

Measuring what we must manage

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The next 10 years

Defining strategic needs

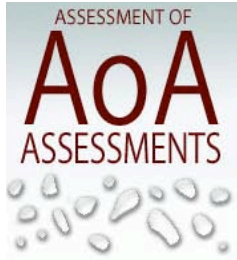
Delivering ocean observations

Deriving information

Defining strategic needs

UN General Assembly Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socio-economic Aspects

EU Maritime Strategy & Marine Strategy Framework Directive including the Water information System for Europe (WISE) and European marine observation network (EMODNET)



Global Marine Assessment

- WSSD 2002 - to “establish by 2004 a Regular Process under the United Nations for global reporting and assessment of the state of the marine environment, including socio-economic aspects, both current and foreseeable, building on existing regional assessments”.
- Endorsed at the United Nations General Assembly (UNGA) (resolution 57/141).



The value of assessments

Assessments are an important mechanism for:

- strengthening relationship between science and policy
- focusing on a fully integrated view of environmental, economic and social aspects
- science to inform decision making
- establish the importance of an issue
- provide authoritative analyses of policy-relevant scientific questions
- demonstrate benefits& costs of different policy options,
- identify new research directions and provide technical solutions

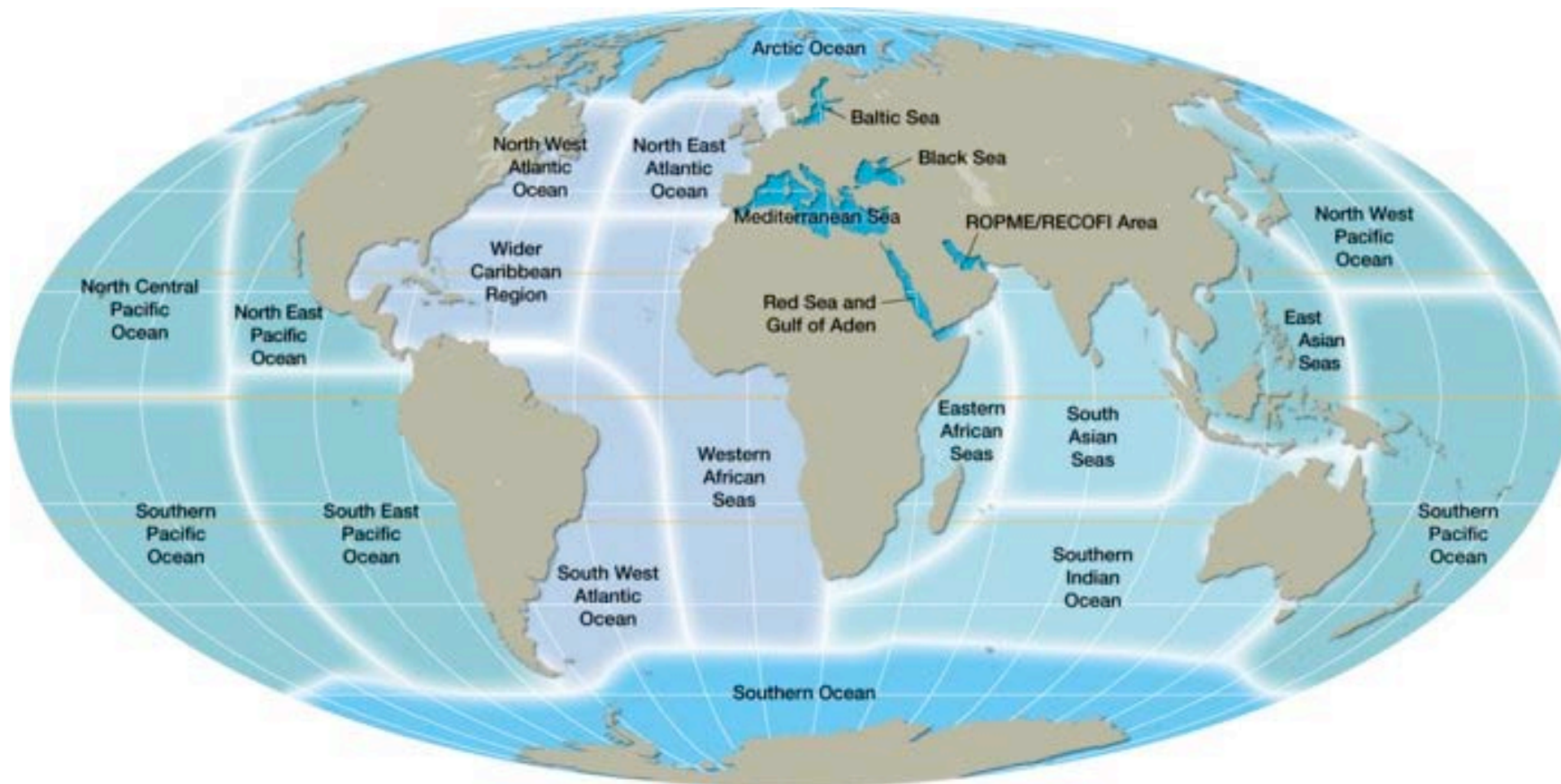


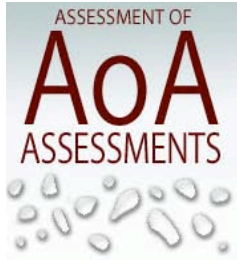
The value of a regular process

- Ensure a global overview of the oceans, showing how different regions and processes are interlinked through a fully integrated assessment
- Help to focus initiatives for improving our understanding
- Feed knowledge into policy development
- Help identify suitable ways to address human activities
- Guide capacity building
- Stimulate co-operation amongst disciplines & stakeholders
- Frame results of existing assessment activities to provide information to facilitate their continuous development



21 Regional Summaries





Thematic and Supra-Regional Summaries

Climate Change: Warming, Ocean Circulation, Sea Level Rise, Acidification

Fisheries and Aquaculture

Global Environment Outlook

Global International Waters Assessment

Global Open Oceans and Deep Seabed Biogeographic Classification

Invasive Alien Species

Pollution From Land-Based Activities

International Shipping

Large Marine Ecosystems GLOBAL assessments

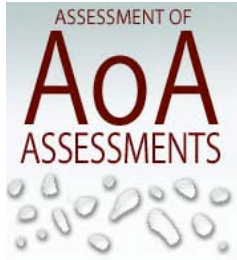
Coastal Development: Urban Development, Tourism and Coastal Zone Management

Marine Biodiversity

Millennium Ecosystem Assessment

GESAMP overview





Towards a Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socio-economic Aspects

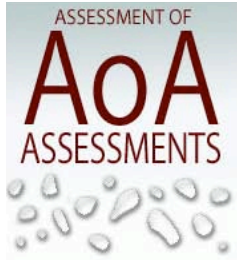
Findings

- Living marine resources and water quality assessments are the strongest area of assessment with good international networks, although these still vary around the globe
- Assessment capability for fisheries and water quality is substantial but funding for data collection is often insufficient
- Habitat status and trend assessments are increasing but less well developed globally
- Social and economic assessments for marine activities and coastal communities are lacking in many areas
- Integrated assessments are rare; most analyses are on a sectoral basis



Findings

- Lack of integration as well as social and economic analyses hinders understanding of overall conditions in the marine environment and the analysis of policy alternatives
- While the use of reference points is common for fisheries and water quality, more effort is needed to ensure intercomparability and to establish benchmarks and standards in other areas
- There are major gaps in global data, including social and economic data. Coverage for many types of data is limited, availability widely restricted and interoperability of data sets often limited



Framework for the Regular Process

Overall objective and scope

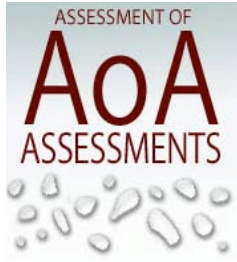
Principles of scientific credibility, legitimacy and relevance

Best practices for design features

Timing

- 2010 - 2014 First cycle of a Regular Process plus key issues such as sea level rise, ocean acidification
- 2012 - Rio +10 World Summit on Sustainable Development
- 2014 - 20 years on from UNCLOS entry into force
- 2014 - next CSD consideration of oceans





What will we get for the money?

- A credible, legitimate and relevant integrated assessment of the marine environment for governments to use in a range of international and regional policy settings
- Support for ongoing needs of society
- An increased commitment to develop capacities for ocean and marine observing and assessments throughout the world
- Streamlining of national efforts and associated costs



Relevant EU policy needs

- **Water Framework Directive**

Requires Good Ecological Status for specific environmental quality elements in coastal and transitional waters

-1283 transitional and 5831 coastal stations

-Chl-a, seagrasses, macroalgae, benthic invertebrate fauna, nutrients, priority substances

- **Marine Strategy Framework Directive**

Requires Good Environmental Status for Europe's regional seas (Baltic, North-east Atlantic, Mediterranean, Black Sea) and assessment of the Arctic according to a set of qualitative descriptors in marine waters.

