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Multidisciplinary Mediterranean and Black Sea Cast Database Developed in Framework of Large Scale European Project "SESAME"

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Data management Team of the SESAME project

Israel Oceanographic & Limnological Research

SESAME

SESAME

Southern European Seas: Assessing and Modelling Ecosystem changes

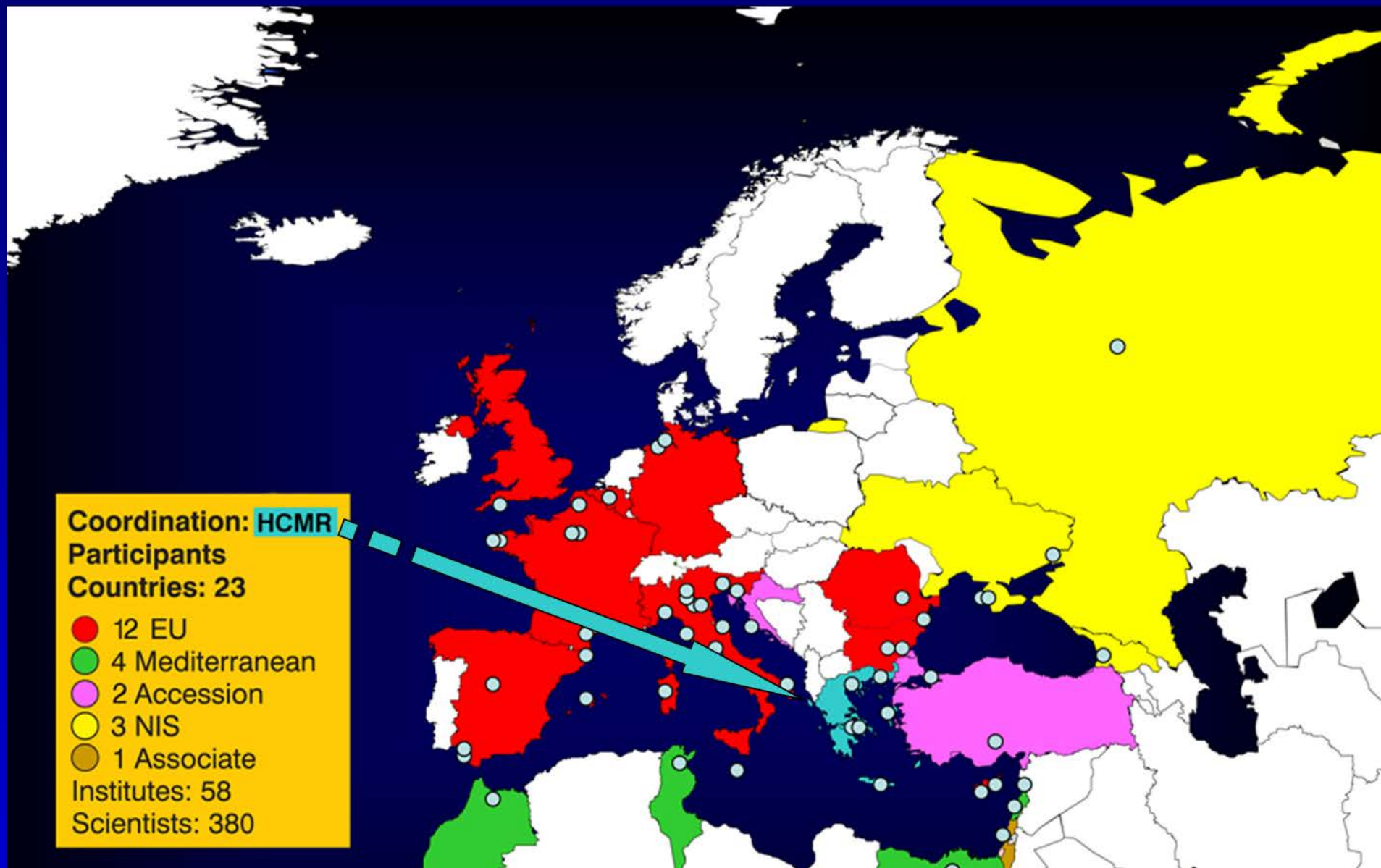
Integrated Project supported by EU Commission (FP6)

Duration: 2006-2010

www. sesame-ip.eu

SESAME

SESAME Consortium



Scientific Objectives of SESAME

1. To assess the changes or regime shifts in the ecosystems of the Southern European Seas (Mediterranean and the Black Sea - SES) over the last 50 years and
   assess the potential mechanisms that relate these changes to changes in natural and anthropogenic forcings.
2. To assess the current status of the SES ecosystems through analysis of existing and newly collected data as well as through model simulations.
3. To predict changes in the SES ecosystem responses to likely changes in climate and anthropogenic forcings during the next five decades.
4. To assess and predict changes in the ability of the ecosystems to provide goods and services (with potentially high societal importance).

Data Management Objectives:

1. Provide easy access to SESAME data for the SESAME consortium as well as to the international science community, industry, educators, media, and public in a timely manner;

2. Coordinate actions of data collection;

3. Implement common standards and effective mechanisms for collection and availability of SESAME related data:
   - historical data (public domain data and product of WP1)
   - newly collected data (product of WP2 and WP3)
   - model data (product of WP4-WP6).

Major databases

- **SESAME Cast database**
  contains vertical observed profiles of physical, chemical and biological data.
- **SESAME Bio database**
  contains taxonomy-related data.
- **SESAME TimeSeries database**
  contains time series of physical, chemical and biological data observed at fixed stations.
- **SESAME Modeled TimeSeries**
  contains time series of physical, chemical and biological data extracted from numerical models output.

Why SESAME need a new cast data management system?

- Two comprehensive large scale data storages are supported by oceanographic community:
  - WOD09
  - SEADATANET
- Both of them have sophisticated data management systems and on line interfaces.
- However, aiming worldwide data storage, these databases are not optimized to suite the requirements of regional and relatively short time investigations:
  - Relative large time delay between data submission and data availability
  - Absence of flexible data management system on level of investigator.

MEDACC - Mobile **MED**iterranean **ACC**ess based system for visualization and manipulation of multidisciplinare cast data

http://isramar.ocean.org.il/Download.asp

Israel Oceanographic & Limnological Research
Israel Marine Data Center (ISRAMAR)

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MEDACC

- Description
- Search interface
- Downloads
  - MEDACC database
  - Cruises in ODV format
- Data Policy &Terms of use
- Contact Us

MEDiterranean ACCess based system for exploration, visualization and manipulation of multidisciplinary marine cast data

The MEDACC is an information system for vertical profiles of hydrophysical and hydrochemical data. The system is based on MS-Access .mdb files.

It is possible to import files in MEDATLAS format , or Sea-Bird format as well as data organized in EXCEL tables in a form similar to generic ODV spreadsheet format (Schlitzer, R., 2001: Ocean-Data-View).

Selected data could be exported to MEDATLAS format or to the generic ODV spreadsheet format.

Requirements:

- MS-Office 2003 - the package uses MS-Access and MS-EXCEL
- Golden Software Surfer 8.0 - required for Oceanographic Interface

Download Installation utility
Version V14

Update utility for existing
MEDACC .mdb files

User Manual

Public available data
(MEDATLAS 2002, MATER, and others)
in MEDACC .mdb file

isramar2011, Welcome to the MEDACC site. LogOut

MEDACC Statistic

Name	Count
Cruises:	4030
Casts:	178011
Countries:	35
Ships:	350
Start Date:	01/Nov/1864
End Date:	09/Sep/2008
Chemical parameters:	103
Biological parameters:	61
Physical parameters:	28
Sea water temperature:	16363541
Sea water salinity:	16294601
Dissolved oxygen:	503621

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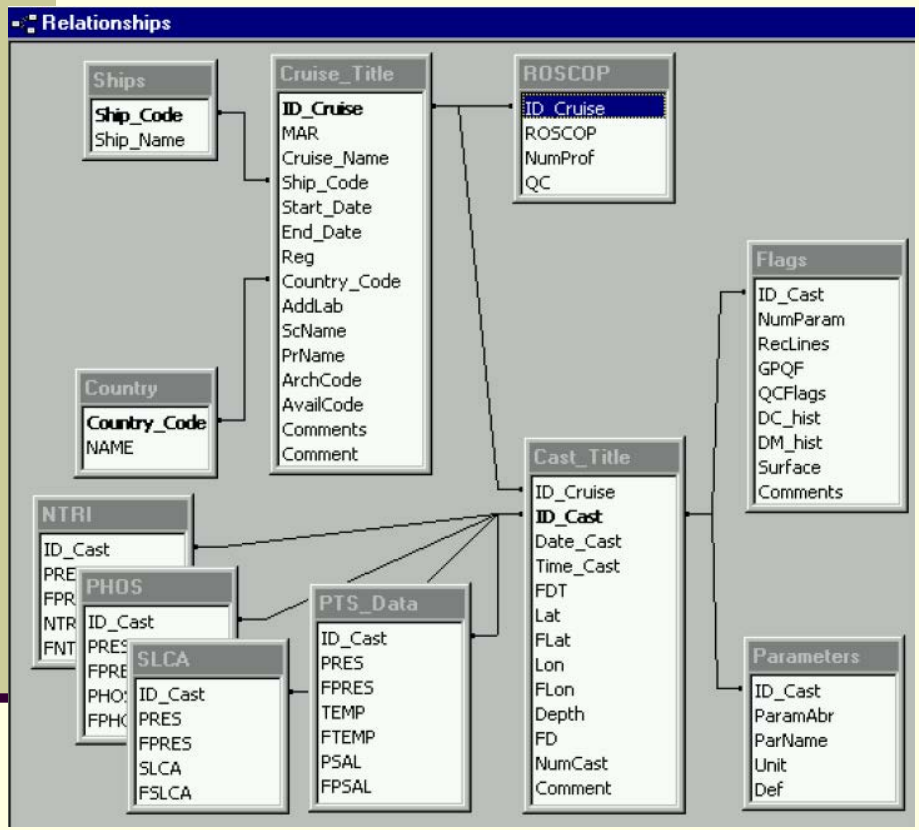
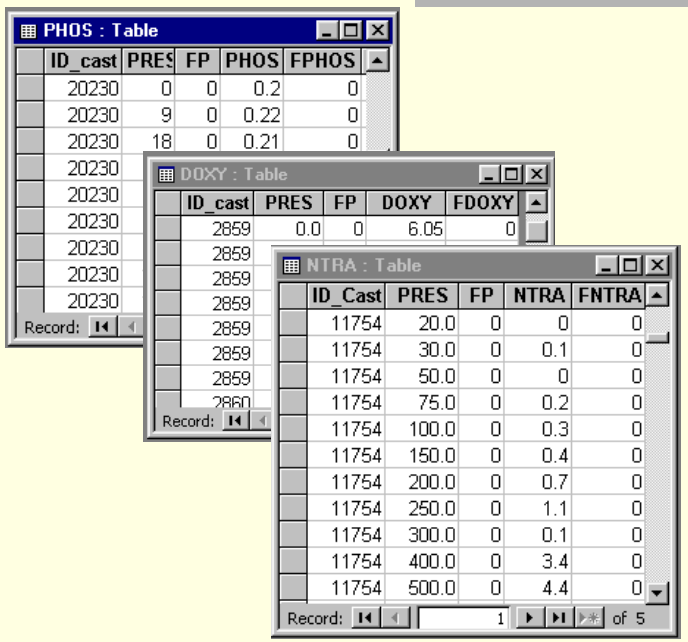
Why MS ACCESS ?

