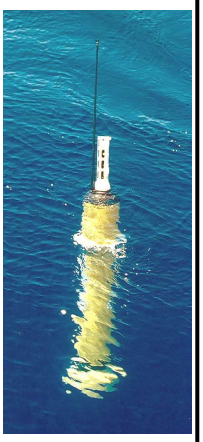
Argo National Data Management Report – Italy (2012)

1. Status

- **<u>Data acquired from floats</u>:** 151 floats were deployed in the Mediterranean and in Black Sea between 2000 and 2012 (Figure 1); 22 floats in 2012 (Figure 10).

Float fleet in the Mediterranean and Black Sea between 2000 and 2012

- **Apex**
  - 38 SBE
  - 17 SBE APF 8
  - 7 SBE APF 8C
  - 13 SBE APF 9A
  - 1 SBE APF 9I
- **Provor**
  - 28 CTS 2 (3 BioArgo)
  - 18 CTS 3 (1 DO9)
- **Nemo**
  - 5 SN 081 to 085
- **Arvor**
  - 2 I
  - 7 I-2
  - 3 A3
  - 11 L
  - 1 Arvor



TOTAL → 151 floats

Figure 1. Floats deployed in the Mediterranean and Black Sea between 2000 and 2012.

- **<u>Web pages</u>:** The MedArgo web page (http://nettuno.ogs.trieste.it/sire/medargo/) has been maintained and tables and graphics are updated in near real time. The floats deployed during 2012 are added to the web page as soon as the technical information are available. The float positions are plotted daily (Figure 2); the monthly and the whole trajectories are also provided (Figure 3). Links with the GDAC center (Coriolis) are also available for downloading both the real-time and delayed-mode float profiles.

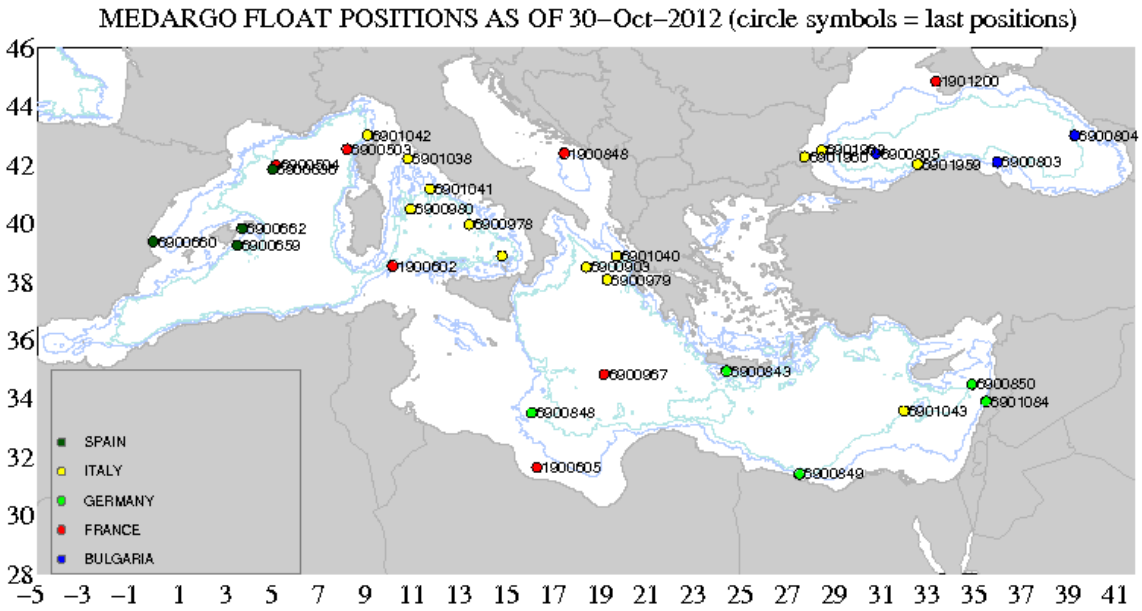


Figure 2. MedArgo float positions as of 26 October 2012 (updated daily).