- **Maritime Strategy**

Requires establishment of European Maritime Observation and Data NETwork (EMODNET) and covers all major uses of maritime space.



Goal of the EU Marine Strategy Framework Directive

‘Protect and preserve the marine environment, prevent its deterioration or, where practicable, restore marine ecosystems in areas where they have been adversely affected’.

‘Prevent and reduce inputs in the marine environment, with a view to phasing out pollution...
so as to ensure there are no significant impacts on or risks to marine biodiversity, marine ecosystems, human health or legitimate uses of the sea’.

‘... apply an ecosystem-based approach to the management of human activities, ensuring that the collective pressure of such activities is kept within levels compatible with the achievement of Good Environmental Status...’



Bridging the observational gaps

How do we know the gap exists?

EEA hosted a series of 3 EU workshops in 2006-2007 on data availability for the determinands covered by the Marine Strategy Framework Directive

- 10 out of 44 determinands were covered in all regional seas

 - of these only 1 (nutrient inputs) was related to an environmental pressure

- 18 out of 44 determinands (often relating to pressures) were not covered in any seas.



Priorities for indicator convergence

	Non-GMES Variables	GMES/operational oceanography Variables
Priority 1.1	hazardous substances in biota selective extraction of commercial fish species chlorophyll-a nutrients in seawater	temperature chlorophyll-a oil slicks atmospheric deposition of non-toxic contaminants
Priority 1.2 other physical and chemical determinants		currents water exchange salinity water transparency

Delivering ocean observations

Global Monitoring for Environment and Security



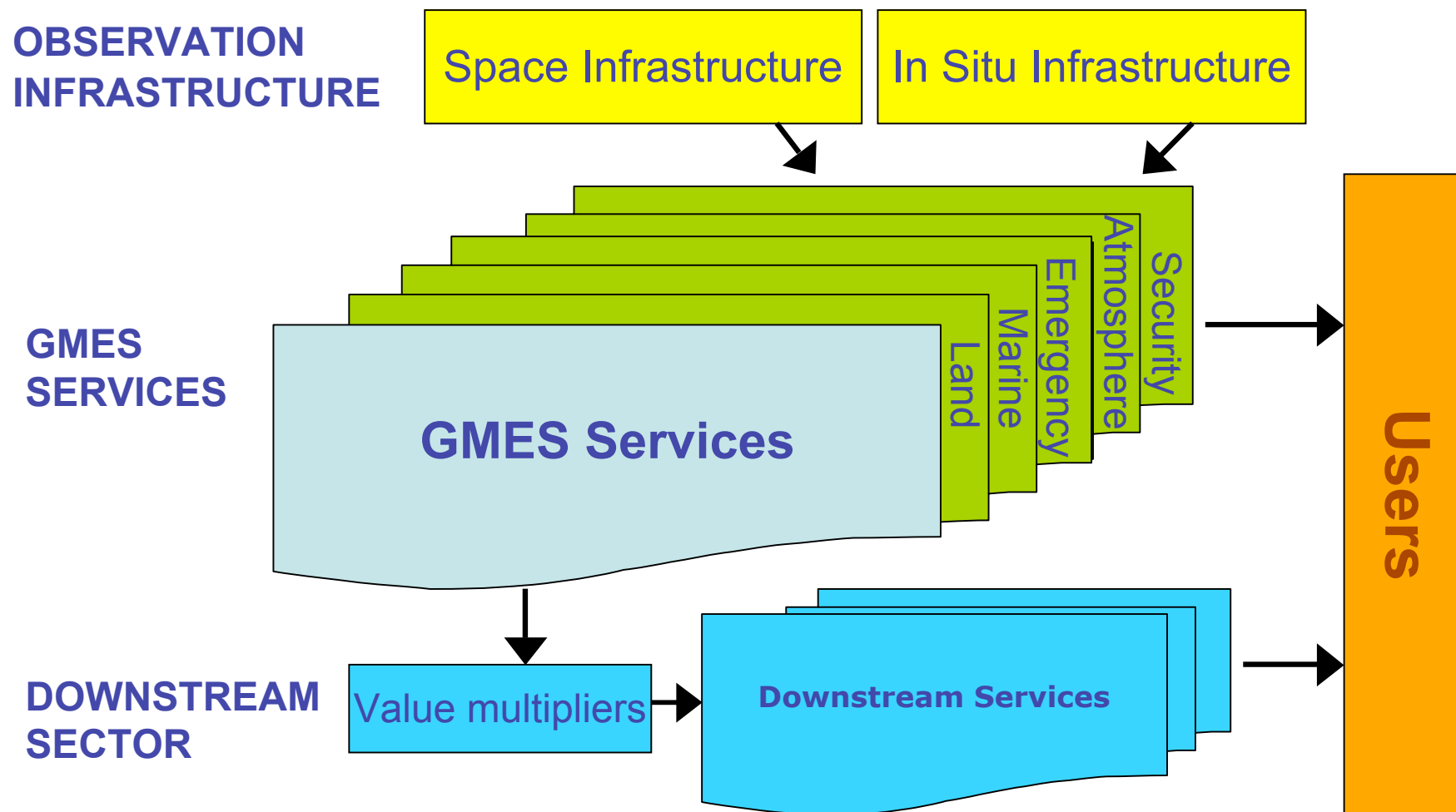
Global setting for European environmental monitoring

European Environment Agency

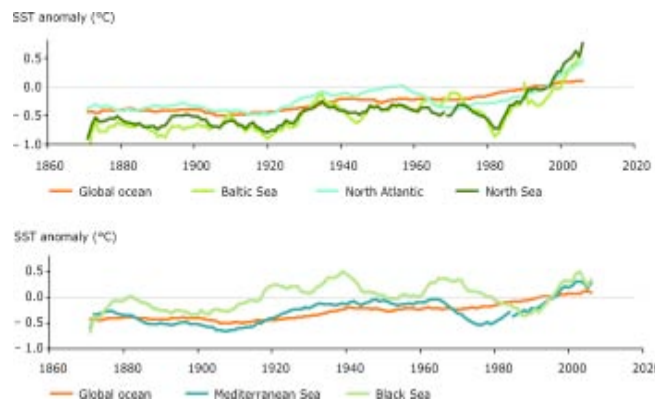
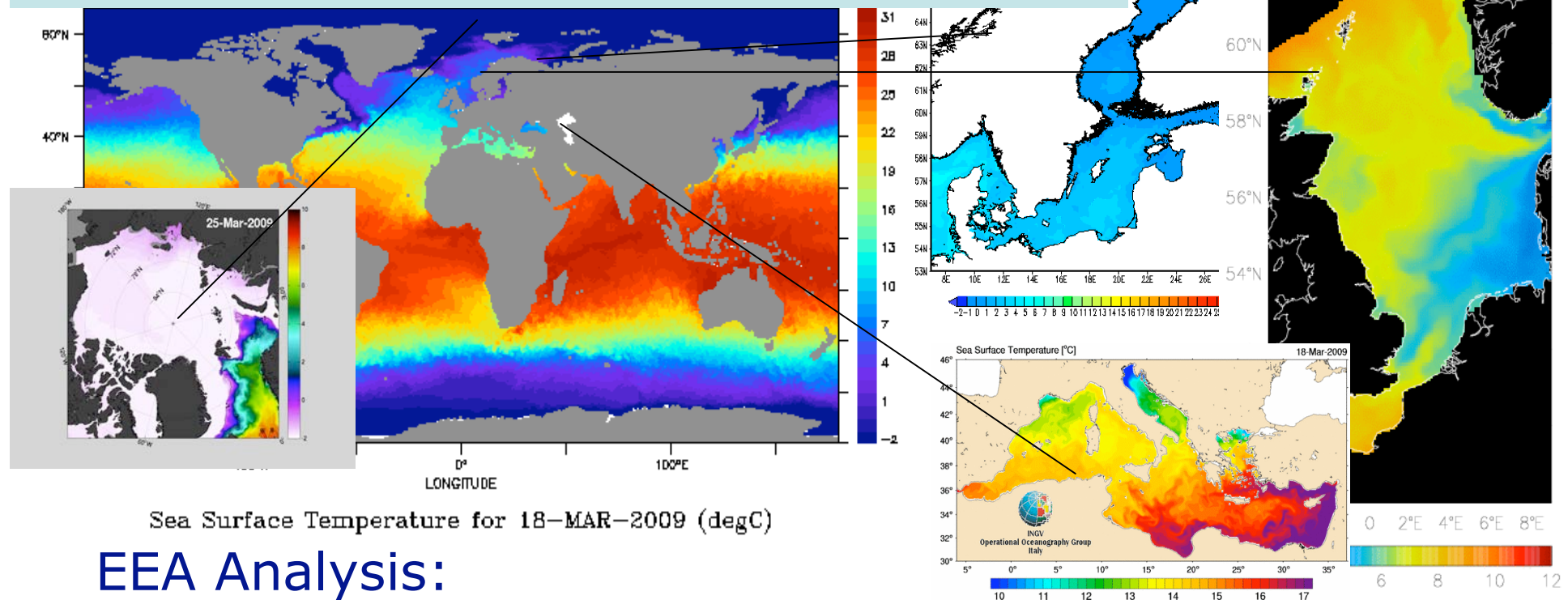


- EU-led initiative for an **autonomous** and **operational** European earth observation capacity
- EU provision of information in support of:
 - **European policies:** environment & climate change, CAP, Maritime Policy, CFSP/ESDP...
 - **EU international commitments:** protocols and conventions (eg Kyoto, Montreal, CLRTAP..)
 - **National or regional «adaptations»** of these policies or commitments
- GMES partners will need to ensure a coordinated approach for an **international cooperation strategy** building on existing cooperation schemes
- GMES aims to provide relevant information
 - **to policy-makers** but also many **other users** (national authorities/agencies, industry, researchers, citizens..)

