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Achievements and Perspectives of Networking Marine Biodiversity Research in Europe

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Outline

- The present situation: MarBEF
 - What it is and how it is structured
 - What has it achieved
- The future of NoE's
 - General perspective
 - EMBEF?
 - Life Watch
- Can EraNets help?



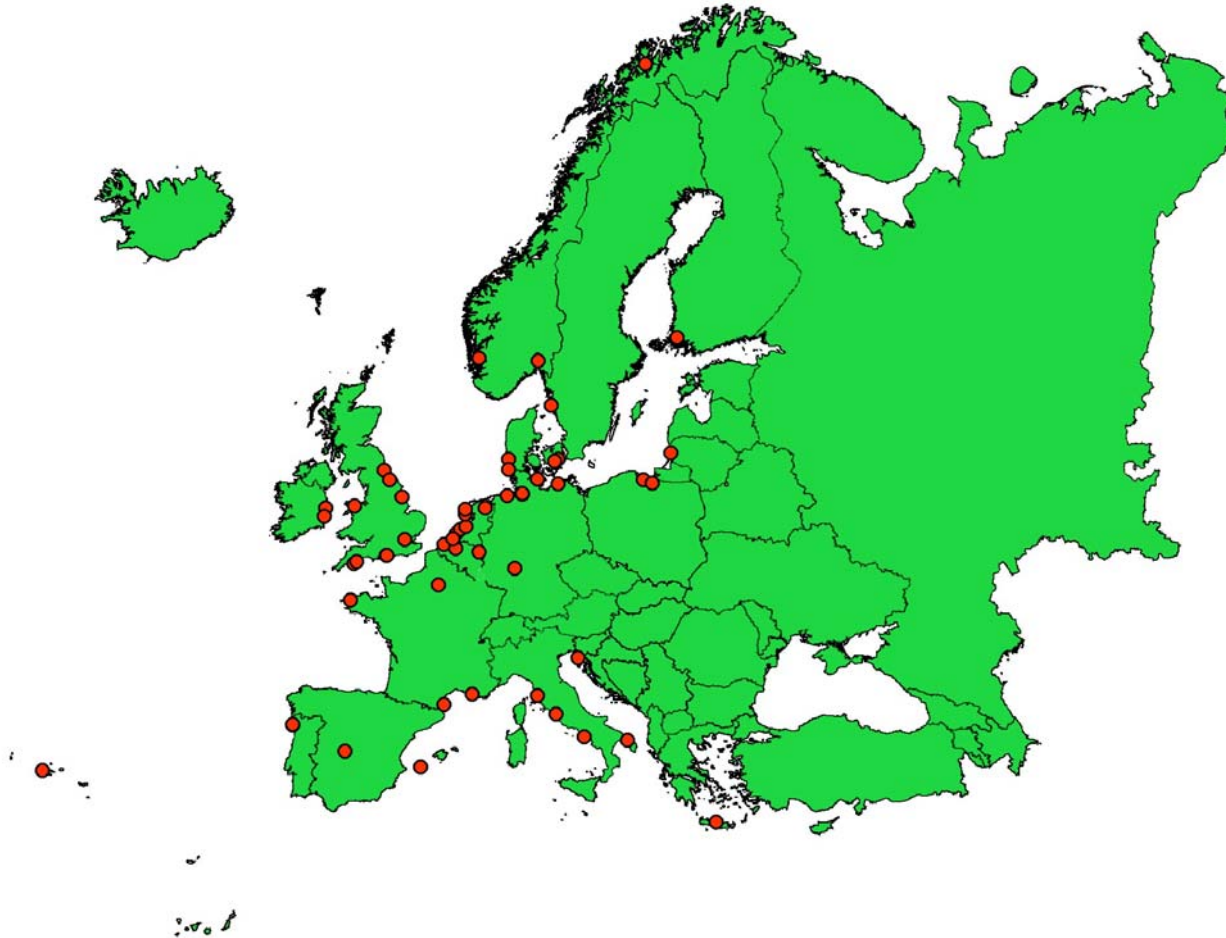
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What has MarBEF achieved?

