HELLENIC NATIONAL OCEANOGRAPHIC DATA CENTRE

Sissy Iona

HCMR, GREECE
JCOMM/DMPA COORDINATOR
IODE CO-CHAIR

NOAA Science Seminars , NOAA/NODC,SSMC III, E/OC5,
Silver Spring, 7 July 2011

History

- It was established in **1986** from the cooperation of Greece with IOC/UNESCO
- It's the **Responsible National Agency** for the management of oceanographic data and information
- It's part of the international network of the **NODC's** of the **IOC/IODE**
- It's belongs to the **HCMR**

HCMR

- The Hellenic Center for Marine Research (HCMR)
  - major public Marine Research Center in Greece
  - comprises 5 Institutes

    (Oceanography, Inland Waters, Marine Biological Resources , Marine Biology and Genetics, Aquaculture)
  - 500-personell staff
  - shares its buildings and facilities in Athens, Heraklion Crete isl., Rhodes isl.

HCMR HQ- Anavissos

Ag. Kosmas

Crete

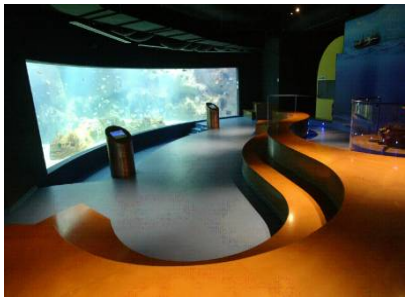
Rhodes Isl.

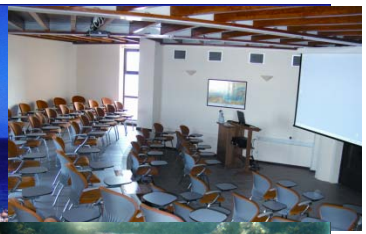
HCMR

- Library
  - 17,000 volumes of monographs, reprints, reports, 180 active print journals, access to over 8,000 electronic journals
- Aquaria

Crete: “Thalassokosmos”

Rhodes: “Hydrobiological Station”





HCMR Fleet

- **3 Research Vessels**
  - **Aegaeo** (62 m), **Filia** (26.1 m), **Alkyon** (13.4 m)
- **Underwater Vehicles**
  - **1 manned (crew of two) submersible** (THETIS), operational depth of 610 m, a submergence limit of 8-9h.
  - **3 ROVs** (Max Rover, Super Achilles, Seabotix)
- More info on HCMR: ***www.hcmr.gr***

HNODC Mission

- **Safeguarding** & **effective mgmt of** marine data and information:
  - collection
  - cataloguing
  - formatting
  - quality controlling
  - archiving
  - dissemination and exchange

Data Sources

- Hellenic Research Institutes (mainly by **HCMR**)
- Through the HNODC participation in **National**, **European** and **International Data and Exchange Projects**

Projects (1/2)

- Participation in Research Projects during the last 15 yrs:
  - **MEDATLAS (1994) PP -**A Composite quality checked hydrographic data set for the Mediterranean Sea
  - **EURONODIM (1998)** -European Network for Oceanographic Data & Information Management
  - **MEDAR/MEDATLAS (1998)**- Mediterranean Data Archaeology and Rescue of Temperature, Salinity and Bio-Chemical Parameters (*Coordinator of the Eastern Mediterranean Data Assembling and Quality Control)*
  - **EDIOS (2001)**- European Directory of Initial Ocean Observing System (*Regional Coordinator* of *Eastern Mediterranean*)
  - **SEASEARCH (2002)**- A Pan-European Network on Oceanographic Data and Information Management
  - **BLACKSEASCENE (2005)**- Black Sea Scientific Network
  - **SEADATANET (2006)**- Pan-European infrastructure for Ocean & Marine Data Management (*Coordinator of the Networking Activities*)
  - **HUMBOLDT (2006)**- Development of a Framework for Data Harmonization and Service Integration
  - **CASPINFO (2008)**- Caspian Environmental and Industrial Data & Information Service
  - **BLACKSEASCENE UPGRADE (2009)**- Black Sea Scientific Network Upgrade

Projects (2/2)

- Participation in Research Projects during the last 15 years:
  - **EMODNET Lot 3 (2009)** – Chemical Data: Preparatory Actions For European Marine Observation and Data Network
  - **EMODNET (2010)** –*Seabed Mapping*
  - **SEADATANET (2011)**- Pan-European infrastructure for marine and ocean data management (*Coordinator of the Networking Activities*)

Support Projects

- Data the management component of the projects:
  - INSEA - Data Integration System for Eutrophication Assessment in Coastal Waters
  - CIRCE - Climate Change and Impact Research: the Mediterranean Environment
  - SESAME - Climate Change and Impact Research: the Mediterranean Environment

Main Facilities

- **Networking Enviroment**
  - is **connected** to the **National Academic network with 1 Gbps** fiberoptic line with failover connection.
  - **localy a gigabit lan is implemeneted** with a 280 Gbps backplain core layer3 switch (HP 9308M) and several border switches
  - Network is protected by **firewall and IDS system** and is monitored using HP open view and Nagios monitoring systems
  - Dial up remote access and VPN services are provided as well
- **Computing Enviroment**
  - Hardware: Is based on several **LINUX** and **UNIX** servers, working as stand alone servers, clusters or virtual machines.
  - Software: **Oracle**, **Mysql** and **Pqsql** RDBMS systems with Geospatial extensions. **Mapserver, Geoserver and Geotools** are used to provide Geospatial access to data.
  - php, perl, C, Java, Fortran, programming languages

