

**TITLE: Mediterranean Data Archaeology and Rescue of Temperature,
Salinity and Bio-chemical Parameters (MEDAR/MEDATLAS II)**

CONTRACTS NO: MAS3-CT98-0174 & IC20-CT98-0103

PARTICIPANTS - MEDAR GROUP

MAILLARD Catherine (CO-ORDINATOR),
FICHAUT Michele, MAUDIRE Gilbert,
RICOU Gwenaelle
IFREMER , Centre de Brest
BP 70
PLOUZANE 29280, FRANCE
TEL: +33(0)2 98.22.42.79
FAX: 02 98.22.46.44
EMAIL: Catherine.Maillard@ifremer.fr,
EMAIL: Michele.Fichaut@ifremer.fr
Gwenaelle.Ricou@ifremer.fr
Gilbert.Maudire@ifremer.fr

BOUKORTT Redouane, EDDALIA Nabila
DEPARTEMENT DE MOLYSMOLOGIE
ISMAL
BP 54 SIDI FREDJ, 42321 STAOUELI
ALGER, ALGERIA
TEL: +213 2 39 14 76
FAX: +213 2 39 35 38
EMAIL: redouaneboukortt@hotmail.com

BECKERS Jean-Marie, RIXEN Michel
GHER
Université de Liège
Sart Tilman B5
BE4000
LIEGE, BELGIUM
TEL: +32 4 36663358, +32 4 3663650
FAX: 02 41 562355
EMAIL: JM.Beckers@ulg.ac.be,
rixen@gher08.phys.ulg.ac.be

KORTCHEV George
INST. METEO. & HYDROLOGY
BULGARIAN ACADEMY OF SCIENCES
66 Tsarigradsko Schausse
SOFIA 1784, BULGARIA
TEL: +359 2 9753986
FAX: +359 2 88 4494
EMAIL: Georgi.Kortchev@meteo.bg

ZODIATIS George
CYNODC
LAB. PHYSICAL OCEANOGRAPHY
Department Fisheries and Marine Research
Aeolou 13
NICOSIA 1416, CYPRUS
TEL: +357 2 30 38 03
FAX: +357-2-67 59 26
EMAIL: gzodiac@spidernet.com.cy

DOOLEY Harry
CIEM - ICES
Palaegade 2-4
DK-1261
COPENHAGUE K , DENMARK
TEL: +45 33 15 4225
FAX: +45 33 93 42 15
EMAIL: harry@ices.dk

EL-AGAMI Sherif
EGYPT NODC
NIOF
Qayet Bay
El-AnFoshy
ALEXANDRIA, EGYPT
TEL: + 203 480 71 38
FAX: +203 4801174
EMAIL: el_agami@usa.net

OLIOUNINE Iouri, HOOD Maria
UNESCO/COI/IOC
1, rue Miollis
PARIS 75700, FRANCE
TEL: +33 1 45 683963
FAX: +33 1 45685812
EMAIL: i.oliounine@unesco.org
m.hood@unesco.org

BALOPOULOS Efstathios, IONA
Athanasia, KARAVREGEKIS Pelopidas
HNODC
National Centre for Marine Research
Institute of Oceanography
Aghios Kosmas - Hellinikon
ATHENS 16604, GREECE
TEL: +30 1 98 15 703
FAX: +30 1 98 33095
EMAIL: ebal@hnodc.ncmr.ariadne-t.gr
sissy@hnodc.ncmr.gr,
pkar@hnodc.ncmr.gr

BRENNER Steve, GERTMAN Isaac,
TSEHTIK Yan
DEPARTMENT OF PHYSICAL
OCEANOGRAPHY
Israel Oceanographic & Limnological Res.
Tel Shikmona
P.O.Box 8030
HAIFA 31080, ISRAEL
TEL: +972 4 8515202
FAX: +972 4 8511911
EMAIL: sbrenner@ashur.cc.biu.ac.il
isaac@ocean.org.il
tsehtik@ocean.org.il

MANCA Beniamino Bruno, GIORGETTI
Alessandra
DIP. OCEANOLOGIA E GEOFISICA
AMBIENTALE
Borgo Grotta Gigante
P.O.Box 2011
TRIESTE 34010, ITALY
TEL: +39 40 21 40 201
FAX: +39.40.21.40.319
EMAIL: manca@ogs.trieste.it
agiorgetti@ogs.trieste.it