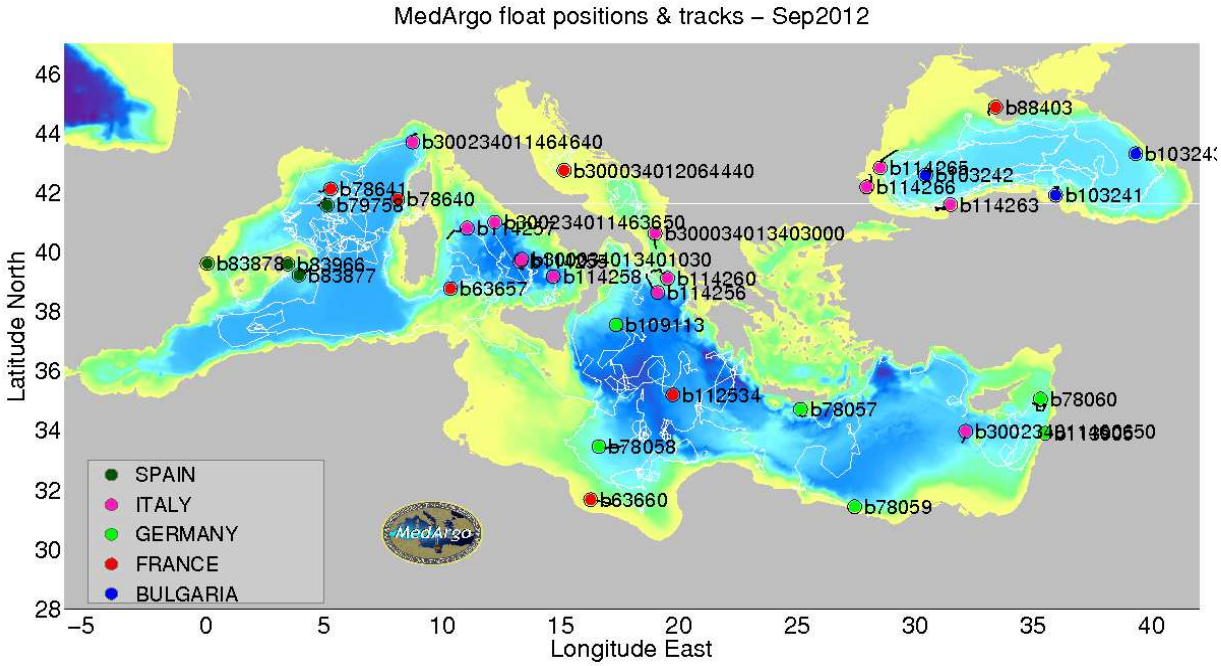


Figure 3. MedArgo float positions and tracks (September 2012). The monthly tracks are in black while the entire float trajectories are in white.

- **<u>Statistics of Argo data usage</u>:** (operational models, scientific applications, number of National Pis…):

    a. The Argo data in the Mediterranean have been used to study the thermohaline variability in Mediterranean sub-basins, work which can be

considered as a consistency test of the data in the areas considered. Ten years of Argo data combined with historical data collected mainly by ships are currently used to study temperature and salinity trends in the Ionian Sea (Figure 4).