- MS Office is commonly accepted software in Windows
  - Easy administration (installation, security, compacting, backup and restore, import-export utility)
  - Graphic query interface with simple translation to SQL
  - Built in VB for applications
  - Possibility to include Dynamic-link library
- Easy transfer from PC to PC
- Major limitations: One table have to by less than 2GB

Start from relation database for management MEDAR/MEDATLAS data





PHOS : Table

ID_cast	PRES	FP	PHOS	FPHOS
20230	0	0	0.2	0
20230	9	0	0.22	0
20230	18	0	0.21	0
20230				
20230				
20230				
20230				
20230				
20230				

DOXY : Table

ID_cast	PRES	FP	DOXY	FDOXY
2859	0.0	0	6.05	0
2859				
2859				
2859				
2859				
2859				
2859				
2860				

NTRA : Table

ID_Cast	PRES	FP	NTRA	FNTRA
11754	20.0	0	0	0
11754	30.0	0	0.1	0
11754	50.0	0	0	0
11754	75.0	0	0.2	0
11754	100.0	0	0.3	0
11754	150.0	0	0.4	0
11754	200.0	0	0.7	0
11754	250.0	0	1.1	0
11754	300.0	0	0.1	0
11754	400.0	0	3.4	0
11754	500.0	0	4.4	0

Record: 1 of 5

GF3 – parameters vocabulary accepted in MEDAR/MEDATLAS

Import oceanographic data

- MEDATLAS format for physical and geochemical data.
- SeaBird CTD files
- Excel table arranged like an ODV file, for geochemical and physical data.

Development SESAME parameters vocabulary

PHOS : Table

ID_cast	PRES	FP	PHOS	FPHOS
20230	0	0	0.2	0
20230	9	0	0.22	0
20230	18			
20230	28			
20230	45			
20230	69			
20230	94			
20230	140			
20230	186			

Record:

DOCCUPOX

ID_Cast	PRES	FPRE	DOCC	FDOC
210070	10	0	82.9	0
210070	20	0	87.1	0
210070	30	0	82.4	0
210070	40	0	88.3	0
210070	50	0	88.4	0
210070	60	0	86.5	0
210070	70	0	84.7	0
210070	80	0	84.2	0
210070	90	0	85.9	0
210070	100	0	82.6	0
210070	120	0	76.3	0

Record: 1 No Filter Search

- Unlimited number parameters.
- Creation new table for single parameter
- Each parameter have to be in vocabulary table
- GF3 is defined as SDN standard (P091 in SDN Common vocabularies) however it does not sufficient for SESAME data
- Introduction SESAME parameter vocabulary

  Combination of:

  - P021 - SeaDataNet Parameter Discovery Vocabulary (Terms describing fine-grained related groups of measurement phenomena designed to be used in dataset discovery interfaces)
  - P061 - BODC data storage units (Terms used by BODC to describe the measurement units for data held in its repositories.)

Development SESAME parameters vocabulary

PHOS : Table

ID_cast	PRES	FP	PI
20230	0	0	
20230	9	0	
20230	18	0	
20230	28	0	
20230	45	0	
20230	69	0	
20230	94	0	
20230	140	0	
20230	186	0	

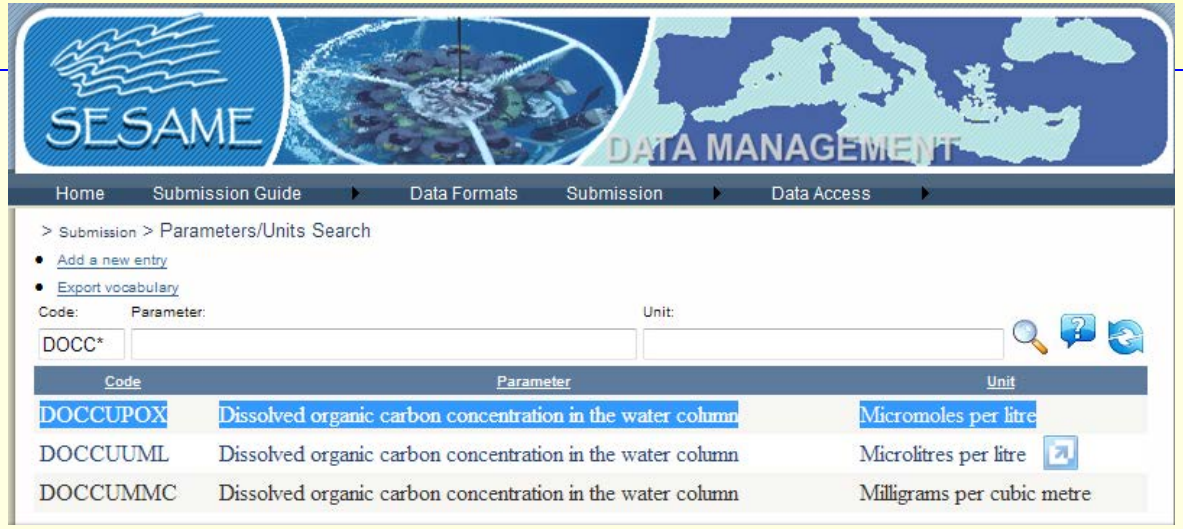
Record: 1

DOCCUPOX

ID_Cast	PRES	FPRE	DOCC	FDOC
210070	10	0	82.9	0
210070	20	0	87.1	0
210070	30	0	82.4	0
210070	40	0	88.3	0
210070	50	0	88.4	0
210070	60	0	86.5	0
210070	70	0	84.7	0
210070	80	0	84.2	0
				0
				0
				0

Search

- SESAME parameters vocabulary is on line supported vocabulary.
- New Entry can be created by combination of P0321 and P061 or introducing by new sequence number entry SES34UPOX or SES45SES27.
- All entries are connected with SDN vocabulary P011 (BODC Parameter Usage Vocabulary: Terms describing fine-grained related groups of measurement phenomena designed to be used in dataset discovery interfaces).



Metadata and data accumulation and dissemination

- Start from public available data
- On line submission of metadata and data from SESAME partners
- Import new data in integral mobile databases by SEASAME data management team.
- Conversion integral MS ACCESS databases to MS SQL databases
- Providing on line interface for data selection and download

Public available databases

- MEDAR/MEDATLAS II (historical data before 2000, was imported into SESAME-CAST-Mobile database. The XBT measurements, especially those carried out before 2000, have significant errors and were rejected.
- The MATER project collection.
- Soviet cruises (1987-1990) in the Eastern Mediterranean published on the CIESM web site.
- The World Ocean Database 2005 (WOD05).
- The CORIOLIS Database of the French Operational Data Centre.
- The ICES Oceanographic Database.
- The Black Sea inter-disciplinary multivariable historical database supported by the Institute of Marine Sciences (Turkey).
- The DYFAMED database supported by Observatoire Océanologique de Villefranche sur Mer (France).

