



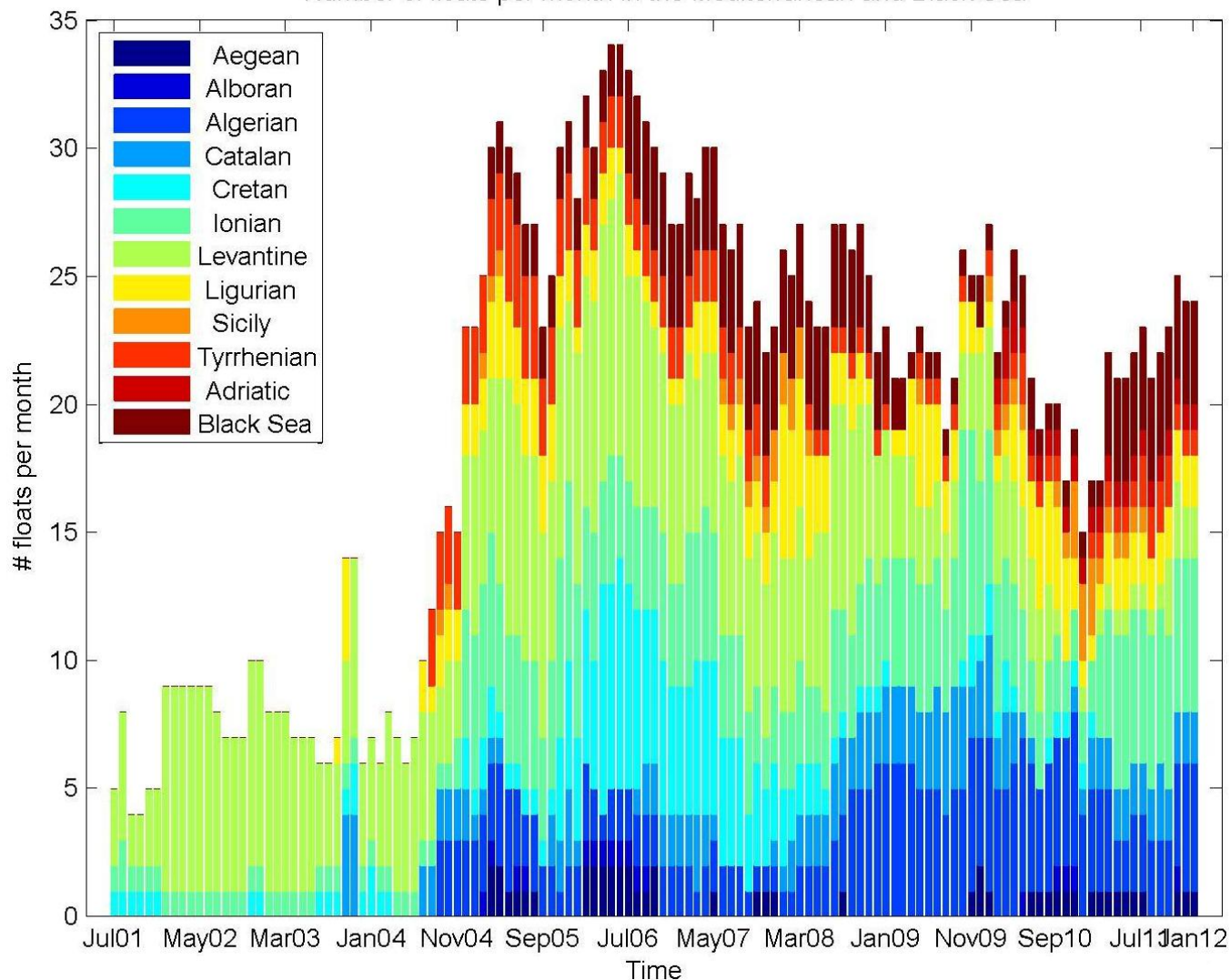
On the Argo Sampling Strategy in the Mediterranean and Black Seas

