



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**

- 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.



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"



- **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***](http://www.hcmr.gr)

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

Data Sources

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Hellenic National Oceanographic Data Centre

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

Projects (1/2)

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- 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)



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- 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

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□ Networking Environment

- is **connected** to the **National Academic network with 1 Gbps** fiberoptic line with failover connection.
- **locally a gigabit lan is implemented** with a 280 Gbps backplane 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 Environment

- 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

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- **permanent staff**
 - ▣ 2 physical oceanographers

- **contract employees**
 - ▣ 2 computer engineers
 - ▣ 1 IT systems expert
 - ▣ 1 computer programmer
 - ▣ 1 physical oceanographer

Available Physical, Biogeochemical Data



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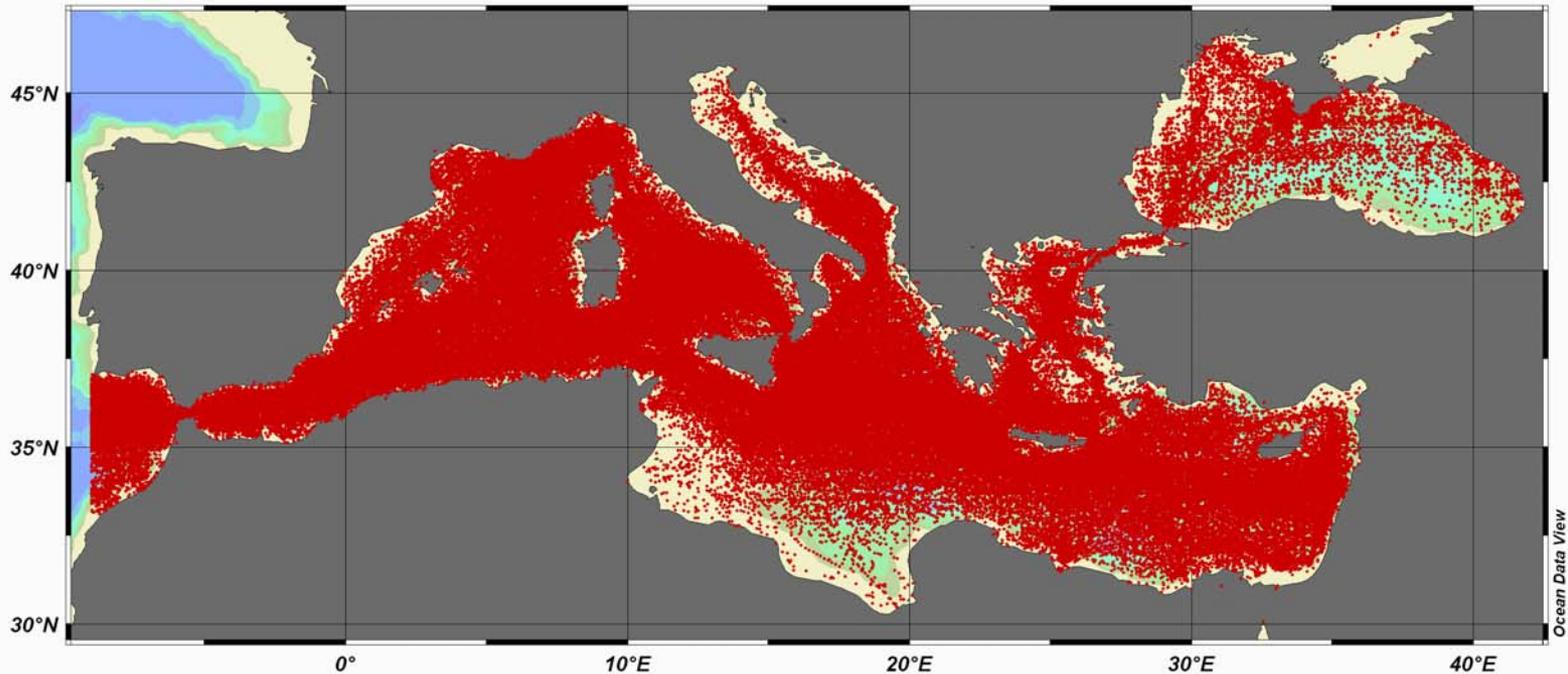
- > 400.000 obs stations of physical, biogeochemical meas.
- > 180 parameters

