HALO Second Workshop

MERSEA :
Architecture and interfaces

MERSEA Overarching Objective

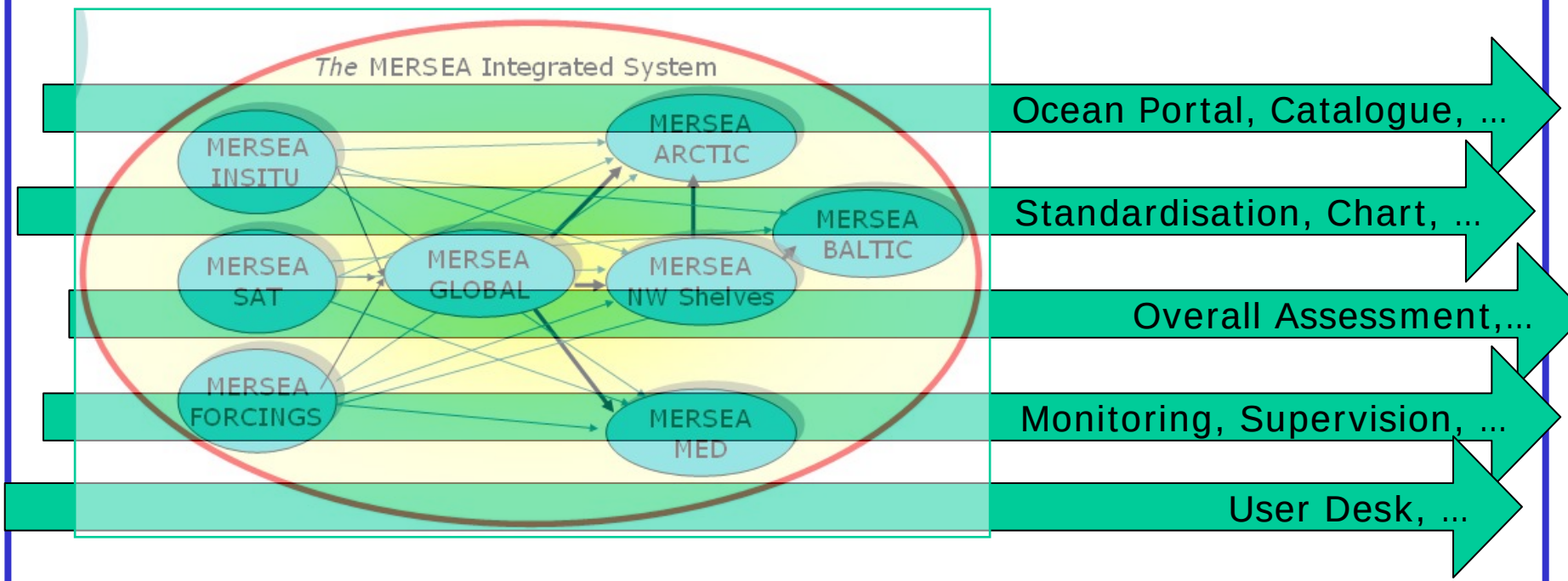
- *Development of a European system for operational monitoring and forecasting of the ocean physics, biogeochemistry, and ecosystems, on global and regional scales*
- A system of systems
- Marine Core Service : will deliver basic oceanographic information on the state of the marine environment and its evolution on different time scales.
  - the common data requirements for all users in the marine sector, i.e. information (sometimes mandatory) for existing & new downstream services.
  - Regular and systematic reference information on the state of the oceans and regional seas
  - Aimed at ***intermediate users*** in support of their mission or activities