HNODC Team

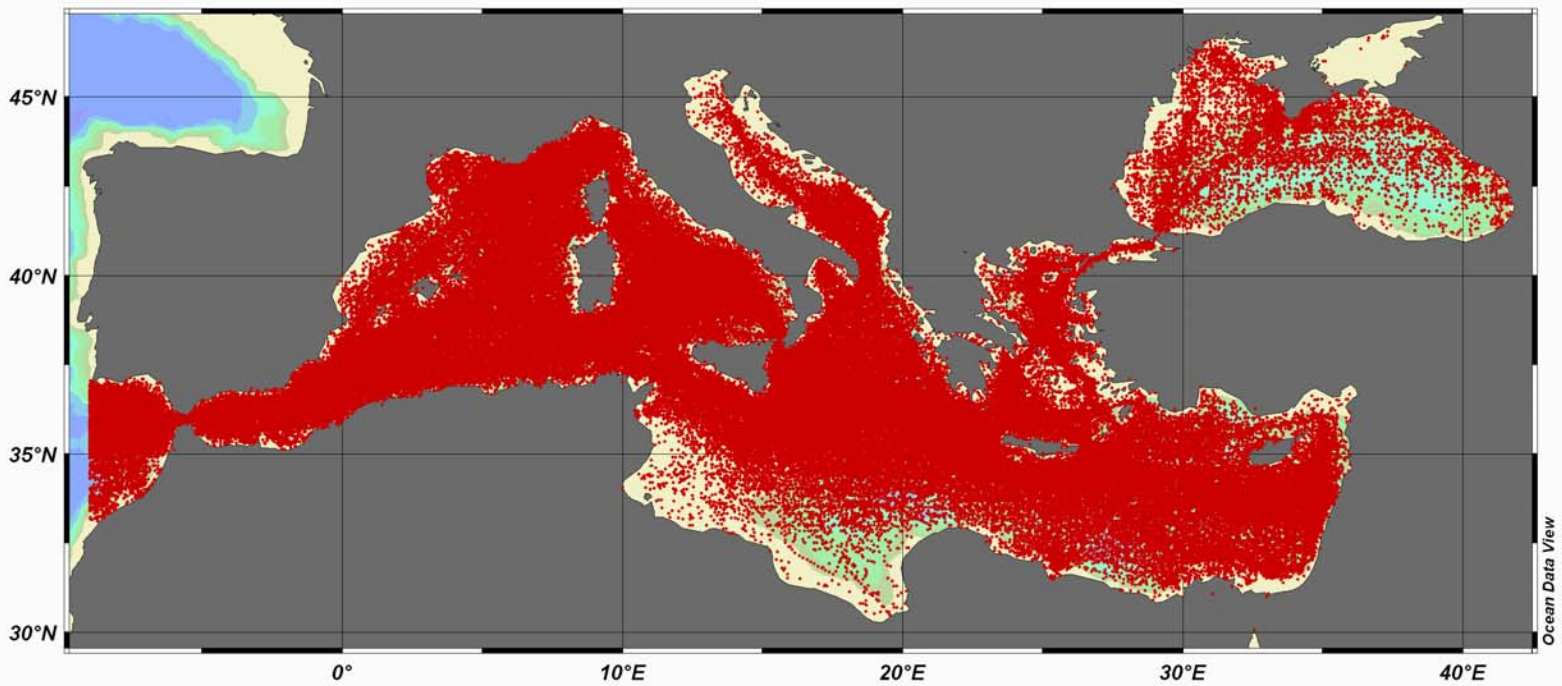
- **permanent staff**
  - 2 physical oceanographers
- **contract employees**
  - 2 computer engineers
  - 1 IT systems expert
  - 1 computer programmer
  - 1 physical oceanographer

Available Physical, Biogeochemical Data

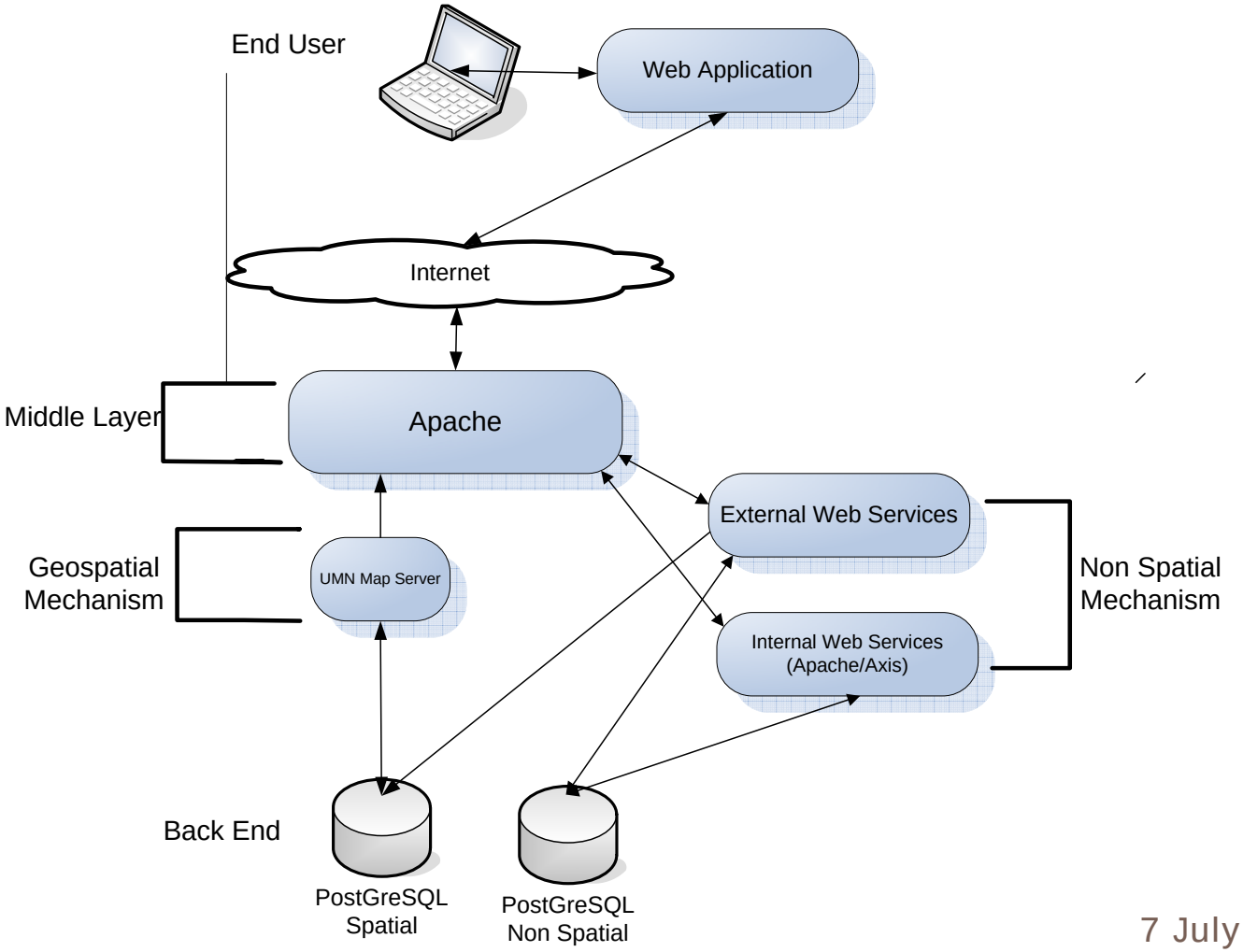
- > 400.000 obs stations of physical, biogeochemical meas.
- > 180 parameters

