Perspectives on European marine data management

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Some history

Global

* 1940-1945: all data from Polar Year 1932 were lost during World War II.
* 1957-1958: The International Geophysical Year established the World Data Centre System (A: USA, B: Russia and C: Western Europe, Australia, and Japan
* 1960: Intergovernmental Conference on Oceanographic Research, in Copenhagen, UNESCO member states recommended that all states make every effort to publish oceanographic data and distribute them to all interested institutions.
* 1960: Establishment of IOC
* 1961: Established of the Working Group on Exchange of Oceanographic Data => IODE was born

Some history

Global

* 1991: Global Ocean Observing System (GOOS) as part of Global Climate Observing System (GCOS) led by WMO, IOC, UNEP and ICSU (World Climate Research Programme, CMIP5)
* 1992: IOC/IODE started Global Oceanographic Data Archaeological and Rescue Project (GODAR project)
* 2000: IOC/IODE established World Ocean Database project (WOD01-WOD13), NODCs data archival, integration, QC to produce a gridded World Ocean Atlas (WOA).
* 2003: IOC Oceanographic Data Exchange Policy
* 2005 to 2015: Group on Earth Observations (GEO) to build a Global Earth Observation System of Systems (GEOSS) (GOOS = marine component of GEOSS)
* 2008: ICSU established World Data System (WDS) and adopted the GEOSS data sharing principles, currently 86 members
    * Regular members Oceanography:
        * WDC - Oceanography, Silver Spring; WDC - Oceanography, Tianjin; WDC - Oceanography, Obninsk
        * Flanders Marine Institute, Data Centre; PANGAEA - Data Publisher for Earth & Environmental Science
    * Network member Oceanography
        * International Oceanographic Data and Information Exchange (IODE) (80 Data Centres)
* 2009: IODE OceanDataPortal

Some history

Europe

* 1994-1998: EC MAST Data Committee of NODC's
* 1998 to 2020: Global Monitoring for Environment and Security (GMES), now Copernicus, ESA and MyOcean
* 1998-2001: European Network for Oceanographic Data & Information Management (EURONODIM)
* 2002-2005: Sea-Search
* 2004-2016: SeaDataNet, 45 European data centres
* 2004-2009: MarBEF, ERMS/WoRMS, EurOBIS, Ocean Biodiversity Informatics conference, Hamburg
* 2007: INSPIRE: Infrastructure for Spatial Information in the European Community, GeoPortal by JRC.
* 2010: integrated maritime policy: European Marine Observation and Data Network (ur-EMODnet)
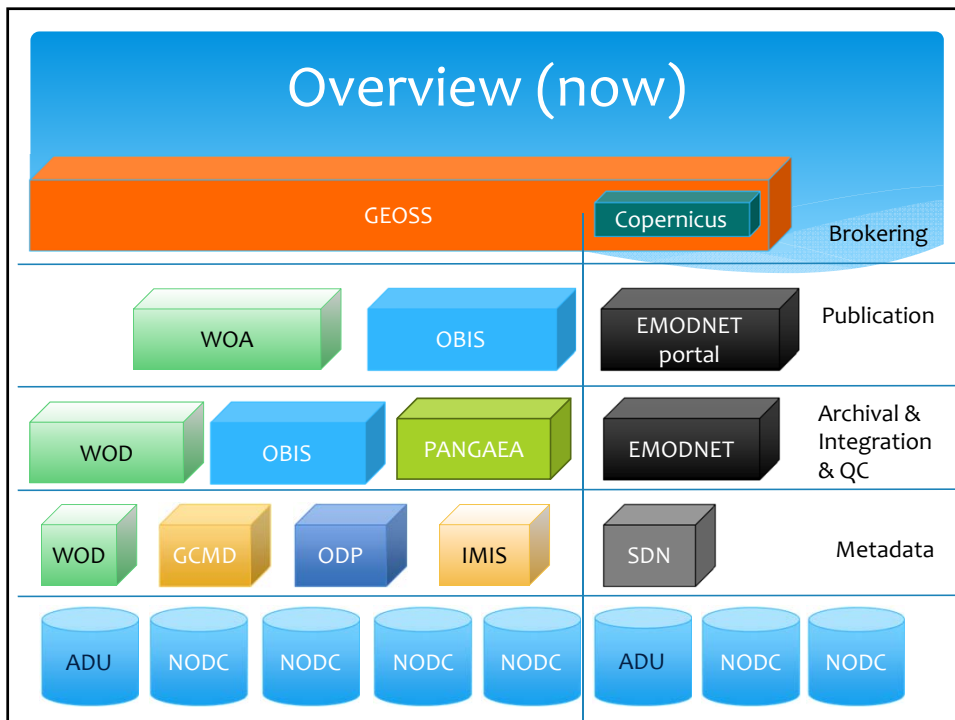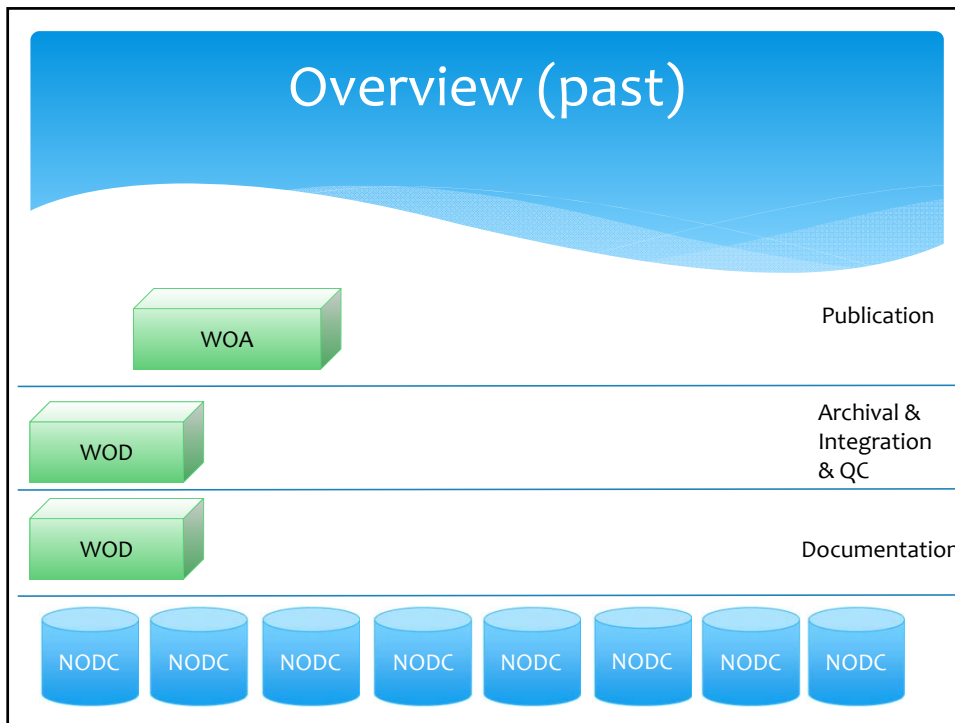* 2014-2020: Marine Knowledge 2020 (EMODnet) ; building a European WOA