State of the project

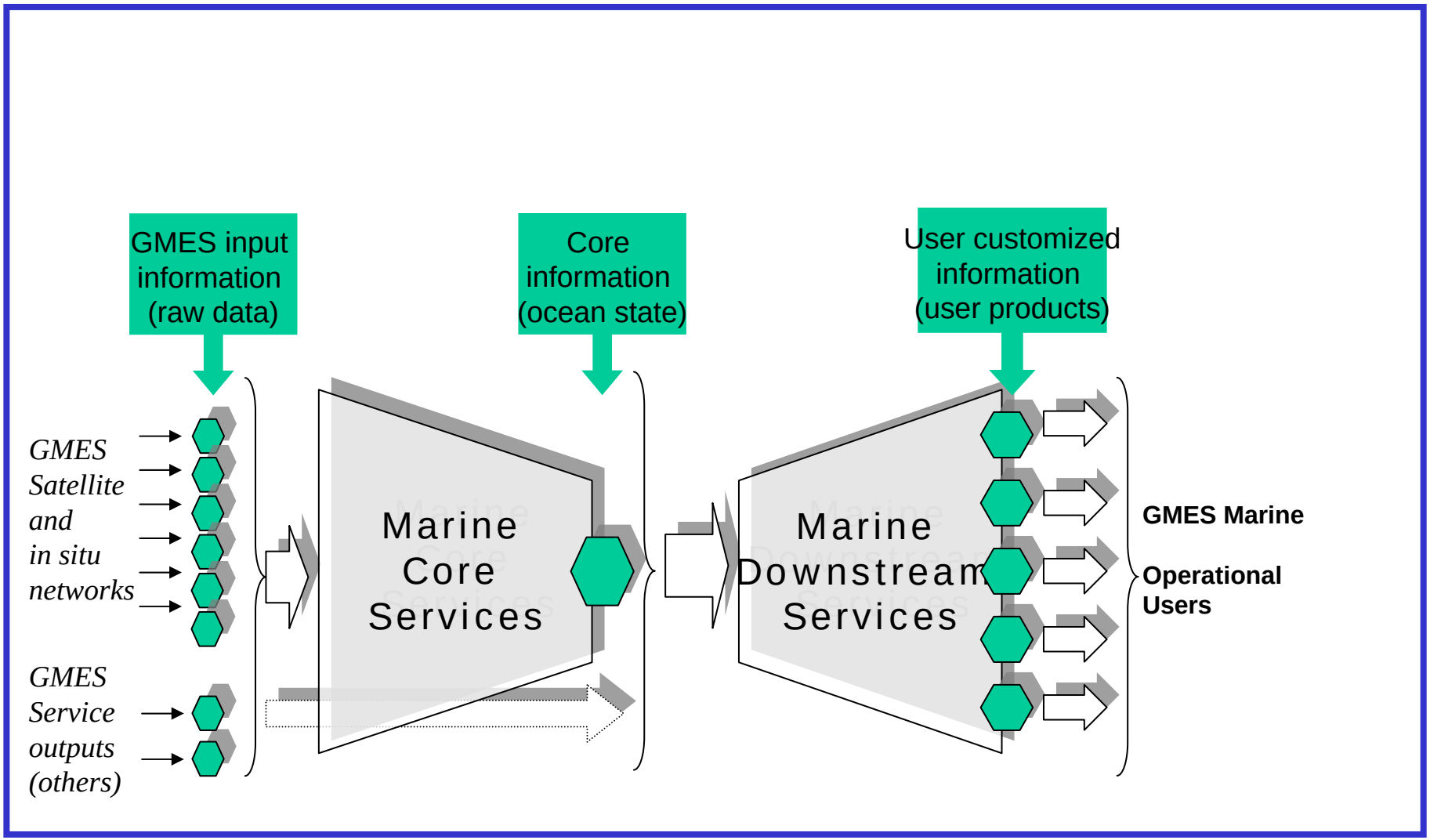
- Start April 1st, 2004 : close to 21 months
- Since Octobre 2005 : first Target Operational Period (TOP1)
  - Six month trial, demonstration, assessment, linked to upgrades from V0 to V1
  - Significant upgrades to each system and the information network (service charter, formats, standard products and outputs, catalogues, key performance indices)
  - Progress in the overall design
  - All components are running in pre-operational mode
  - Working on assessment and validation methodology

