

EMODNET

The European Marine Observation and Data Network



Presented by Hans Dahlin, Director, EuroGOOS

Commission will



1. take steps in 2008 towards a European Marine Observation and Data Network,
2. and promote the multi-dimensional mapping of Member States' waters

in order to improve access to high quality data.



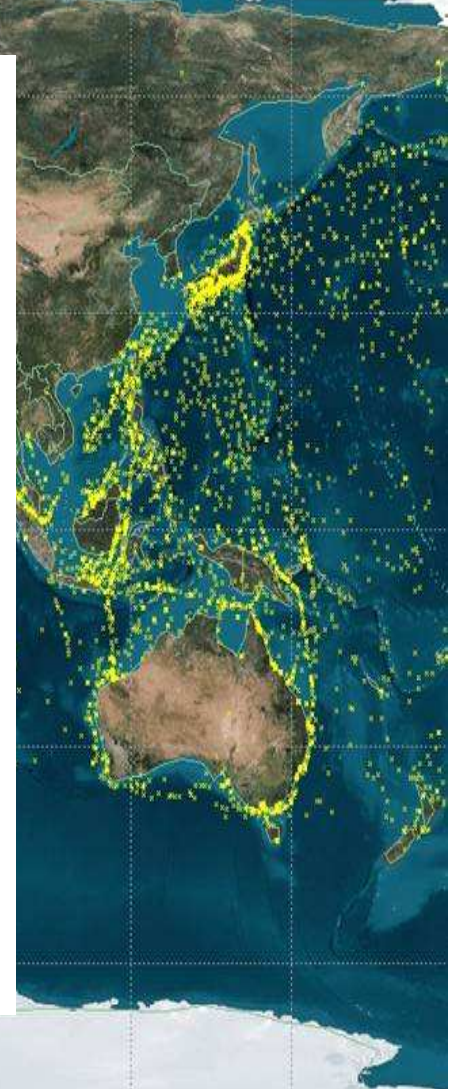
- optimising operational costs and reducing delays:
 - helping private industry
 - improving the quality of public decision-making
 - strengthening marine scientific research
- increasing competition amongst users of marine data
- reducing uncertainty in knowledge of the oceans



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- The background of the slide is a world map with a grid of latitude and longitude lines. The map is overlaid with numerous small yellow and green dots, representing marine observation data points. The dots are most densely clustered in the North Atlantic, the Mediterranean, and the Indian Ocean. A small label 'AUTIAS SEL' is visible on the map near the coast of West Africa. The map also shows the outlines of continents and the Arctic region at the top.
- an observation not made today is lost forever
 - if not usable, also existing observations are lost



- Discovery of Data.
 - Especially difficult outside your own community
- Access to data.
 - Confidentiality
 - Desire of owners to exploit added-value themselves
- Use of data.
 - Often restricted to “research”
- Cost of data.
 - Landsat fiasco
- Coherence of Data.
 - Especially cross-disciplinary and cross-border
- Quality of Data.
 - Data unaccompanied by precision estimates is useless



Current spending in EU

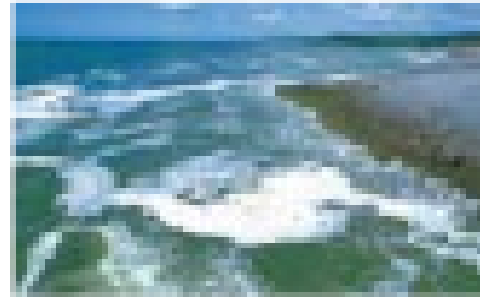


Space data	€400 million per year
In-situ data	> €1 billion per year

From Observation to Information

Analysis and Assessment

- Combination of different data
- Model Application
- Data interpretation
- Environmental Assessment



