Argo in the Mediterranean and Black seas

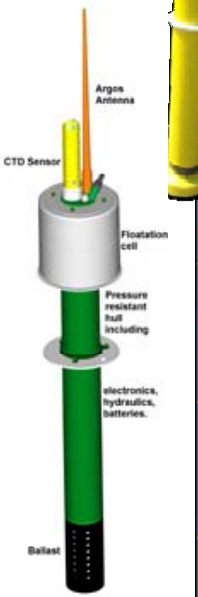
Pierre-Marie Poulain

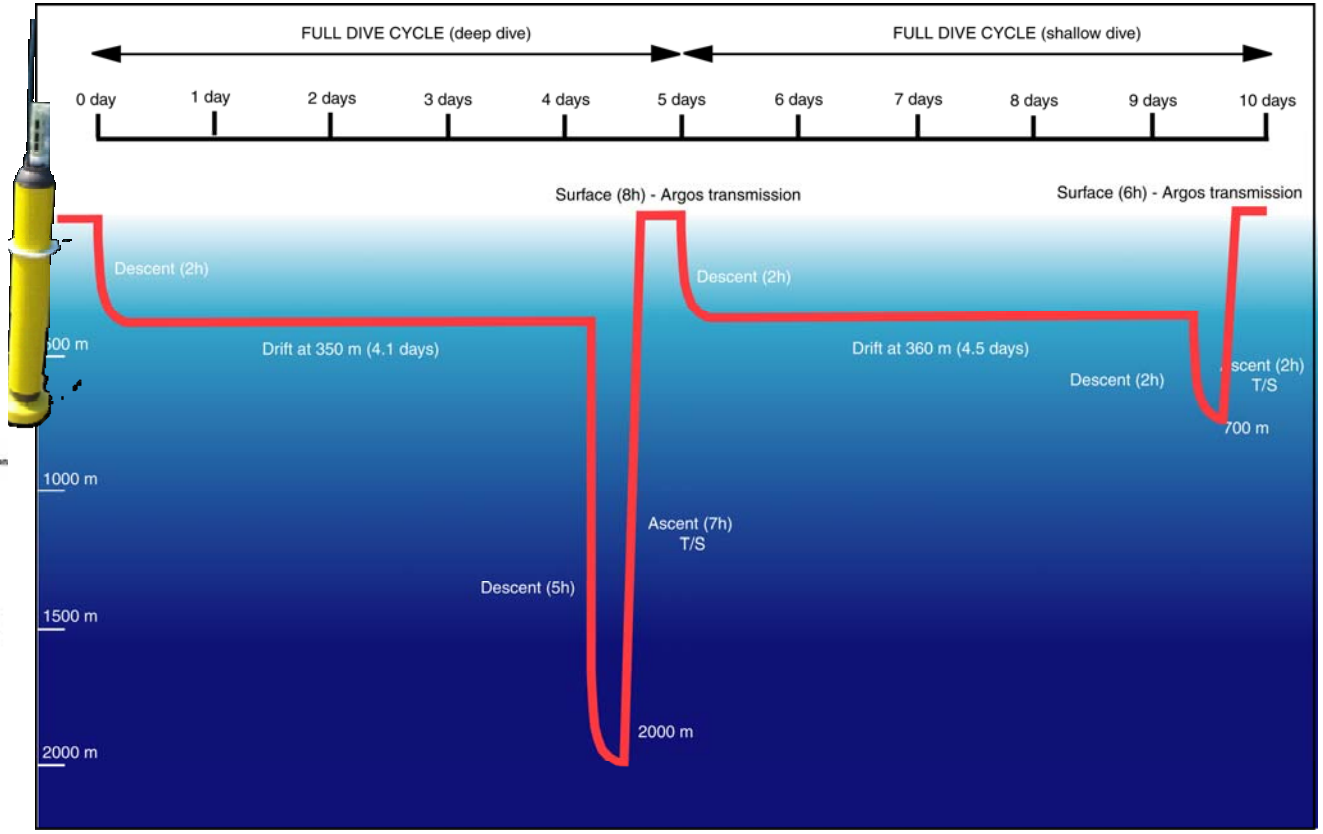
Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS)
Trieste, Italy