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

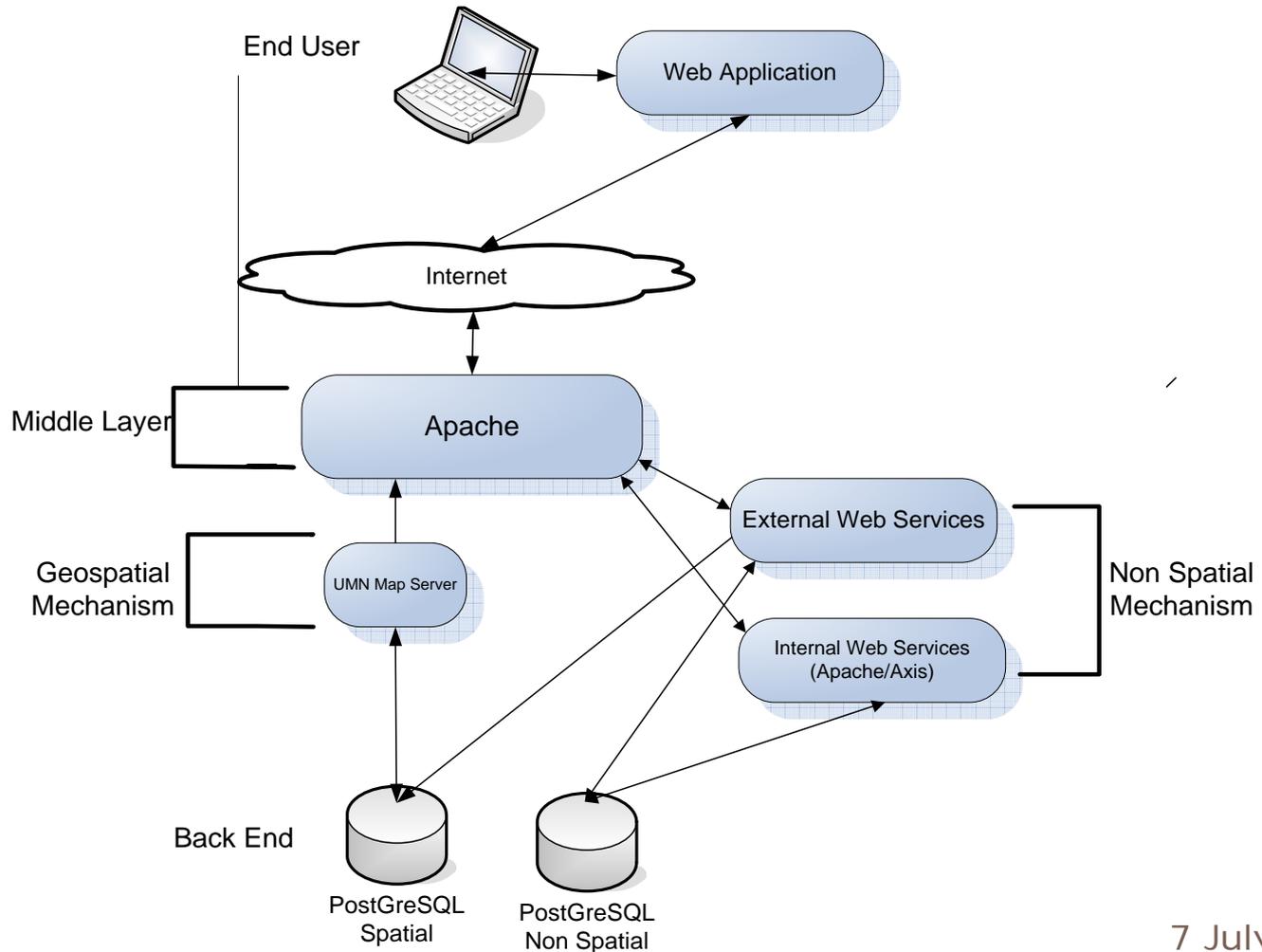
7 July 2011

Distribution Maps

239000 XBT, MBT, XCTD stations



System Architecture



Web Interface



HNODC - Windows Internet Explorer
http://mapserver.ath.h. Google

File Edit View Favorites Tools Help

HNODC

Best Performance by Mozilla Firefox, Version 2.0.1 & Internet Explorer

A. Select an Area:
First select the area of your interest on the right map.

A. Selected Area
Latitude South: Longitude North:
Longitude West: Longitude East:

B. Select Criteria
Cruise Name:
Date Type:
Ship:

Time Interval Search
Start: End: (yyyy-mm-dd)

Periodical Search
Start:
Year:

Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec

HNODC - Windows Internet Explorer
http://mapserver.ath.hcmr.gr/pagin/se Google

File Edit View Favorites Tools Help

HNODC

Tip
Click on a cruise name at the table below to view the stations of the cruise.

Map Tools
Click on the I button and then on a station (red point on the map) to view Station Details.

No	Cruise Id	Cruise Name -> Click to View on Map	Project Name	Start Date	End Date	Ship	Country	Download/Request for Cruise
1	GN98199402801001	PELAGOS1	PELAGOS	1994-03-01	1994-04-15	ARGARO (ARGAIO PRE-10/94)	Greece	Download
2	GN98199402801002	PELAGOS1	PELAGOS	1994-03-01	1994-04-15	ARGARO (ARGAIO PRE-10/94)	Greece	Download