56 participating institutes
35 associated institutes
Over 700 scientists



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Biodiversity Research Still Grounded

LAST WEEK, THE UNITED STATES DESIGNATED NEARLY 140,000 SQUARE MILES OF THE PACIFIC OCEAN northwest of Hawaii as the largest protected marine reserve in the world. This is good news, considering that earlier this year, 4000 delegates left the international Conference of the Parties to the Convention on Biological Diversity (held in March 2006 in Brazil) with mixed feelings. Portrayal of the conference as successful by the Executive Secretary was in stark contrast to the frustration expressed by environmentalist groups about the failure to progress toward creating large marine protected areas. Paradoxically, the fact that the oceans are the patrimony of all nations creates a legislation gap that is the major obstacle to increasing the percent of protected ocean to the 10% targeted by the convention. This obstacle is augmented by a lack of awareness by legislators and the general public about the role, status, and prospects of biological diversity in oceans relative to the land. Until a better understanding of the diversity of and threats to life in the oceans is achieved, there will be no progress in protecting marine biodiversity.

The vast richness of marine biodiversity remains to be discovered, particularly in remote habitats such as the deep ocean. There is a widespread misconception that extinction in the ocean is unlikely because of its huge biogeographical ranges and high connectivity of habitat. But recent surveys and molecular analyses of ocean samples have revealed marine invertebrates with biogeographical ranges as small as 4 km. Specialized communities in deep-sea habitats, such as hydrothermal vents and cold seeps, are isolated across thousands of kilometers. Marine diversity is much more extensive and vulnerable than previously thought. Moreover, much of this diversity is microbial and therefore generally unappealing to society. Indeed, more charismatic animals and plants receive most of the conservationists' attention. Scientific research must unveil the importance of ocean life diversity, test for declines in important taxa and ecosystems, elucidate the causes of these declines, and provide remedial options to change these perception biases.