Integrated System : transverse functions

- Cross functions : integration, consistency, quality of services
- Information management : adapt product and delivery to user needs
- HALO's common facilities
- Search and discovery, view, download, order



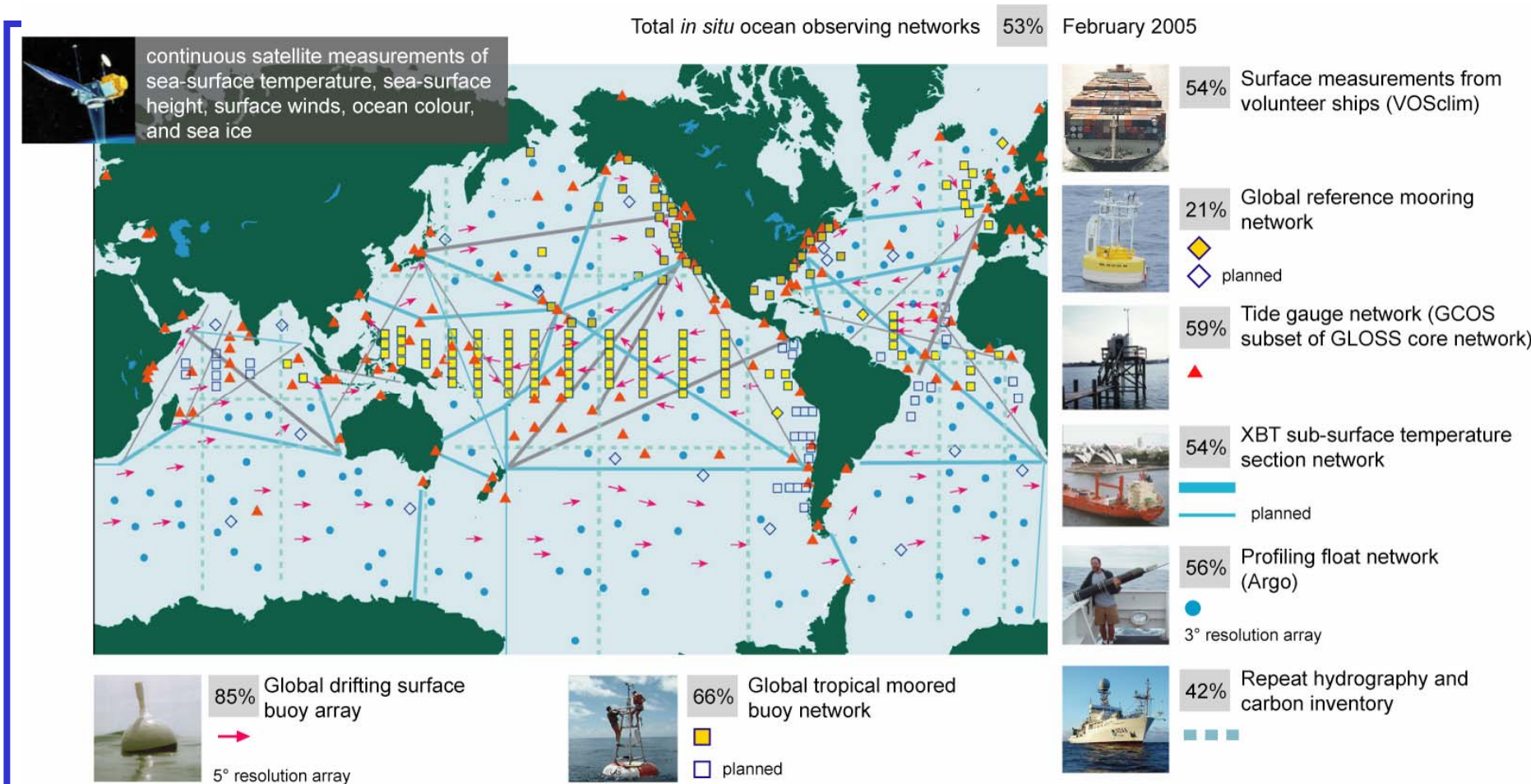
Marine core service : a link between raw data providers and intermediate users