	MEDAR	National Data	CORIOLIS	WOD05
CTD	*36.558*	*8.805*		*2.743*
Bottles	*88.346*	*2.687*		*11.817*
XBT, MBT	*161.883*		*8.652*	*68.515*
Profiling Floats			*6.924*	*63*
Drifting Buoys				*3167*
Gliders			*13.789*	
ADCP		*980*		
Current Meters		*344*		

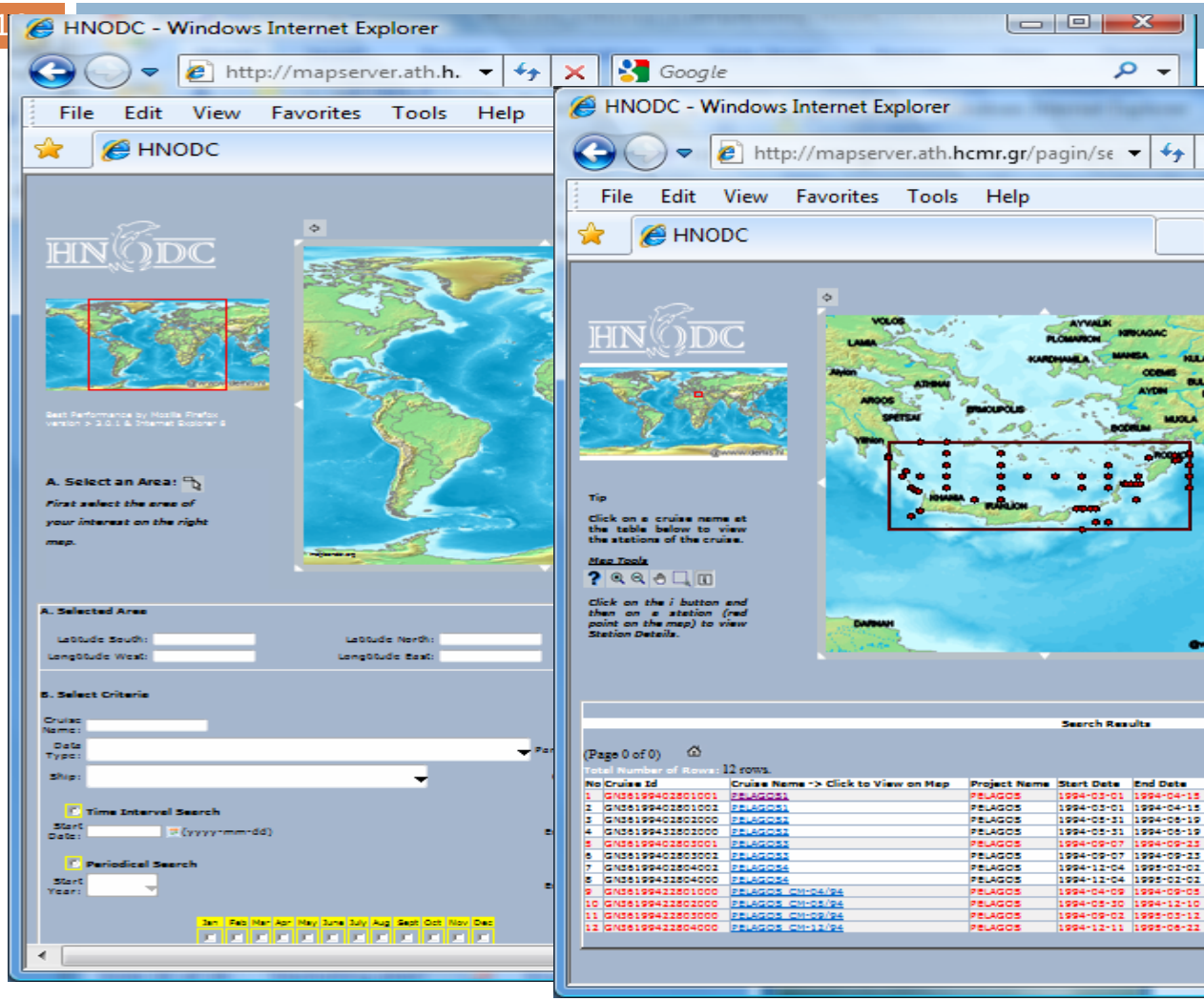
Distribution Maps



System Architecture

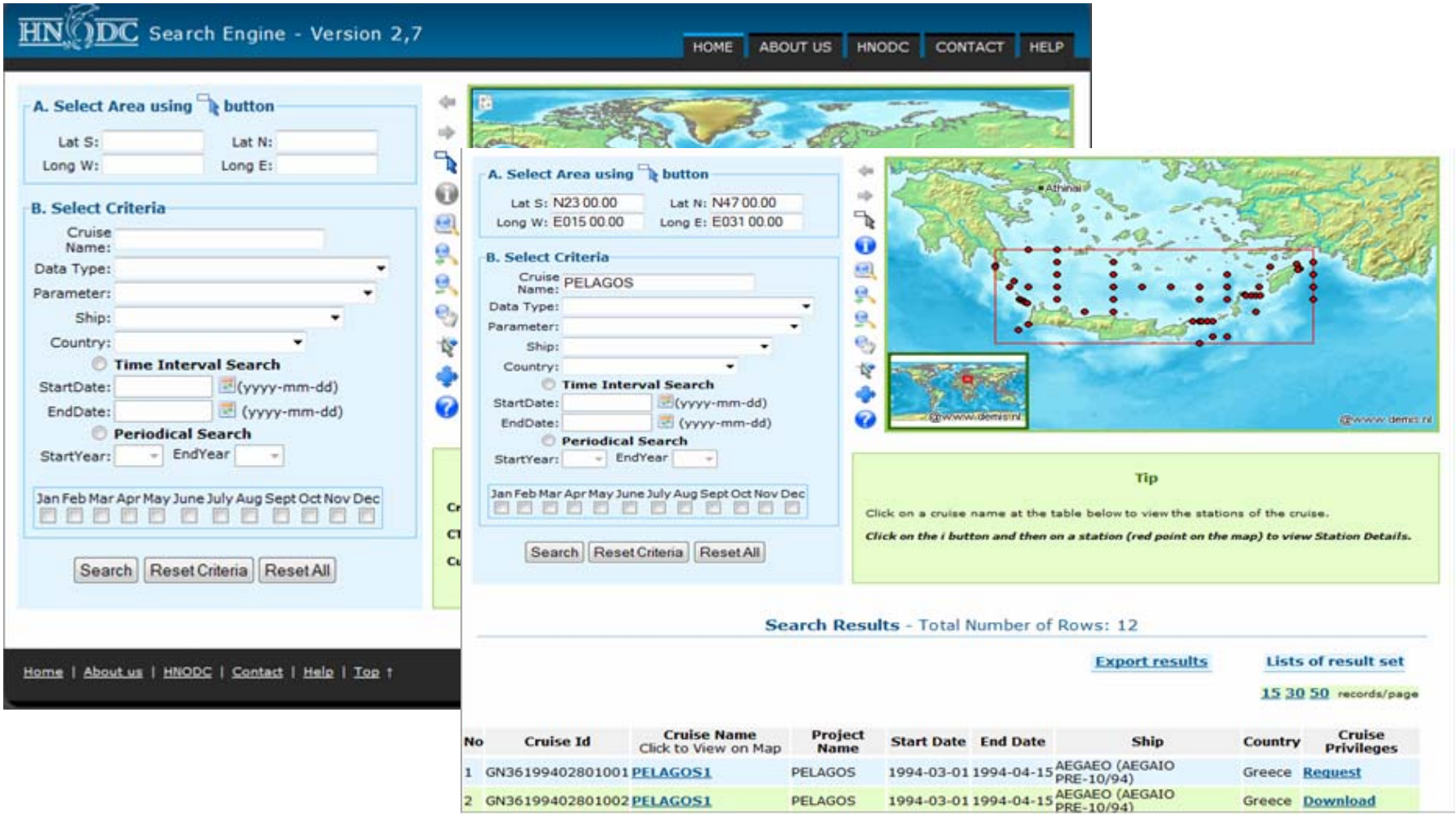


Web Interface



http://hnodc.hcmr.gr

New Web Interface



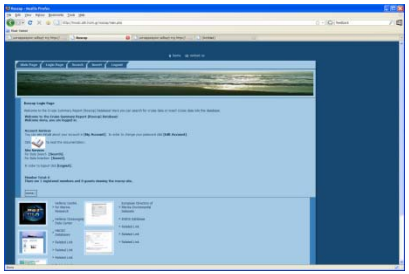
Quality Assurance

By:

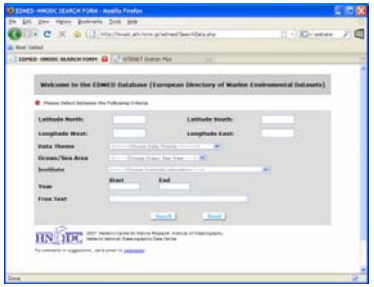
- **Metadata Catalogues** (RDBMS)
- **Common Format** (Ascii Medatlas, ...)
- **Quality Control** on data and metadata (using SCOOP software, under HP-UX environment)
  - UNESCO/IOC/IODE and MAST, 1993, Manual and Guides 26
  - Data Type guidelines - ICES Working Group of Marine Data Management

Metadata Catalogues

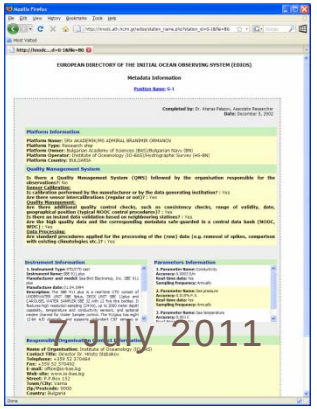
- **National Cruise Summary Report Database - ROSCOP**
  - Free **on line access** to the reports
  - **On-line import** of new reports
  - >190 reports of oceanographic cruises



- **National Environmental Datasets - EDMED**
  - Free **on line access** to the descriptions of the environmental data sets
  - >200 reports EDMED



- **National Observing System Database - EDIOS**:
  - Free **on line access** to the descriptions of the ocean observing, measuring and monitoring Systems in Eastern Mediterranean and Black Sea
  - >2200 desciptions



QC Procedures

- The QC procedures according to IOC, ICES and EU recommendations include **automatic** and **visual** controls on the data and their metadata:
  1. Check of the **Format**
  2. Check of the **location** and **date**
  3. Check of the **measurements**
- The results of the automatic control are added as **QC flags** to each data value.
- Validation or correction is made manually to the QC flags and **NOT** to the data.
- In case of uncertainties, the data originator is contacted.
- All QC procedures applied to the data are fully documented