MANZELLA Giuseppe
CTR. RICERCHE AMBIANTE MARINO
ENEA-CRAM
P.O. Box 316
Forte S. Teresa, Localita Pozzulo
LA SPEZIA 19100, ITALY
TEL: +39 187 536215
FAX: +39 187 536213
manzella@estوسف.santateresa.enea.it

PINARDI Nadia, ZAVATARELLI Marco
ISAO
Area Della Ricerca Del CNR
Via Gobetti 101
BOLOGNA 40129, ITALY
TEL: +39 051 639 8015
FAX: +39 051 639 8132
EMAIL: N.Pinardi@isao.bo.cnr.it
M.Zavatarelli@isao.bo.cnr.it

LAKKIS Sami
NAT. CENTRE FOR MARINE SCIENCES
P.O. Box 534
BATROUN, LEBANON
TEL: +961 6 741 582
FAX: +961 6 741 584
EMAIL: slakkis@inco.com.lb

DRAGO Aldo
PHYSICAL OCEANOGRAPHY UNIT
University of Malta
Department of Biology
MSIDA, MALTA
TEL: +356 34 24 88
FAX: +356 342488
EMAIL: genmcst@keyworld.net

ORBI Abdellatif, LARISSI Jamila
INST. NATIONAL DE RECHERCHE
HALIEUTIQUE
2, rue Tiznit
CASABLANCA 20000, MOROCCO
TEL: +212 2 22 02 49
FAX: + 212 2 26 6967
EMAIL: inrh@mail.ebi.net.ma
hilmi@inrh.org.ma

MIKHAILOV Nickolay, VYAZILOV
Evgeny, KUZNETSOV Alexander
ALL RUSSIA OCEANOGRAPHIC DATA
CENTRE
RIHMI-WDC
6, Koroleva St.
Kaluga Region
OBNINSK 024020, RUSSIA
TEL: +7 0 8439 74 907
FAX: +7 095 255 2225
EMAIL: nodc@meteo.ru
vjaz@meteo.ru
kuznet@wac.meteo.ru

GARCIA Maria-Jesus
INSTITUTO ESPANOL DE
OCEANOGRAFIA
c. Corazon de Maria 8
MADRID 28002, SPAIN
TEL: +34 91 343612
FAX: +34 91 4135597
EMAIL: MJesus.garcia@md.ieo.es

OZYALVAC Mustafa, TURKER Ahmet,
BERKAY Fatih
DEPT. NAVIGATION HYDROGRAPHY &
OCEANOGR.
Seyir ve Hidrografi Daire Baskanligi
Cubuklu
ISTANBUL 81647, TURKEY
TEL: +90 216 322 25 80
FAX: +90 216 331 05 25
EMAIL: mustafa@shod.mil.tr
info@shod.mil.tr
ocean@shod.mil.tr

SUVOROV Alexander, KHALIULIN Alexey
DPT MARINE INFORMATION SYSTEMS
& TECHNO.
MARINE HYDROPHYSICAL INSTITUTE
2, Kapitanskaya Str.
Crimea 335000
SEVASTOPOL 99001, UKRAINE
TEL: +380 692 54 0452
FAX: +380 (0692) 554253
EMAIL: suvorov@alpha.mhi.iuf.net

MEDITERRANEAN DATA ARCHAEOLOGY AND RESCUE OF TEMPERATURE, SALINITY AND BIO-CHEMICAL PARAMETERS (MEDAR/MEDATLAS II)