3	GN98199402802000	PELAGOS2	PELAGOS	1994-05-31	1994-08-19	ARGARO (ARGAIO PRE-10/94)	Greece	Download
4	GN98199402802000	PELAGOS2	PELAGOS	1994-05-31	1994-08-19	ARGARO (ARGAIO PRE-10/94)	Greece	Download
5	GN98199402803001	PELAGOS3	PELAGOS	1994-09-07	1994-09-23	ARGARO (ARGAIO PRE-10/94)	Greece	Download
6	GN98199402803002	PELAGOS3	PELAGOS	1994-09-07	1994-09-23	ARGARO (ARGAIO PRE-10/94)	Greece	Download
7	GN98199402804002	PELAGOS4	PELAGOS	1994-12-04	1995-02-02	ARGARO (ARGAIO PRE-10/94)	Greece	Download
8	GN98199402804000	PELAGOS4	PELAGOS	1994-12-04	1995-02-02	ARGARO (ARGAIO PRE-10/94)	Greece	Download
9	GN98199402801000	PELAGOS CH-02/94	PELAGOS	1994-04-09	1994-09-05	ARGARO (ARGAIO PRE-10/94)	Greece	Download
10	GN98199402802000	PELAGOS CH-03/94	PELAGOS	1994-05-30	1994-12-10	ARGARO (ARGAIO PRE-10/94)	Greece	Download
11	GN98199402803000	PELAGOS CH-02/94	PELAGOS	1994-09-02	1995-03-12	ARGARO (ARGAIO PRE-10/94)	Greece	Download
12	GN98199402804000	PELAGOS CH-12/94	PELAGOS	1994-12-11	1995-08-22	ARGARO (ARGAIO PRE-10/94)	Greece	Download

http://hnodc.hcmr.gr

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New Web Interface



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HNODC Search Engine - Version 2,7

[HOME](#) | [ABOUT US](#) | [HNODC](#) | [CONTACT](#) | [HELP](#)