Soviet POEM

WOD05

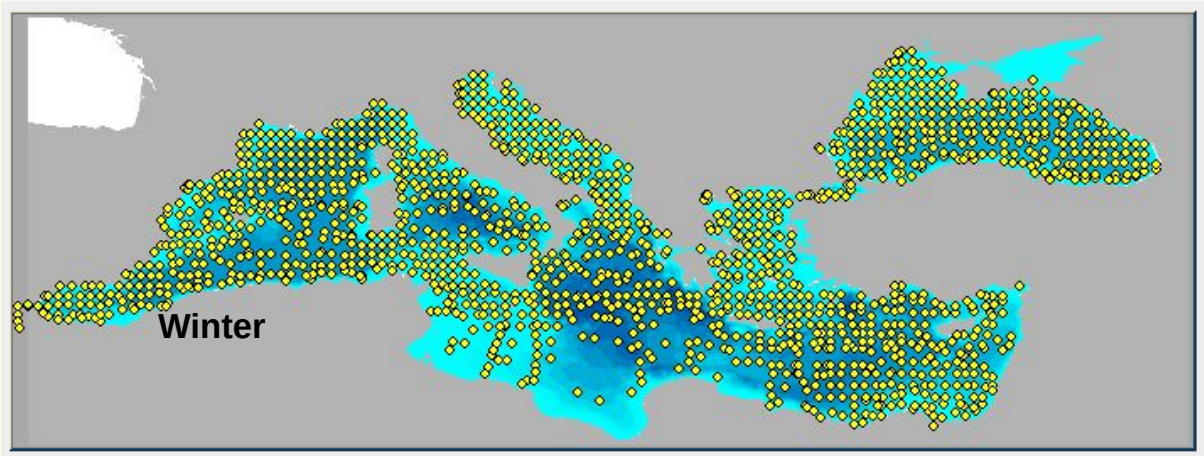
NATO TU BS

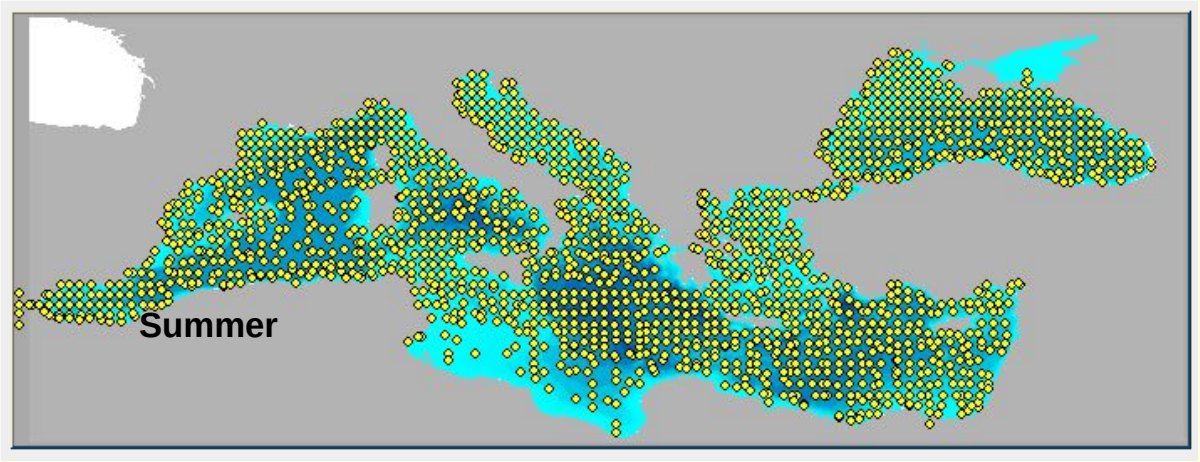
DYFAMED

Parameter Name	Abrev.	Cast Number
SEA PRESSURE sea surface=0	PRES	128007
SEA TEMPERATURE	TEMP	126943
SALINITY (PRE-1978 DEFN)	PSAL	125822
DISSOLVED OXYGEN	DOX1	65810
PHOSPHATE (PO4-P) CONTENT	PHOS	38114
PH	PHPH	26727
SILICATE (SIO4-SI) CONTENT	SLCA	26594
NITRITE (NO2-N) CONTENT	NTRI	20531
NITRATE (NO3-N) CONTENT	NTRA	16073
AMMONIUM (NH4-N) CONTENT	AMON	10134
HYDROGEN SULPHIDE (H2S)	HSUL	7329
ALKALINITY	ALKY	6625
TOTAL PHOSPHORUS (P) CONTENT	TPHS	6598
CHLOROPHYLL-A CONTENT	CPHL	5952
DISSOLVED OXYGEN	DOXY	4625
FLUORESCENCE	FLUO	4228
TOTAL NITR. (NO2+NO3) CONTENT	NTRZ	3217
AVERAGED DATA CYCLES NBR	NAVG	3092
LIGHT TRANSMISSION	TUR3	2991
TOTAL PHEOPHYTINE	PHTP	2435
PARTICULATE ORGANIC CARBON	POCP	628
TURBIDITY	TUR6	590
DISSOLVED OXYGEN	DOX2	521
TOTAL NITROGEN	NTOT	500
TURBIDITY-attenuation coeff	TUR2	496
LIGHT SCATTERING	LSCT	493
CHLOROPHYLL-B TOTAL	CHLB	437
TOTAL SUSPENDED MATTER	TSMP	424
PARTICULATE TOTAL NITROGEN	PTNP	407
CHLOROPHYLL-TOTAL	CHLT	399
NITRATE + NITRITE CONTENT	NTZW	395
SILICATE (SIO4-SI) CONTENT	SLCW	395
PHOSPHATE (PO4-P) CONTENT	PHOW	371
NUMBER OF PARTICLES	NUMP	267
PARTICULATE ORGANIC NITROGEN	PONP	221
CHLOROPHYLL-C TOTAL	CHLC	203
TOTAL PHAEOPIGMENTS	TPHP	194
ELECTRICAL CONDUCTIVITY	CNDC	148
LIGHT IRRADIANCE IMMERGED PAR	LGHT	140
DISSOLVED CFC11	CF1W	136
DISSOLVED CFC12	CF2W	136
FLUORESCENCE	FLU1	133
PARTICULATE TOTAL PHOSPHORUS	PTPP	120
ORGANIC SUSPENDED MATTER	OSMP	120
DISSOLVED OXYGEN	DOC4	113
VOLUME CONC. OF PARTICLES	VOCP	111
CHEMICAL OXYGEN DEMAND	CODW	96
DISSOLVED CFC113	CF3W	75
DISSOLVED C-TETRACHLORIDE	CL4W	75
DISSOLVED ORGANIC CARBON	CORG	74
ALKALINITY	ALKW	65
TOT. SUSP. PART. MATT/ESTER	EPMP	65
DISSOLVED TRITIUM	TRIW	61
IODINE	IODI	47
DIVINYL CHLOROPHYLL-A	CHAD	32
DISSOLVED OXYGEN BY CTD	DOC2	32
GLUCIDE	GLUC	24
14C PRODUCTION UNKNOWN FILTER	CUPW	24
PROTEIN	PROT	24
PART. ORGANIC PHOSPHORUS (P)	PP1P	20
PARTICULATE ORGANIC NITROGEN	PN1P	20
PARTICULATE ORGANIC CARBON/POC	PC1P	20
DISSOLVED INORGANIC NITROGEN	TINW	19
TOTAL DISSOLVED CARBON	TDCW	19
par: PAR/Irradiance	PARB	15
14C UPTAKE 0.2-1 MICRON	C1UW	13
DISSOLVED OXYGEN	DOX4	6
NUM.OF SW PHYTOPLANCTON CELLS	PHCW	5

Scanning public available data sources in order to accumulate all SESAME relevant data.

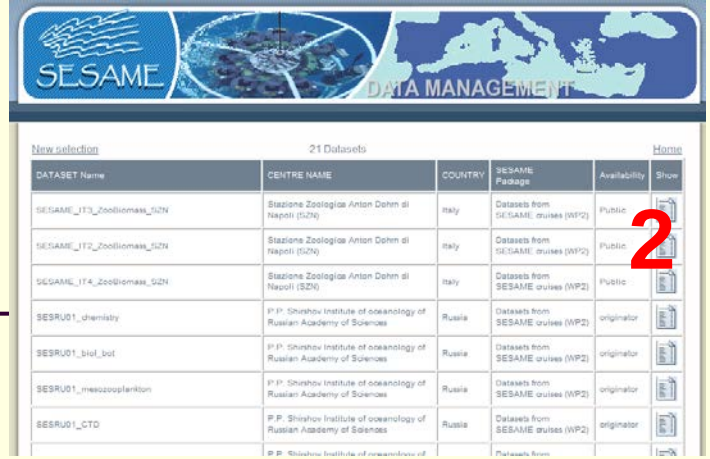
- **Multiparametric data from MEDAR/MEDATLAS II + MATER**