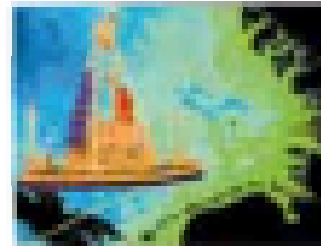
Data Processing and Management

- Data check, -conversion and -storage
- Quality control
- Data presentation



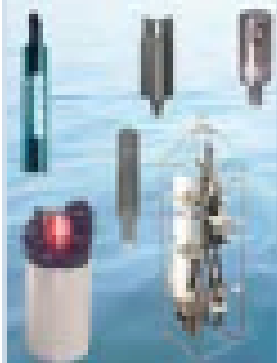
Observations

- from automated systems
- during ship cruises
- from remote sensing



Essential Components of an Observation Network

Sensors to measure continuously and autonomously physical, chemical and biological parameters



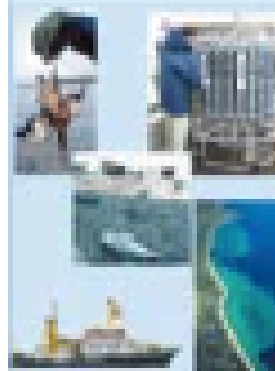
- salinity, temperature
- turbidity, oxygen
- chlorophyll, nutrients
- pH, alkalinity
- bathymetry
- primary production

Platforms or structures anchored on the seabed, floating in the water column or drifting at the sea surface, and remote sensing from satellites.



- buoys, floats
- gliders
- mooring
- AUVs, larval
- FerryBox
- cabled networks
- remote sensing
- living Argo

Sampling and consecutive laboratory analyses from research ships, or shore, including water, sediments and biota (phytoplankton, bacteria, zooplankton, fish)



- inorganic trace compounds
- gases, e.g. CO₂, CH₄, DMS
- organic micropollutants
- abundance & function of biota
- food web
- HABs

Communication systems to transfer in real-time data from sensors to the network and to the land stations



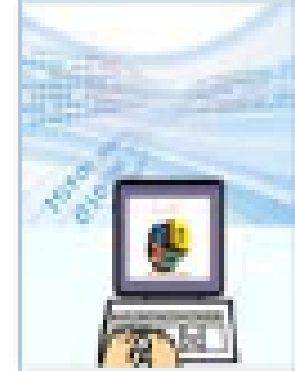
- satcom
- GSM, GPRS
- fibre optics
- acoustics

Data collection and management system for direct control of data quality, and data storage systems to enable data analysis and use for model applications



- data bases
- quality control
- data standards

Software and web based information tools to analyse data for trends, compliance to EU directives, to distribute and disseminate data to end users



- analysis
- Presentation
- web
- GIS



Observations have to resolve existing scales.