A. Select Area using

Lat S: Lat N:
 Long W: Long E:

B. Select Criteria

Cruise Name:

Data Type:

Parameter:

Ship:

Country:

Time Interval Search

StartDate: (yyyy-mm-dd)
 EndDate: (yyyy-mm-dd)

Periodical Search

StartYear: EndYear:

Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec

A. Select Area using

Lat S: N23 00.00 Lat N: N47 00.00
 Long W: E015 00.00 Long E: E031 00.00

B. Select Criteria

Cruise Name: PELAGOS

Data Type:

Parameter:

Ship:

Country:

Time Interval Search

StartDate: (yyyy-mm-dd)
 EndDate: (yyyy-mm-dd)

Periodical Search

StartYear: EndYear:

Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec

Tip

Click on a cruise name at the table below to view the stations of the cruise.
 Click on the *i* button and then on a station (red point on the map) to view Station Details.

Search Results - Total Number of Rows: 12

[Export results](#) [Lists of result set](#)
15 30 50 records/page

No	Cruise Id	Cruise Name <small>Click to View on Map</small>	Project Name	Start Date	End Date	Ship	Country	Cruise Privileges
1	GN36199402801001	PELAGOS1	PELAGOS	1994-03-01	1994-04-15	AEGAEO (AEGAIO PRE-10/94)	Greece	Request
2	GN36199402801002	PELAGOS1	PELAGOS	1994-03-01	1994-04-15	AEGAEO (AEGAIO PRE-10/94)	Greece	Download

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Quality Assurance



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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



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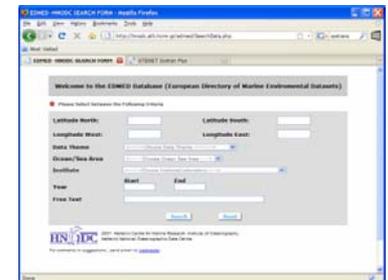
□ National Cruise Summary Report Database - ROSCOP

- Free **on line access** to the reports
- **On-line import** of new reports
- >190 reports of oceanographic cruises



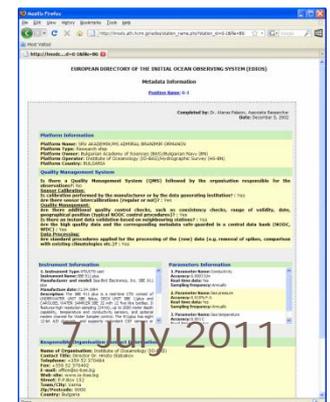
□ National Environmental Datasets - EDMED

- 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 descriptions



QC Procedures

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- ❑ 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

The image displays a software interface for managing cruise data, specifically focusing on visual checks of location and date. The main window, titled "ses33 : 20 stations (ident = 14107)", shows a "Cruise Description" form with the following details:

- Reference: GN36200805903
- Name: SESAME WP3 04/08
- Ship: 36AE / Angeo
- Ship reference:
- Start Date: 06/04/2008 End Date: 10/04/2008
- Institution: HCMR, Institute of Oceanography, GREECE
- Responsible: Dr S.Psara

Below the form is a "Ship velocity" bar chart showing data points for various stations. The chart has a y-axis from 0.0 to 8.0 and an x-axis with station identifiers. A "Zoom" control with minus and plus buttons is located below the chart.

A "STATION DESCRIPTION" dialog box is open, showing details for station GN3620080590304078:

- Begin Date: 09/04/2008 17:07 Correct 1
- Depth: 307 Correct 1
- Lat: N40 07.76 Correct 1
- Lon: E024 37.23 Correct 1

The dialog also includes fields for "End (Times Series)", "SensDepth", "DistBot", "Duration", and "Step". It features "Previous", "Next", "Comments", and "Adding description" buttons, as well as a "Detected errors" section and "Validate" and "Cancel" buttons at the bottom.