- Builds on **existing capacities** in Member States taking into account subsidiarity principle. Imperative to fulfil the European need for information at global level and to develop a **cost efficient system**
- **System of systems**: mutualisation & long term sustainability of capacities & resources
- Major **financial resource and political commitment**. GMES is about **reliable and timely services** delivered on a **sustained basis**
- **GMES provides information products** (e.g. maps, datasets, gridded fields, assessment reports, targeted alerts, etc.) related to environmental and security issues
- **These products** are designed to develop and support a **downstream sector in Europe**



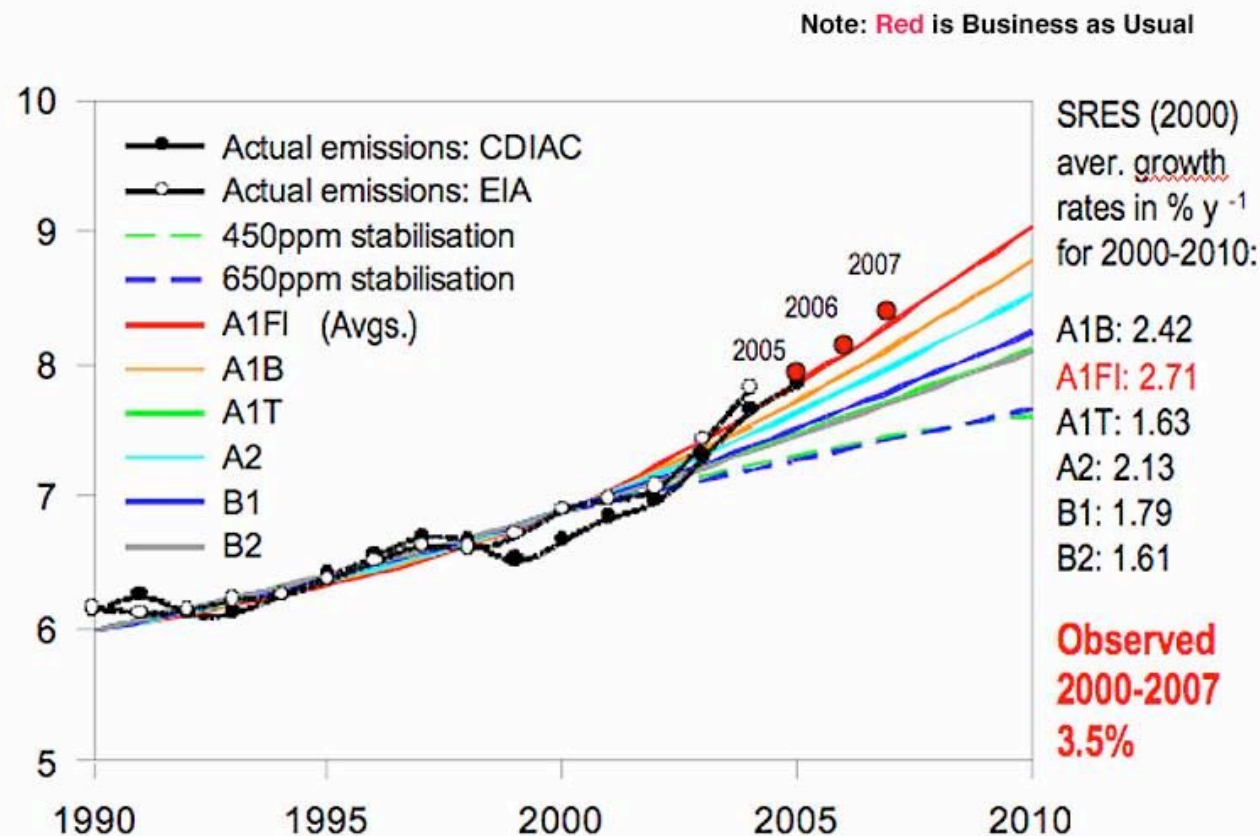
MyOcean input: Sea Surface temperature



EEA Assessment:

Over the past 25 years the rate of increase in sea surface temperature in all European seas has been about 10 times faster than the average rate of increase during the past century. In five European seas the warming occurs even more rapidly. In the North and Baltic Seas temperature rose five to six times faster than the global average over the past 25 years, and three times faster in the Black and Mediterranean Seas.

Fossil Fuel Emissions: Actual vs. IPCC Scenarios



Raupach et al 2007, PNAS (updated)



A global setting for European environmental monitoring — measuring what we must manage

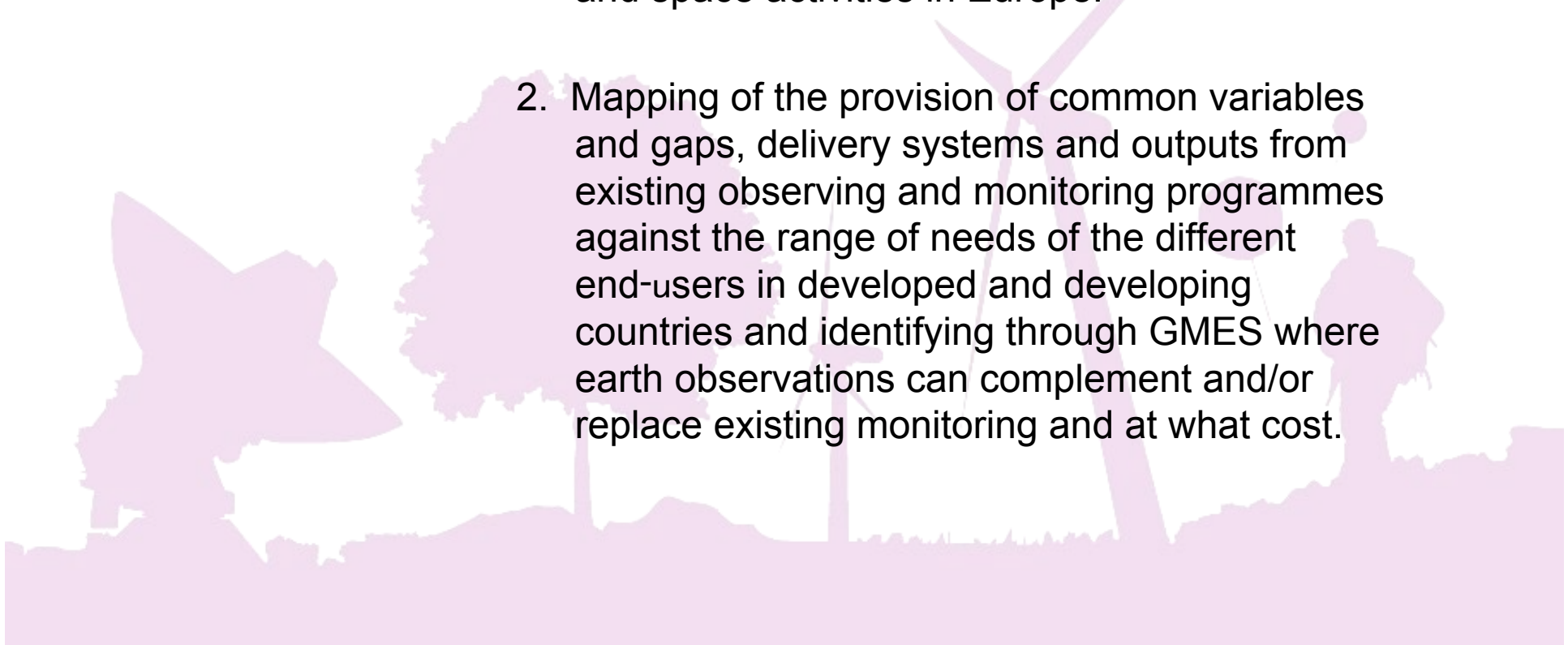
EEA International conference, 13–15 May 2009



Essential climate variable	WFD	MSFD	CFP	CC
Sea temperature	*	*		***
Sea level rise				***
Sea Ice	*	*		***
Ocean Color	**	**		**
PCO ₂				***
Sea salinity	*	*		***
Ocean Currents	*	*		***
Subsurface Nutrient concentrations	***	***		**
<i>Species biomass, composition and geographical distribution of plankton</i>	***	***		
<i>Structure of fish populations including the abundance, geographical distribution and age/size structure of populations</i>		***	***	
<i>Species composition, biomass, and annual/seasonal variability of submerged aquatic vegetation and benthic inv</i>	***	***		
<i>Water column density structure</i>				***
<i>Time series of heat and density fluxes in relevant cross-sections</i>				***

Key conclusions

1. Strengthening links between GMES activities, the global observing, monitoring and forecasting programmes and improving their coordination with national and regional *in-situ* and space activities in Europe.
2. Mapping of the provision of common variables and gaps, delivery systems and outputs from existing observing and monitoring programmes against the range of needs of the different end-users in developed and developing countries and identifying through GMES where earth observations can complement and/or replace existing monitoring and at what cost.



