Update to the Italian *"Detailed National Report"* on Systematic Observation for Climate: Italian Global Climate Observing System (I-GCOS) Program

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In this update several new activities, with relevant climate significance, beyond those included in the ***Italian GCOS 2005 report***, are presented.

Chapter 2

Besides the monitoring activities described in the Chapter 2, it has to be mentioned the activity begun in 2008 of digitizing data of former Italian Colonies (Aerytrea, Etyopia, Lybia and Somaliland), found during a data rescue operation and to put them in the NOAA web site Database for their publication, thanks to an agreement with the mentioned U.S. Administration.

Chapter 3

Several new activities occur in the marine environment observation, so the update should be added to the Chapter 3, Oceanic Observation of the previous report.

We would notice the activity of the Mareographic station of Trieste, performing the monitoring every 10 minutes of the sea level, and temperature (surface and 2 m. below sea level) since 1995.

Meteorological conventional data and radiation data are monitored since 1979 in the same station.

The present update describes the *MOON* observing system and also refer to the state of implementation of the *MOON4CLIMATE* project that was submitted to the *"GCOS REGIONAL ACTION PLAN FOR THE MEDITERRANEAN BASIN"* published in September 2006. An overview on the achievements during the period May 2006-September 2008 is presented.

Most of the existing structure in operational oceanography in the region has been coordinated by *MOON (Mediterranean Operational Oceanography Network)*, in which is involved the *Italian National Group of Operational Oceanography (GNOO)* as a part of the *National Institute of Geophysics and Volcanology (INGV).*

The actual observing system is composed of a specific implementation of VOS-SOOP, ARGO, meteo-oceanographic buoys, gliders and analysed satellite data that are both archived and real time. The in-situ observations collected in the period May 2006-September 2008 are shown in figure 1. The products derived from satellite observations have been improved and consist of Sea Surface Temperature, Sea Level Anomaly and Chl-a concentration.