Temporal scales from

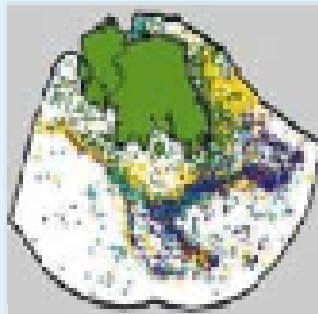
- Seconds for tsunami alerts

to

- Centuries for climate effects

Regional Scale

Example: Fishing efforts near Ireland



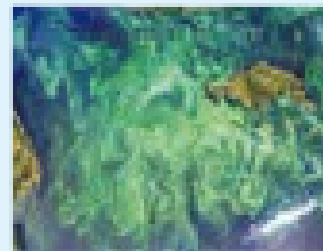
Regional Scale

Example: Invasion of new species and community shift



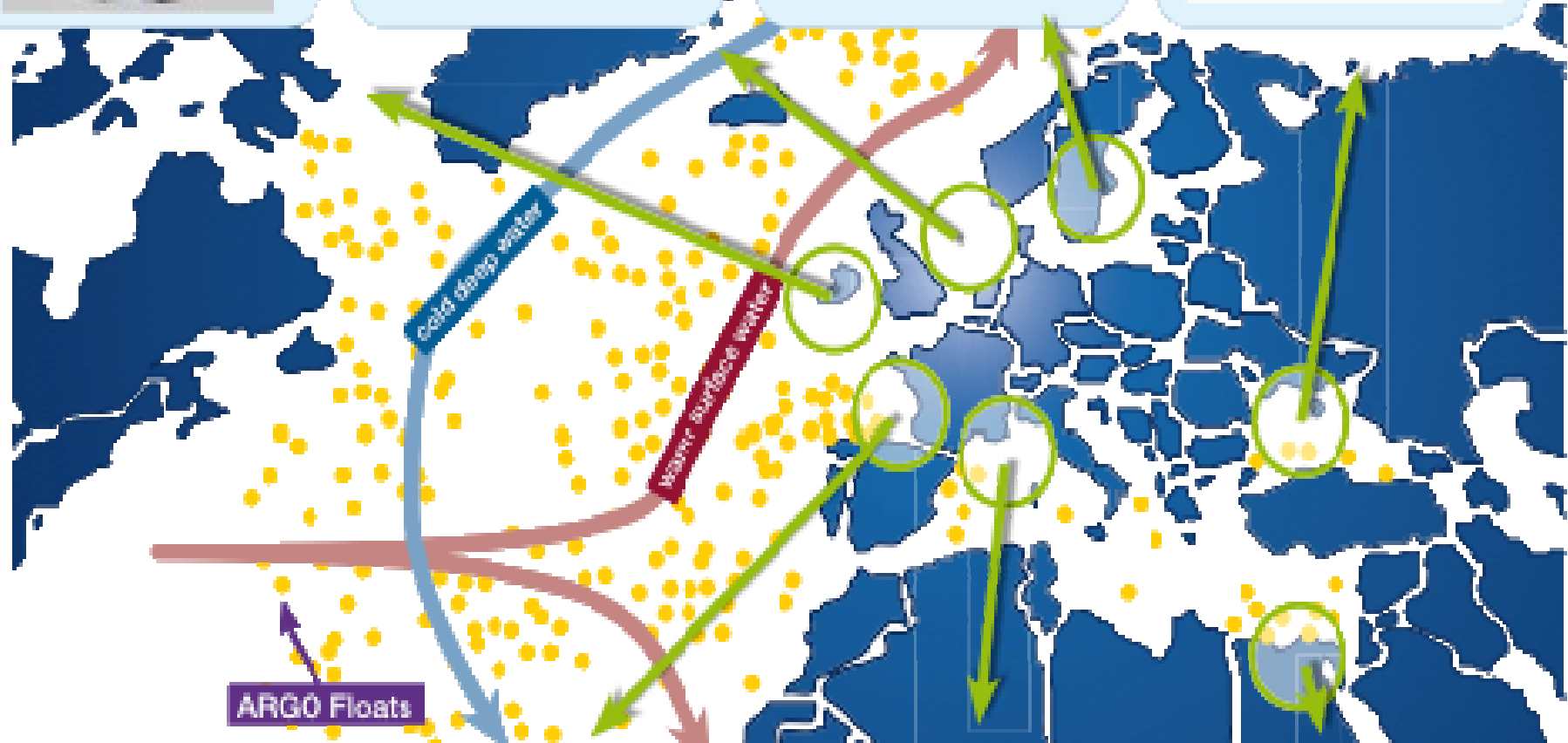
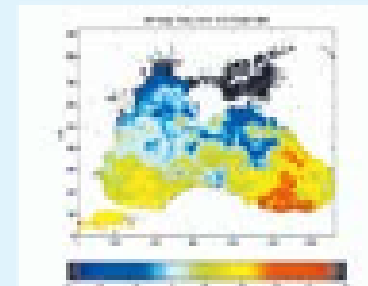
Regional Scale