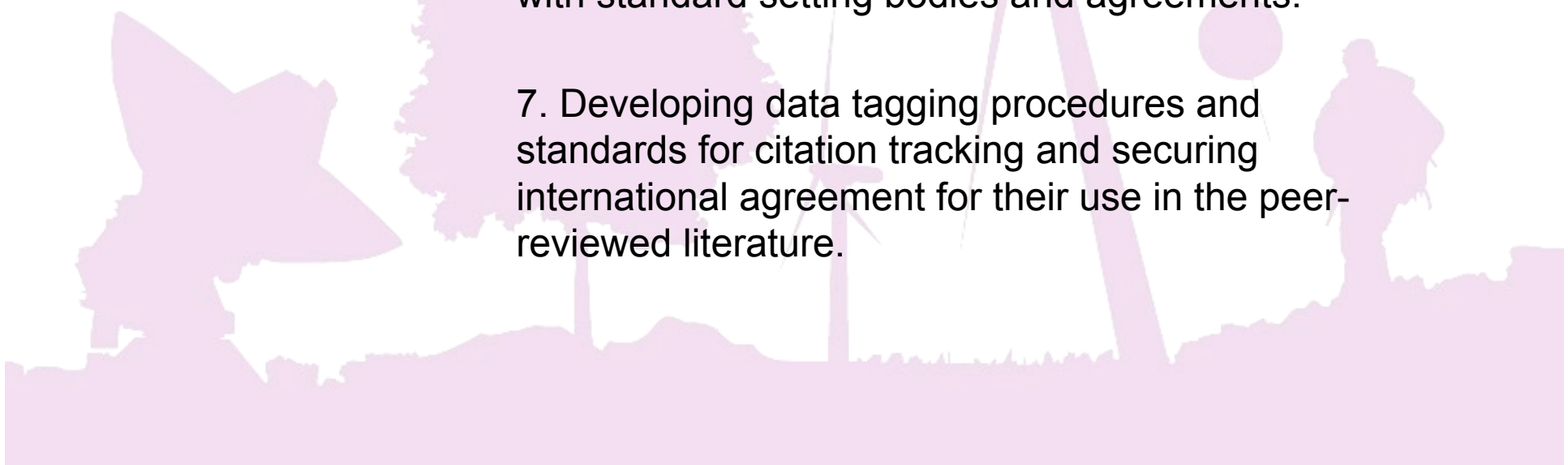
3. Placing more attention on increasing effort in critical areas such as carbon budgets, ocean acidification, monitoring of the cryosphere, establishment of reference sites for long-term monitoring, the identification and estimation of biodiversity and linking global observing outputs to socioeconomic data and the economics of ecosystem services.

4. Improving policy and funding in Europe for the establishment and maintenance of observing systems for regular data collection and meta-data compilation, in particular through strengthening cross-disciplinary linkages through dialogue between different environmental communities, consolidating and improving existing global and regional *in-situ* networks and enabling the discovery, rescue, and mobilisation of existing but inaccessible information.

5. Intensifying R&D activities in Europe and the development of human potential in the fields of environmental observing, monitoring, forecasting and sensor technology and enhancing the uptake of innovation and technology transfer.

6. Improving quality assurance through global data standards harmonisation, quality control and delivery systems through a direct engagement with standard setting bodies and agreements.

7. Developing data tagging procedures and standards for citation tracking and securing international agreement for their use in the peer-reviewed literature.



8. Securing international agreement for free and open access to environmental data.

9. Developing European citizen observing activities using new software, sensors and mobile technologies and reporting agreements to enable near-real-time access.

10. Developing and deploying information and materials explaining the relevance and need for GMES, GEO and GEOSS and the continued development of the global observing, monitoring and forecasting programmes, tailored to the needs of different stakeholders and user communities in Europe and more generally.



Deriving information

Water Information System for Europe WISE-Marine

Shared Environmental Information System

Inspire Directive

UNECE Aarhus Convention

ABOUT WISE

WHAT'S NEW?

PARTNERS

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PUBLICATIONS

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Español



WISE
HOME PAGE

SEARCH

buscar...