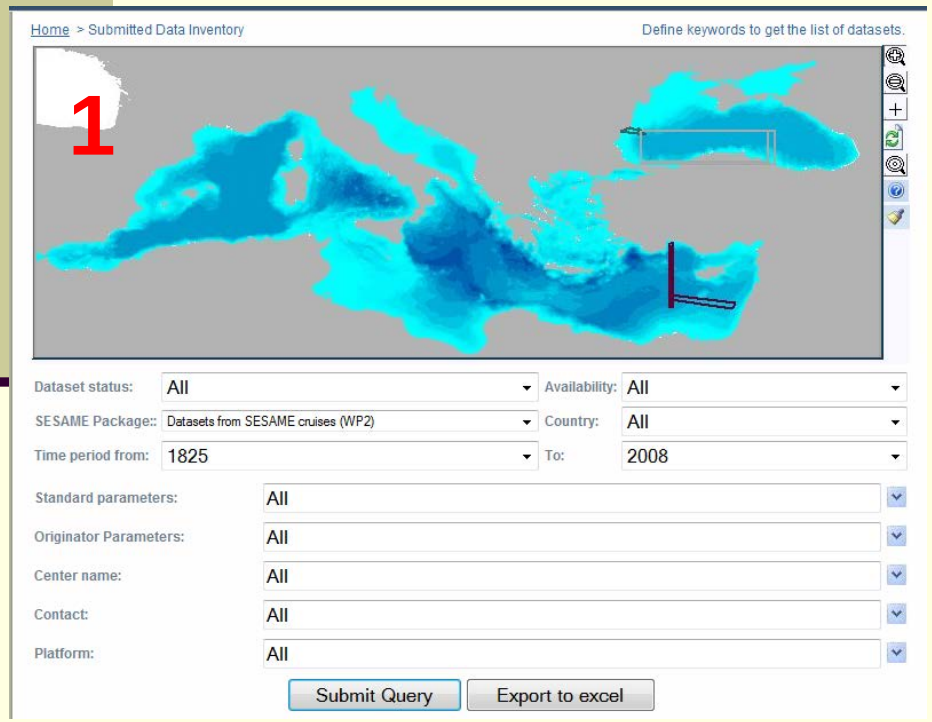


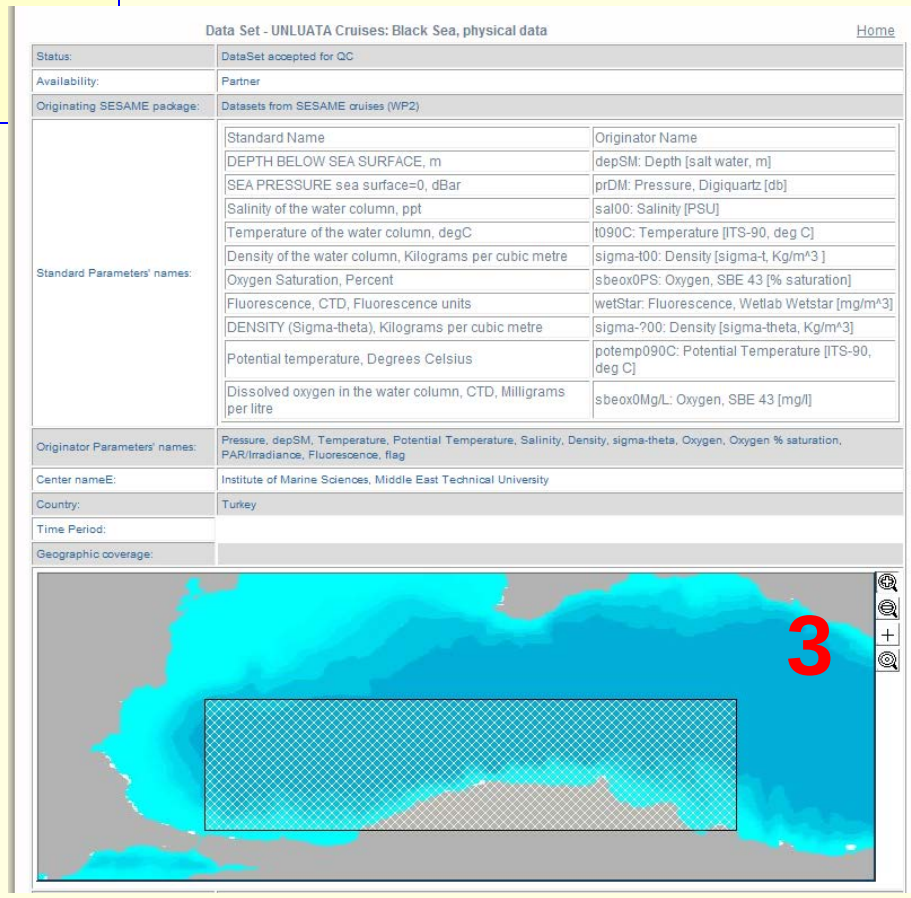


On line management of data flow from SESAME partners

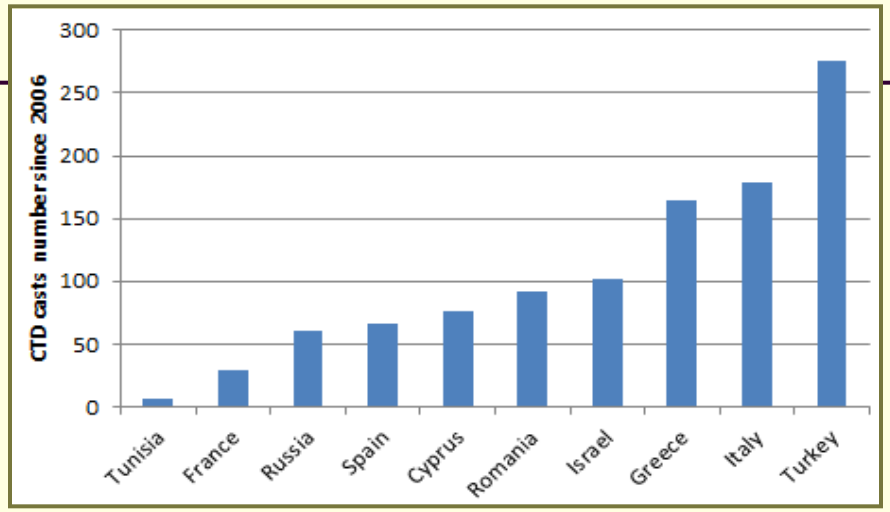
- On line submission of metadata regarding data providers
- On line submission of metadata regarding datasets
- Editing of metadata by registered data providers
- On line interface for metadata analysis
- On line submission of datasets