Upstream

- Earth (ocean) observation satellites and their ground segments
- In situ observing systems (ships, buoys, moorings, floats)
- Forcing fields (winds, fluxes) from NWF systems
  - ECMWF, Met Office, HIRLAM, ALADIN
- Assimilation into high resolution ocean circulation models

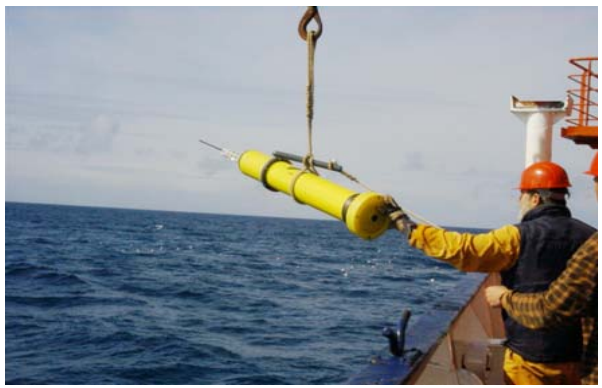
The observing system for climate

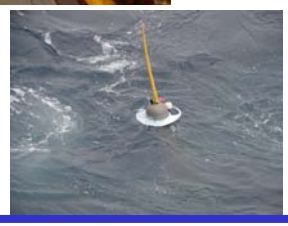


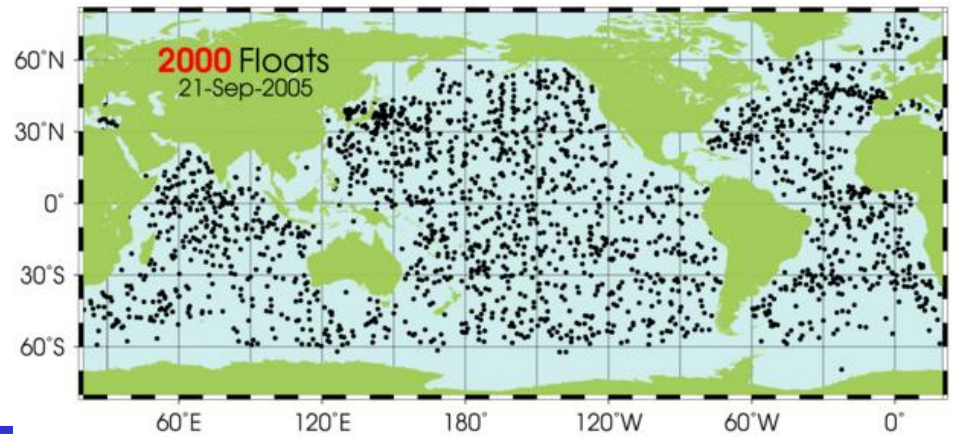
A schematic of the composite ocean observing systems, including the current status against the goals of the 2000 -2010 implementation plan. (Johnson, JCOMM, OPA, NOAA/OCO)

Input data : from R&D to production

- In situ
  - profiles (**ARGO**, XBT), moorings, SST from sh
  - global + focus on Med ; regional data sets
  - new technology (sensors, gliders)
  - **Data management**