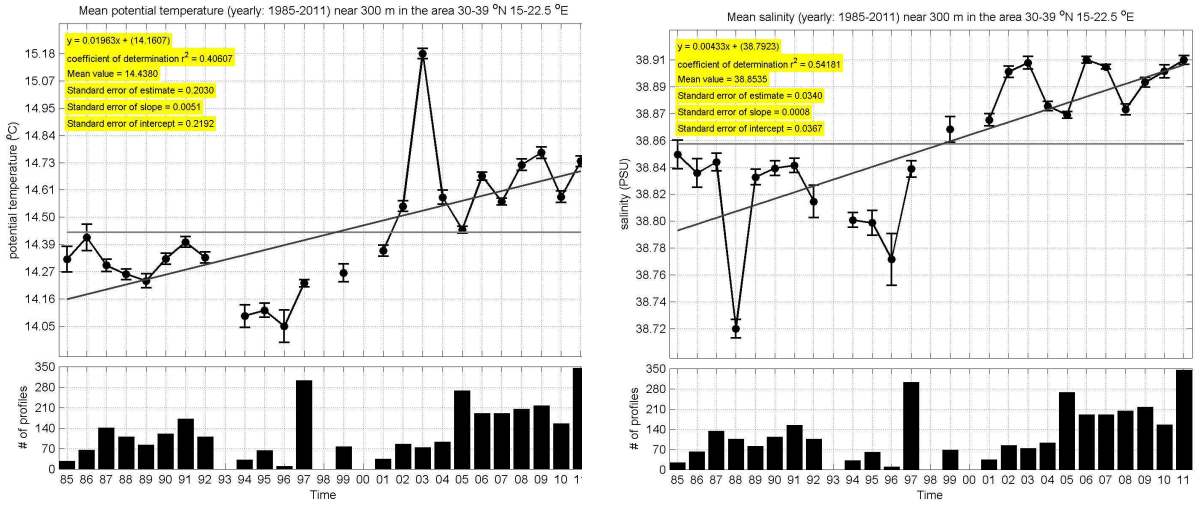


Figure 4. Trends in thermohaline properties in the deep Ionian Sea (1985-2011)

b. The study of the salt and mass transports and the sub-surface Mediterranean circulation at 350 m (Figure 5), are other examples of scientific applications of the Argo data.

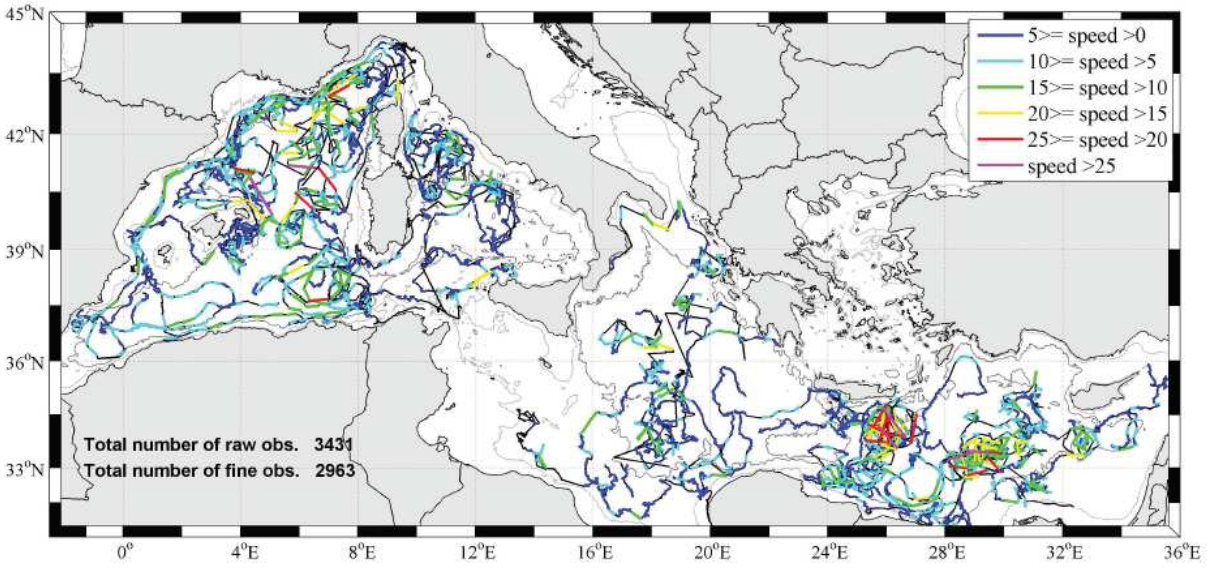


Figure 5. Sub-surface Mediterranean circulation at 350 m (Mediterranean intermediate circulation estimated from Argo data. Ocean Sci., 6, 331-343, 2010).

c. The MedArgo data are routinely assimilated in numerical forecasting models (MFS) (Figure 6).