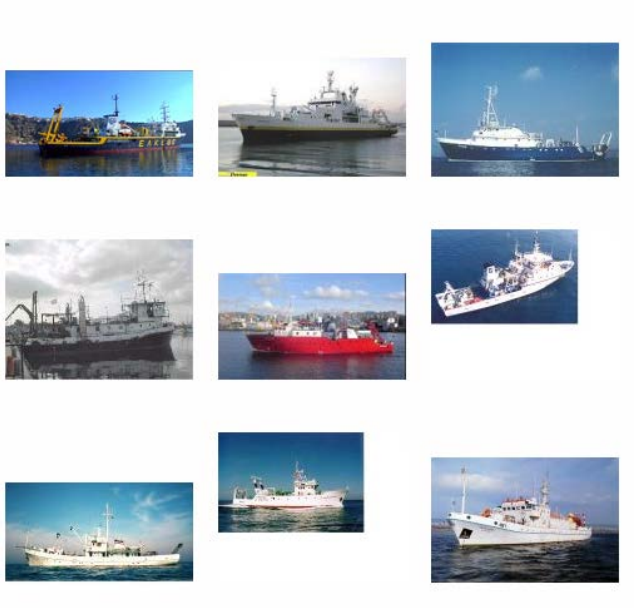


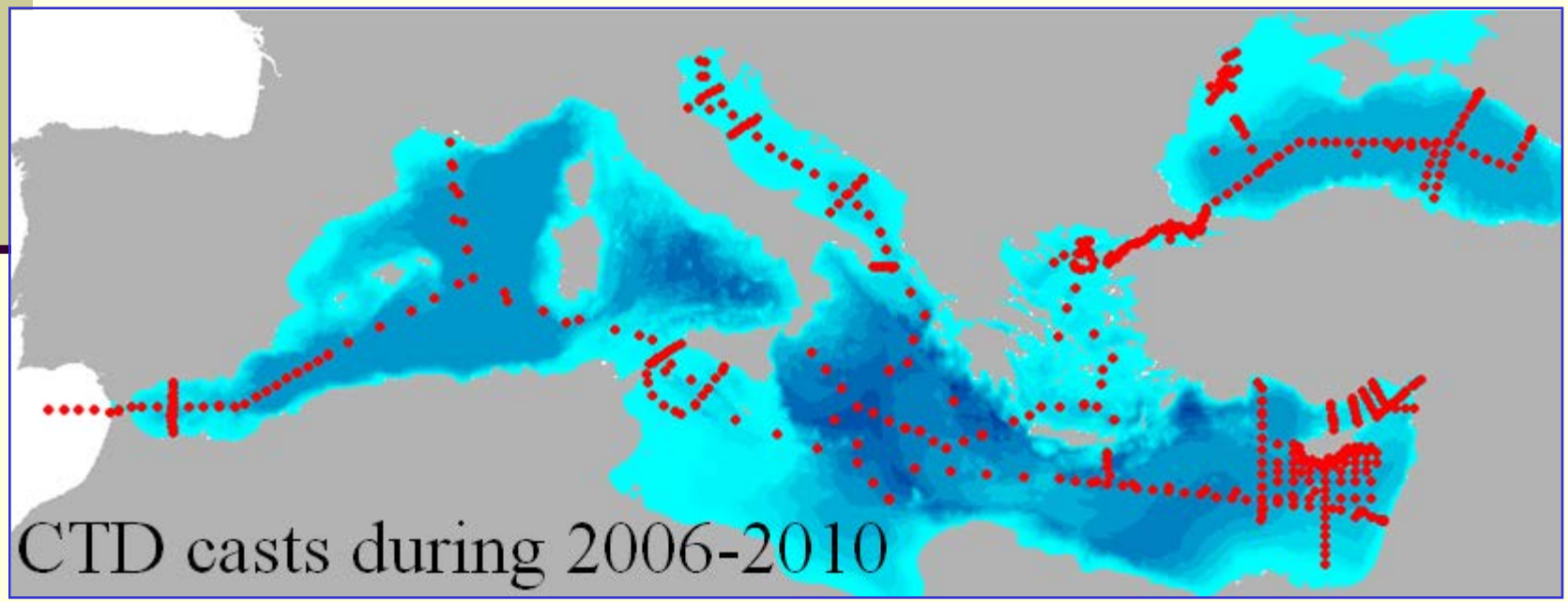




Observations in SESAME cruises

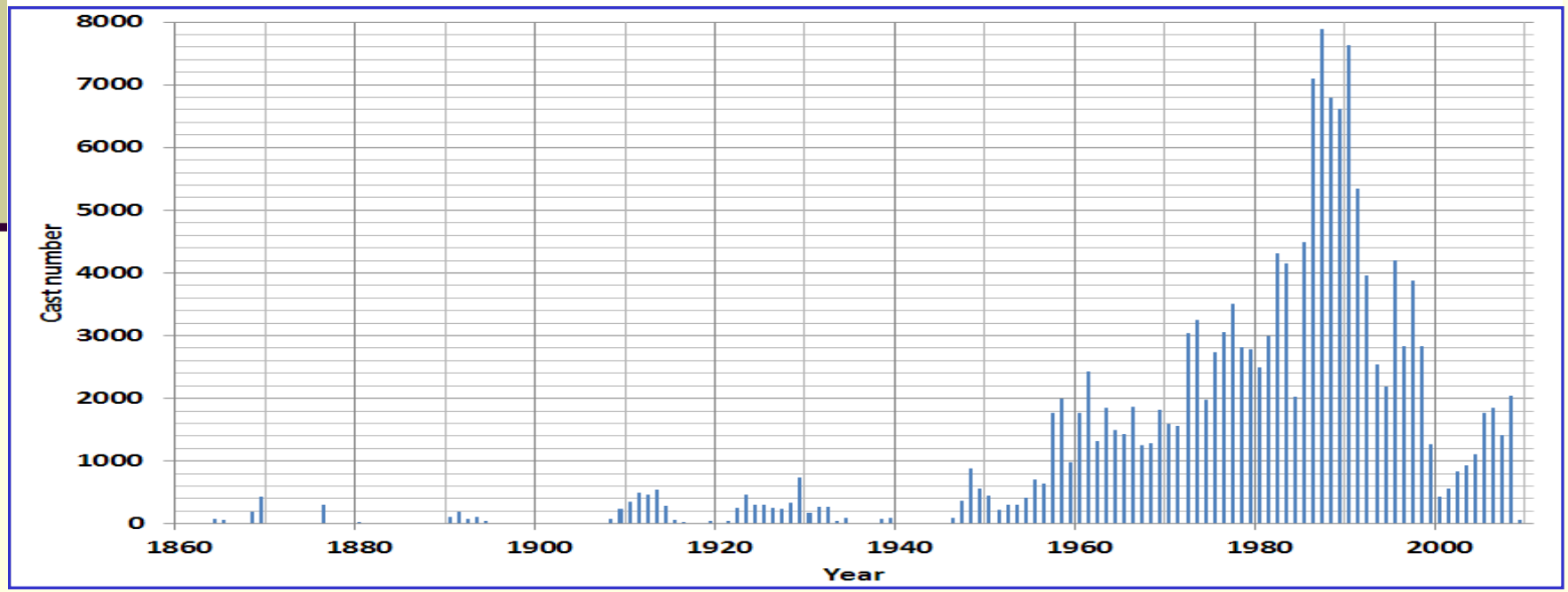




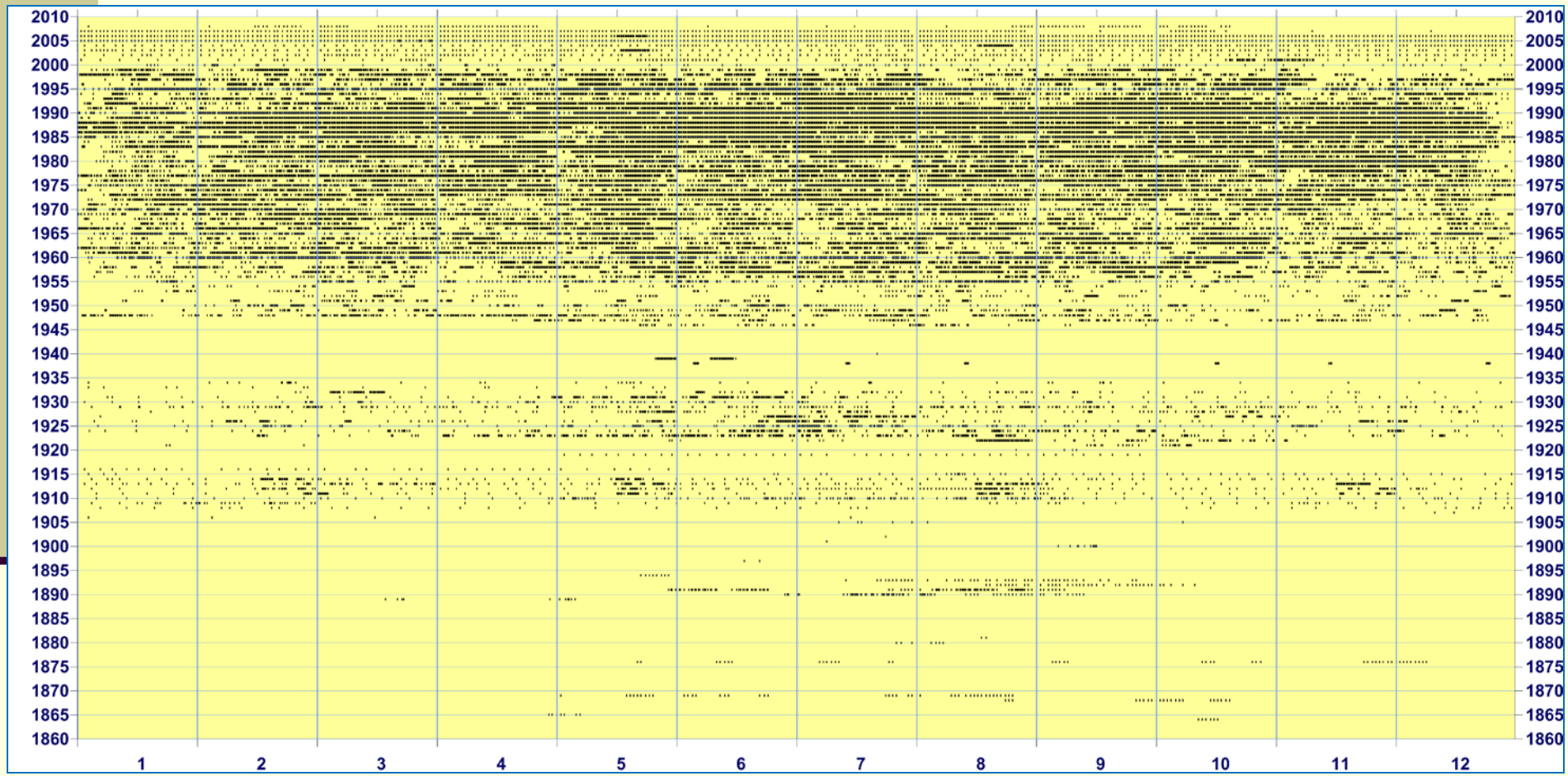


Contents of SESAME cast DB

Item	Number of cruises	Number of casts	Number of T/S levels	Number of Parameters
Contents of MEDAR/MedatlasII collection (without XBT)	2,713	131,113	15,156,004	129
Contents of SESAME Cast DB on the end of 2010	4,221	166,175	18,069,236	249