MEDAR Group

C. MAILLARD, M. FICHAUT, G. MAUDIRE, G. RICOU, IFREMER , Centre de Brest, BP 70,
PLOUZANE 29280, FRANCE
R. BOUKORTT, N. EDDALIA, ISMAL, 42321 STAOUELI, ALGER, ALGERIA
J.-M. BECKERS, M. RIXEN, GHER, Univ. de Liège, BE4000, LIEGE, BELGIUM
G. KORTCHEV, INST. METEO. HYDROLOGY, SOFIA 1784, BULGARIA
G. ZODIATIS, CyNODC, Dept Fisheries & Marine Res., NICOSIA 1416, CYPRUS
H. DOOLEY, ICES, Palaegade 2-4, DK-1261, COPENHAGUE K , DENMARK
EL-AGAMI Sherif, ENODC, NIOF, Qayet Bay, El-AnFoshy, ALEXANDRIA, EGYPT
I. OLIOUNINE, UNESCO/COI/IOC, 1, rue Miollis, PARIS 75700, FRANCE
E. BALOPOULOS, A. IONA, P. KARAVREGEKIS, NCMR/HNODC, Hellinikon, ATHENS 16604,
GREECE
I. GERTMAN, Y. TSEHTIK, IOLR., Tel Shikmona, P.O.Box 8030, HAIFA 31080, ISRAEL
B. MANCA, A. GIORGETTI, OGS, Borgo Grotta Gigante, P.O.Box 2011, TRIESTE 34010, ITALY
G. MANZELLA, ENEA-CRAM, P.O. Box 316, Forte S. Teresa, LA SPEZIA 19100, ITALY
N. PINARDI, ISAO, Via Gobetti 101, BOLOGNA 40129, ITALY
S. LAKKIS, NAT. CENTRE FOR MARINE SCIENCES, BATROUN, LEBANON
DRAGO Aldo, PHYSICAL OCEANOGRAPHY UNIT, University of Malta, MSIDA, MALTA
A. ORBI, J. LARISSI, INRH, 2, rue Tiznit, CASABLANCA 20000, MOROCCO
N. MIKHAILOV, E. VYAZILOV, A. KUZNETSOV, RIHMI-WDC, 6, Koroleva St., Kaluga Region,
OBNINSK 024020, RUSSIA
M.-J. GARCIA, IEO, c. Corazon de Maria 8, MADRID 28002, SPAIN
M. OZYALVAC, F. BERKAY, Seyir ve Hidrografi, Cubuklu, ISTANBUL 81647, TURKEY
A. SUVOROV, A. KHALIULIN, MHI, 2, Kapitanskaya Str., SEVASTOPOL 99001, UKRAINE

Summary

The objective of the MEDAR/MEDATLAS II project (1998-2001) is to rescue, safeguard and make available a comprehensive data set of temperature, salinity and bio-chemical parameters collected in the Mediterranean and Black Sea, through a wide co-operation of the Mediterranean countries. The data are collected at national levels and checked for quality according to the common protocol, at four regional qualification centre. The data sets will be integrated in a common database and transferred to a modellisation centre for calculating the climatological statistics. At the present stage of the project, a preliminary benchmark of data sets from all participants has been processed, to test the structure and the protocol.

In addition to the technical tasks, sharing the knowledge and know-how among the participants is an important issue of the project. It aims to enhance the overall capacity of the Mediterranean and Black Sea data centres network, in oceanographic data management, in the perspective of the forthcoming operational oceanography.

Introduction

Managing the marine resources and following up the environmental changes in the sea waters requires the availability of long times series of observations. Key parameters are dissolved oxygen, nutrients, temperature and salinity. Oxygen deficiencies in the upper layers can result in diminution of higher life forms, and pathology in living organisms. Nutrient fluxes that control primary production and the bio-diversity, and can affect aquaculture and fishing activity. Temperature and Salinity, which are the primary indicators of climate changes and allow the computation of other derived quantities such as density, sound velocity, current.

Appropriate data management is necessary to insure the availability of such data. It is currently recognised that, about 30% of data remaining dispersed in the scientific laboratories are in danger to be lost after 10 years. Unfortunately, an observation in variable environment can never be remade.

Therefore, the objective of the MEDAR/MEDATLAS II project is to rescue, safeguard and make available a comprehensive data set of such parameters collected in the Mediterranean and Black Sea, through a wide co-operation of the Mediterranean countries: 15 National Oceanographic Data Centres or National Designated Agencies (NODC/DNA, 3 modelling centres and 2 international organisations. This project follows to previous successful pilot projects MAST/MEDATLAS (MAS2-CT93-0074) in which the presently most exhaustive database of temperature and salinity was produced, and MODB (MAS2-CT93-0075-BE) where the Variational Inverse Model for preparing objectively analysed data was developed.

The present project is organised in four regional tasks for data compilation and qualification, and four thematic tasks for preparing a global cruise inventory, an integrated data product, an updated climatology and a reference protocol manual.