Outline

- Argo float deployments and data in the Mediterranean and Black seas (2001-2010)
- Examples of scientific results
- MedArgo Regional Centre
- Future plans

Argo profiling floats : PROVOR, ARVOR, APEX, SOLO/NEMO



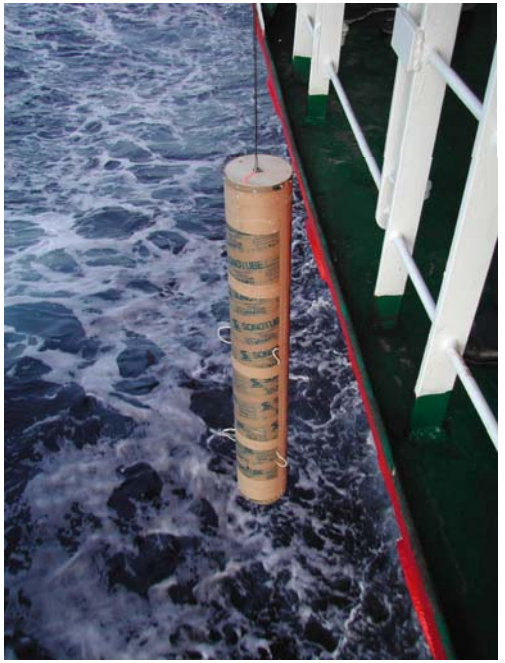


NRT data (every 5 or 10 days):

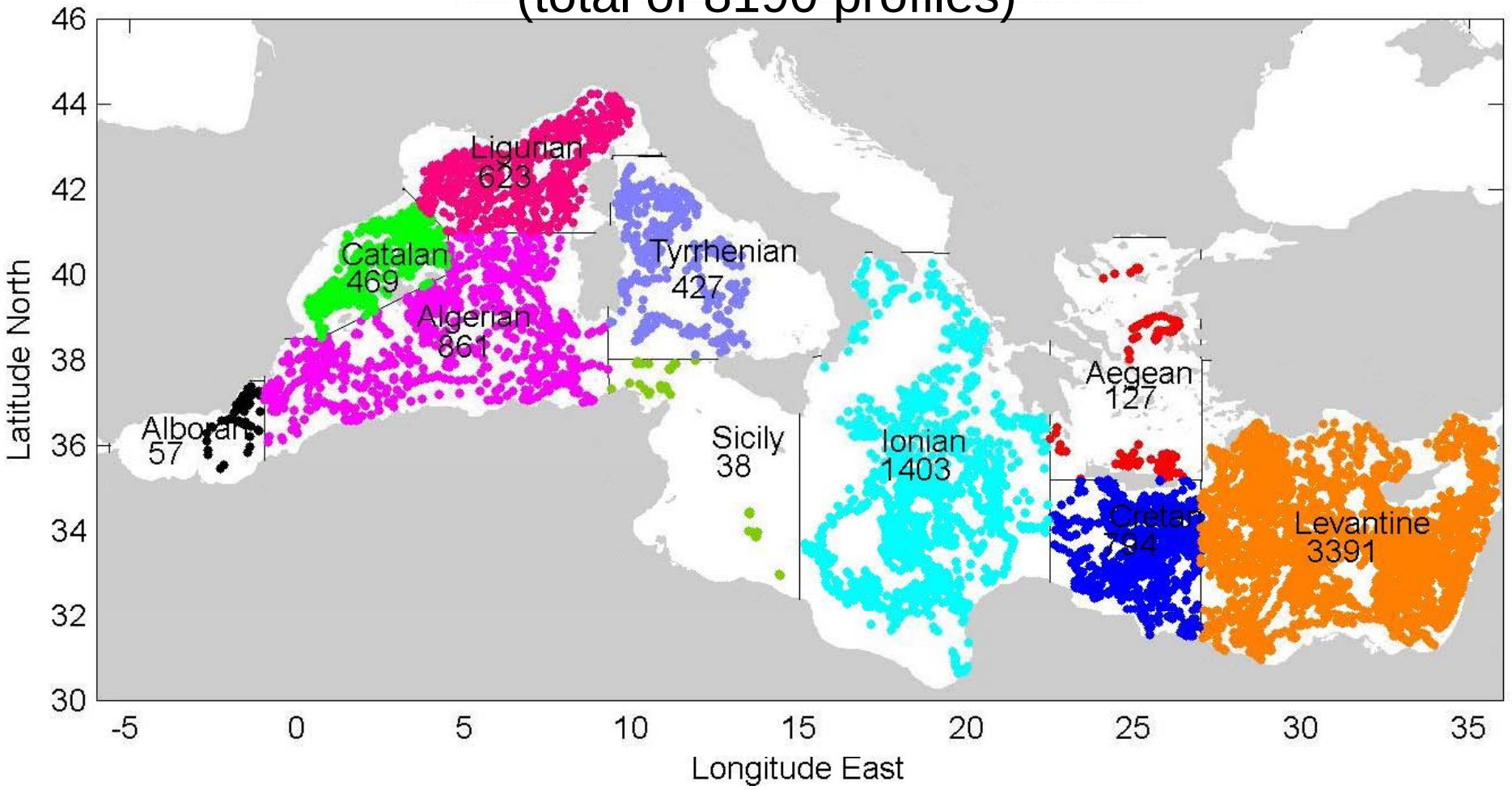
Pressure, temperature, conductivity (salinity)
oxygen, chlorophyll, turbidity, etc.