- **<u>Products generated from Argo data</u>:**
  a. Daily maps of float positions (Figure 2)
  b. Monthly maps of float positions and track (Figure 3)
  c. Float data are assimilated in numerical forecasting models by INGV (MFS); daily and weekly maps of Mediterranean ocean forecasting system are produced (Figure 6).

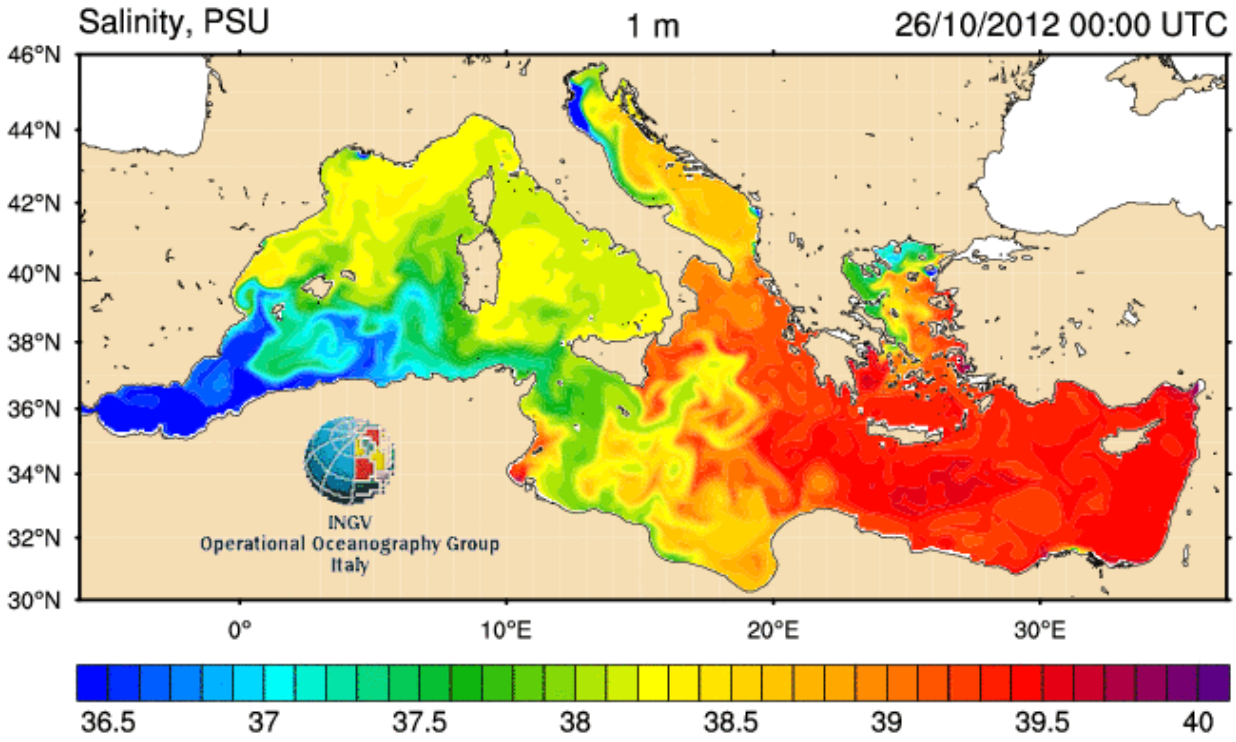


Figure 6. Daily mean forecasting model of salinity (1 meter deep).

2. Delayed Mode QC

OGS has continued to carry out the DMQC for the Argo data in the Mediterranean. Before the application of the DMQC, selected float profiles are qualitatively compared (in time and space) with the historical data (see example in Figure 7 and 8). Any possible surface pressure offsets were examined using the Metadata and Technical data files; different procedures were applied to correct this pressure offset depending on the float type, following the standard method proposed by the Argo community. In particular, for the Apex floats equipped with previous versions of Apf-9 controller the method was applied (in 2011)

and 5 floats were classified as Truncated Negative Pressure Drift (TNPD) in the Mediterranean Sea.