MEDAR Cruise Inventory

The first task has been to inventory and compile information on oceanographic cruises where Temperature, Salinity, Oxygen, Nitrate, Nitrite, Ammonia, Total Nitrogen, Phosphate, Total Phosphorus, Silicate, Chlorophyll-a, Alkalinity, pH, H₂S observations have been made. In addition to national sources, a review of the project and bibliographical sources has been identified to complete this information. The resulting global cruise inventory, developed by the Russian NODC/World Data Centre-B, in collaboration with ICES and the other participants, has been published on internet (www.meteo.ru/nodc/project/ftp/load.htm), with tools to select the cruise reports by countries (fig 1).

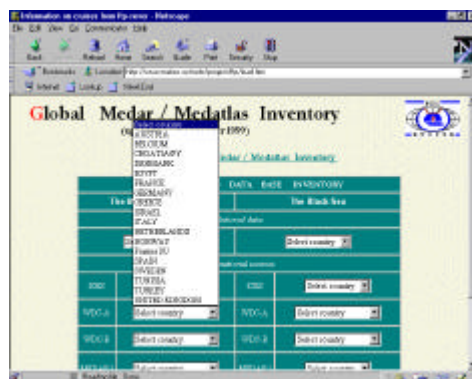


Fig. 1: On line tool for retrieving cruise information

Methodology for data processing

The compilation of data from each source laboratory is done in each country, by the National Oceanographic Data Centre (NODC) or Designated National Agency (DNA). In order to prepare an integrated database from data sets issuing from these various sources, it was necessary to insure comparability and compatibility by using a common protocol for formatting and quality checking (1). Formatting at the MEDATLAS format is made by each participant, and the quality checks on the observations, are performed at four regional qualification centres, by using available expert software tools, designed according to the protocol. As a result, the data are eliminated or a quality flag is added to each numerical value.

All the profiles are submitted to a series of automatic and visual checks. A first series of checks (QC1) is dedicated to the location, date, and data below the bottom depth (fig 2).

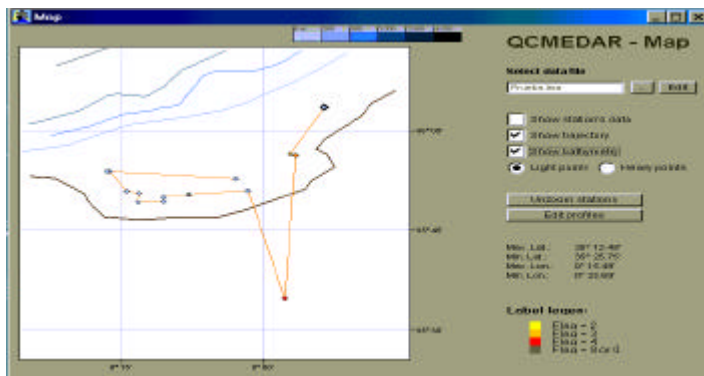


Fig 2: User interface for controlling the Location and Date

A second series (QC2) checks that the data points are not: constant profiles, out of the regional broad range values, do not create a vertical instability, a spike, incoherent with the existing climatological statistics. After the automatic checks, the profiles are visualised in waterfall individual profiles and superposed profiles to check the internal coherence (fig. 2).

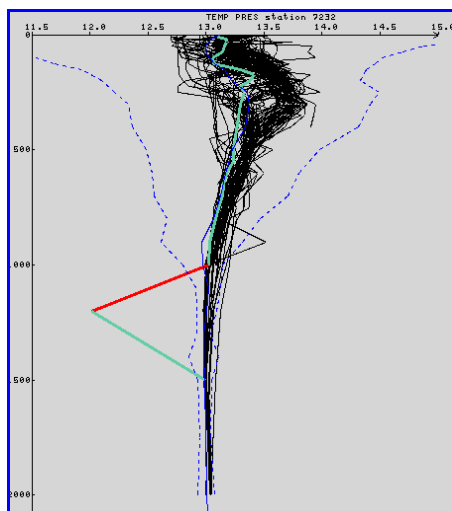


Fig 3: Example of Quality Checks of Temperature Profiles

First Benchmark of Data to test the structure

A first benchmark of newly rescued data from all sources has been circulated to test the whole structure and the protocol, format, codes, software etc. Several systematic format or codes errors have been detected and new clarifications will be inserted in the revised protocol manual. The data location of some bio-chemical parameters of this benchmark are displayed on fig 4.