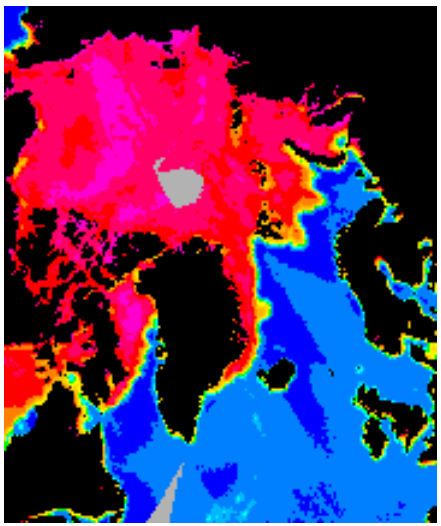






Input data : from R&D to production

- **Remote sensed**
  - merged altimetry (currents)
  - high resolution SST
  - Wind, waves (scatterometer)
  - Ocean colour (SeaWifs, MERIS,MODIS)
  - Sea ice (SSMI)
  - SAR synthetic aperture radar



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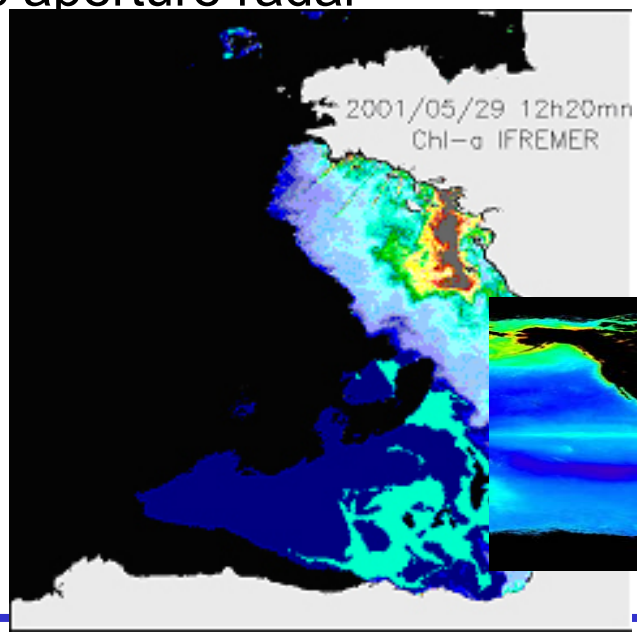