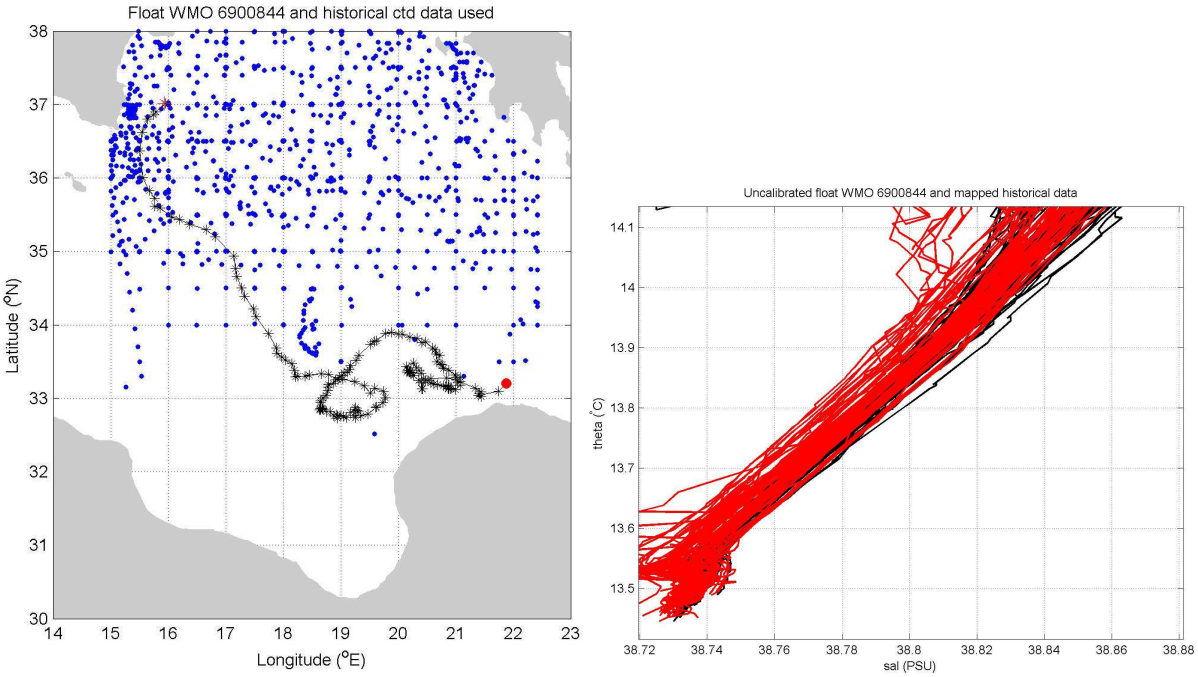


Figure 7. Location of float profiles (black stars; red star and dot are the deployment and last positions, respectively) and historical CTD data in blue (left panel) and float salinity profiles (black lines) and mapped historical data (red lines) in the most uniform part of the θ-S curve (right panel).