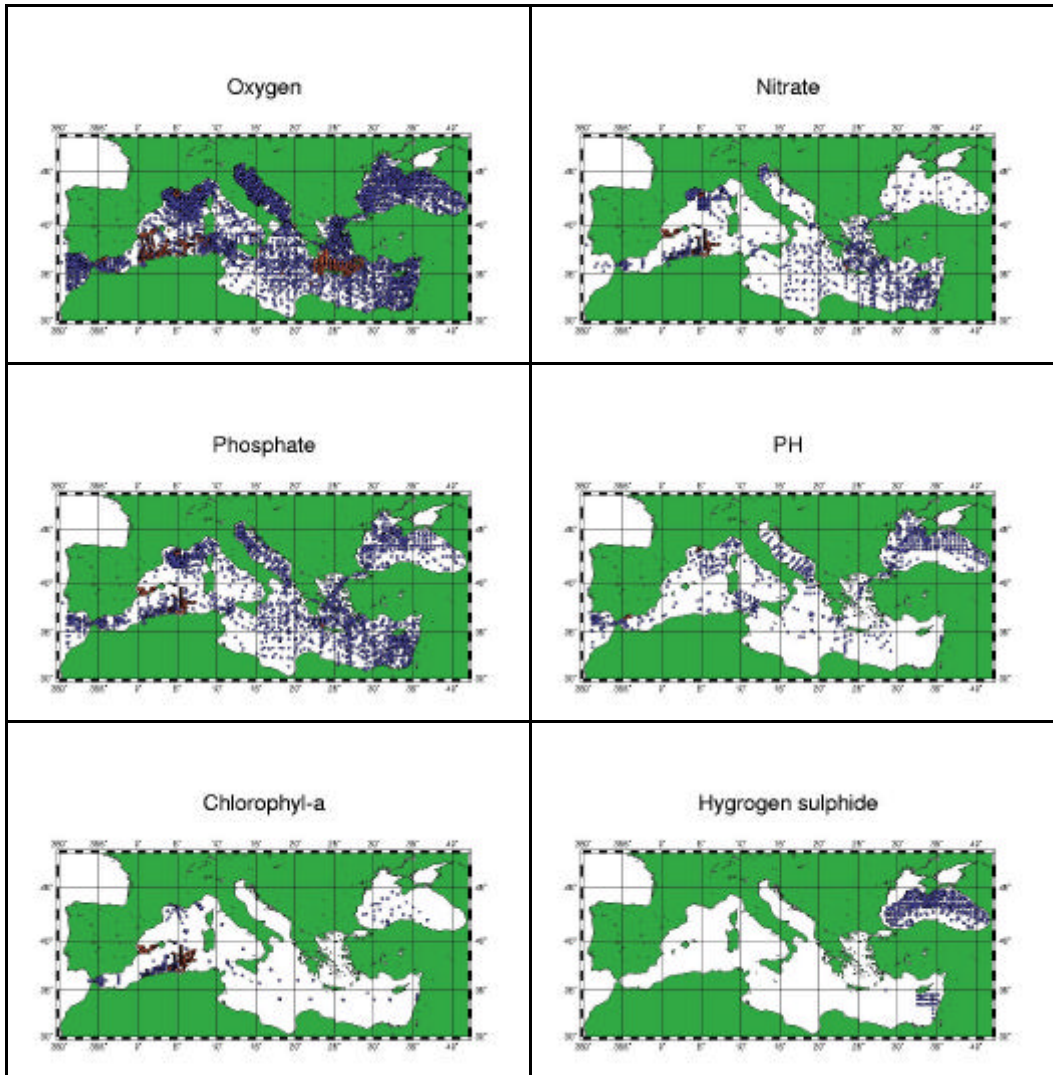


Fig 4 : Bio-chemical parameters of the first benchmark - test of the structure

Climatologies and Maps

In parallel to the observational data management, several improvements have been made to the variational inverse model analysis tool, which includes now an automatic error computation, an automatic coordinate transformation, and automatic statistical parameters. Moreover, the gridding technologies and available software have been reviewed, the data decimation pre-

processing technique has been developed and is ready to use, the horizontal and vertical grid, the relevant analysis regions and time resolution have been defined, an optimiser and a semi-normed background field facility have been added. Some preliminary tests on the database have been performed and the new release of the analysis tool has been made available on Internet <http://modb.oce.ulg.ac.be/Medar> (Fig. 5):