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Monthly float distribution in the Med and Black Sea between 2001 and 2011

Number of floats per month in the Mediterranean and Black Sea

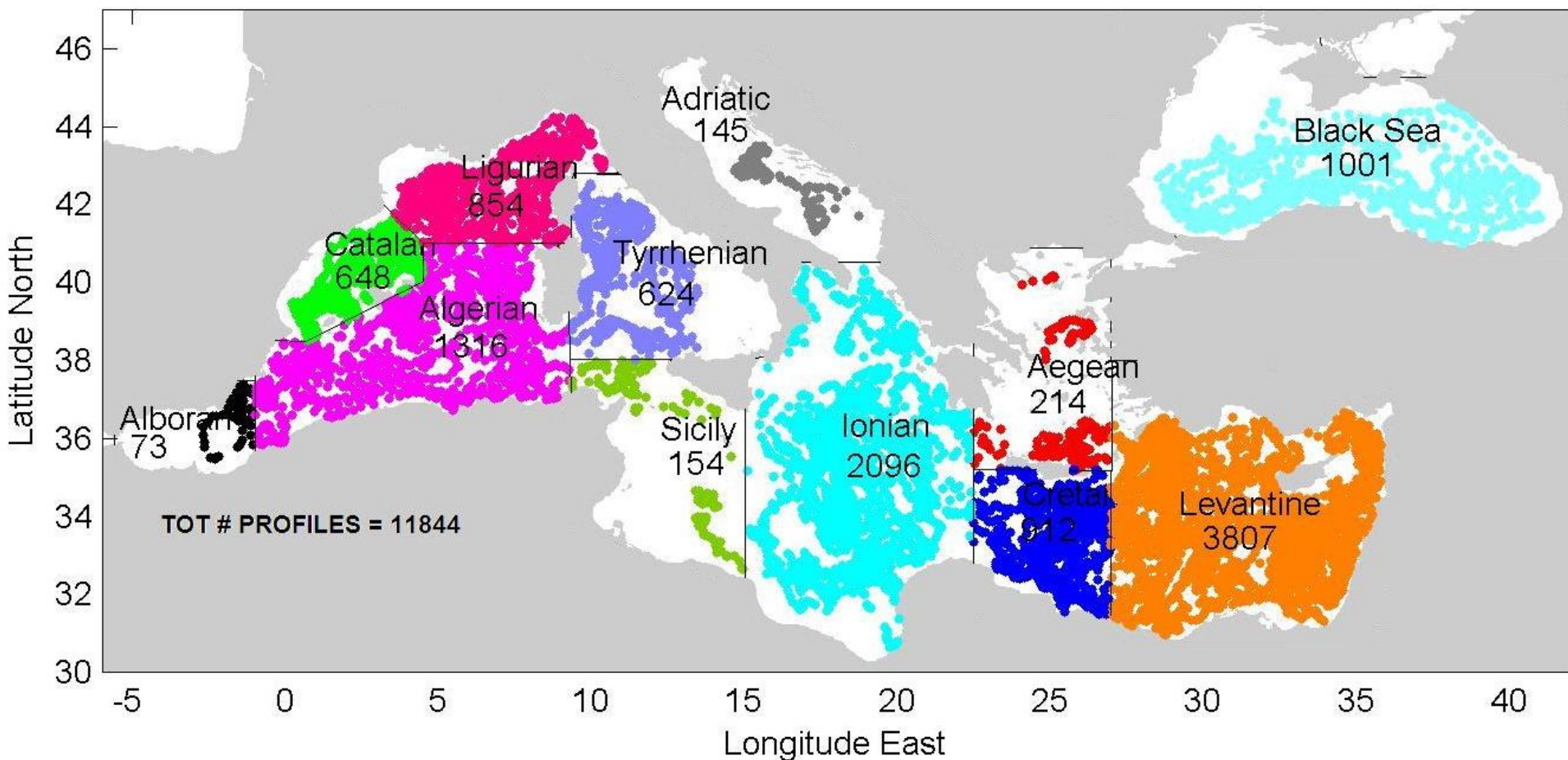




CTD float profiles distribution in the Med and Black Sea between 2001 and 2011



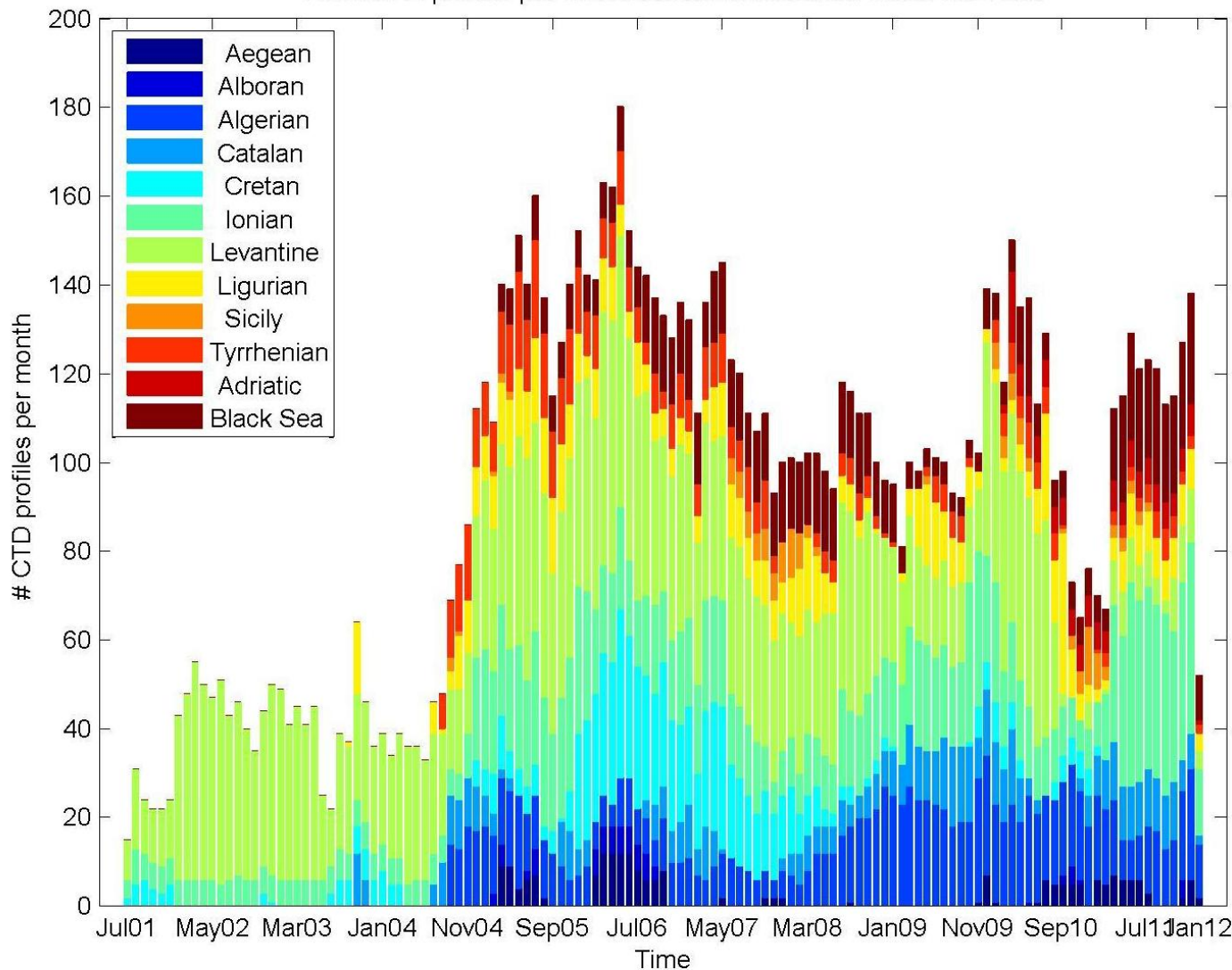
Number of CTD profiles in the Mediterranean and Black Sea