Welcome to the Homepage of the Water Information System for Europe

POLICY

THEMES AND DATA

PROJECTS

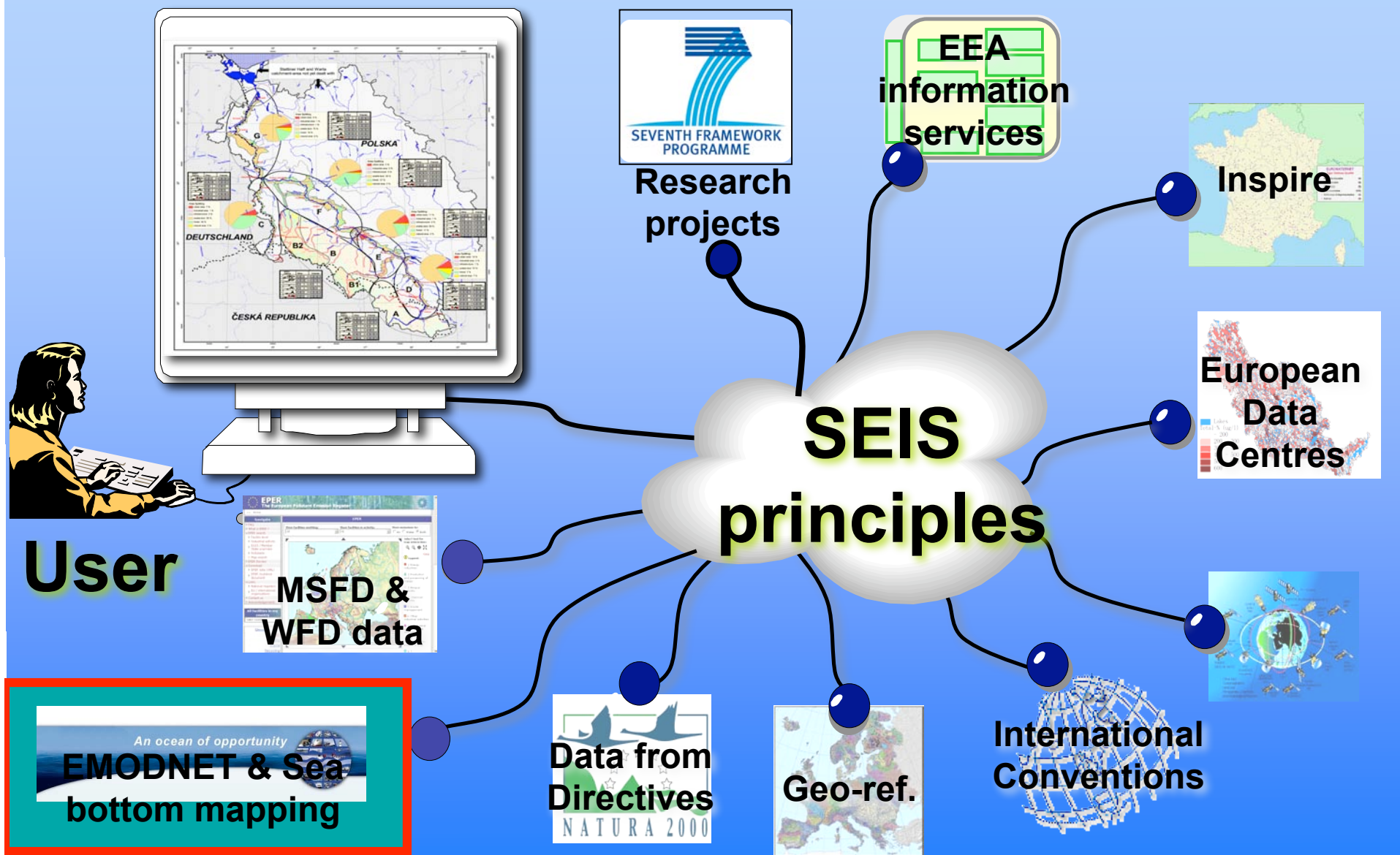
LINKS



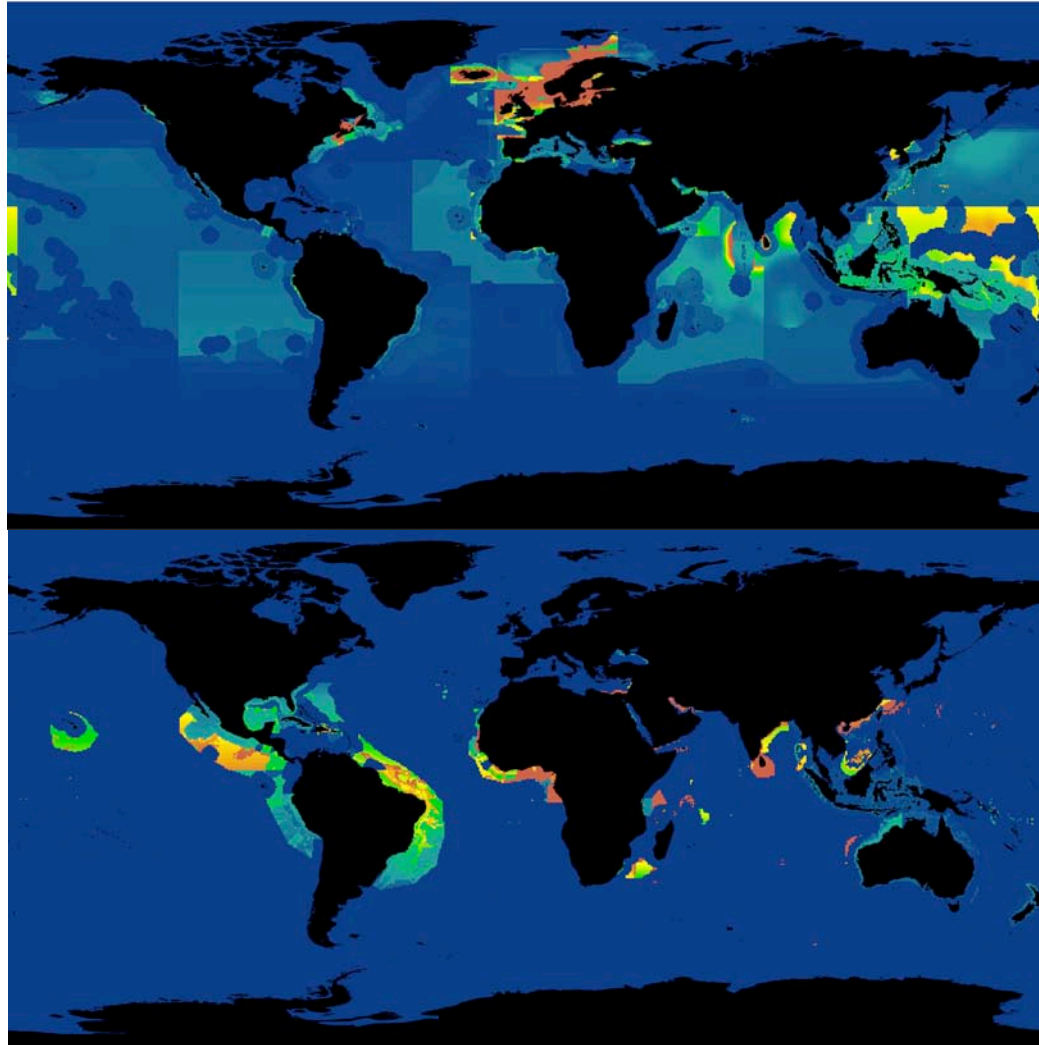
Environment

European Environment Agency





Environment



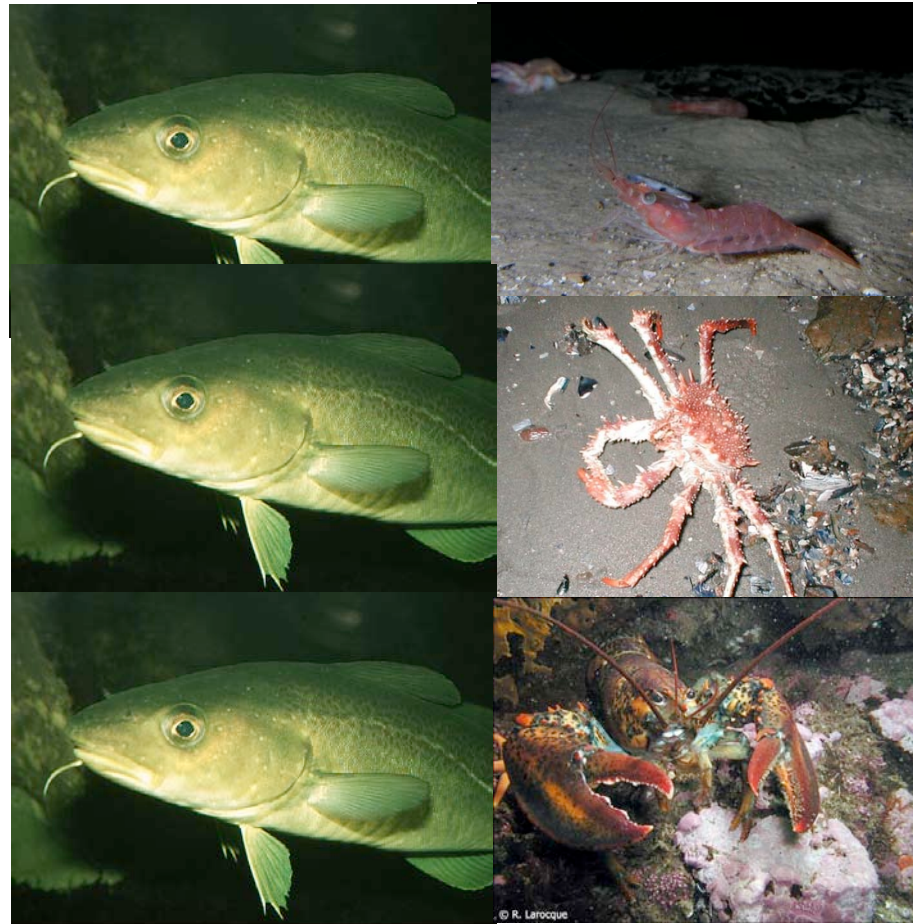
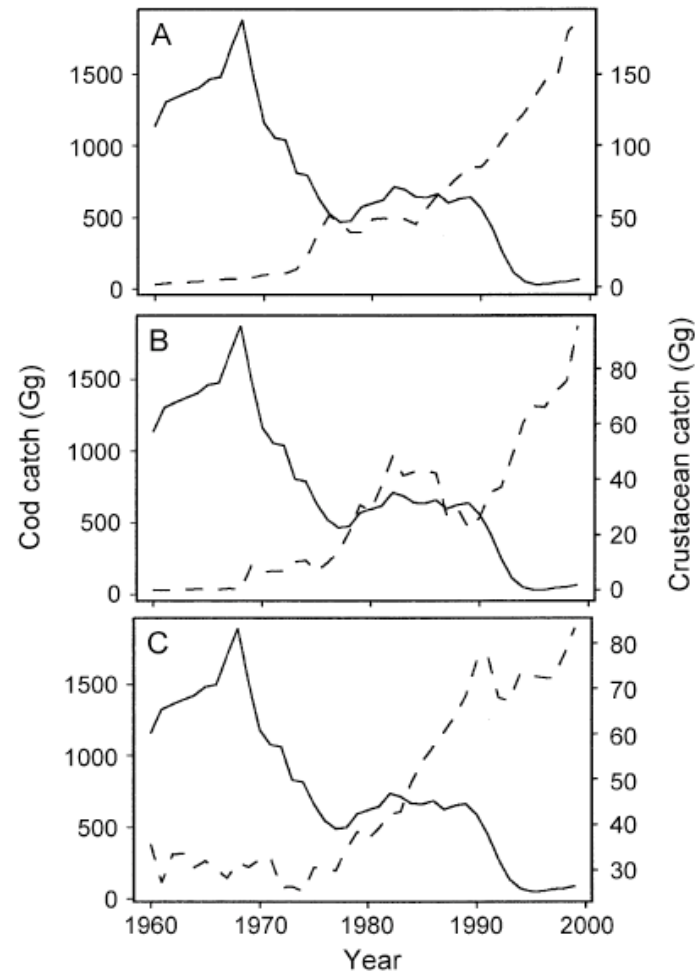
Ocean threats: commercial fishing