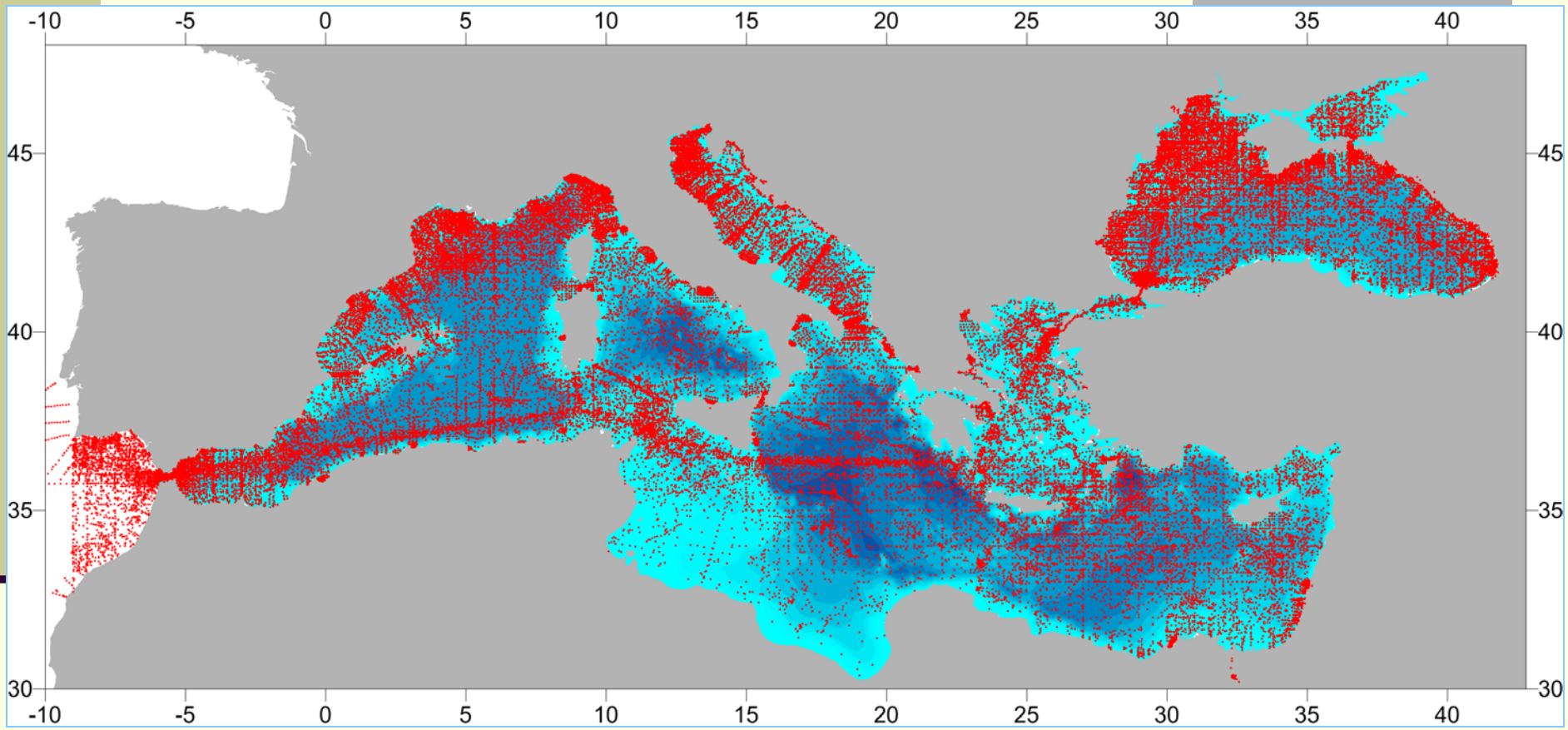


SESAME cast DB Year/Month distribution

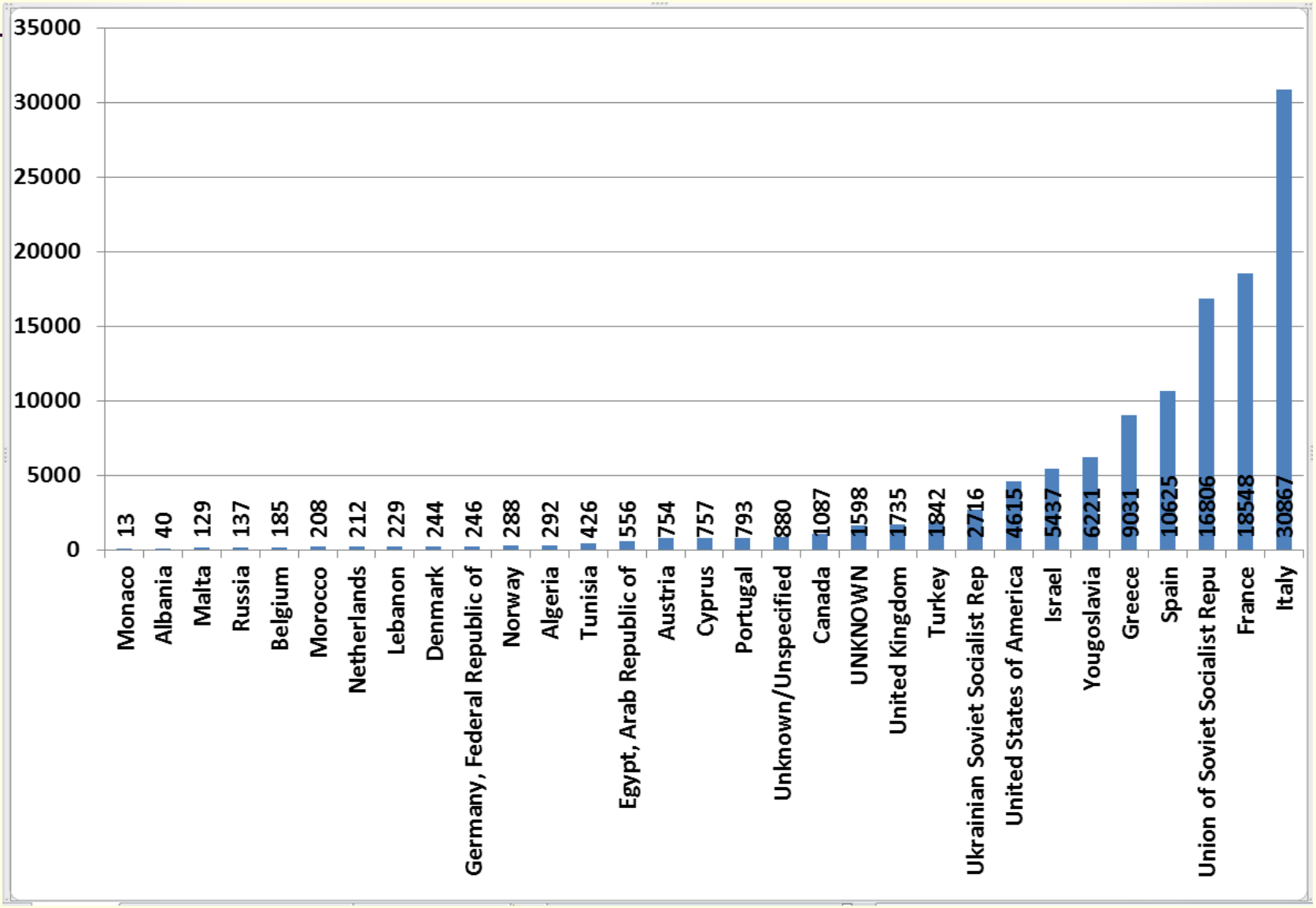


One stick is one cast

Mediterranean Cruises
Spatial distribution of casts

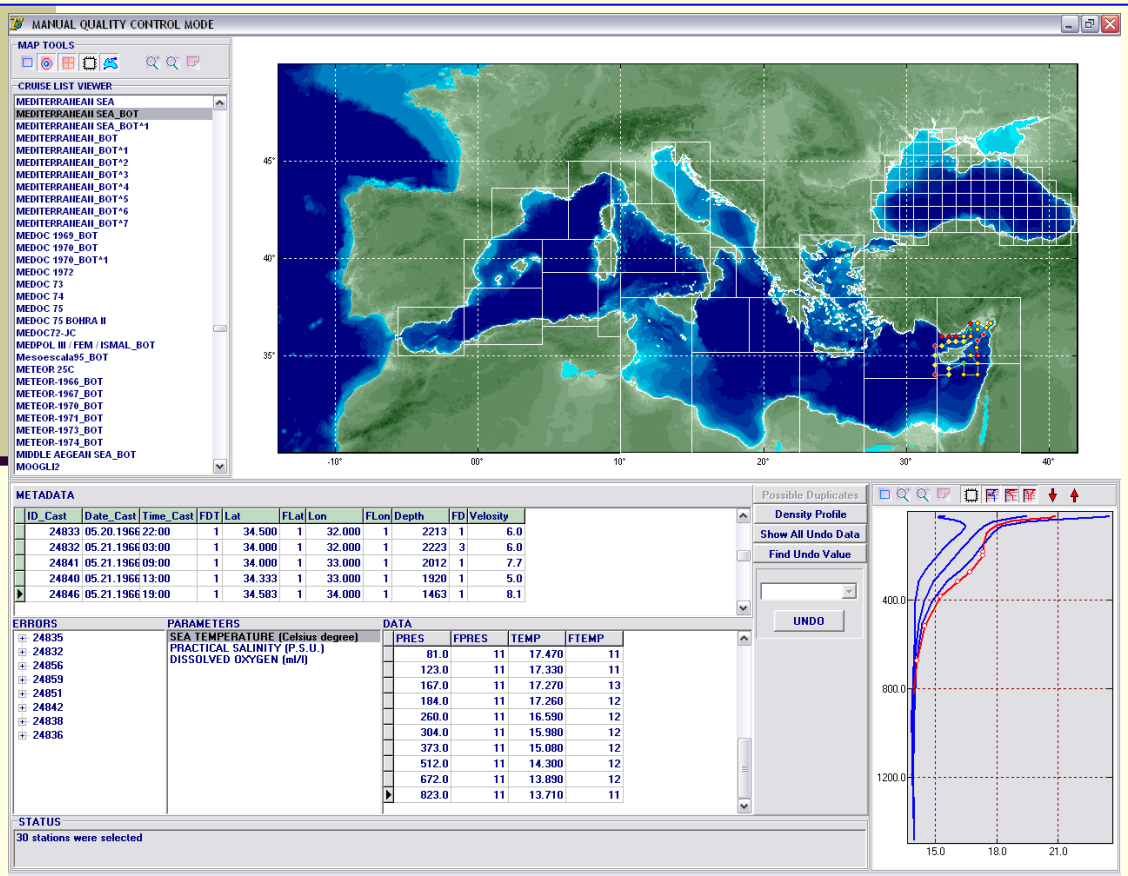


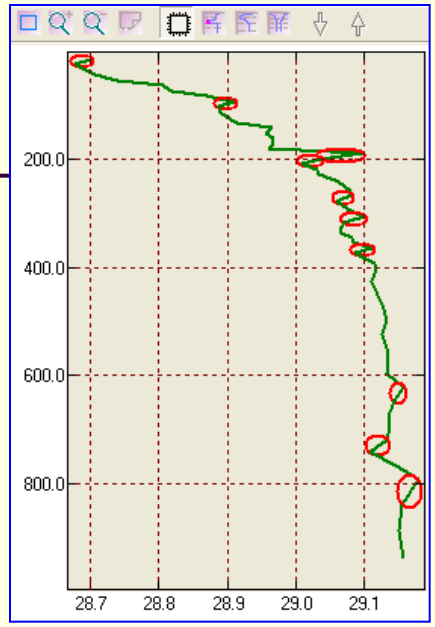
Cast number by Country

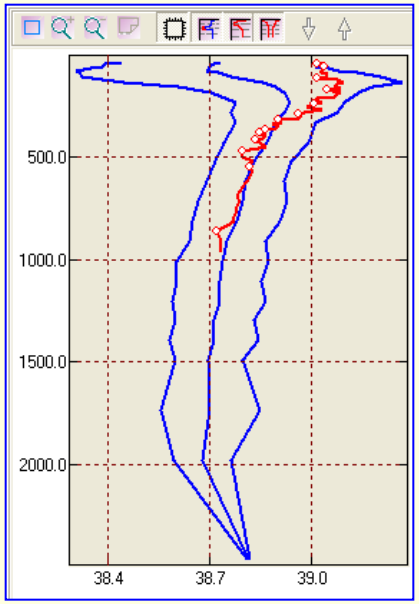


MEDACC - External Quality Control Wizard

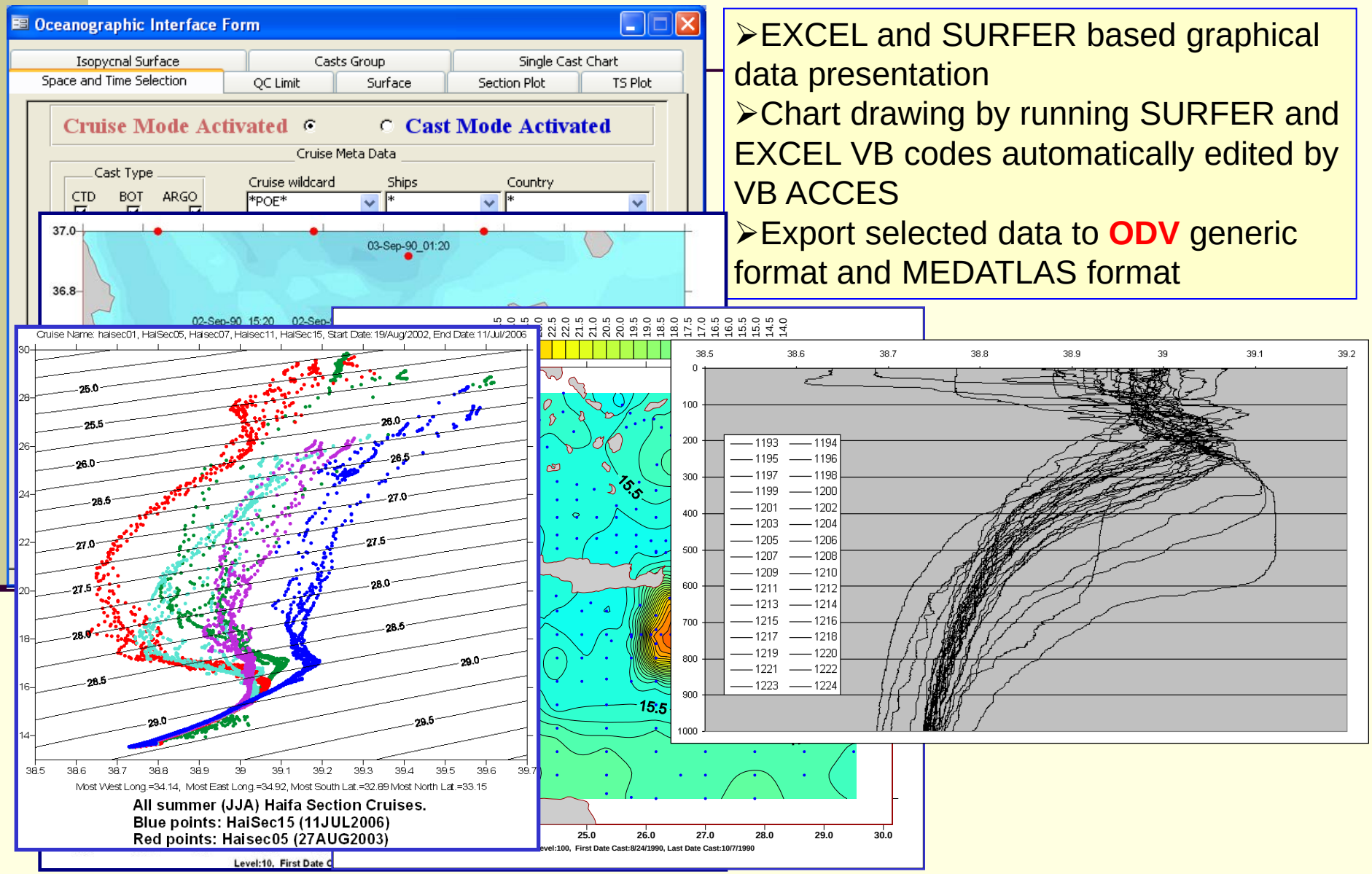
- Direct connection with MEDACC DB
- Auto and manual modes;
- Metadata quality check (location, chronology, sea depth…);
- Data quality control (climatic check, spikes, density inversion…)
- <u>SEADATANET QC Flags convention</u>