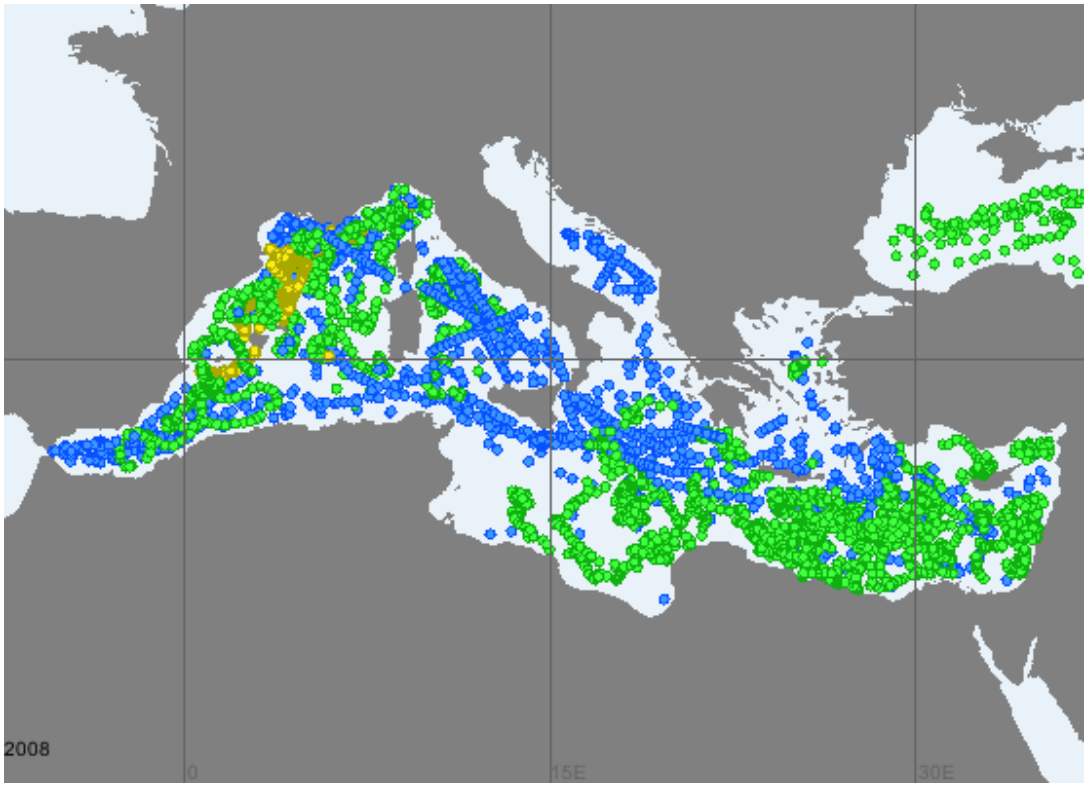

Figure 1: Overall *MOON* monitoring observing network in the Mediterranean from May 2006 to September 2008. The blue dots indicate the *Ship of Opportunity Program-SOOP XBT* temperature profiles and *CTD*, the green dots the *MEDARGO* floats temperature and salinity profiles locations (700 and 2000 meters profiles every 5 and 25 days cycles respectively) and the yellow dots the glider cruisess, with the collection of salinity, temperature and oxygen profiles down to 200 and 1000 meters.

Products

MOON observing products consists of:

1) in situ temperature and salinity profiles, chlorophyll, nutrients, oxygen turbidity and air-sea interaction state variables time series are made available with quality control as part of the *MEDARGO, SOOP*, *M3A* and glider programs of *MOON*.
2) satellite data such as Sea Surface Temperature, Sea Level Anomaly, Surface Chlorophyll and surface winds are also provided and analysed in Near Real Time or Real Time.

The *GNOO (Italian National Group of Operational Oceanography)* publishes also a Monthly Bulletin that contains some starting climate indicators for the basin thermohaline properties of different marine areas of the Mediterranean Sea. Moreover *GNOO* has developed a website with a viewing service for indicators (http://gnoo.bo.ingv.it/mfs/B4G_indicators/MFS_indicators.htm)

Achievements of *MOON* observing system during the period May 2006 to September 2008

1) ***MEDARGO***

Achievements since May 2006:
36 floats have been operating in this period in the Mediterranean and the number of station collected are 2619

2) ***SOOP* campaigns:**

Achievements: Approximately 50 cruises have been performed in this period. Figure 1 shows the *XBT* stations (1275) in the Mediterranean from May 2006 to September 2008. The table below the figure shows the monthly statistics of the collected data.

3) **Upgrade of two of the *SOOP* tracks to *VOS* tracks (c and b above) adding meteo-stations for measuring and transmitting in real time meteorological measurements.**

4) **Further development and maintenance of *M3A* buoys in the Ligurian Sea (*W1-M3A*) and in the Southern Adriatic Sea (*E2-M3A*).**

5) **Ensure the availability of satellite daily products of Sea Surface Temperature (SST), Sea Level Anomaly (SLA) and Surface Chlorophyll (Chl-a).**

6) **The *Fishery Observing System (FOS)* in the Adriatic Sea collecting data of fishing effort and commercial catches, including Temperature and Pressure data during the hauls. The FOS system need to be upgraded with the transmission in Near Real Time of T/P data and the development of a conductivity recorder (*CTD*)**

7) **"ocean climate" indicators**

Achievements: *MOON* has developed a dedicated viewing service (http://gnoo.bo.ingv.it/mfs/B4G_indicators/) with an initial set of indicators as described in table 1.

SST	Sea Surface Temperature [°C]
SST anomaly	Sea Surface Temperature Anomaly [°C] The difference between the SST of the model and the SST of the Medatlas climatology[1].
SSS	Sea Surface Salinity [PSU]
HC	Heat Content [1021J] Calculated in 0-150 m upper layer by multiplying the volume of water by its density and specific heat capacity.
HC anomaly	Heat Content Anomaly [1021J] The difference between the HC of the model and the HC of the Medatlas climatology[1]
Net Volume Transports	Net Volume Transports [Sv] Calculated for the Strait of Gibraltar, Sicily Channel, and Corsica Channel. Sv = 106 m3/s.
Net Volume Transports Anomaly	Net Volume Transports Anomaly [Sv] The difference between the Net Volume Transport of the model and the Net Volume Transport of the MFS sys2b climatology[2]. Calculated for the Strait of Gibraltar, Sicily Channel, and Corsica Channel. Sv = 106 m3/s.

Table 1: current set of indicators available at the MFS website: http://gnoo.bo.ingv.it/mfs/B4G_indicators/