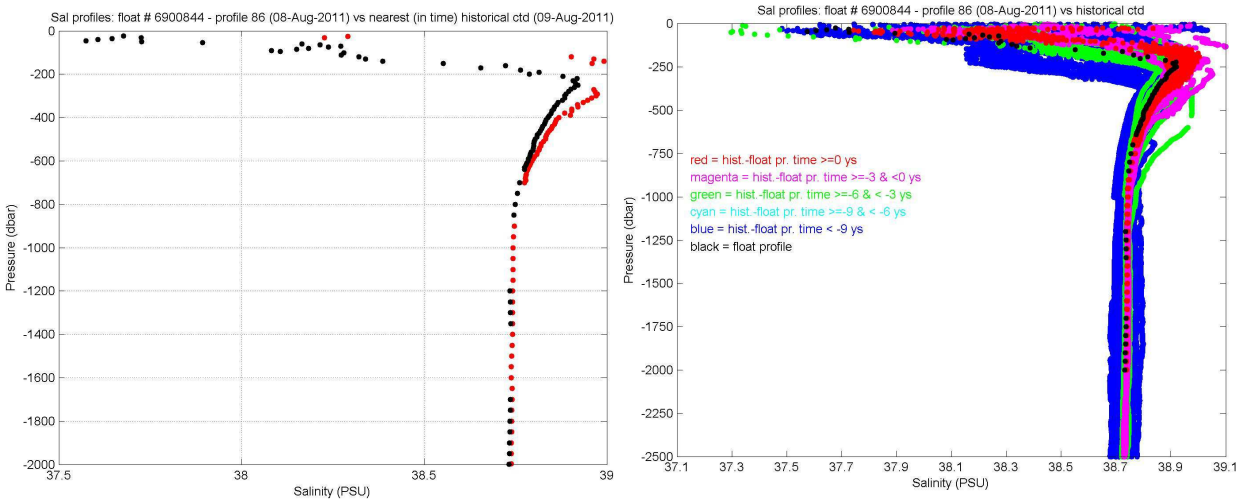


Figure 8. Selected float salinity profile (black dots) versus the nearest historical profile (left panel) and versus the historical data used to performed the DMQC (right panel). The float profile in the right panel is depicted in black while other colours represent the reference profiles.

Additional historical reference data for the Mediterranean have been recently uploaded and transformed in the correct format to be used by the DMQC procedure; moreover, some Argo reference data have been also added (Figure 9).

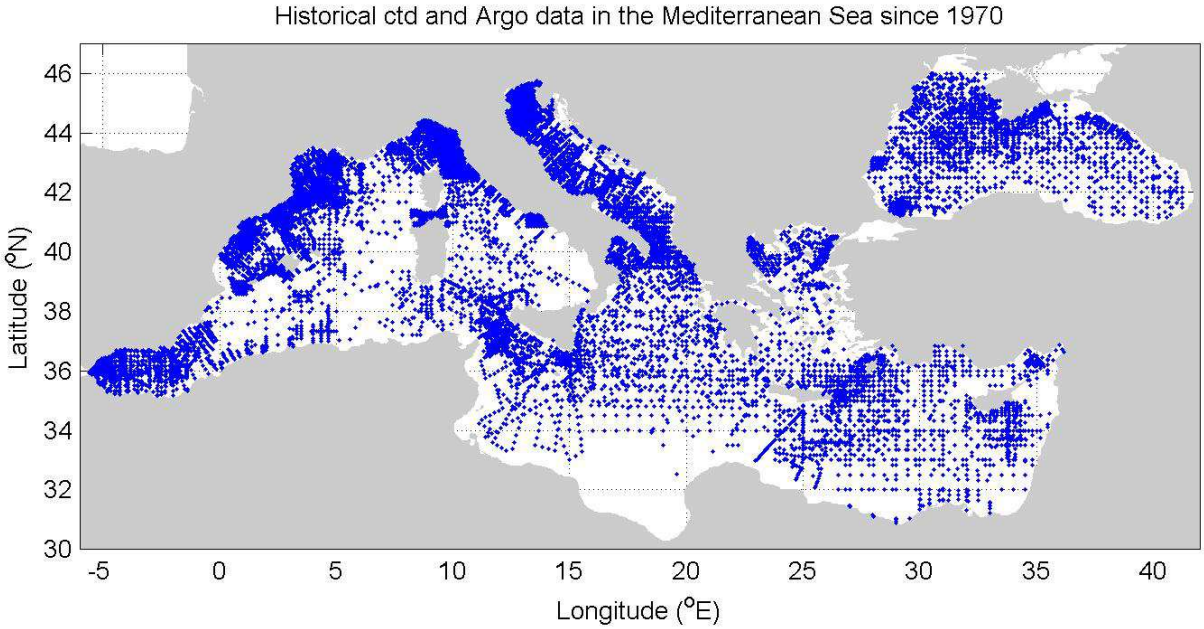


Figure 9. Location of the historical CTD and Argo data, spanning from 1970 to 2011, used in the DMQC.