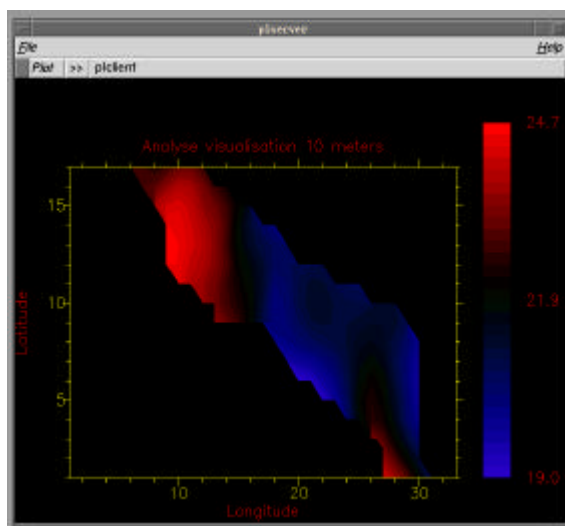


Fig. 5: Output of the DIVA software - Horizontal distribution of analysed data

Discussion and new developments

It is noticeable that two main objectives of the project are progressing: making available geochemical data and completion of the void areas at the East and South of the region, thanks to the joint effort of all the participants. Collaborations have also been developed with NODC-Croatia, INSTM Tunisia, DNA Georgia IODE and MAST NODC network, and with GODAR Project (World Data Centre-A) (2), EUROGOOS, MEDGOOS (3), SHOM. However the data rescue is not an easy task and difficulties arise not only to convince the scientists to publish their data, but also from the number of duplicates found in the historical data sets. Archiving information on cruises, maintaining national responsibilities and making use of expert software can allow working out this problem. In any case, preservation and documentation of the data sets is improved by short time lag between data collection and release, and should be encouraged by all the funding agencies.

One key point of the project is the sharing of know-how and expertise among Mediterranean and Black Sea data managers. A double QC workshop (in Brest and Athens) organised by IFREMER, IOC, NCMR/HNODC, RIHMI-WDC and IEO was dedicated to training in data formatting and QC. From many discussions of the workshop, the QC methodology will be improved. The software developed by IEO on PC has been disseminated after the workshop to all the participants and the IFREMER software on Unix is used for final checking and inter-comparisons. Another workshop will be dedicated to objective analysis.

Another important point has been the development of networking. A distributed network of thematic and regional websites has been opened to public (4), with interfaces for data request. National websites for hydrological data information and exchange are under development, and a few of them like for the Israeli site, already open.

By all these actions, is expected to contribute to the preservation of the existing data, to the further exploitation of the experimental fieldwork, and the improvement of the overall level of data quality.

Acknowledgements

The MEDAR Group acknowledges with gratitude the many contributors who have made this work possible. The scientific laboratories contributed to this database by sending copies of the collected observational data and documentation to their NODC/DNA. The financial support was provided by the Commission of the European Communities under the contracts MAS3-CT98-0174 & IC20-CT98-0103, and by the participating organisations. We thank Dr. Elisabeth Lipiatou of the DGXII/MAST Office for her efficient assistance.

References

- (1) MEDAR Group, 1999: MEDAR/MEDATLAS Protocol, Part 1: Exchange format and quality checks for observed profiles, Preliminary version, Feb. 1999, R. Int. IFREMER/DITI/IDM/SISMER/99-031
- (2) MEDAR Group, EU/GODAR-type project in the Mediterranean Sea: MEDAR/MEDATLAS II Concerted Action, 1999: International GODAR review Conference 12-15 July 1999, Silver Spring, MD, USA
- (3) MEDAR Group, 1999: Importance of the data archiving for MEDGOOS: The MAST/MEDAR-MEDATLAS II, Mediterranean Data Archaeology and Concerted, by, MEDGOOS Conference in Rabat, November 1999
- (4) MEDAR/MEDATLAS co-ordinating web site: www.ifremer.fr/medar/