Automatic Checks of location and date

- For vertical profiles

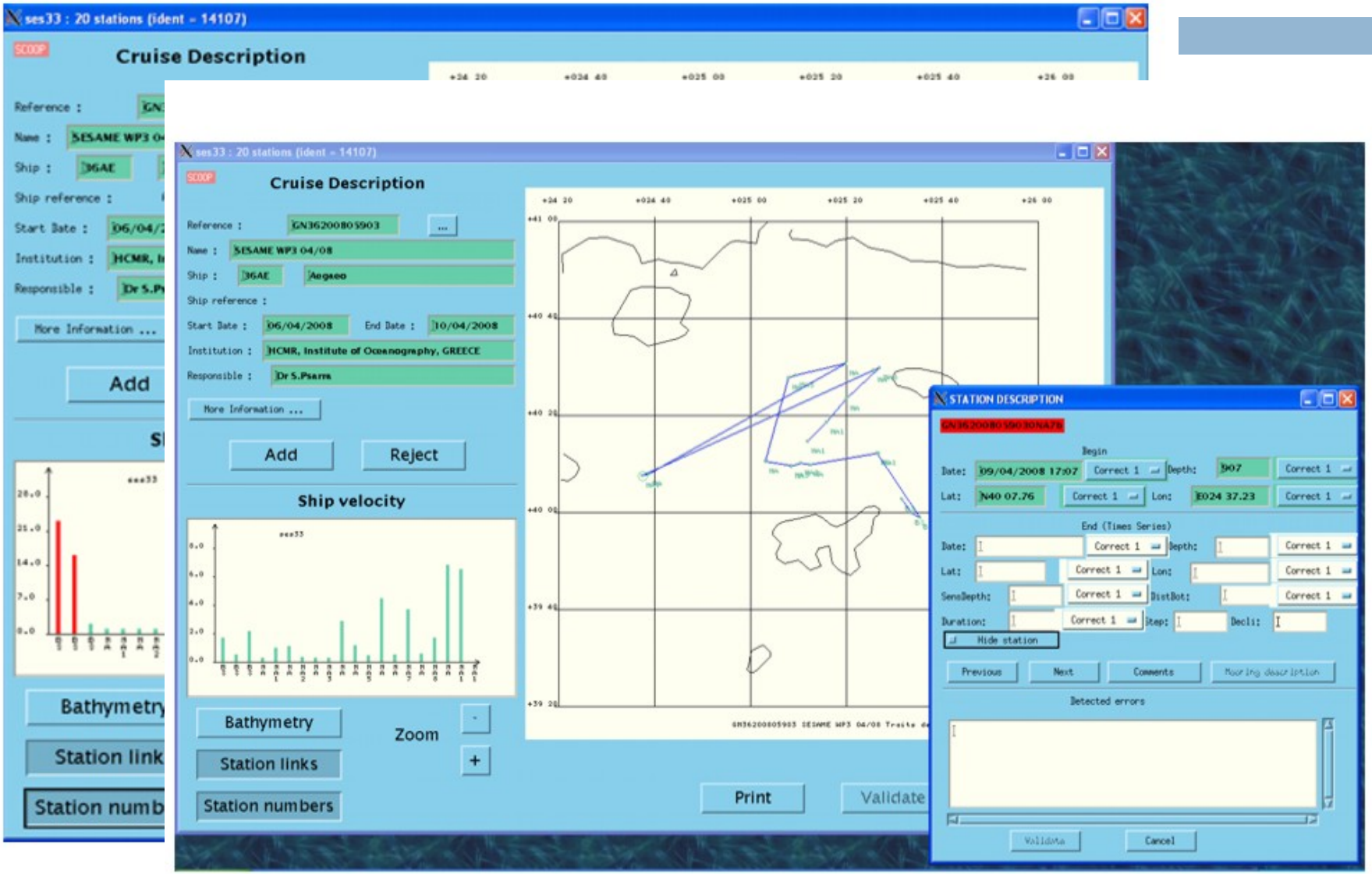
  (CTD, XBT, MBT, Bottle Data, etc)

  - **duplicate entries** within a space-time radius
  - **date**: reasonable date, station date within the begin and end date of the cruise
  - **ship velocity** between two consecutive stations.

  (e.g., speed > (threshold value) means wrong station date or wrong station location, threshold value at HNODC=15 knots)

  - **location/shoreline**: on land position (GEBCO)
  - **bottom sounding**: out of the regional scale, compared with the reference surroundings (ETOPO5)