The DMQC method has been applied to about 75% of the floats which died between 2000 and 2012 in the Mediterranean Sea: they were quality controlled in delayed-mode for salinity, temperature and surface pressure and the respective D-files were sent to GDAC (not all but about 65% of the D files have been already sent to the GDAC). So far, the majority of the DM checked floats, whose D files were sent to the GDAC, can be considered as well calibrated. The DMQC report of each float can be downloaded by the MedArgo web page (http://nettuno.ogs.trieste.it/sire/medargo/all/table_out_all.php).

3. Regional Centre Functions

MedArgo is the Argo Regional Centre for the Mediterranean and the Black Sea recognized officially in 2012. OGS, who coordinates the MedArgo activities, established several collaborations with European countries (Bulgaria, France, Spain, Greece, Germany) in order to set the planning and the deployment coordination of floats; these collaborations continued this year and will be extended also to Ukraine and Romania in 2013. Moreover, as part of these cooperations the float data are transferred in near real time to MedArgo and 22 new floats have been deployed in the Mediterranean and Black Sea during 2012 (Figure 10).

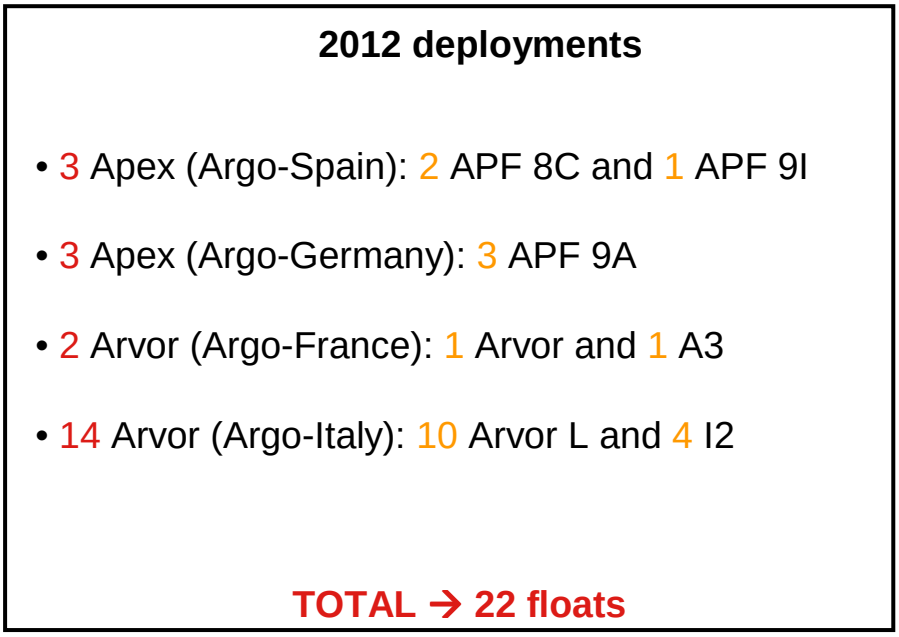


Figure 10. 2012 float deployments in the Mediterranean Sea

Three German floats were deployed in the Ionian Sea and Levantine sub-basin between April and June 2012. Three Spanish floats were deployed last summer close to the Balearic Islands. Two French Arvor models are operating since March in the Ionian Sea. Italy deployed 14 units: 3 floats in the Black Sea and 11 in the Mediterranean Sea (Tyrrhenian and Ionian Sea and Levantine sub-basin); 10 units were Arvor-L models and 4 were Arvor I2 (Iridium).

There are 28 active Argo floats in the Mediterranean Sea and 7 in the Black Sea as of November 2012.

About 40 floats will be deployed in 2013 (Figure 11): 33 in the Mediterranean Sea and 7 in the Black Sea, including the contributions of many countries. Many countries will give their contribute and it is expected that the total number of floats will be approximately around 80 units (including about 20 floats equipped with biogeochemical sensors), that is double with respect to the conservative minimal density recommended in EuroArgo PP and about double with respect to the global Argo density.

Figure 11. Deployments plans for 2013.