Monthly float profiles distribution in the Med and Black Sea between 2000 and 2011

Number of profiles per month in the Mediterranean and Black Sea





Float fleet in the Mediterranean and Black Sea between 2001 and 2011



- **Apex**

- 37 Apf controller # ≤ 8
- 16 Apf controller # = 8 → 62
- 9 Apf controller # = 9

- **Provor**

- 28 CTS 2
- 18 CTS 3 → 46

- **Arvor**

- 2 I-1
- 4 I-2
- 2 A3 → 9
- 1 C

- **Nemo**

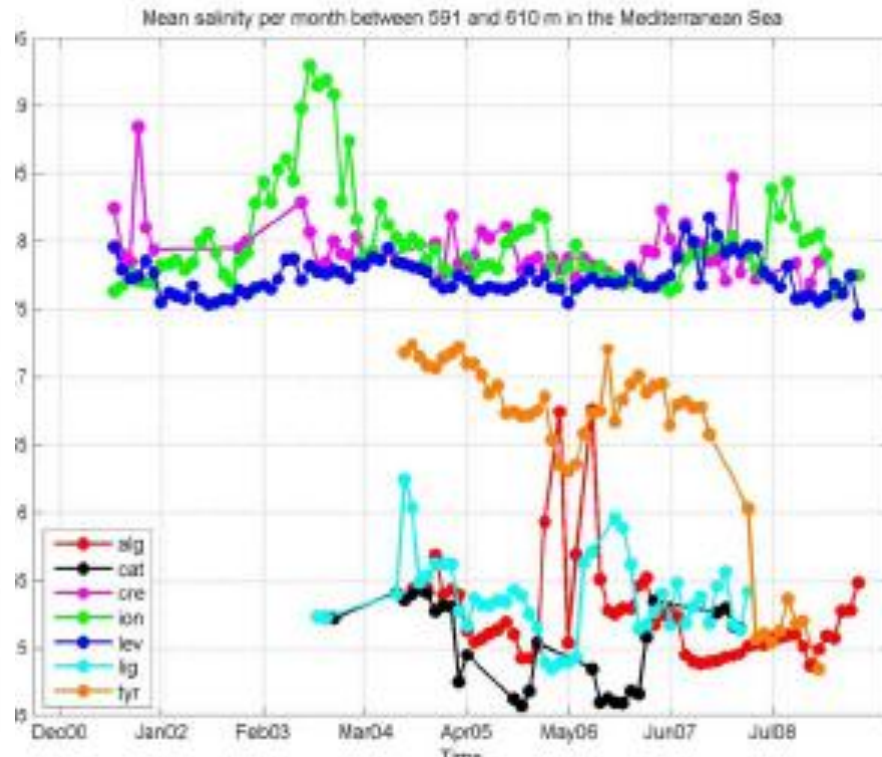
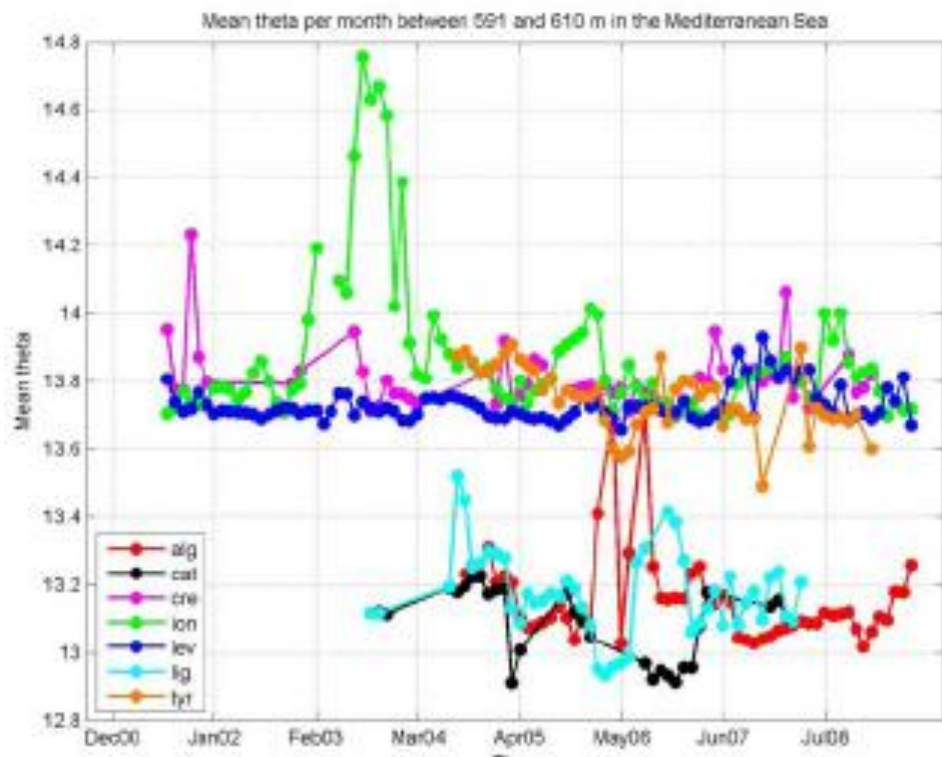
- 5 SN > 100