Some history

Europe

* Collaboration between EU, USA and AU
    * Research Data Alliance, Marine Data Harmonization IG
    * Ocean Data Interoperability Platform (ODIP), sharing standards, best practices and technologies
* Research infrastructures
    * ESFRIs, D4Science (iMarine), BioVel, …

Marine Data Management

* Data standardisation
* Data documentation
* Quality control
* Data integration
* Data publication
* Data distribution
* Training in data management

Overview (past)

WOA	Publication
WOD	Archival & Integration & QC
WOD	Documentation
NODC NODC NODC NODC NODC NODC NODC NODC	

Overview (now)

GEOSS Copernicus	Brokering
WOA OBIS EMODNET portal	Publication
WOD OBIS PANGAEA EMODNET	Archival & Integration & QC
WOD GCMD ODP IMIS SDN	Metadata
ADU NODC NODC NODC NODC ADU NODC NODC	

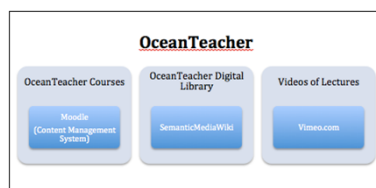# Data standardisation

* **IODE Ocean Data Standards** (www.oceandatastandards.org)
  * Recommendation for a Quality Flag Scheme
  * Adoption of ISO 8601 as the standard for the representation of dates and times
  * Adoption of ISO 3166-1 and 3166-3 Country Codes
* **IODE Ocean Data Practices** (www.oceandatapractices.org)
  * Promoting best practices from the IODE community

* **EU Data Standards**
  * SDN/BODC Controlled vocabularies
  * SDN Quality Flag Scale
  * SDN NetCDF (CF) format
  * SDN CDI metadata
  * INSPIRE
  * OBIS Scheme
  * WoRMS taxonomy
* **EU Data Practices**
  * E.g. ICES guidelines

Capacity Development

* IOC/IODE Ocean Teacher Global Academy (www.oceanteacher.org)

"To ensure equitable participation in global initiatives"

* EU ad hoc basis

International Cooperation

* EU NODCs are a strong community network, setting standards and making good progress
* NODCs now need to serve multiple data systems
* EU NODCs work with SDN, contributions to global systems e.g. WOD is slowing down
* WOD produces global maps for monitoring e.g. heat and salinity, by integrating data from Argo floats and gliders, but still need data from NODCs to fill the coastal, continental shelves, and marginal seas areas
* Each region developing their own standards, best practices and data systems. => A challenge for IODE to coordinate. IODE's role becomes to promote new technologies and innovations, and at the same time ensure worldwide participation.

Future

* Future is in innovation, new technology, and will be market and service driven
* Improve Data-Science interface. Need more information generation. What world pressing questions can be answered?
* Improve communication
* What is the entire cost model (from data collection to services, including operational/infrastructure costs) and who will pay?
* End of the open access to data?
* Need Specialisation, near-real time delivery, keep the global context.