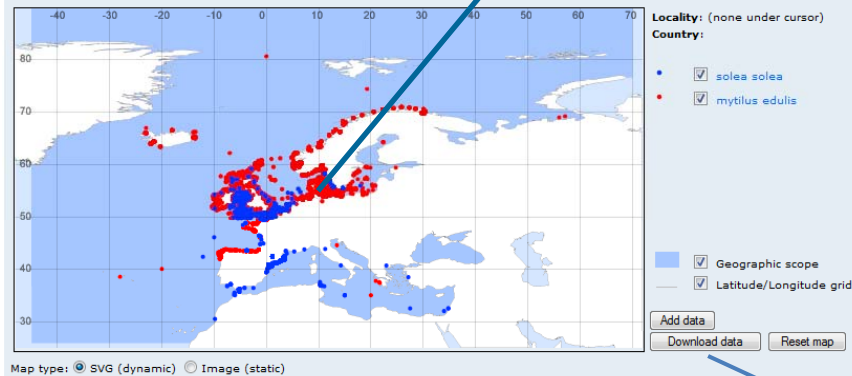
Species List:

CatalogNumber	Scientific name	CollectionCode	Institution	Collectionperiod	Dataset
28533	Mytilus edulis	Benthos_Ostsee	IOW	1981	53
28596	Mytilus edulis	Benthos_Ostsee	IOW	1981	53

EuroOBIS distribution records

(6,800,000 distribution records; 15,000 species)

You need a **SVG viewer** to work with this map. To **install a viewer**, go to <http://www.eurobis.com/svg/viewer/install/main.html>. The viewer is available for Internet Explorer 5+ only at this time. Use the **right mouse button** to see the SVG menu. To Zoom In press **Ctrl** while selecting a region. To Pan press **Alt** while dragging the map. The latitude and longitude are visible in the statusbar.



Terms of use (data policy)

- Non-commercial purposes
- No redistribution => refer to EuroOBIS
- Cite datasets & EuroOBIS
- EuroOBIS nor data providers responsible for errors

Several download formats

www.eurobis.org

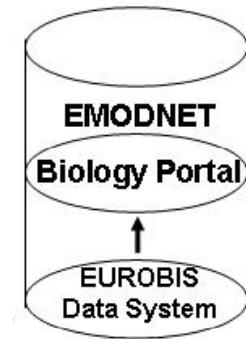
Flanders marine institute

EurOBIS as backbone of EMODnet

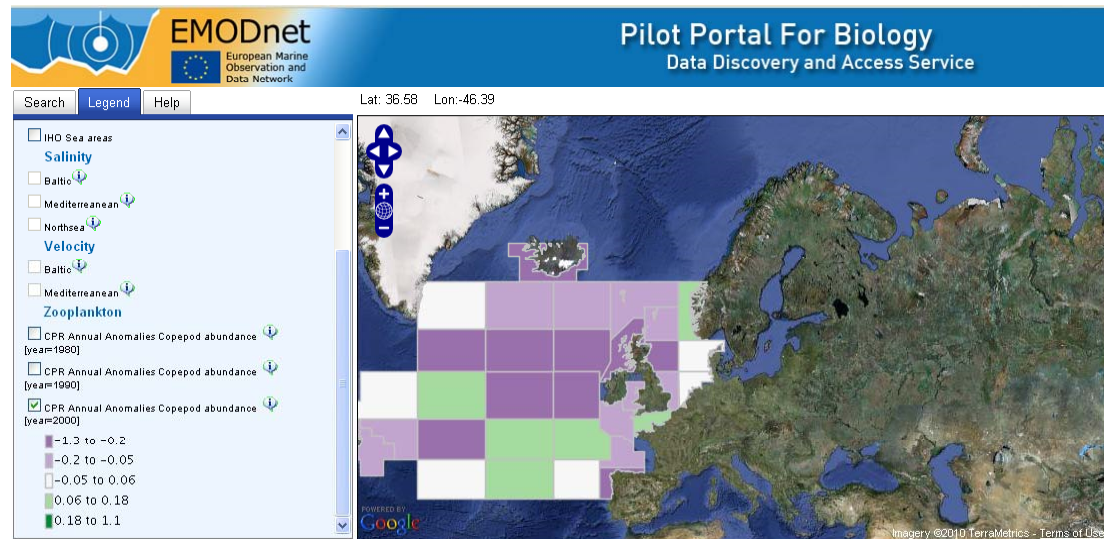
- European Marine Observations and Data Network
will be an end-to-end, integrated and interoperable network of systems of European marine observations and data communications, management and delivery systems, supported by a comprehensive user-oriented toolkit to enable implementation of the integrated Maritime Policy for Europe
- Preparatory actions (2009-2012)
 - ✓ Hydrography, geology, chemistry, biology, habitat mapping
- Basic design principles
 - ✓ Collect data once, use them many times
 - ✓ Recognise that marine data is a public good and discourage cost-recovery pricing from public bodies
 - ✓ Build upon existing efforts where data communities have already organised themselves (e.g. EurOBIS, SeaDataNet)



- EMODnet = EurOBIS in data availability
- Additional features: data products
 - ✓ Relevant for science, policy, practitioners, dissemination, education, awareness, ...
 - ✓ possibilities:
 - Species distribution maps & trends (marine spatial planning)
 - Indicators (biodiversity indices)



- E.g. annual anomalies copepod abundance (CPR)



Why contribute data to EurOBIS?

- Archival
 - ✓ Prevent corruption & loss
- Online metadata
 - ✓ Thorough description
 - ✓ Searchable
- Longer life-span ('second life')
- Quality control
 - ✓ Quality enhancement of data
 - ✓ Communication with provider
- Greater visibility of researchers & institutes



Why make use of EurOBIS?

- Quality controlled & standardised information
- Clustered data in space and time
 - ✓ Cheap
 - ✓ Long-term analyses possible
 - ✓ Comparison ≠ locations & habitats
 - ✓ Possible new insights & hypotheses

Marine biomes of the world: what primary data tell us about biogeography

Mark J. Costello^{1,2}, Peter Tsai², Pui Shan Wong², Alan Cheung³

¹ Leigh Marine Laboratory, University of Auckland, PO Box 349, Warkworth, New Zealand.

² Bioinformatics Institute, University of Auckland, New Zealand

³ School of Environment, University of Auckland, New Zealand

Submitted





Thank you

EurOBIS management team @ VLIZ
info@eurobis.org