At the bottom of the main window, there are buttons for "Print" and "Validate".

Automatic Checks of measurements

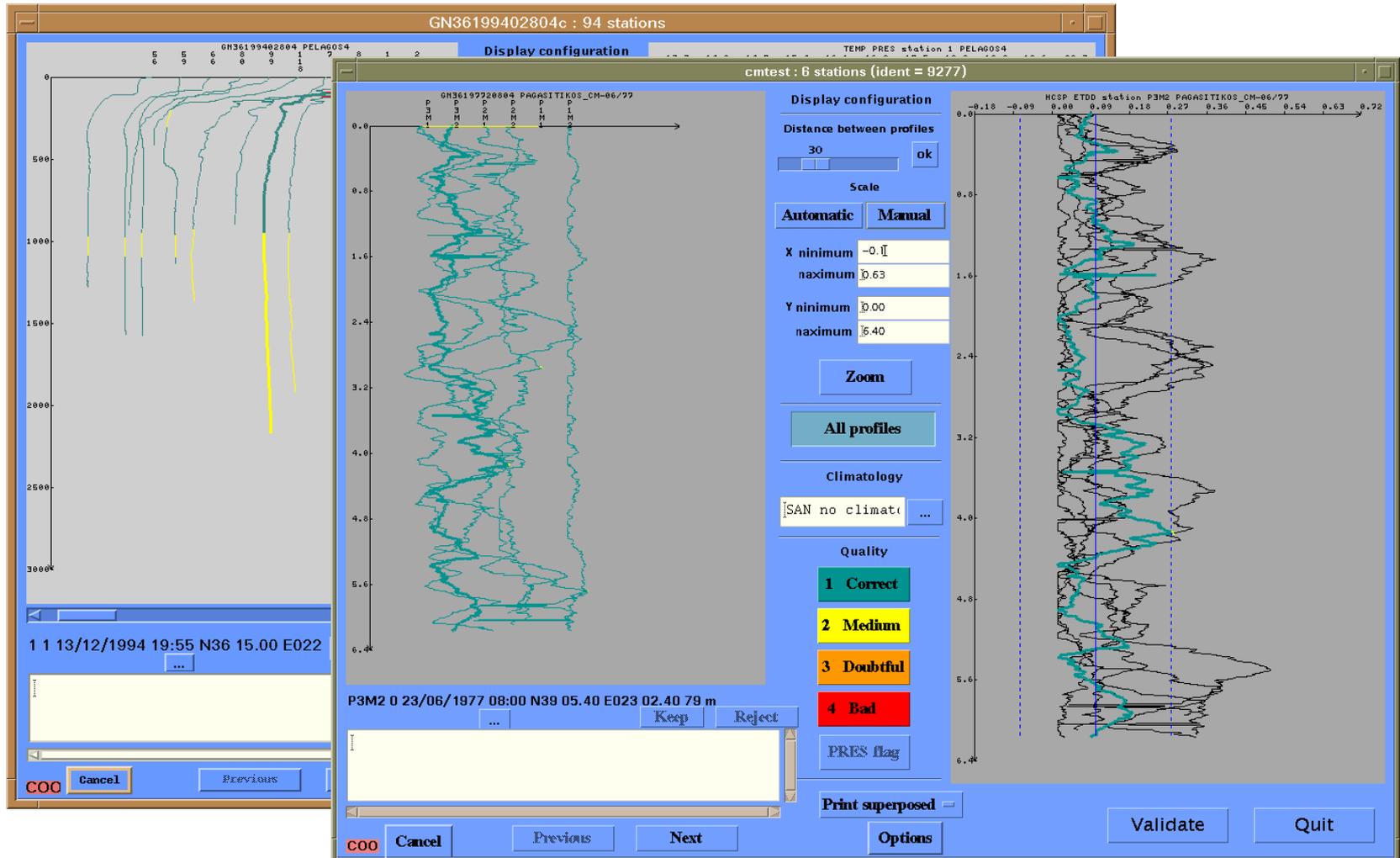
□ For vertical profiles and time series

- **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

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Link with the geophysical/multibeam db

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Emodnet hydrography Common Data Index (CDI) V2 - Windows Internet Explorer

http://www.emodnet-hydrography.eu/v_cdi_v2/browse_step.asp

File Edit View Favorites Tools Help

Emodnet hydrography Common Data Index (CDI...)