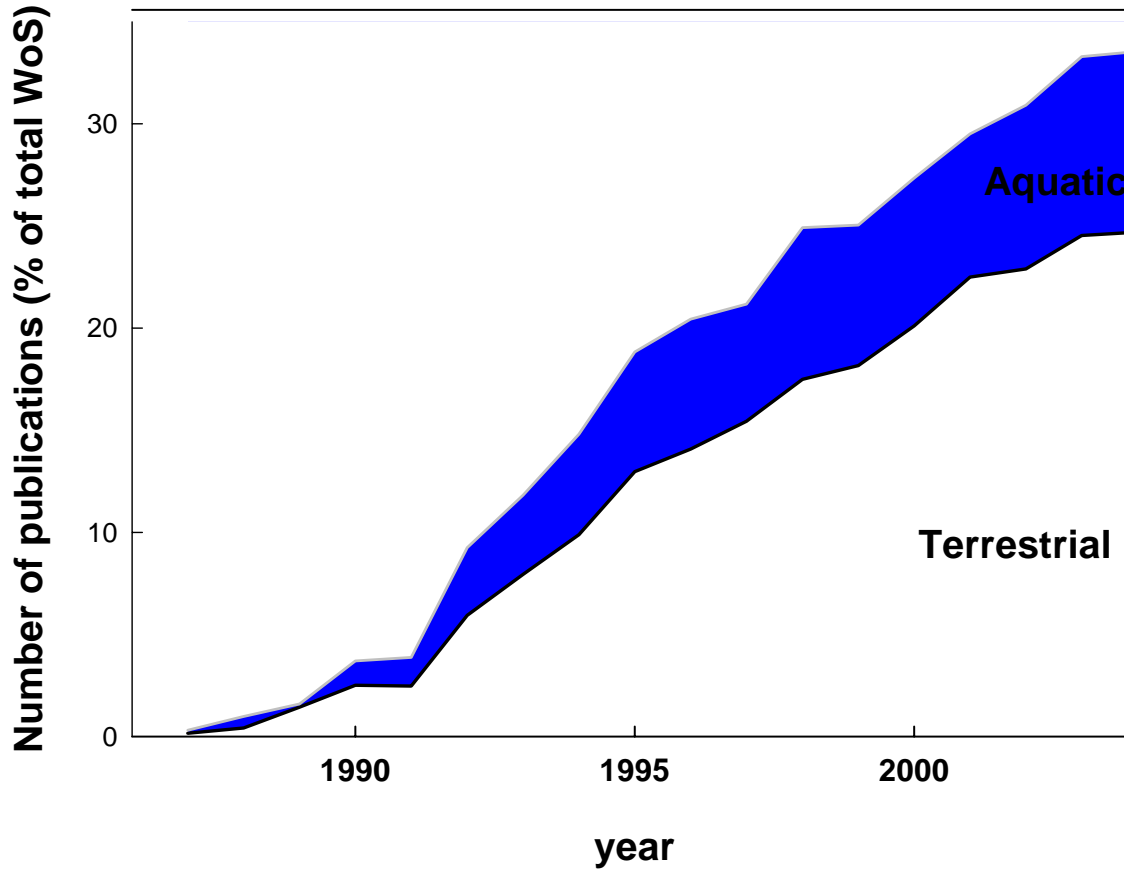




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$$y = a \cdot e^{Rx}$$

Table 2. Growth rate *b* of accumulating publication effort concerning biodiversity.

habitat	a	R
marine	39.93	1.2407
freshwater	27.12	1.2519*
terrestrial	399.5	1.2215
general	269.8	1.1165*

*growth rate is significantly different

Number of publications concerning biodiversity corrected for total number of publications in WoS retrieved with the keywords 'Ecology' and/or 'Biodiversity'



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What we do

- Understanding the changes we observe and their consequences for ecosystem functioning: the three MarBEF Themes
 - 1. Global Patterns of Marine Biodiversity
 - 2. Marine Biodiversity and Ecosystem Functioning
 - 3. Socio-Economic Importance of Marine Biodiversity
- Data: management (EurObis), synthesis and modelling, data rescuing.
- Observatories: sites
- Methods: standardization, calibration, certification
- Informing people and society on threats to biodiversity and contribute to exploring solutions



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Research within MarBEF: RMP's



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acronym	Title
	WP1. Data integration
MarDATA	Bringing biogeographical data online
	WP3. Theme 1 Global Patterns of Marine Biodiversity Across Ecosystems
MarFISH	Causes and consequences of changing marine biodiversity – a fish and fisheries perspective
ArctEco	Biodiversity and ecosystem function under changing climatic conditions – the Arctic as a model system (<i>ArctEco</i>)
DEEPSETS	Deep-sea & Extreme Environments, Patterns of Species and Ecosystem Time Series (<i>DEEPSETS</i>)
MANUELA	Meiobenthic And Nematode biodiversity: Unraveling Ecological and Latitudinal Aspects (<i>MANUELA</i>)
PROPE-taxon	Web Accessible Taxonomic Expertise in MARBEF: PROviding a e-Platform for the European Taxonomists (<i>PROPE-taxon</i>)
LargeNet	Large scale and long term Networking on the observation of Global Change and its impact on Marine Biodiversity (<i>LargeNet</i>)
Mar-ECO	Integration of different methods to study patterns and changes ocean along the Mid-Atlantic Ridge
MARPLAN	European integration of marine microplankton research (<i>MARPLAN</i>)



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	WP4. Theme 2 Comparative analysis of marine biodiversity and ecosystem functionality
GBIRM	Genetic Biodiversity (<i>GBIRM</i>)
MarENGIN	The role of native and/or invasive ecosystem engineers in explaining biodiversity
MarPACE	Pan-European Gradients in Propagation and Settlement Events
BIOFUSE	Effects of biodiversity on the functioning and stability of marine ecosystems – European scale comparisons
FOODWEBIO	Functioning of FOOD WEbs across ecosystems of different BIOdiversity level (<i>FOODWEBIO</i>)
MarMICRO	Microbial diversity and ecosystem functions: concepts, open questions and recommendations for integration of microbes into general ecological frameworks
ROSEMEB	Role of Secondary Metabolites in Ecosystem Biodiversity (<i>ROSEMEB</i>)



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	WP5. Theme 3. The socio-economic importance of marine biodiversity
MarDSS	Development of decision support systems
	WP8. Outreach
COASTW ATCH	Pilot MARBEF Coast Watch network of students and amateurs in Europe



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Gaps in knowledge

- Microbial biodiversity
- Biodiversity Change: changes in spatial and temporal distributions, extinction
- Consequences on ecosystem functioning
 - Biogeochemical Cycling
 - System productivity
- Human society and the oceans
 - Understanding of drivers
 - Motivation, perceptions,
 - Protection, sustainable use, legislation