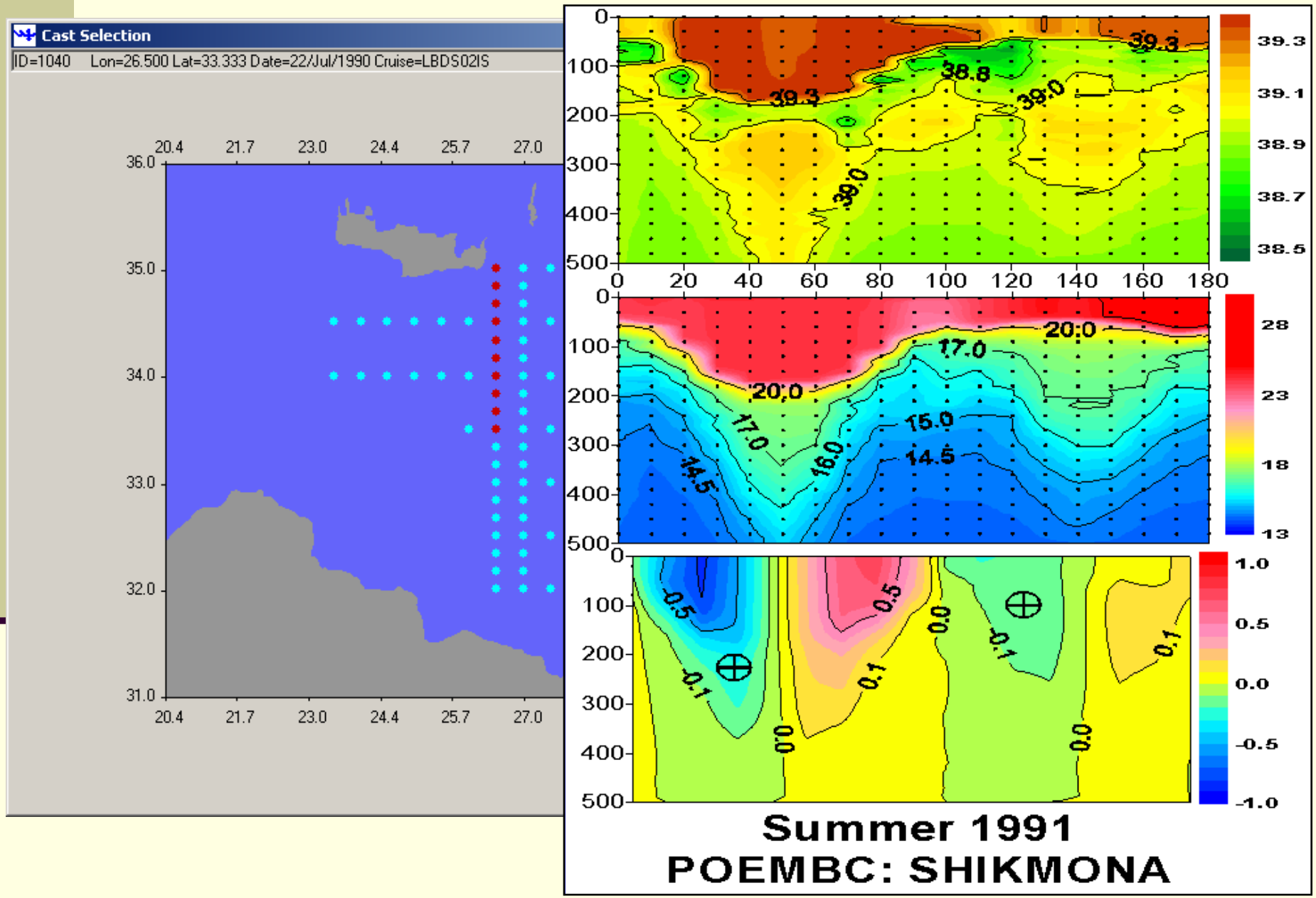


MEDACC
Oceanographic interface



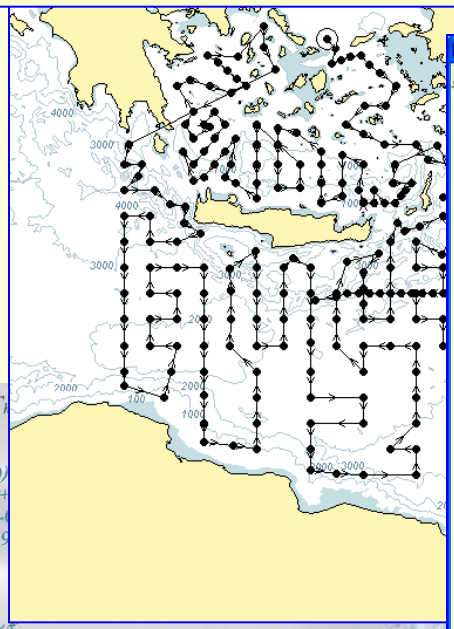
- EXCEL and SURFER based graphical data presentation
- Chart drawing by running SURFER and EXCEL VB codes automatically edited by VB ACCES
- Export selected data to **ODV** generic format and MEDATLAS format