TOTAL → 122 floats

- 60% of floats were checked in DM
- 40% of D files sent to GDAC (Coriolis)



Monthly mean of θ and S near 600 m in all Mediterranean sub-basins

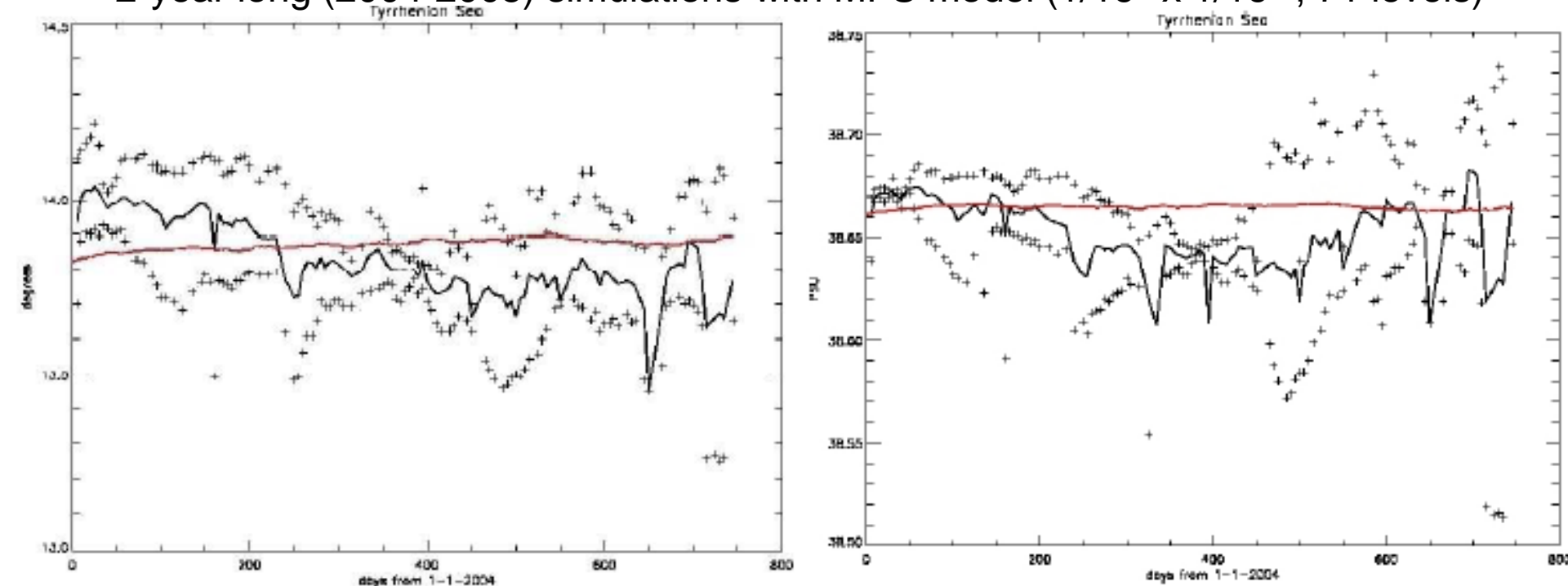


Are these monthly statistics robust? Any biases due to limited and non-uniform sampling?

Simulated Argo data in a Mediterranean sub-basin

Tyrrhenian Sea

2-year long (2004-2005) simulations with MFS model ($1/16^\circ \times 1/16^\circ$, 71 levels)



Monthly means of T and S reconstructed by 6 Argo numerical floats in the Tyrrhenian Sea at 615 m (black curve) with minimal and maximal values sampled (crosses). The red curve indicates the means computed at the same depth from the Eulerian model (all data).



Recommendations two years ago (EuroArgo PP)



- **Maximum profiling depth of 2000 m** at every cycle or every two cycles, with a short 700 m profiles in between;
- **Deployment in deep waters** (depth > 2000 m);
- **Cycles of 5 days:** this is a good compromise to capture more variability of the sub-surface velocity field and to obtain a robust estimate of the mean velocity at parking depth. Note that from historical data, displacements of floats near 350 m during ~5 days have been as large as **100 km**. In addition, a cycle length closer to the decorrelation time of the velocities is also an advantage for the assimilation of float displacements into numerical forecasting models. Numerical simulation reveal that floats with cycles of 5 days tend to cover better the Mediterranean when compared to those with cycles of 10 days;
- **Parking depth** between 300 and 400 m to track the LIW throughout the Mediterranean;
- Use **Argos-3 or Iridium** telemetry to reduce surfacing time (from about 6 h to less than 1 h) and probability of hazards (stranding, theft by seafarers, etc.);
- Maintain a **minimum population of 30/50 floats** in the Mediterranean. If we use the decay rate of the historical Argo fleet in the Mediterranean (mean life time of 563 days; there is a **reduction of ~30% after a year**. This means that every year **10/15 floats have to be deployed** to maintain an initial population of 30/50 units. If Argos-3 or Iridium telemetry is used, the “mortality” of the floats should be reduced and reseedling of 5/10 floats might be sufficient. ·
- **Deploy the floats inside and outside the significant circulation structures** (with sub-basin scale of about 100 km) such as the instability eddies of the Algerian and Lybio-Egyptian Currents, in order to obtain unbiased statistics.

Minimum Argo sampling in the Mediterranean and Black Seas proposed two years ago (EuroArgo PP)