Reset all steps > Greece

Tools

Layer control Expand Add layer

- CDI entry Points
- CDI entry Tracks
- CDI entry Areas
- Grid Lines
- Regional sea
- Regional sea labels
- Main sea
- Main sea labels
- Bathymetry
- Blue Marble

Display all selected records
Only selected records in results list

Zoom to selected

Search by:

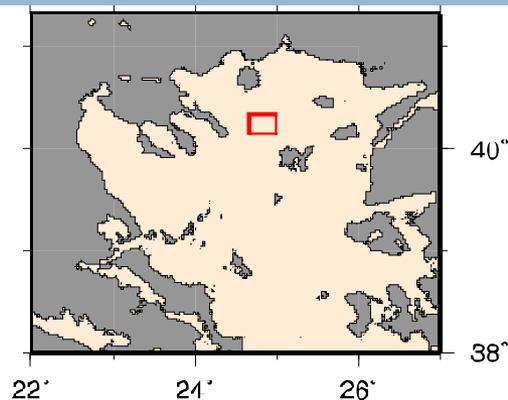
Geographical Box

Time period

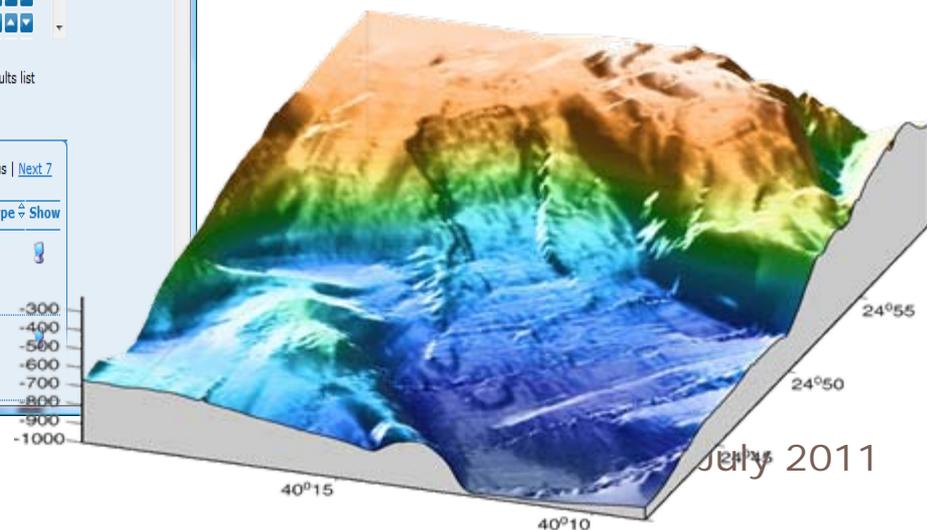
Measuring area type

Add to basket 20 50 100 Records Go | Found 27 | Show (1-20) | Previous | Next

#	Data set name	Variables measured	Instrument / gear type
<input type="checkbox"/>	danas200905	Marine geology > Gravity, magnetics and bathymetry Terrestrial > Terrestrial	NAVSTAR Global Positioning System receivers, multi-beam echosounders
<input type="checkbox"/>	Voudia200907	Marine geology > Gravity, magnetics and bathymetry Terrestrial > Terrestrial	NAVSTAR Global Positioning System receivers, single-beam echosounders



3D Slide of the North Aegean



July 2011

Poseidon System



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- 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