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Biodiversity Exploration



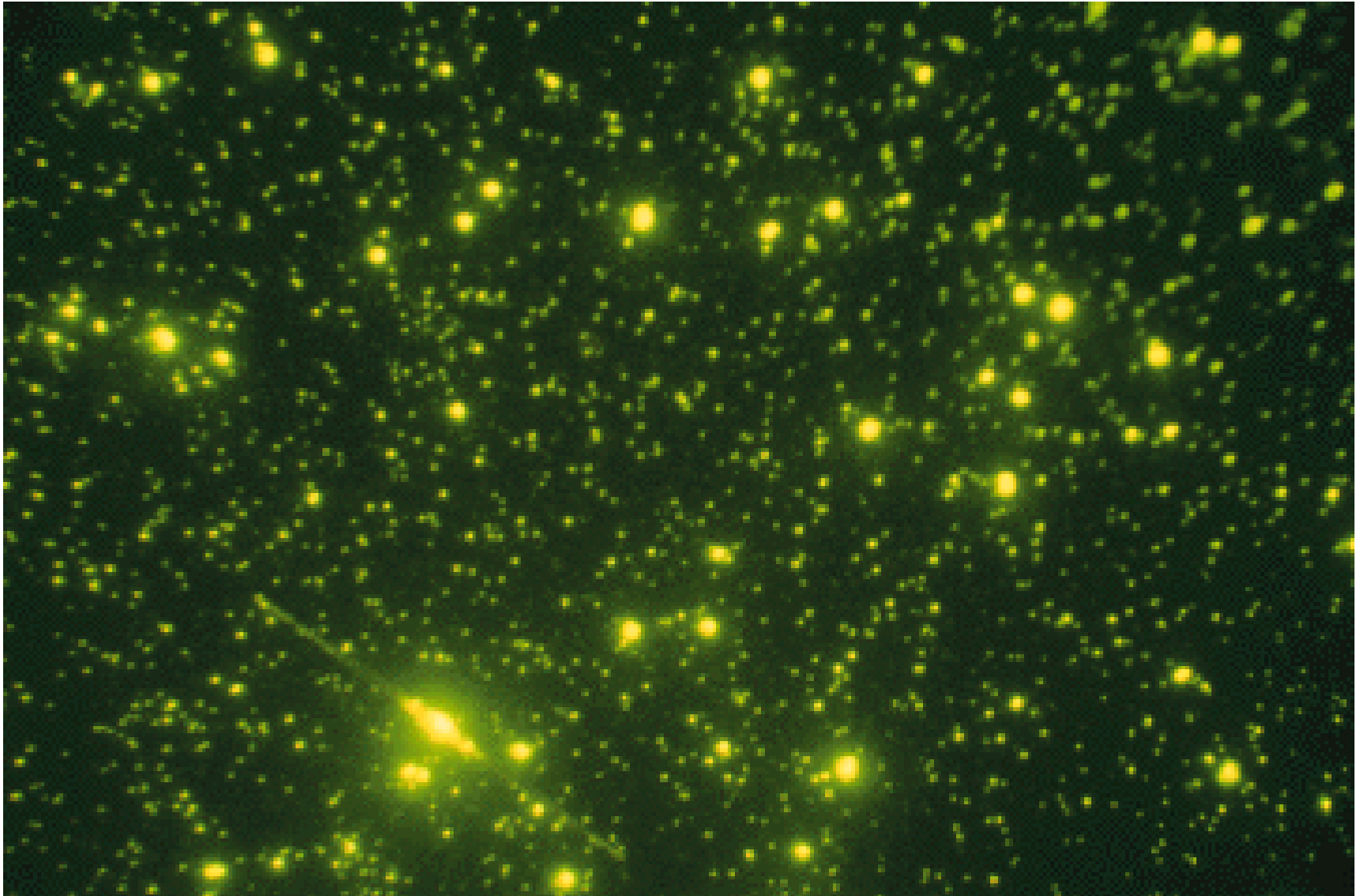
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1 billion bacterial cells per liter
10 billion viral particles per liter