Pelagic, low bycatch

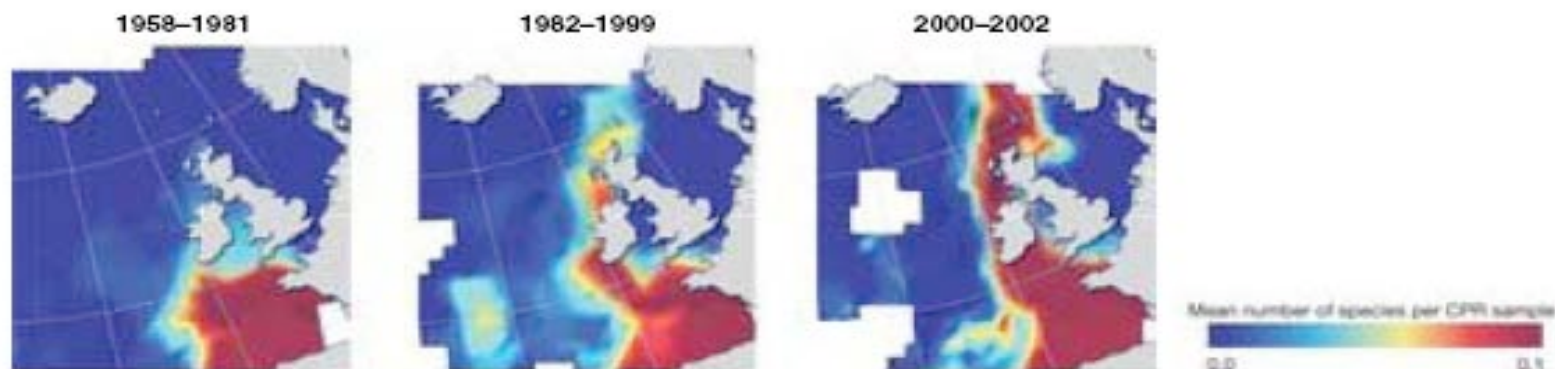
Pelagic, high bycatch

- Reg Watson, SAUP

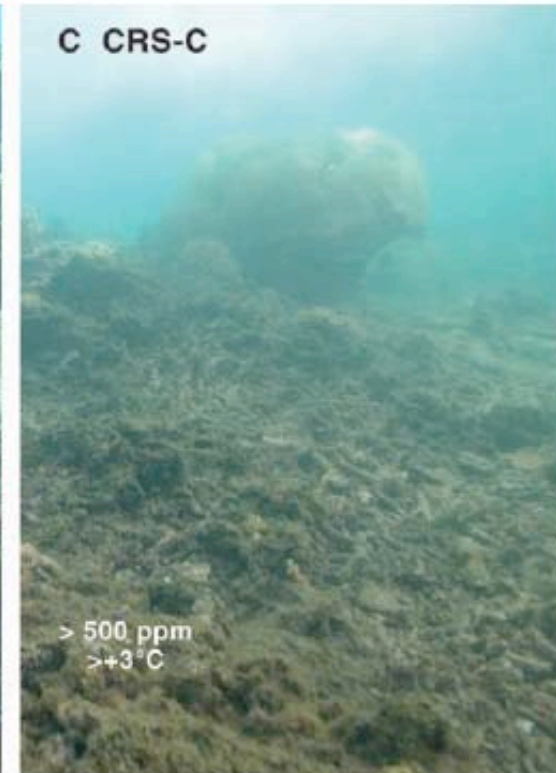
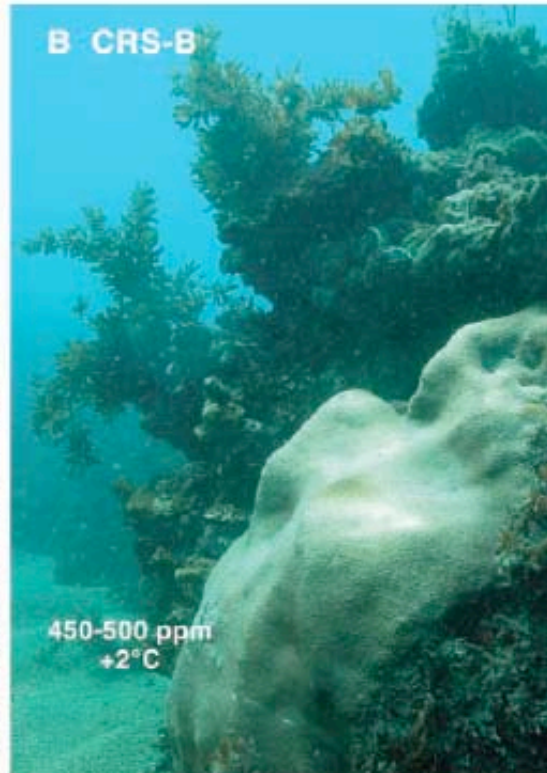
Ecosystem shifts.. cod to crustacea



Latitudinal shifts in species distributions

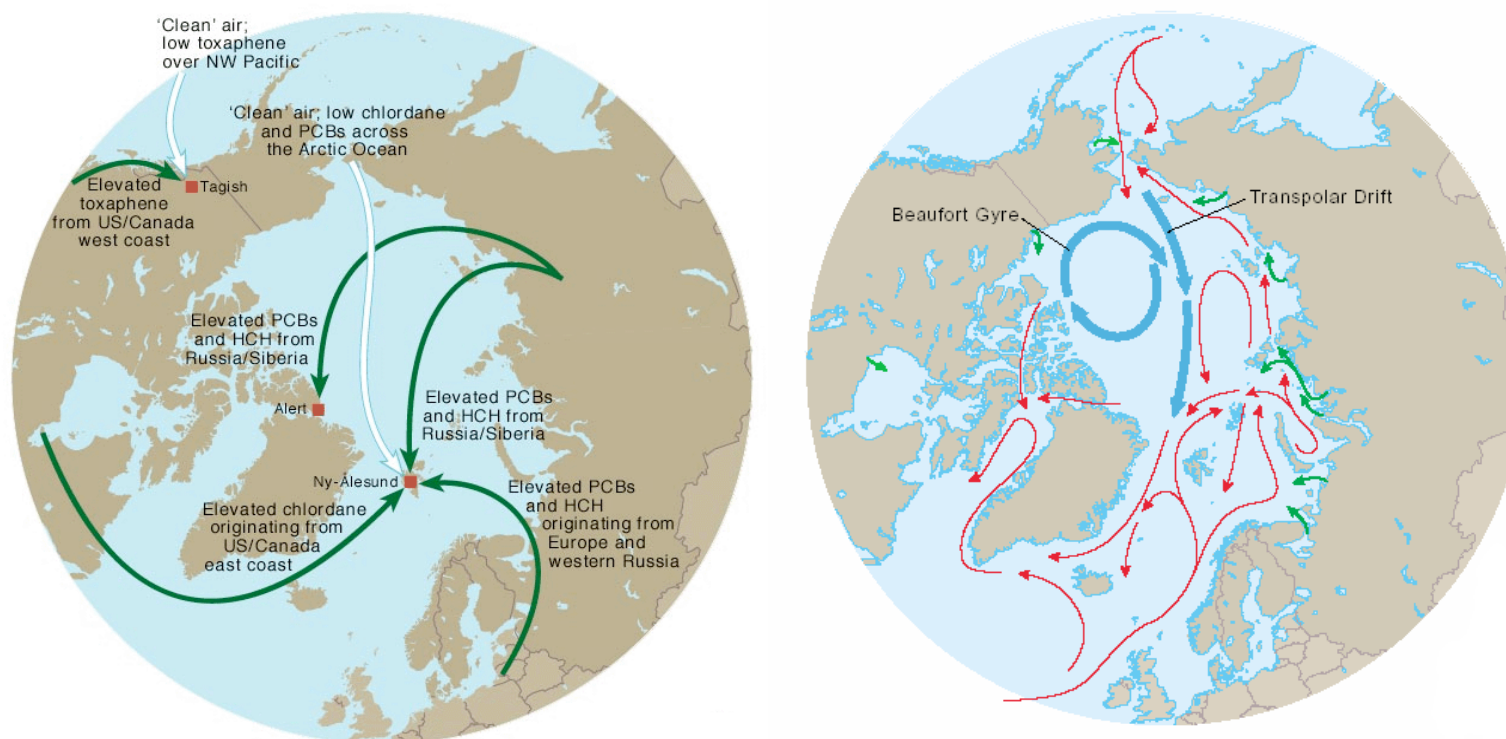


Sir Alistair Hardy Continuous Plankton Recorder Survey data show a shift in the distribution of warm-water copepod species by up to 10° of latitude ($\sim 1,000\text{km}$) in the last 40 years to 1999. Example includes the subtropical dinoflagellate *Ceratium hexacanthum* found in North Sea 6 standard deviations above previous measurements since 1958 (Nellerman et al., 2008).