Medium cost (15-20 K€)
Long-lived (> 3 years)
Generally expandable
Argos or Iridium data telemetry

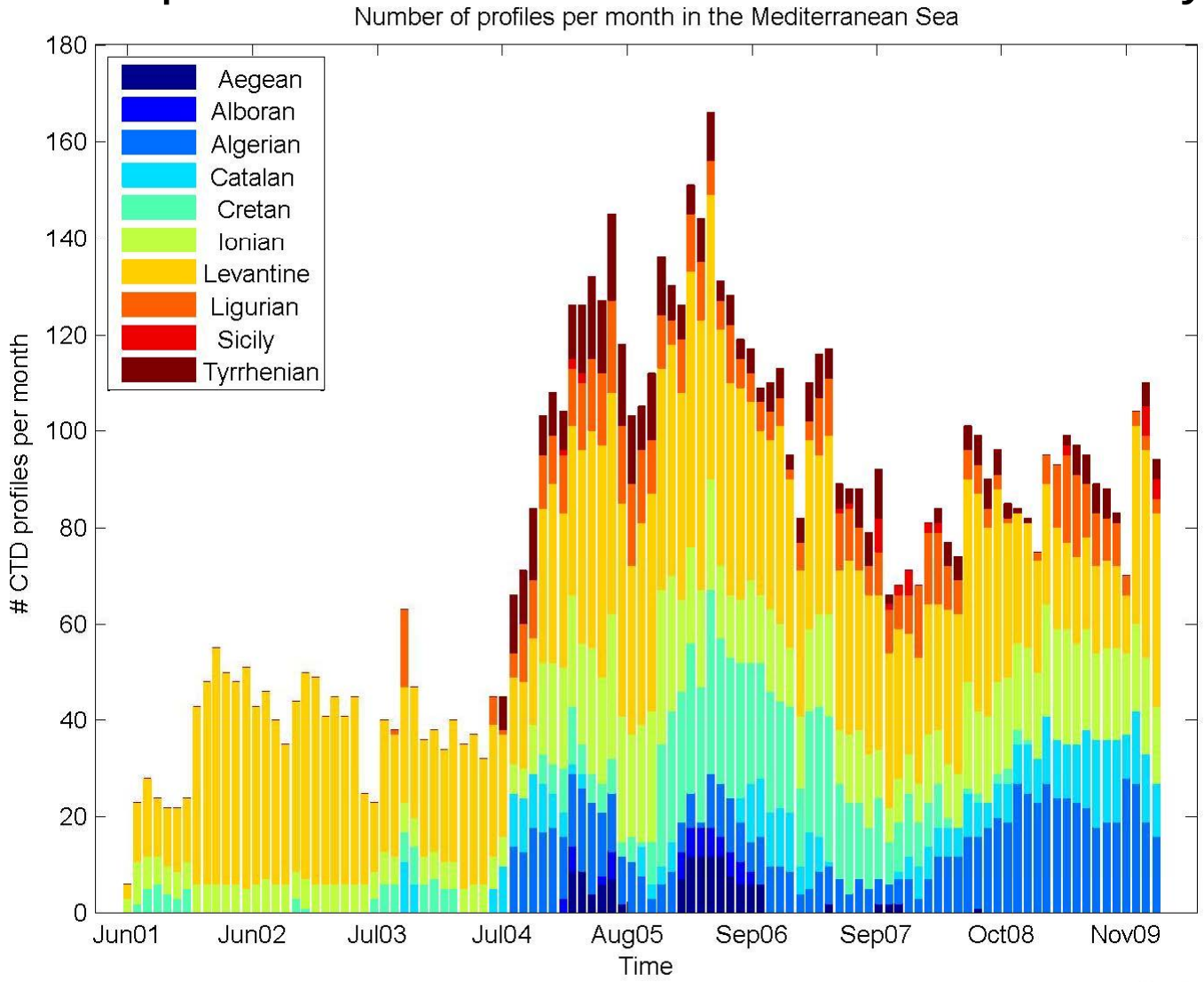
Argo float deployments in the Mediterranean