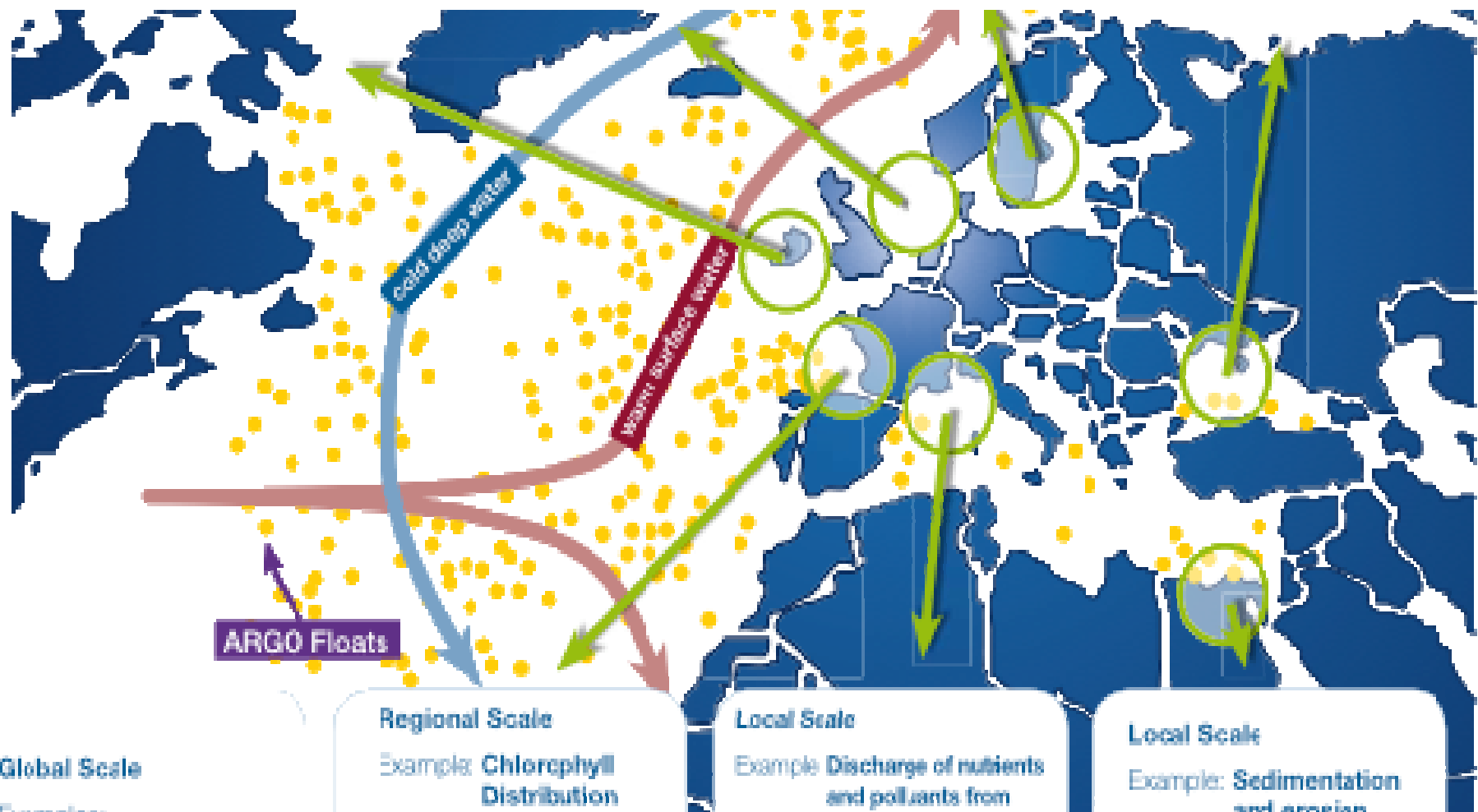
Example: Cyanobacteria Bloom



Regional Scale

Example: Sea Surface Temperature Maps





ARGO Floats

Global Scale

Examples:

Global currents:

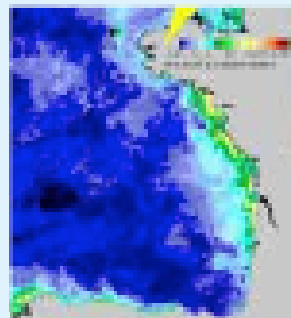
Gulf Stream (Observed by ARGO floats)

Meteorology:

North Atlantic Oscillation

Regional Scale

Example: **Chlorophyll Distribution**



Local Scale

Example: **Discharge of nutrients and pollutants from river into the sea**



Local Scale

Example: **Sedimentation and erosion**



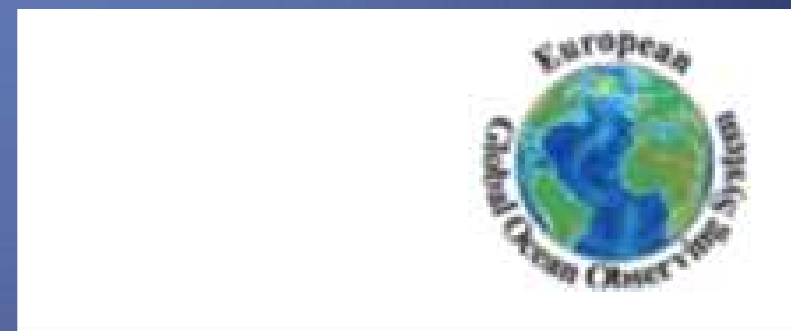
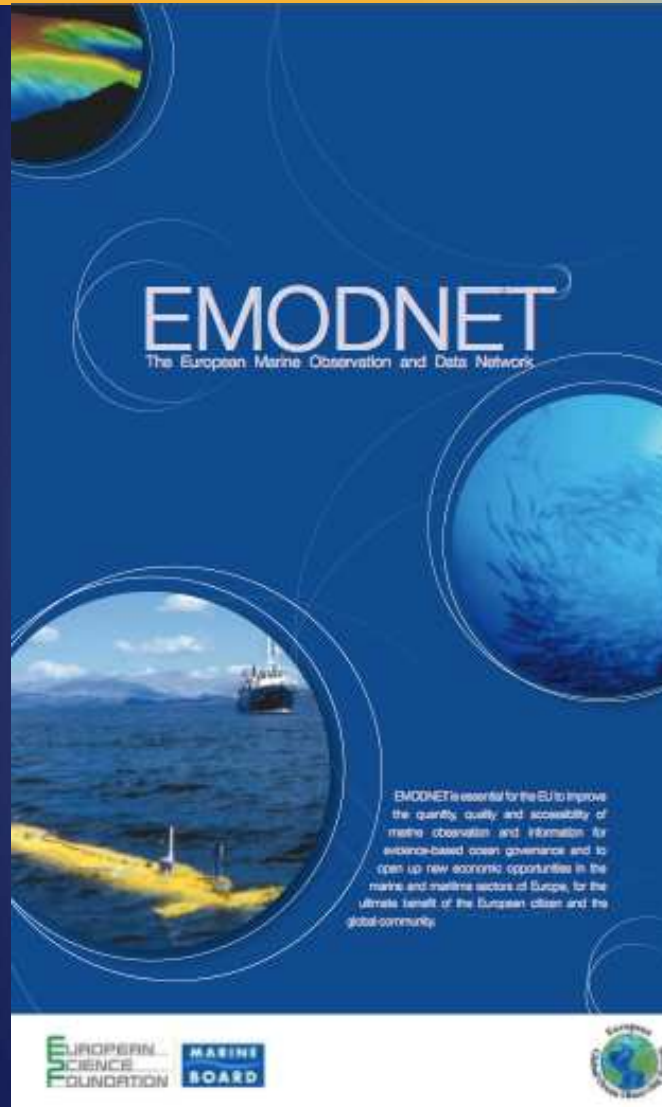
How to implement EMODNET?