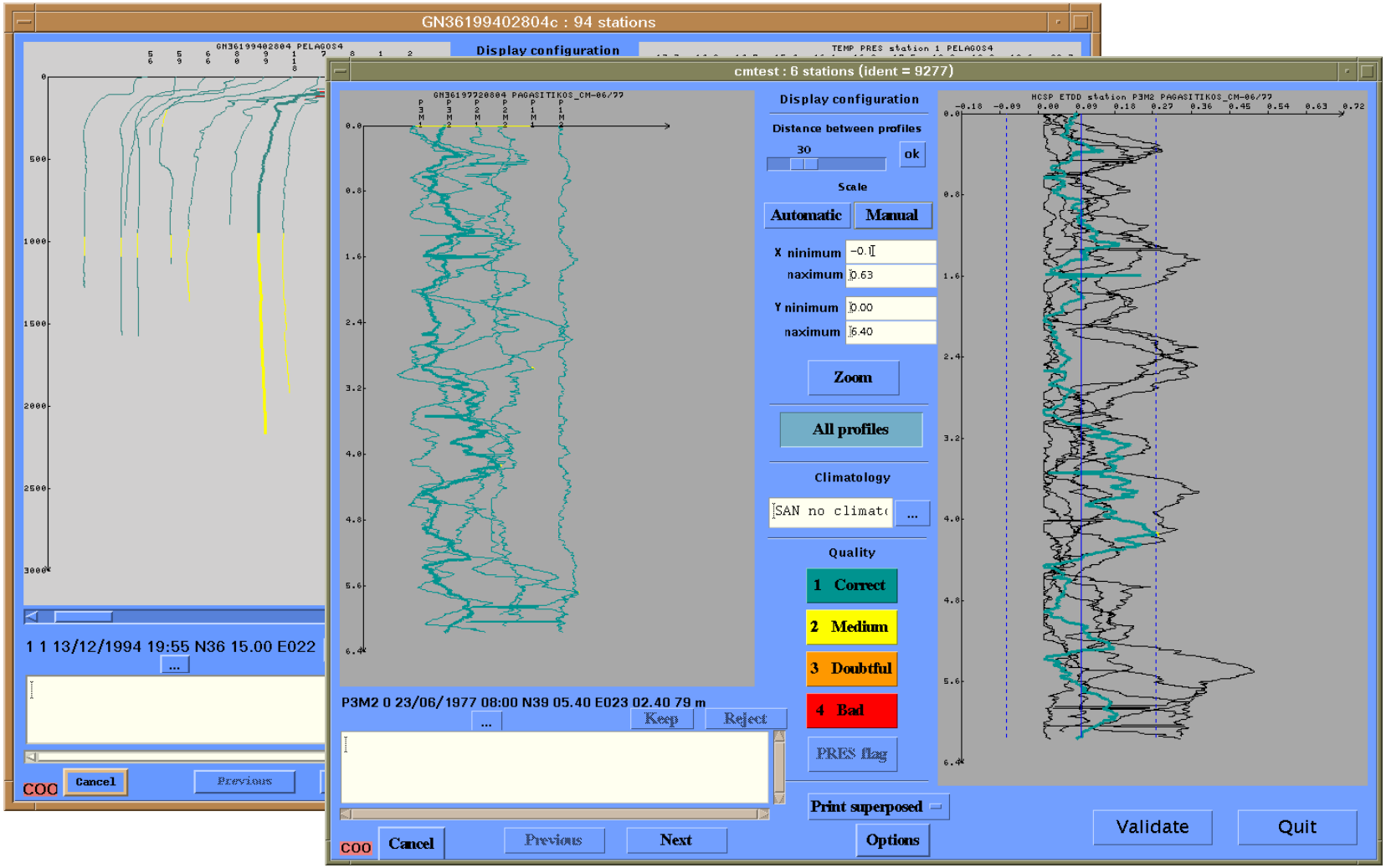
Visual Checks of location and date



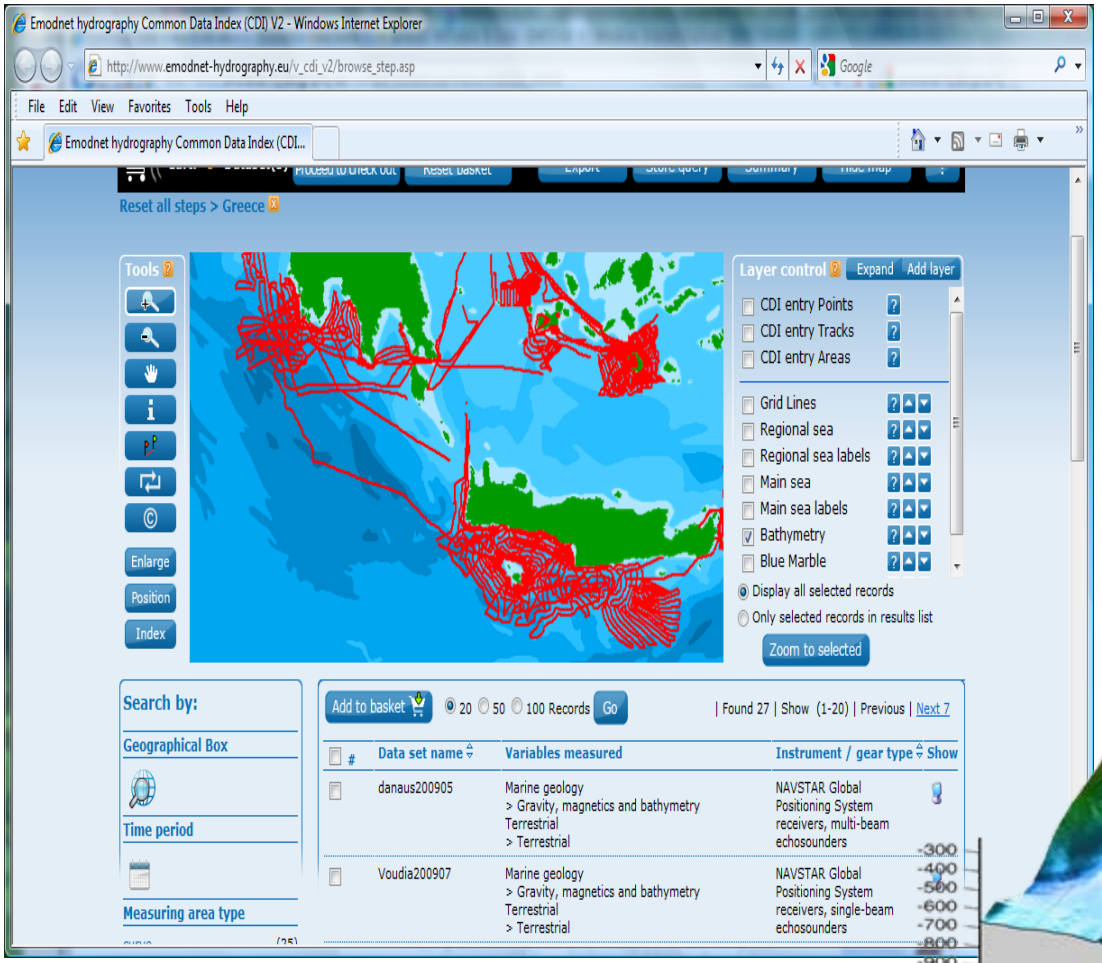
Automatic Checks of measurements

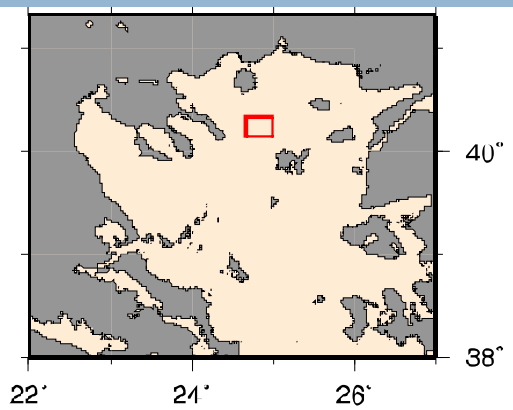
- **For vertical profiles and time series**
  - **presence of at least two parameters**: vertical/time reference + measurement
  - **pressure/time must be monotonous increasing**
  - **the profile/time series must not be constant:** sensor jammed
  - **broad range checks:** check for extreme regional values compared with the min. and max. values for the region. The broad range check is performed before the narrow range check.
  - **data points below the bottom depth**
  - **spikes detection:** usually requires visual inspection. For time series a filter is applied first to remove the effect of tides and internal waves.