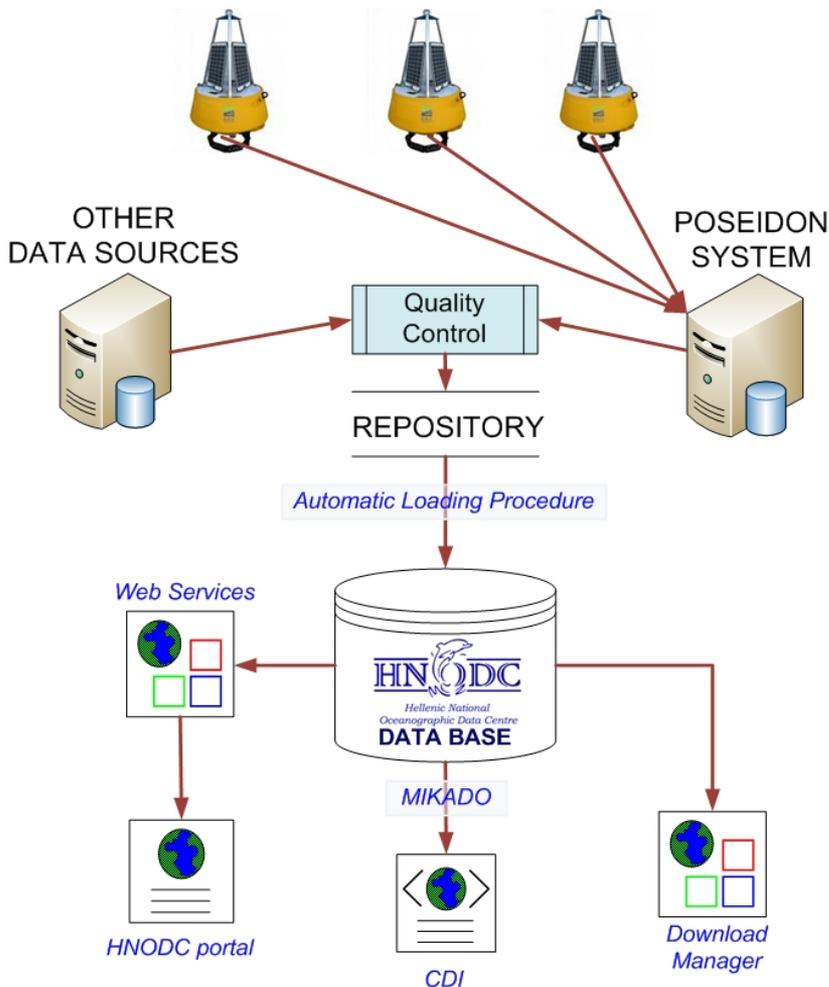


- **The buoys are equipped with:**
- **Meteorological Sensors:**
 - Atm. Pressure
 - Air Temperature
 - Wind speed and direction
- **Blue Sensors:**
 - Temperature and Salinity
 - Wave height, period and direction
 - Current speed and direction
- **Green Sensors:**
 - Dissolved oxygen
 - Chlorophyll-A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



The screenshot shows the SeaDataNet Common Data Index (CDI) V2 web interface in a Windows Internet Explorer browser. The address bar shows the URL: http://seadatanet.maris2.nl/v_cdi_v2/result.asp. The interface includes a search bar, navigation tools (Enlarge, Help, Position, Index), a Layer control panel on the right, and a table of search results.

#	Data set name	Country	Start date	Variables measured	Instrument / gear type	Show
	zakynthos20090228.data	Greece	20090228	Administration and dimensions > Administration and dimensions Chemical oceanography > Dissolved gases Physical oceanography > Currents > Water column temperature and salinity	not applicable	
	zakynthos20090228.data	Greece	20090228	Administration and dimensions > Administration and dimensions Atmosphere > Meteorology Physical oceanography	not applicable	

Future Plans

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Hellenic National Oceanographic Data Centre

- **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>