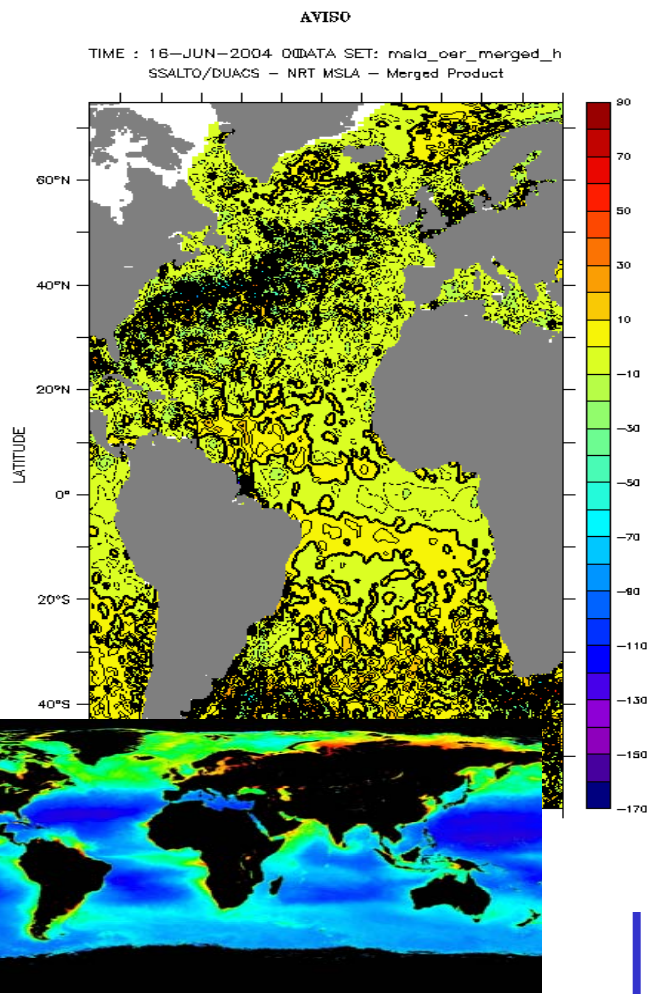
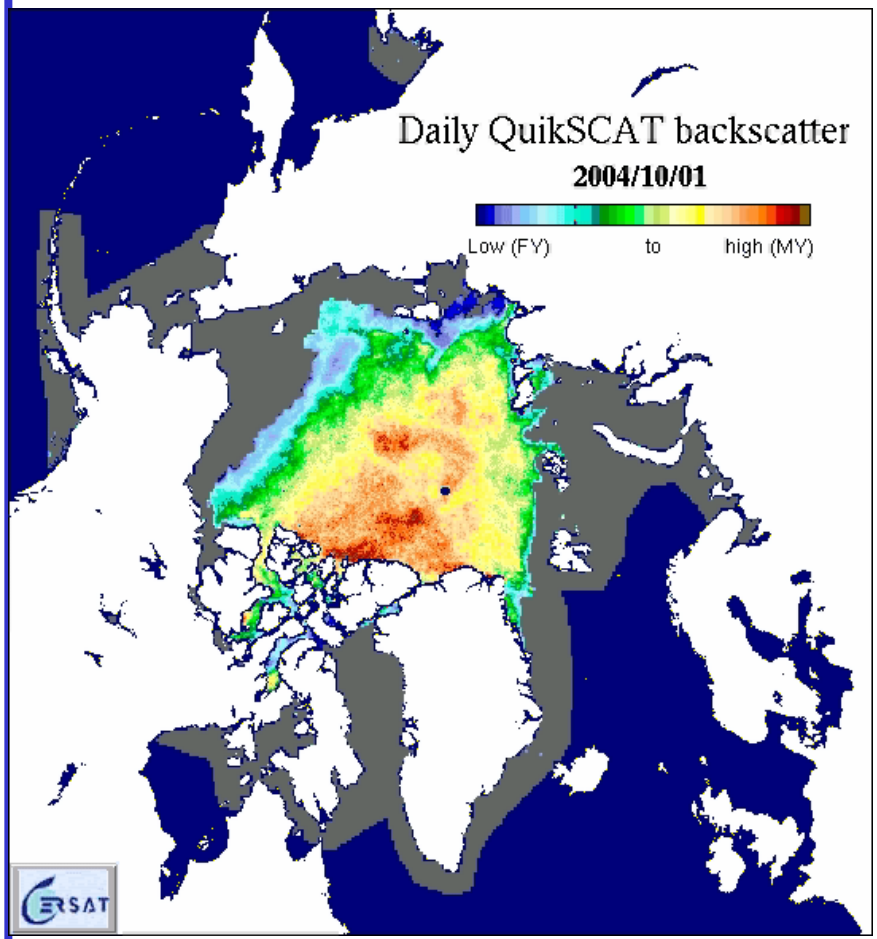
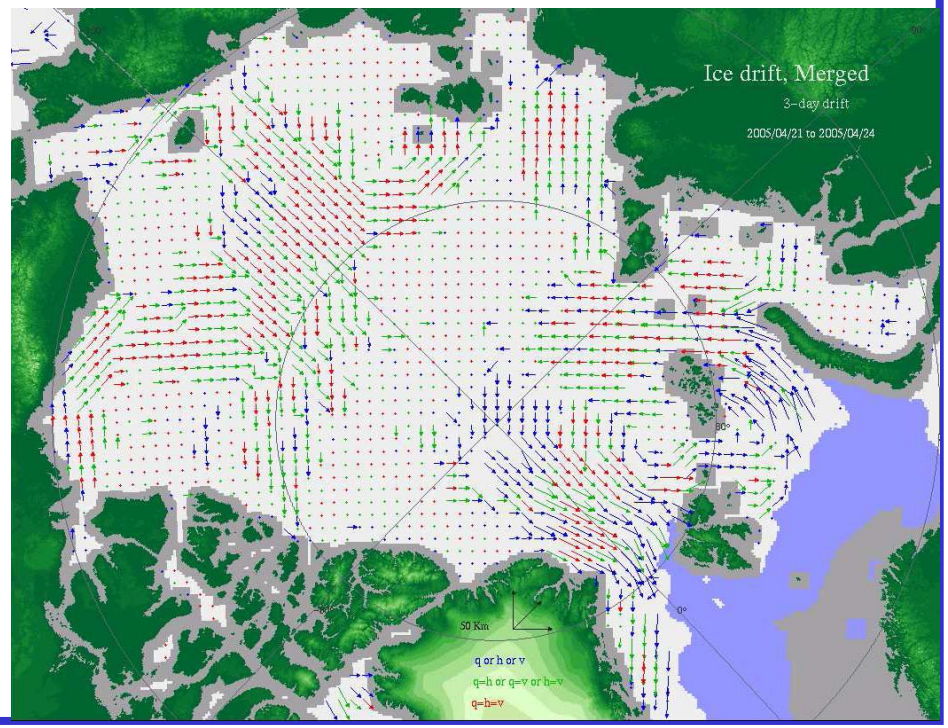
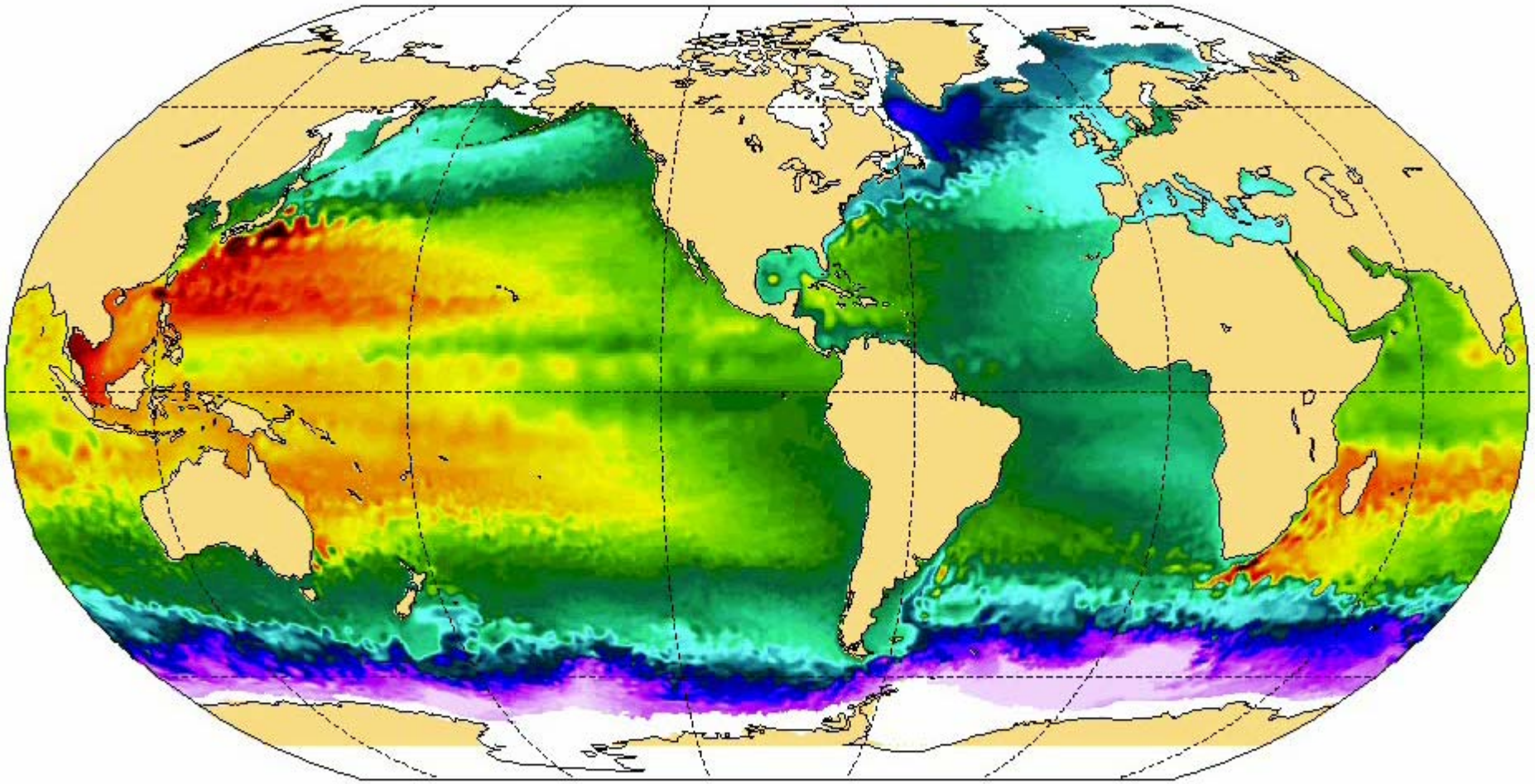