  - **narrow range check:** comparison with pre-existing climatological statistics. (Levitus2005, MODB, Medatals). Time series are compared with internal statistics.
  - **density inversion test:** (potential density anomaly, FOFONOF and MILLARD, 1983, MILLERO and POISSON, 1981)
  - **Redfield ratio for nutrients:** ratio of the oxygen, nitrate and alkalinity (carbonates) concentration over the phosphate (172, 16 and 122 in Atlantic and Indian ocean, Takahashi & al)

Automatic Checks of measurements

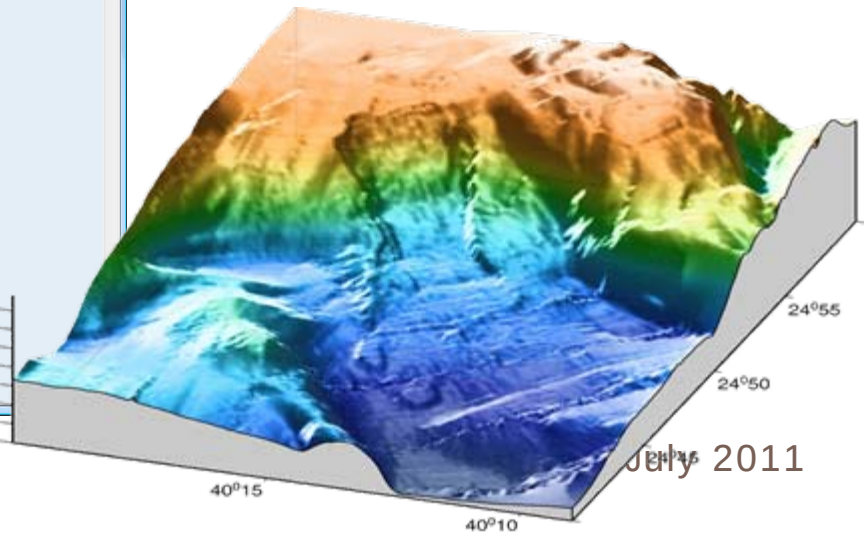


Link with the geophysical/multibeam db





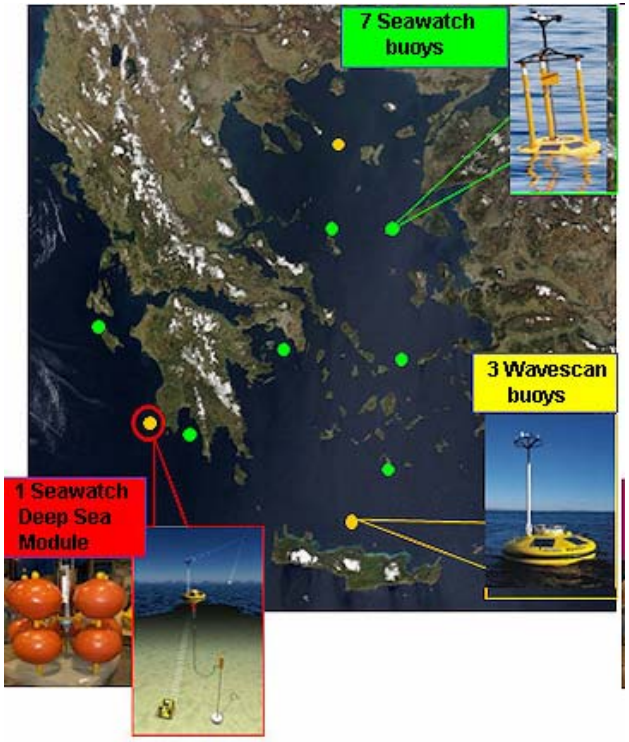
3D Slide of the North Aegean



Poseidon System

- The **operational monitoring**, **forecasting** and **information system** for the marine environmental conditions of the Aegean Sea and Ionian Sea
- It is implementing by the Hellenic Centre of Marine Research - HCMR