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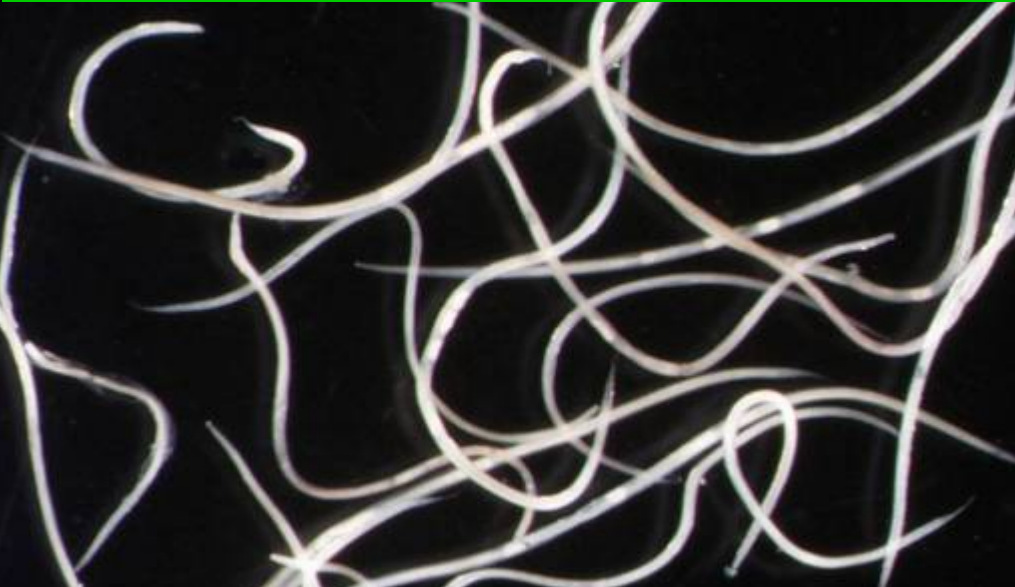
Largest Habitat On Earth: the Abyssal Plains