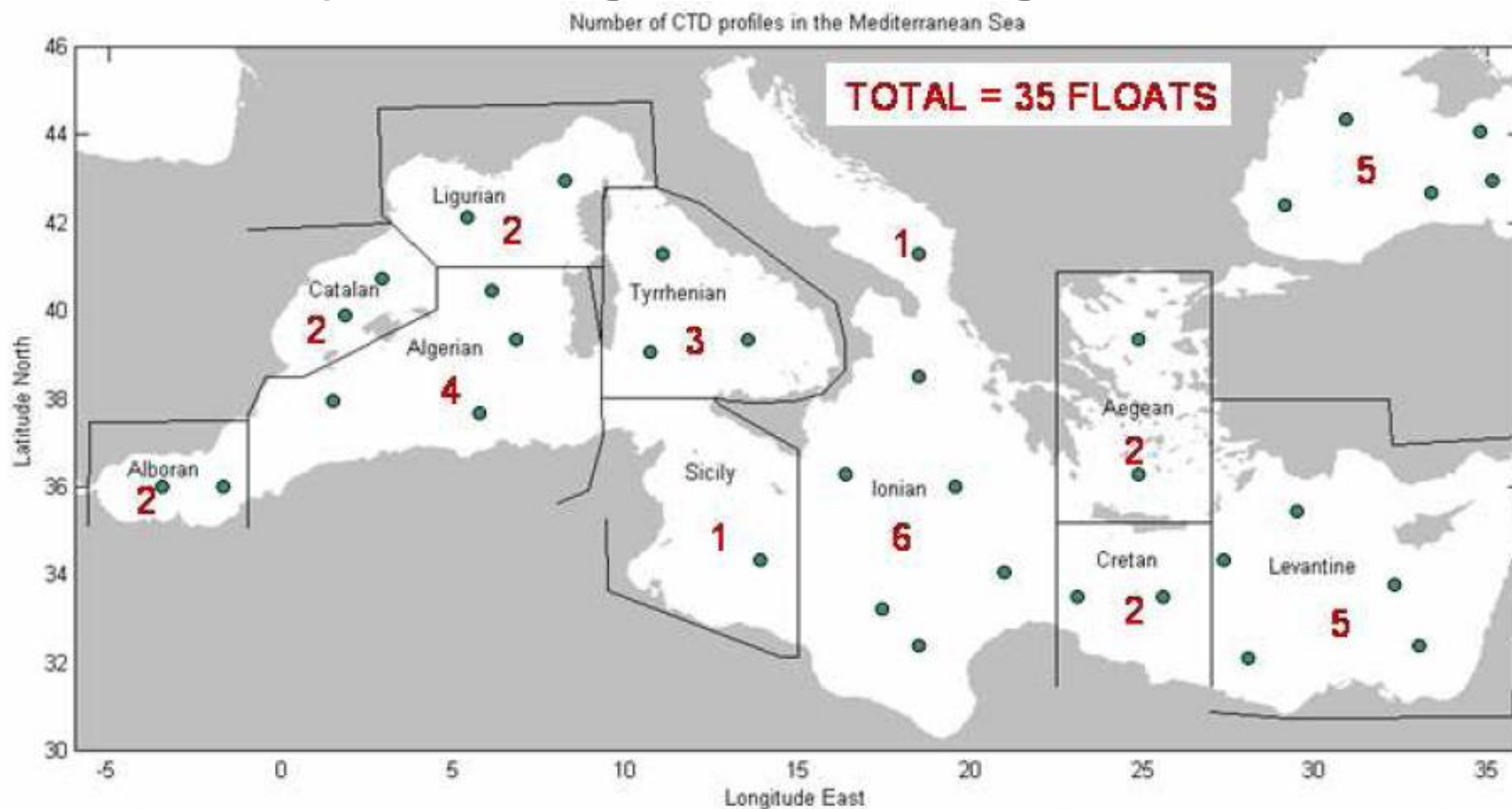
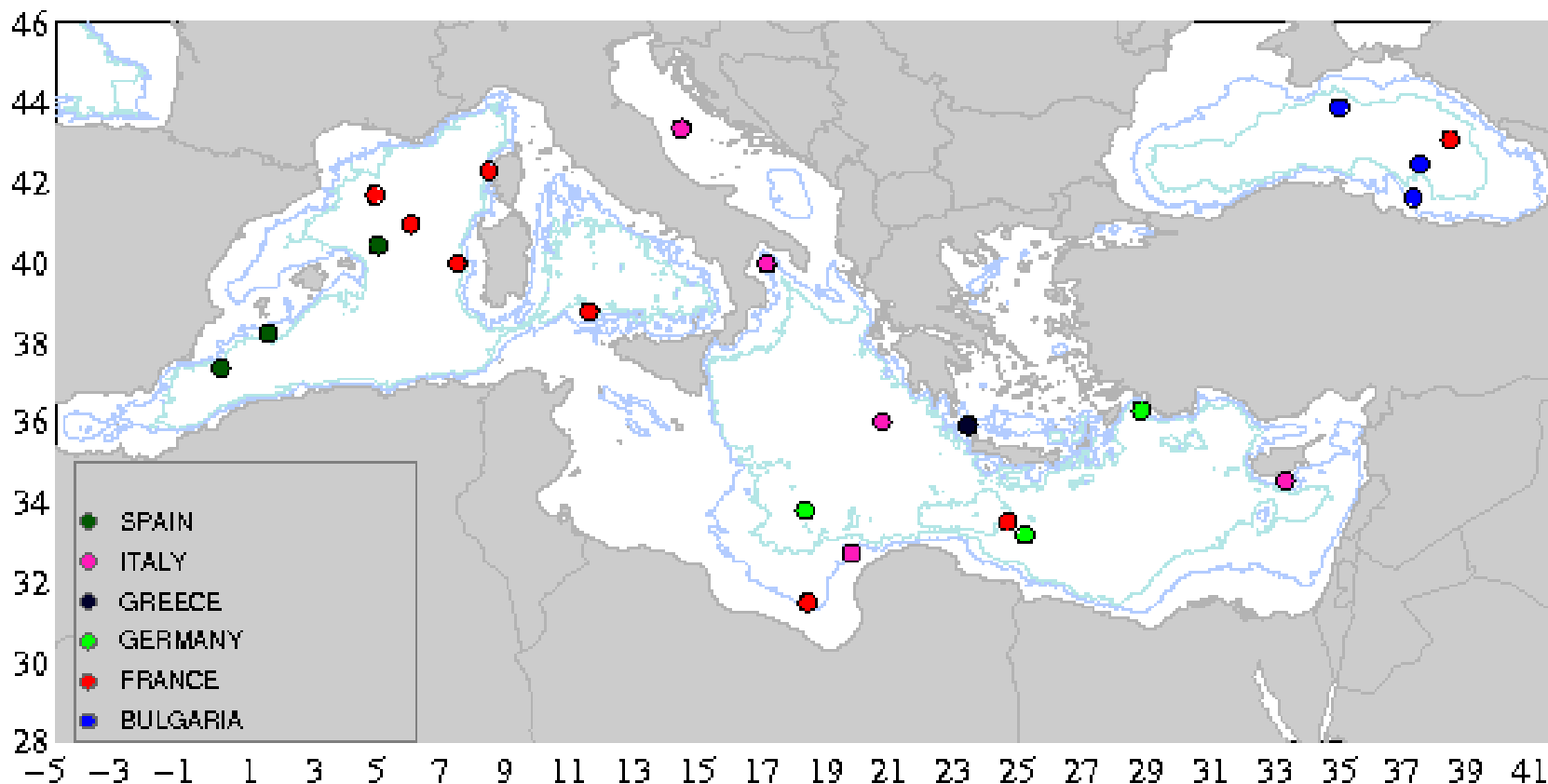


Figure 23. Proposed minimum distribution of the float array in the Mediterranean and Black Seas for the continuation of the Argo project. Numbers indicate the quantity of proposed floats in the sub-basins.

Argo sampling in the Mediterranean and Black Seas today!

MEDARGO FLOAT POSITIONS AS OF 19-Mar-2012



19 (Med) + 4 (Black) = 23 active floats by 6 countries
[+ 6 Med and 4 Black very soon, so total will be 33 floats]