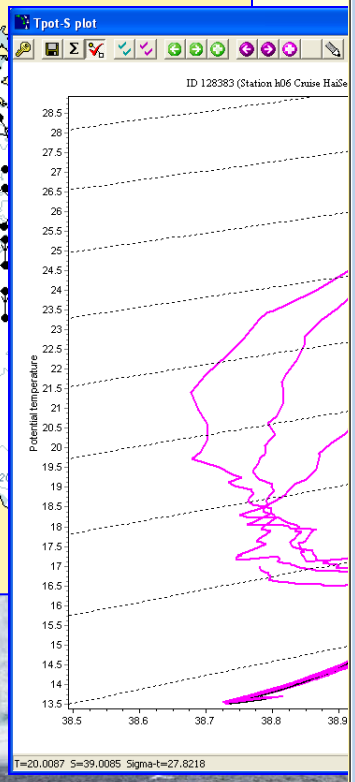
Plot of Sections

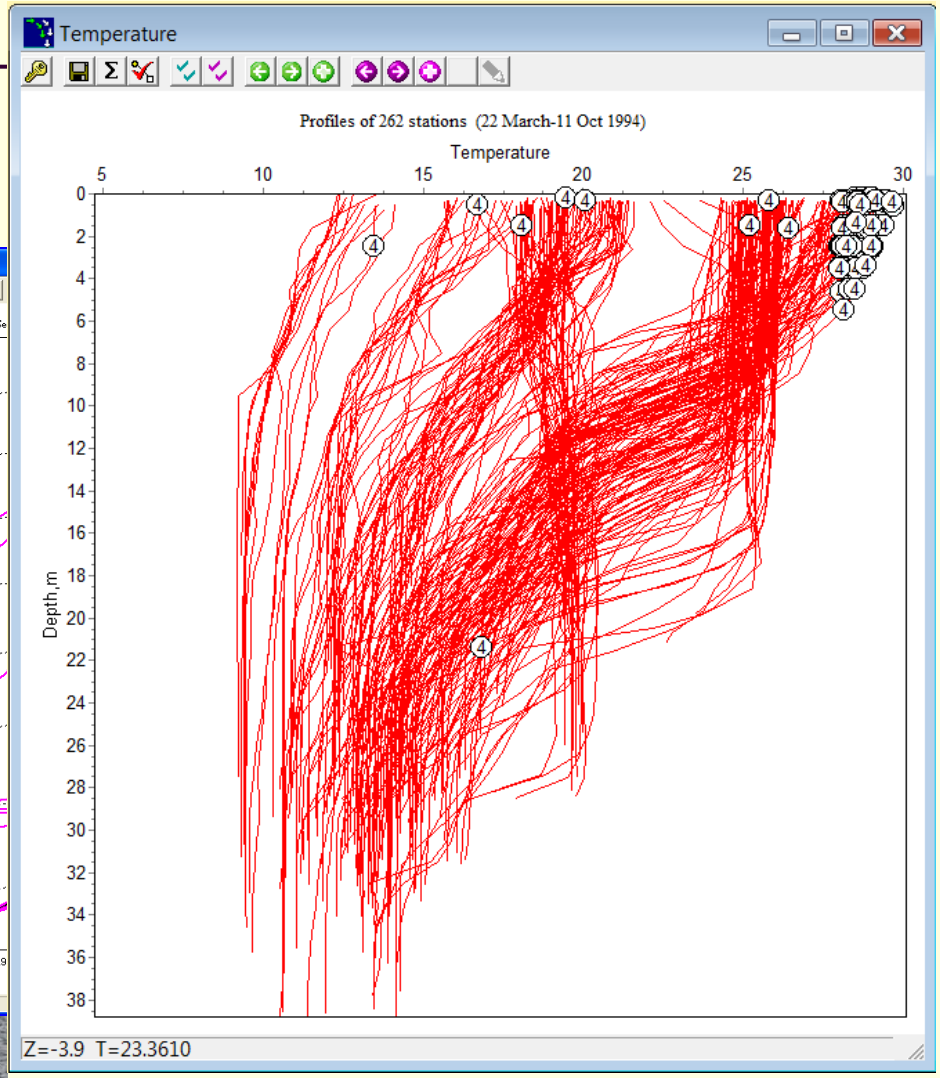


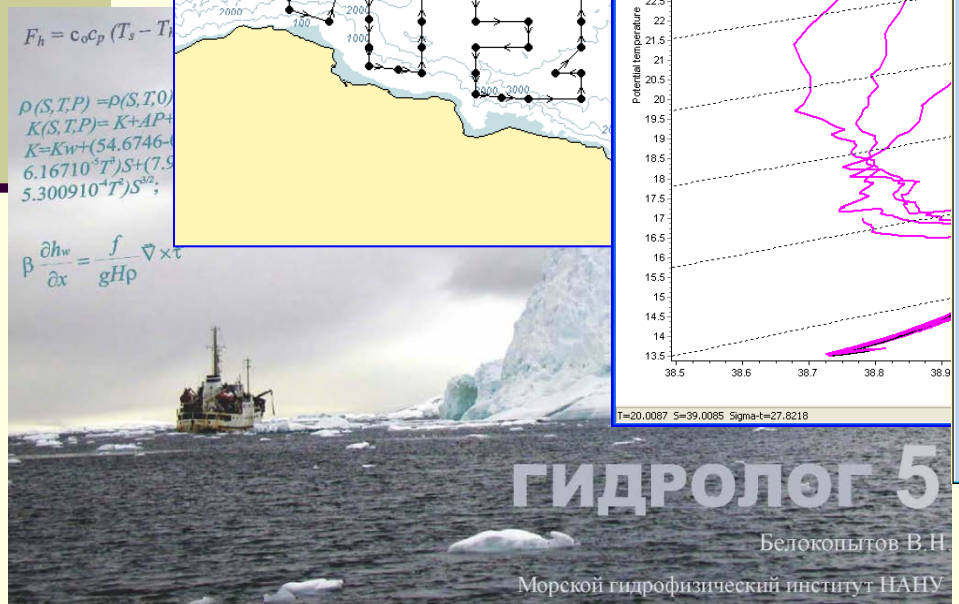
Hydrolog - MEDACC
External Oceanographic Analysis Tools

- Direct connection with MEDACC DB
- Sophisticated data profile charting
- SURFER based vertical and horizontal mapping
- Calculation oceanographic parameters





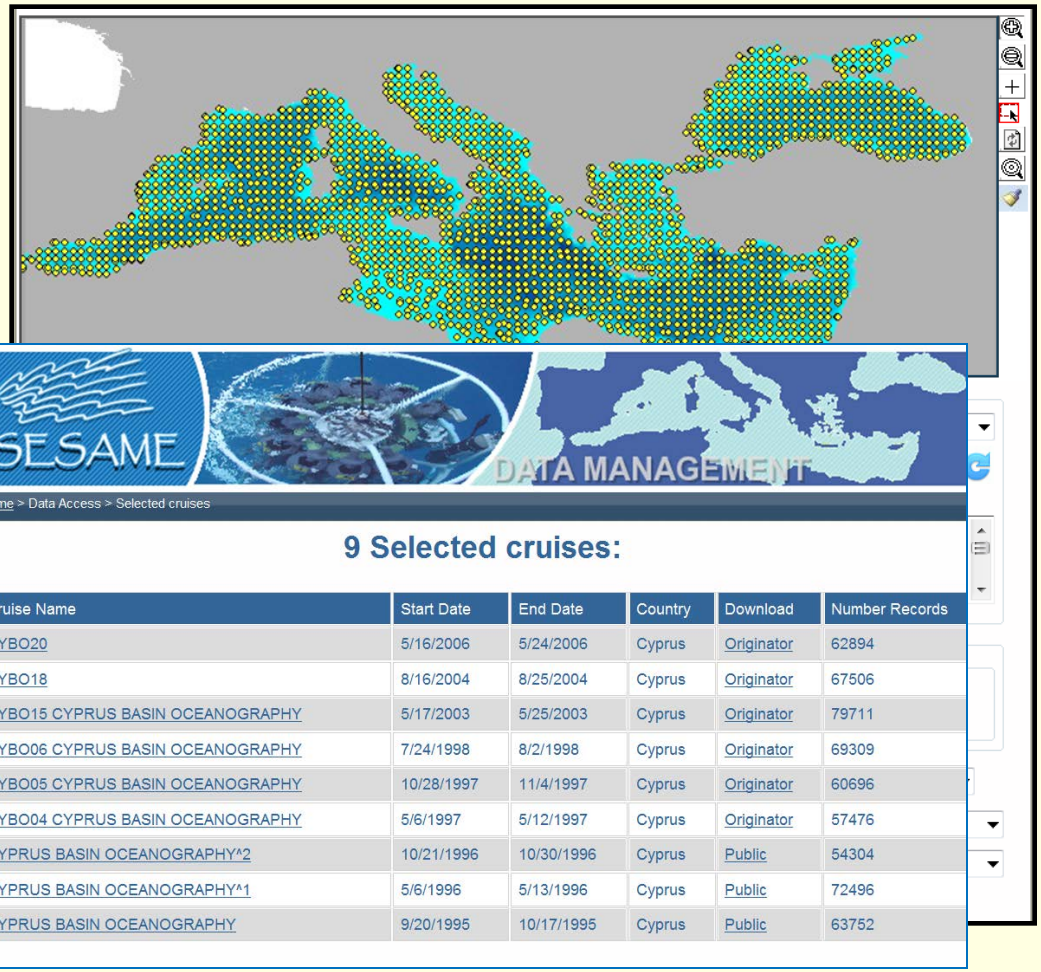




On line interface to SESAME data

On line interfaces for SESAME-CAST DB

- Based on MEDACC converted in MS SQL DB
- WEB interface on asp net technology
- Selection cruises according to controls
- Results in a table form
- Extended analyses of cruise metadata
- Download cruise by cruise in ODV format, according to SESAME data policy



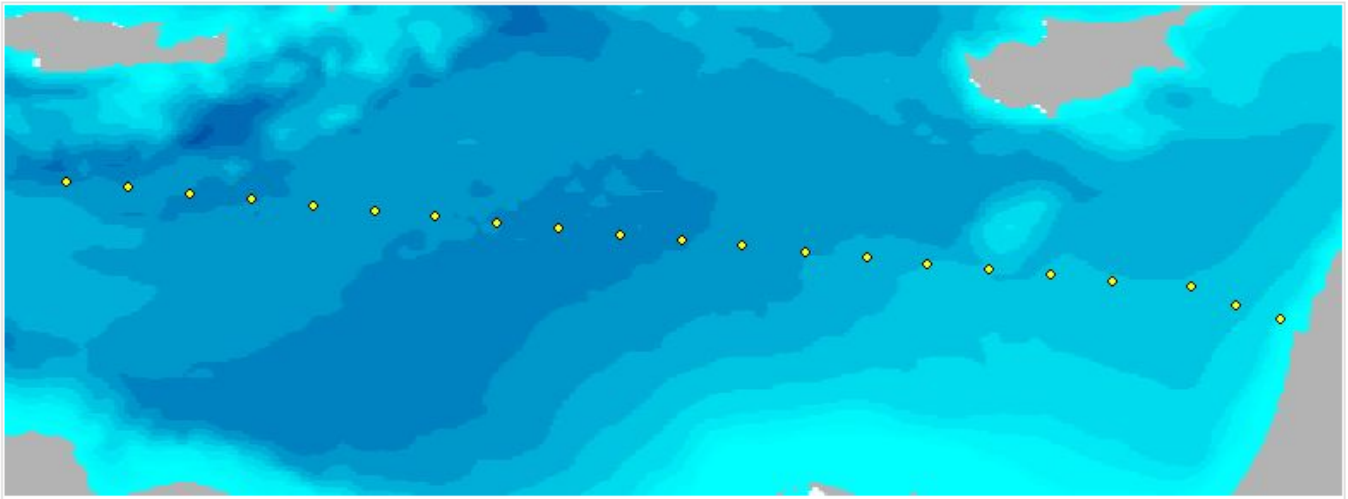
Cruise Name	Start Date	End Date	Country	Download	Number Records
CYBO20	5/16/2006	5/24/2006	Cyprus	Originator	62894
CYBO18	8/16/2004	8/25/2004	Cyprus	Originator	67506
CYBO15 CYPRUS BASIN OCEANOGRAPHY	5/17/2003	5/25/2003	Cyprus	Originator	79711
CYBO06 CYPRUS BASIN OCEANOGRAPHY	7/24/1998	8/2/1998	Cyprus	Originator	69309
CYBO05 CYPRUS BASIN OCEANOGRAPHY	10/28/1997	11/4/1997	Cyprus	Originator	60696
CYBO04 CYPRUS BASIN OCEANOGRAPHY	5/6/1997	5/12/1997	Cyprus	Originator	57476
CYPRUS BASIN OCEANOGRAPHY^2	10/21/1996	10/30/1996	Cyprus	Public	54304
CYPRUS BASIN OCEANOGRAPHY^1	5/6/1996	5/13/1996	Cyprus	Public	72496
CYPRUS BASIN OCEANOGRAPHY	9/20/1995	10/17/1995	Cyprus	Public	63752

Download limitation

- Data download is available for registered users only.
- Official SESAME participants are automatically registered with their login and password from the SESAME PROGECTA website.
- The availability of the data is determined by the data originator and can be classified to 3 types:
  - **Public data** is available to all registered users.
  - **Partner only data** is restricted to SESAME partners only.
  - **Originator only data** is available to the SESAME WP leaders only, and can be requested by Email to the data originator. A list of WP leaders who are given access to all data is available here.

General information regarding particular selected cruise

Information about Cruise: SESIL02



Coordinates:	.	.

Country:	Israel	**Ship:**	SHIKMONA
Data provider:	Israel Marine Data Center (ISRAMAR)	Contact:	Isaac Gertman
Start Date:	7/Sep/2008	**End Date:**	12/Sep/2008

Measured parameters	Units	Number casts
Pressure (spatial co-ordinate) exerted by the water column by profiling pressure sensor and corrected to read zero at sea level	Decibars	21
Temperature of the water column	Degrees Celsius	21
Concentration of oxygen {o2} per unit mass of the water column [dissolved phase]	Micromoles per kilogram	21
Fluorescence of the water column	Not specified	21
Practical salinity of the water column by computation using unesco 1983 algorithm	Parts per thousand	21
Light attenuation coefficient	per metre	20