- Discovery of existing holdings of marine data relevant to the identified needs.
- Performance of a gap analyses to determine where the shortcomings in existing data lie for the coastal and open oceans.
- Coordinate joint investments in sustainable, efficient observing systems.
- Removal of the impediments to exchange and effective access to data
- Implementing collaboration and governance arrangements to sustain the EMODNET: Intergovernmental agreements involving the EU and Member States will be essential to provide an adequate level of governance and ensure long term investments.





- **COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT: Marine Knowledge 2020**
 - Covers EMODnet, GMES, Data Collection Regulation etc
- **Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL concerning the establishment of a Programme to support the Integrated Maritime Policy**
 - Proposes a financing for period 2011-2013



Deep Ocean

Shelf and coastal seas

Satellites

Active and passive sensors:
enable measurements of ocean surface parameters (SST, wind, sea level height, sea state, sea ice, ocean colour) and of the geoid
Data gathering (e.g. from drifter, Argo profilers)
www.ess.int

Ocean reference sites
Wide variety of variables
Time series
Surface to full ocean depth
www.oceansites.org

Moored buoys arrays
Surface meteorology, SST, SSS, SLP
Ocean T, S V profiles
www.metoc.iecm.fr/argos

Argo profiling float array
T, S profiles every 10 days
V at ~2000m
www.ifmarnet.hi/euro-argo

Glinters
Provide long path T, S and vertical water velocity with depth
www.ocean-ipsi.upmc.fr/gloerist/EGOV

Autonomous underwater vehicles
Sensors include compasses, depth sensors, sonars, magnetometers, thermistors and conductivity probes

Remote operating vehicles
Includes benthic landers and corers
Sampling of the deep ocean and sea bed

Key	
SST	= Sea surface temperature
SSS	= Sea surface salinity
SLP	= Sea level pressure
T	= Temperature
S	= Salinity
V	= Ocean current data
pCO ₂	= Partial pressure of carbon dioxide
XBT	= Expendible bathy-thermograph

Ship of Opportunity Programme
Repeat XBT line network measuring temperature profiles
www.jcommops.org/scoop/

Sustained and repeated ship-based hydrography and carbon network

Research ship full depth T, S & carbon profiles
Identified lines
www.iaccp.org
Volunteer Observing Ship (VOS) fleet
Surface meteorology, SST
VDCSIm
Includes extensive ship metadata
www.jcommops.org/glof
Carbon VOS
pCO₂ and surface T&S
www.iaccp.org

Satellites

Remote sensing of shelf sea ecosystems
www.aaf.org/research-areas/marine-board/publications.html

Oil and gas platforms
Meteorological data

Ferry box
Measurements include:
SST, SSS, oxygen, nitrate, sound velocity, fluorescence, light, redox levels, PH, dissolved organic material, turbidity, chlorophyll
www.ferrybox.org

Surface drifter array
Surface V, SST, SLP
www.metoc.iecm.fr/argos

Continuous plankton recorder
Measures ecology and biogeography of plankton
www.sah/cs.ac.uk

Drifters, autonomous vehicles, gliders, ROVs
Measurements include temperature, salinity, velocity, biogeochemistry, positional and other information, depending on vehicle

Coastal zone monitoring
Land and sea-based instrumentation
Physical, biological and chemical sampling
Sediments

Sea ice observations
In situ and remotely sensed
www.damodis-eu.org

Shelf and near-shore moorings; coastal observatories
SST, SSS, S, V profiles
Chemical and biological sampling
Coastal HF radar networks

Research vessels
Discrete sampling
e.g. T,S; biology, chemistry
www.gosut.org
www.seam-into.org
www.marcocean.org
www.iaccp.org

Tide gauges networks
Sea level
Regional and national
www.gcos-seaifmnet.org

Cable networks, ocean transport measurements.

Acoustic doppler current profilers
Moored or ship-based



GOOS illustration modified for Plymouth Marine Laboratory by glenn@pml.ac.uk



Thanks for your attention