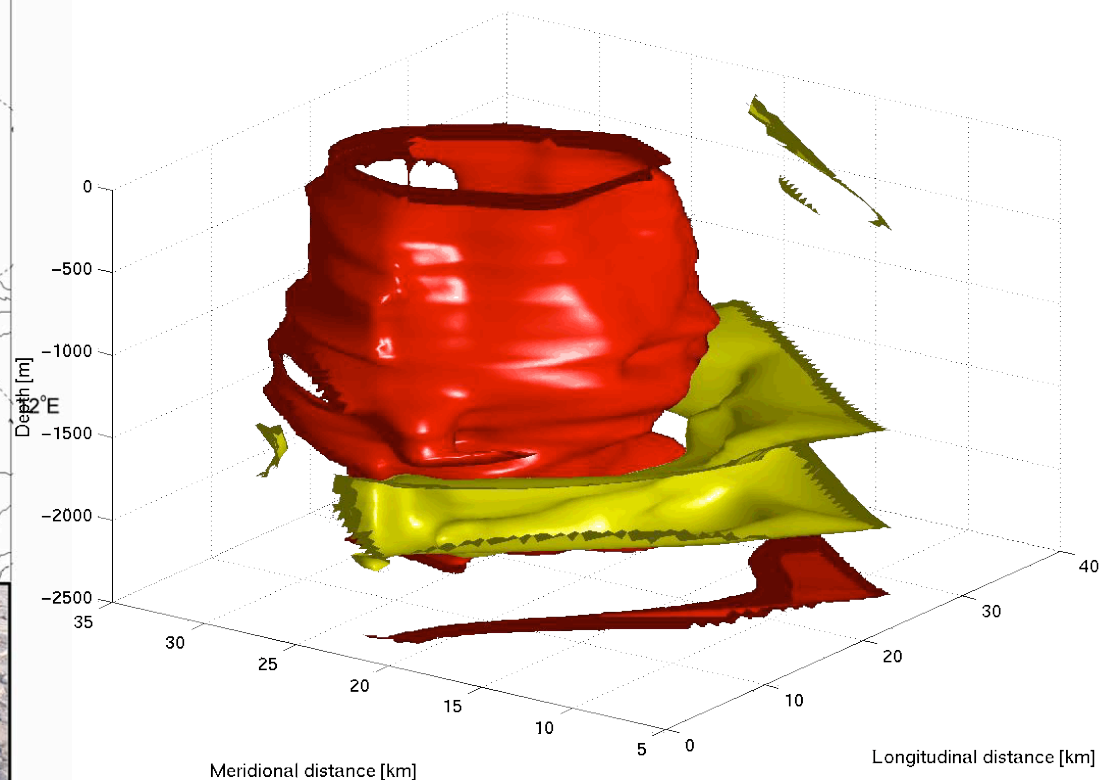
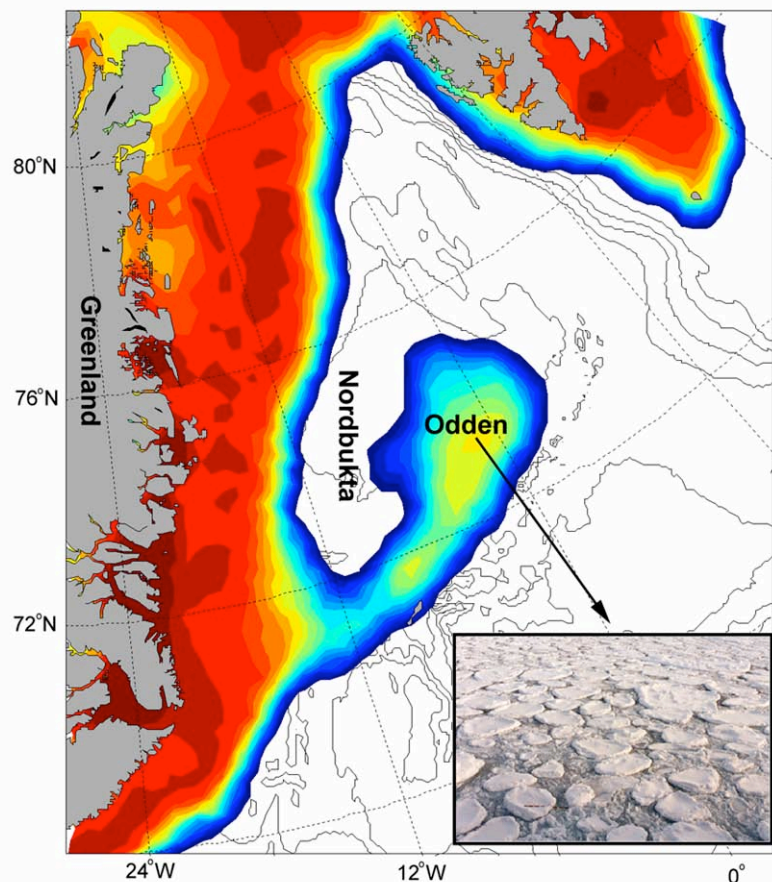


32.8% of assessed corals are threatened with extinction now

Transportation of pollutants into the Arctic

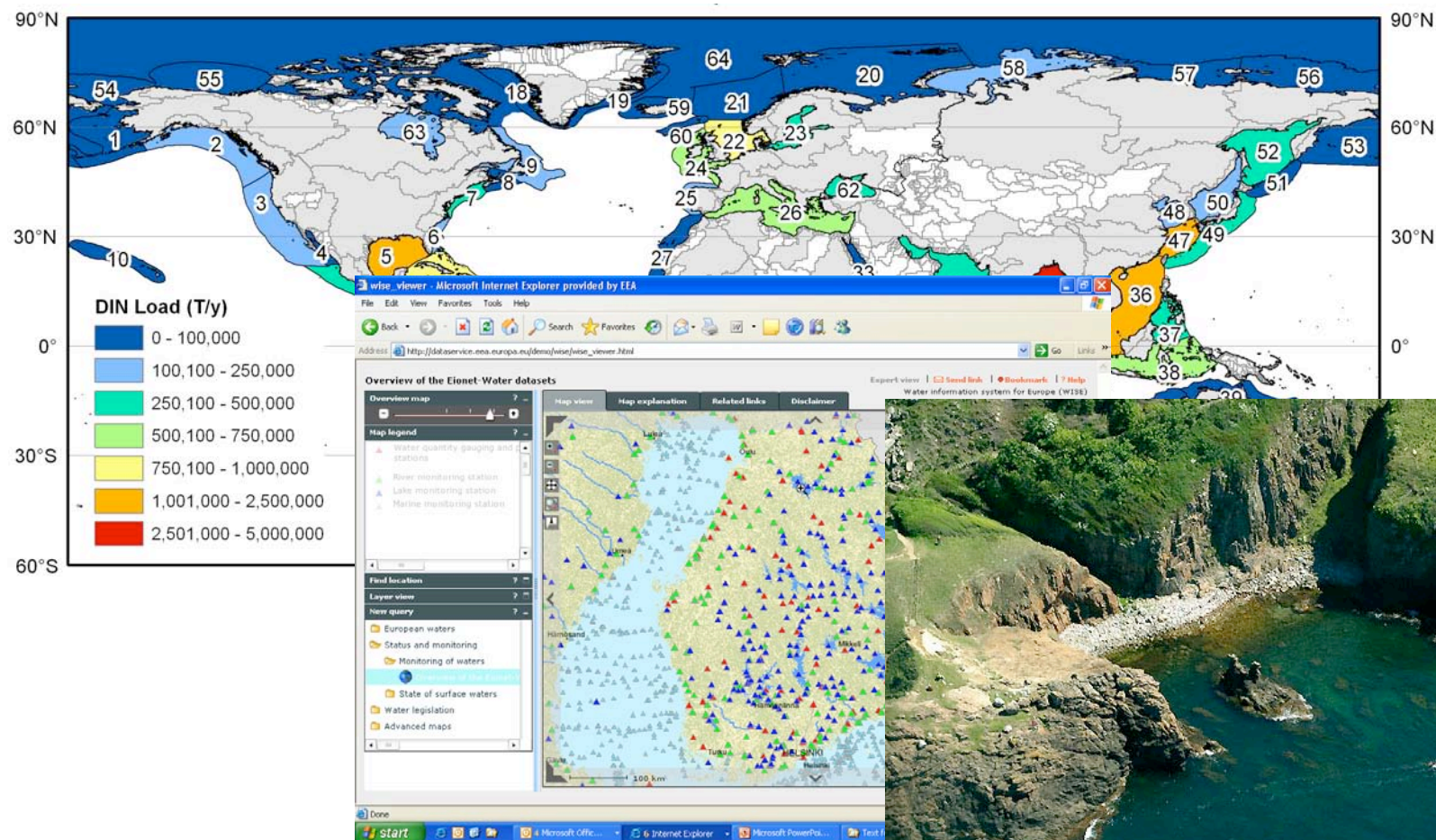


Greenland Sea in a severe winter Convective chimneys form in the Odden ice tongue