Poseidon Buoys Network



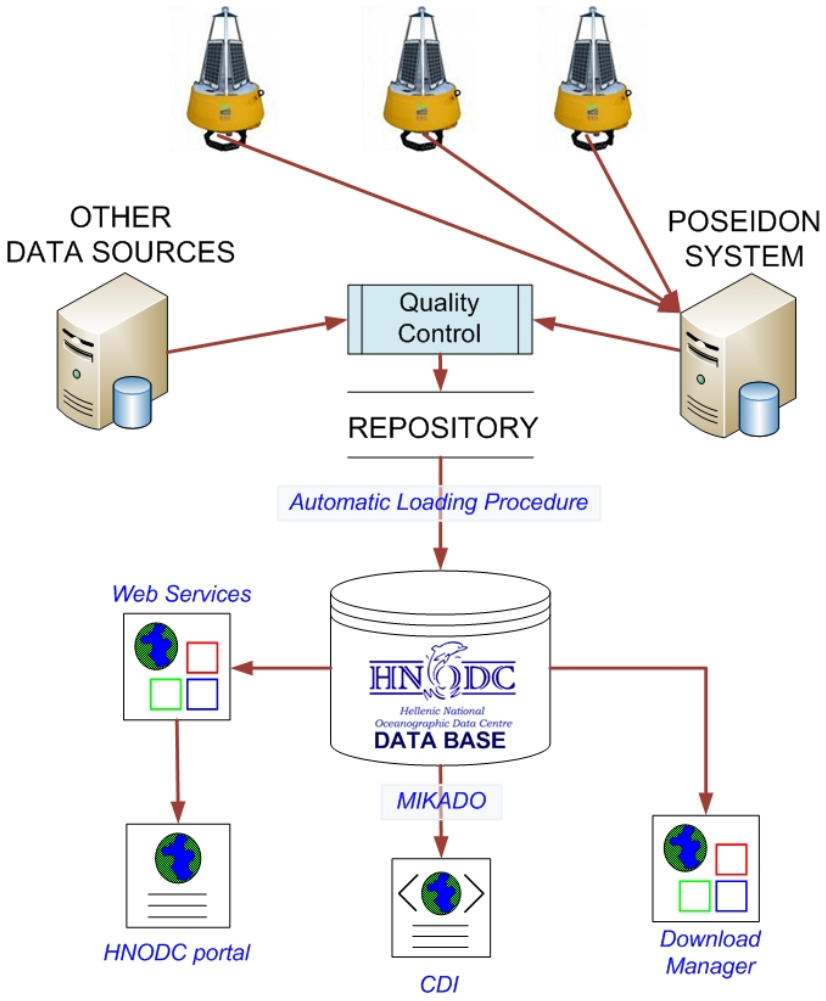
- **The buoys are equipped with:**
- **Meteorological Sensors:**
  - Atm. Pressure
  - Air Temperature
  - Wind speed and direction
- **Blue Sensors:**
  - Temperature and Salinity
  - Wave height, period and direction
  - Current speed and direction
- **Green Sensors:**
  - Dissolved oxygen
  - Chlorophyll-A
  - Light attenuation
  - Radioactivity

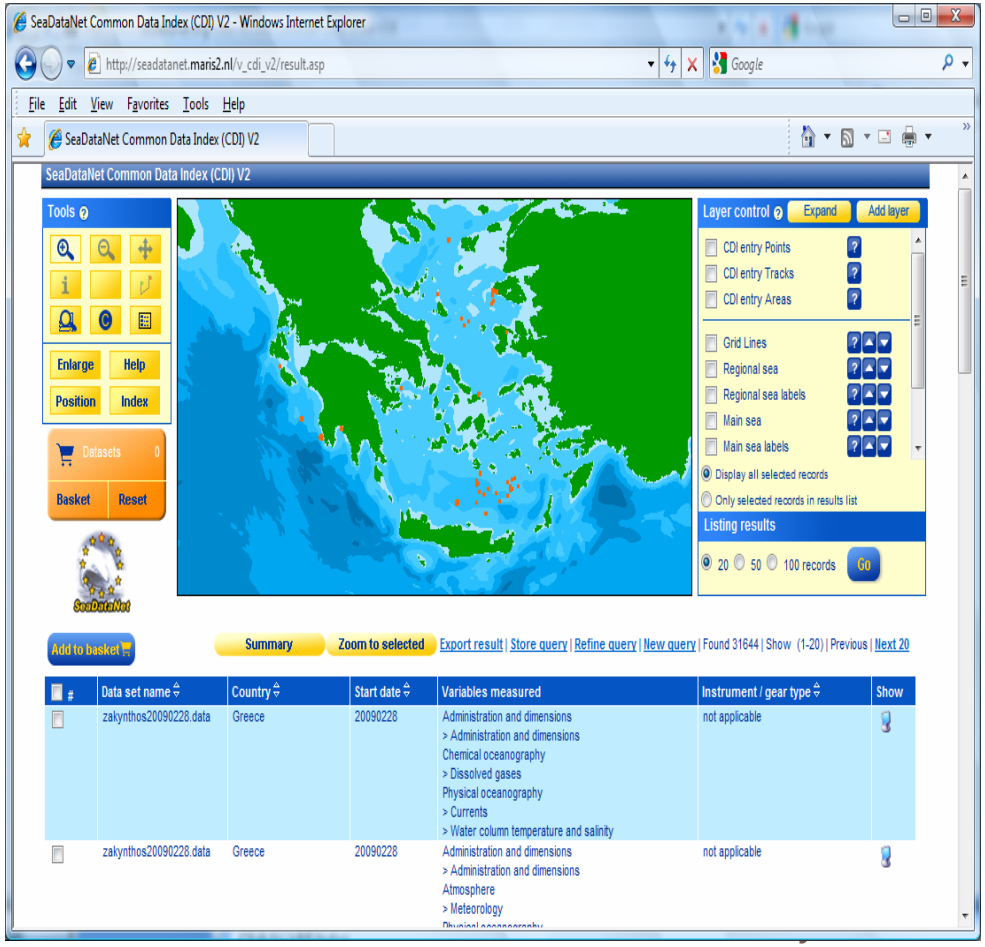
http://www.poseidon.hcmr.gr

2011, HCMR will deploy in Ionian Sea the first autonomous multi-sensor seabed platform in the Mediterranean Sea, at the depth of 2000m

Linkage with operational oceanography

Hellenic National Oceanographic Data Centre





Future Plans

- **Improve** our on-line services
- **Expand** our data archive with additional data types (geophysical, satellite, gridded data, etc)
- **Connect** through Web Services with Operational Oceanography, Fisheries db, etc)

Thank you

http://hnodc.hcmr.gr