60% of Planet Surface
4 km deep, 4 km thick
Rich Organic Mud
< 0.1% Sampled

Unknown and Unseen

Microscopic
Meiofauna Rule

10 Million Species?





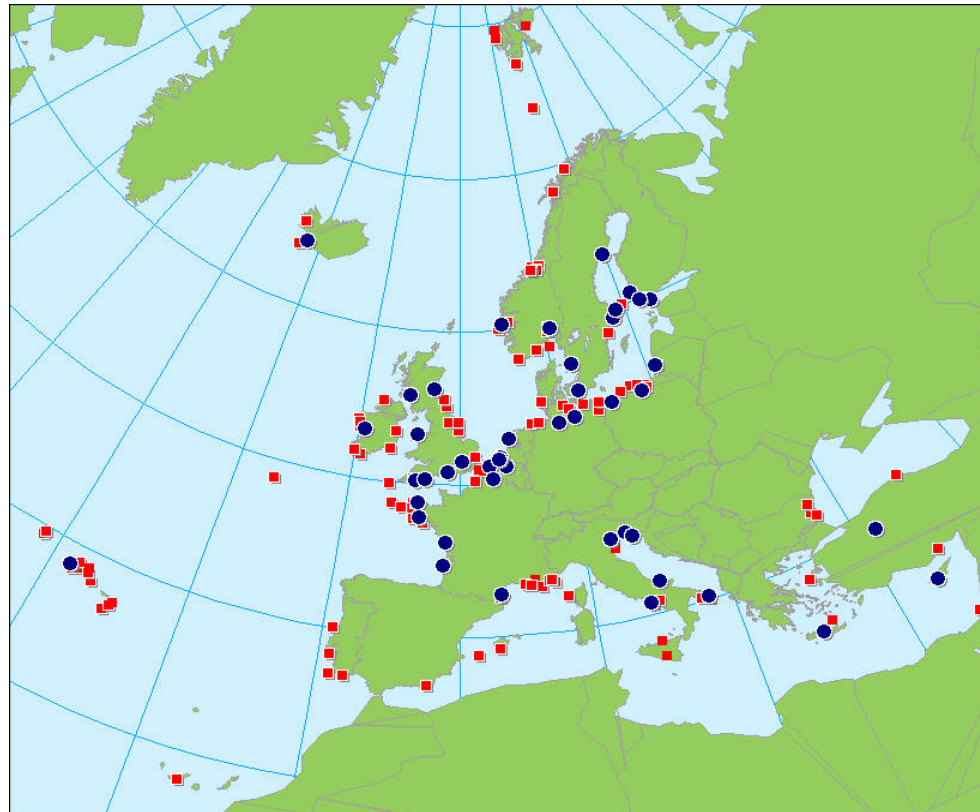
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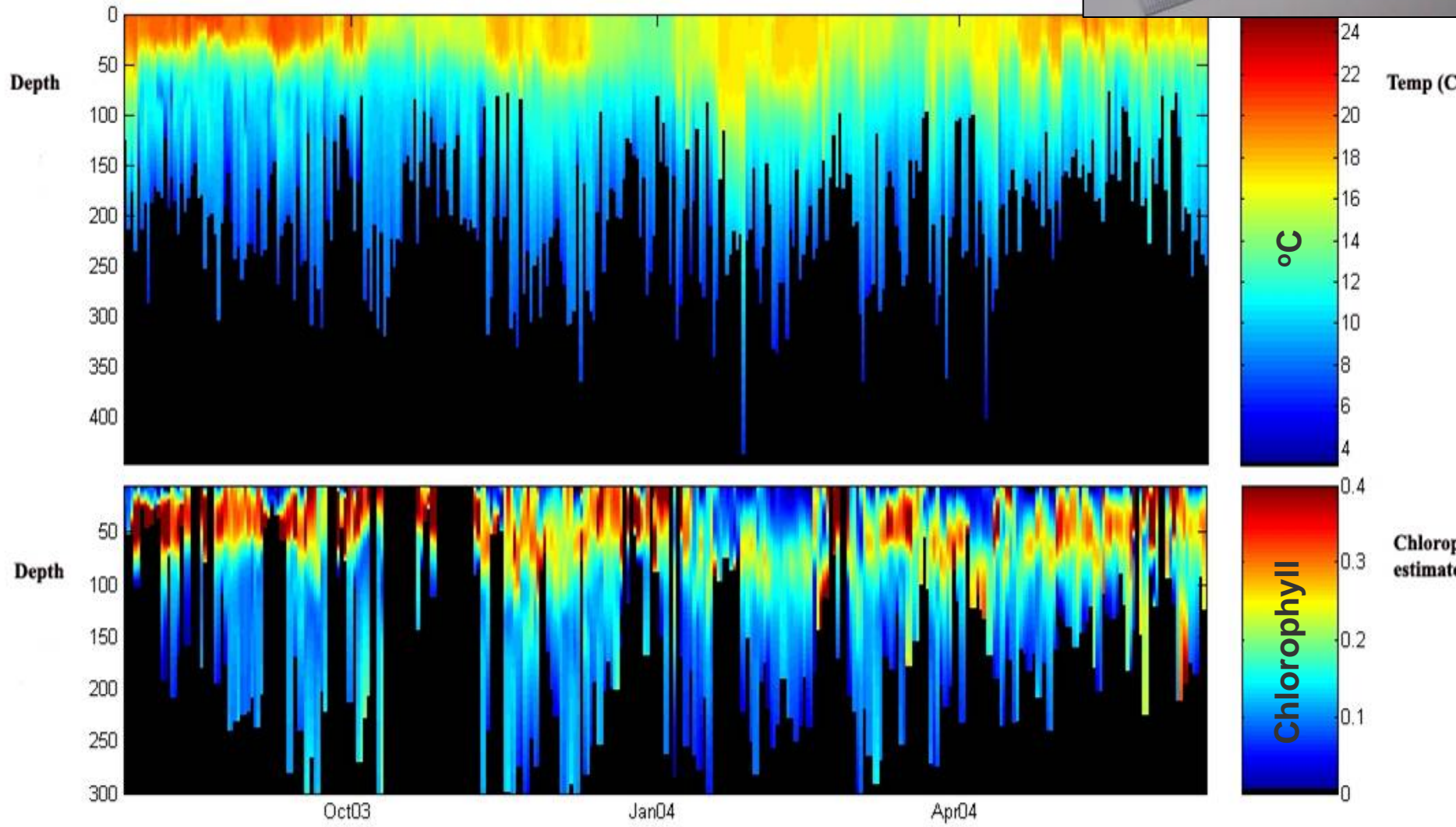
Observation

BIOMARE reference and focal sites





Thermal & Chlorophyll Profiles from a California Current Tuna





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Human Society and the Oceans



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Future Perspectives

- A virtual European Centre for Research on Marine biodiversity and Ecosystem Functioning
EMBEF (MarBEF+)
- Continuation of EU support
- EraNet support
- A network of networks
- A legal Foundation (MARS+)
- Incorporation in ICES, CIESM
- Life Watch
- Data Management