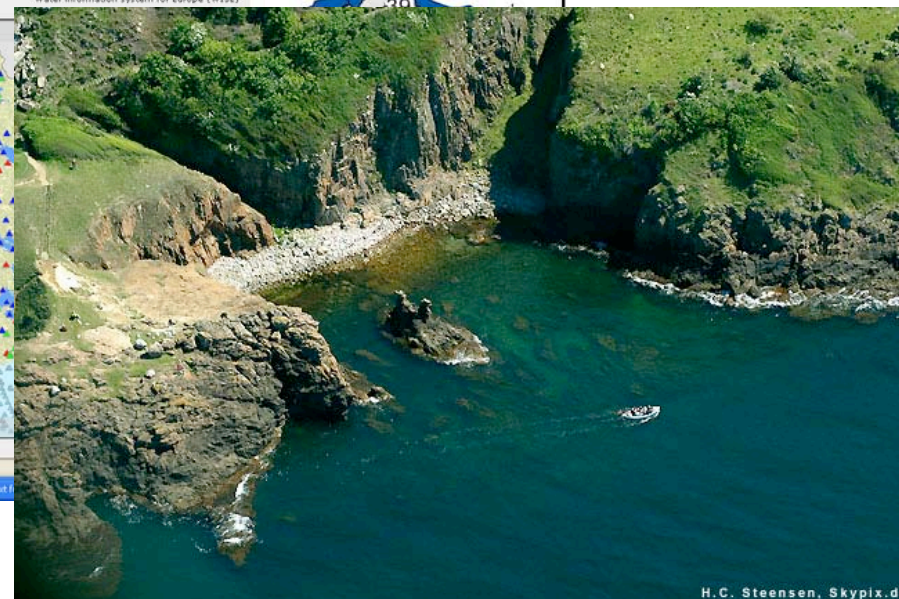


OceanObs'09

Ocean information for society: **sustaining the benefits, realizing the potential**



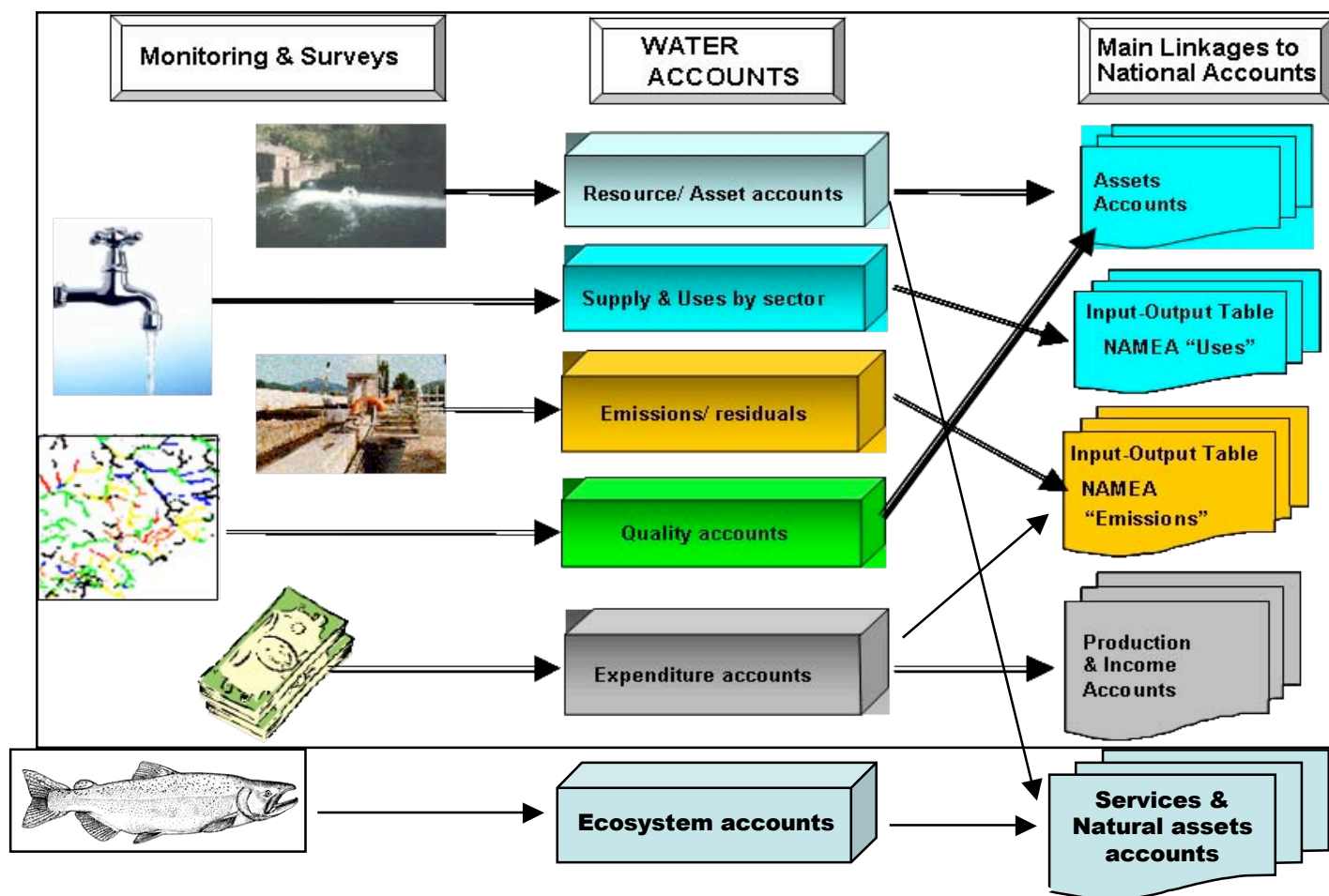
Bornholm 6th October 1986



21-25 September 2009 | Venice, Italy

www.oceanobs09.net

Ecosystem accounts



OceanObs'09

Ocean information for society: **sustaining the benefits, realizing the potential**

Global citizen observatory - Eye on Earth

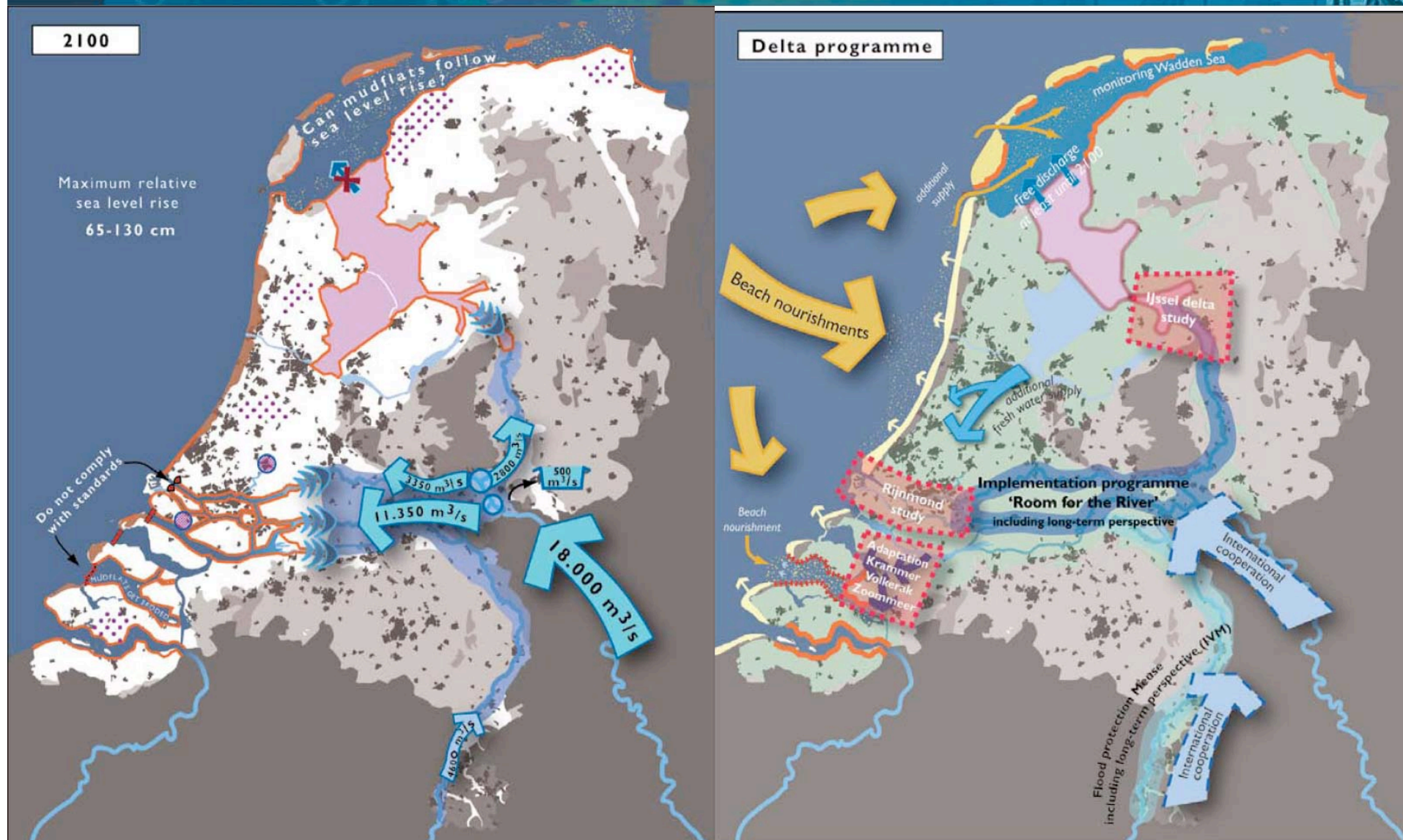


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Worth 1000.com

The field of knowledge is the common property of all mankind, and any discoveries we can make in it will be for the benefit . . . of every other nation, as well as our own.

Thomas Jefferson 1807

UNECE Aarhus Convention