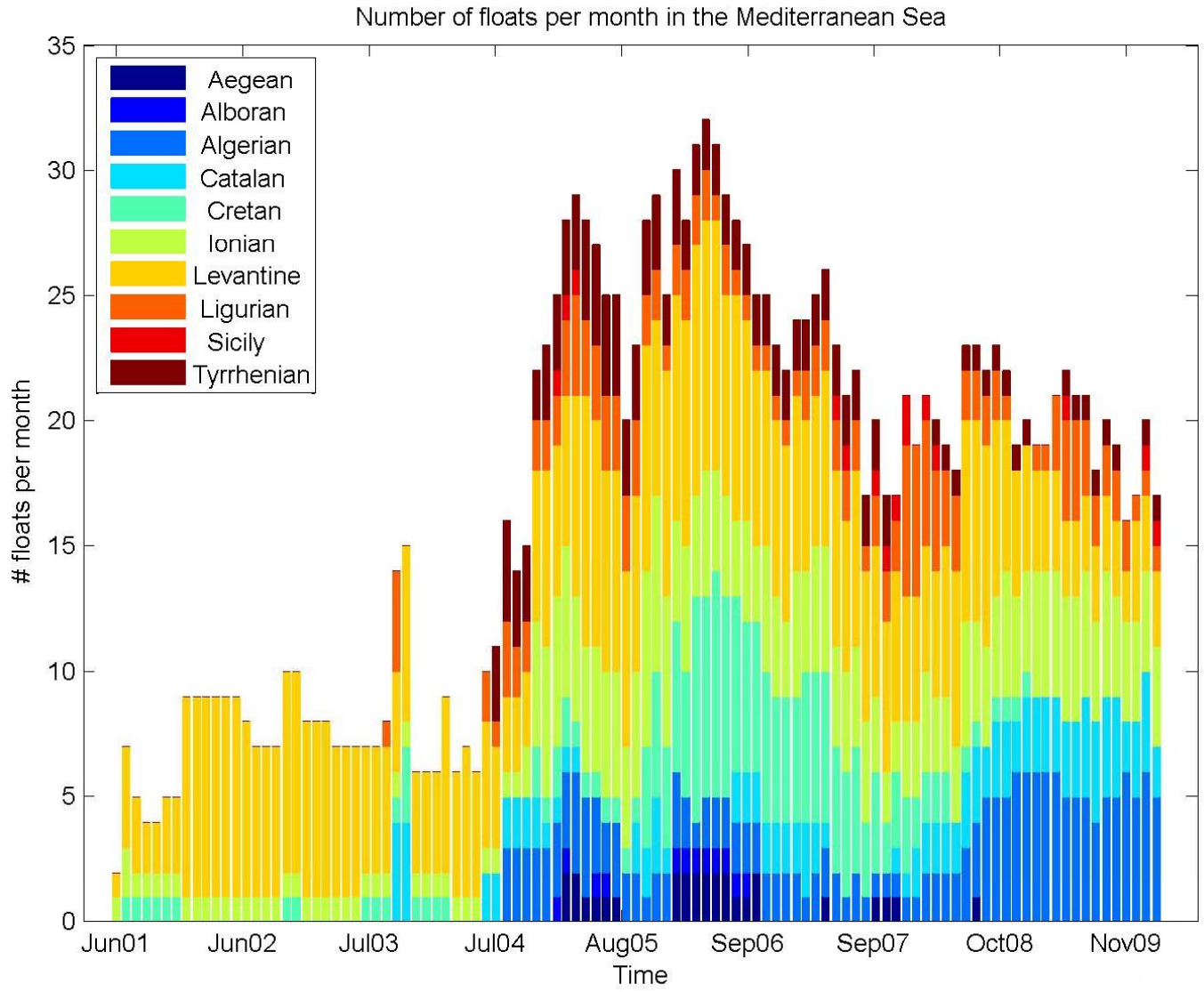
Argo CTD profiles between June 2001 and February 2010 (total of 8190 profiles)



Argo CTD profiles between June 2001 and February 2010