Sea Ice Concentration and drift







Architecture (1/2)

- The main nodes : TEP's : *« Thematic Portals »;*
  - Facilities –or Centres for *transformation and production*
- Three Data Centres
  1. Remote sensed data
     - Altimetry, Sea Surface reflectance (aka Ocean colour), SST, sea ice,
  2. In situ
     - Temperarure, salinity; [sea level, biogeochemistry]; global and regional
  3. Forcing fields
     - NWP and remote sensed

Architecture (2/2)

- Data centres provide merged validated products
  - Regular grids, re-analysis, climatology, statistics, …
- Monitoring and forecasting Centres
  - Global, NE Atlantic, Arctic, Baltic, Mediterranean
  - Transform the data into ocean analysis and forecasts
  - Elaborate specific products
- Intermediate users :
  - EC Directorates, Marine Strategy, EEA
  - met agencies, coast guards, marine safety
  - Value adding companies
  - Scientific research
  - Coastal systems

Towards GMES Services

- Identify *Operators* of the Facilities
  - Bound by a Service Level Agreement, a quality Charter
  - Implement common functions, agree on formats,
  - Provide the Marine Core Service, aimed at intermediate users
- Need political ownership by GMES « *entity* »

Commonalities, interfaces

- Most interfaces are with atmosphere
  - But some shared satellite systems Atmosphere, Land, Ocean,
- Ocean receives *forcings* from NWF
  - Wind, fluxes (heat, moisture)
  - [aerosols, carbon concentration]
- Ocean provides
  - Improved fluxes, gas exchange coefficients, [+biological fluxes]
  - Ocean currents (for waves, drift forecasts)
  - High resolution SST (and heat content), sea ice
  - In situ ocean observations

A word on fluxes

- ECMWF (and Met offices) provides air temperature, winds, and flux estimates
  - Ocean recomputes those fluxes, using bulk formulae and SST
  - High resolution fluxes, merged with scatterometre data
  - Fluxes are a product (output) of the ocean models
  - Sea ice has a strong impact on fluxes
  - Concerns about data extraction (native vs standard grids) ?
- Data policy has to be considered

Conclusions

- MERSEA is setting up Facilities for diverse data
  - Remotely sensed, in situ, ocean fields (incl. Fluxes)
- To be transitioned to full operational status
  - Service level agreement for GMES
  - Distinct from WMO procedures ?
- Is HALO study logic taking proper account of these developments ?