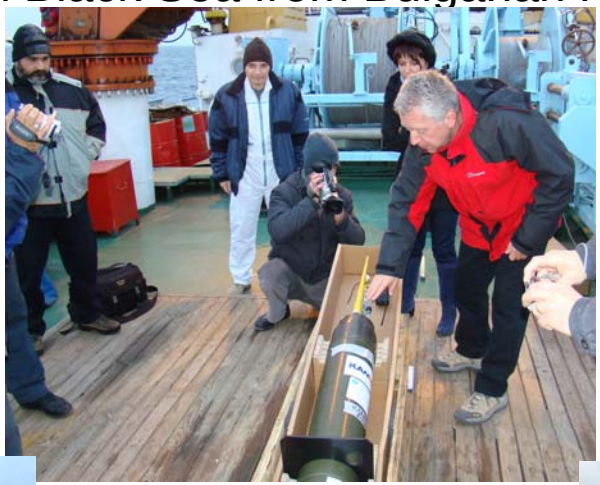


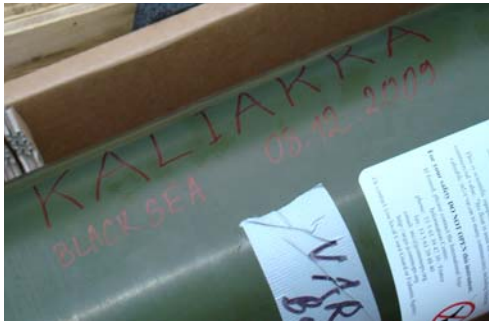
Argo CTD profiles between Jun 2001 and Feb 2010 (95 floats)



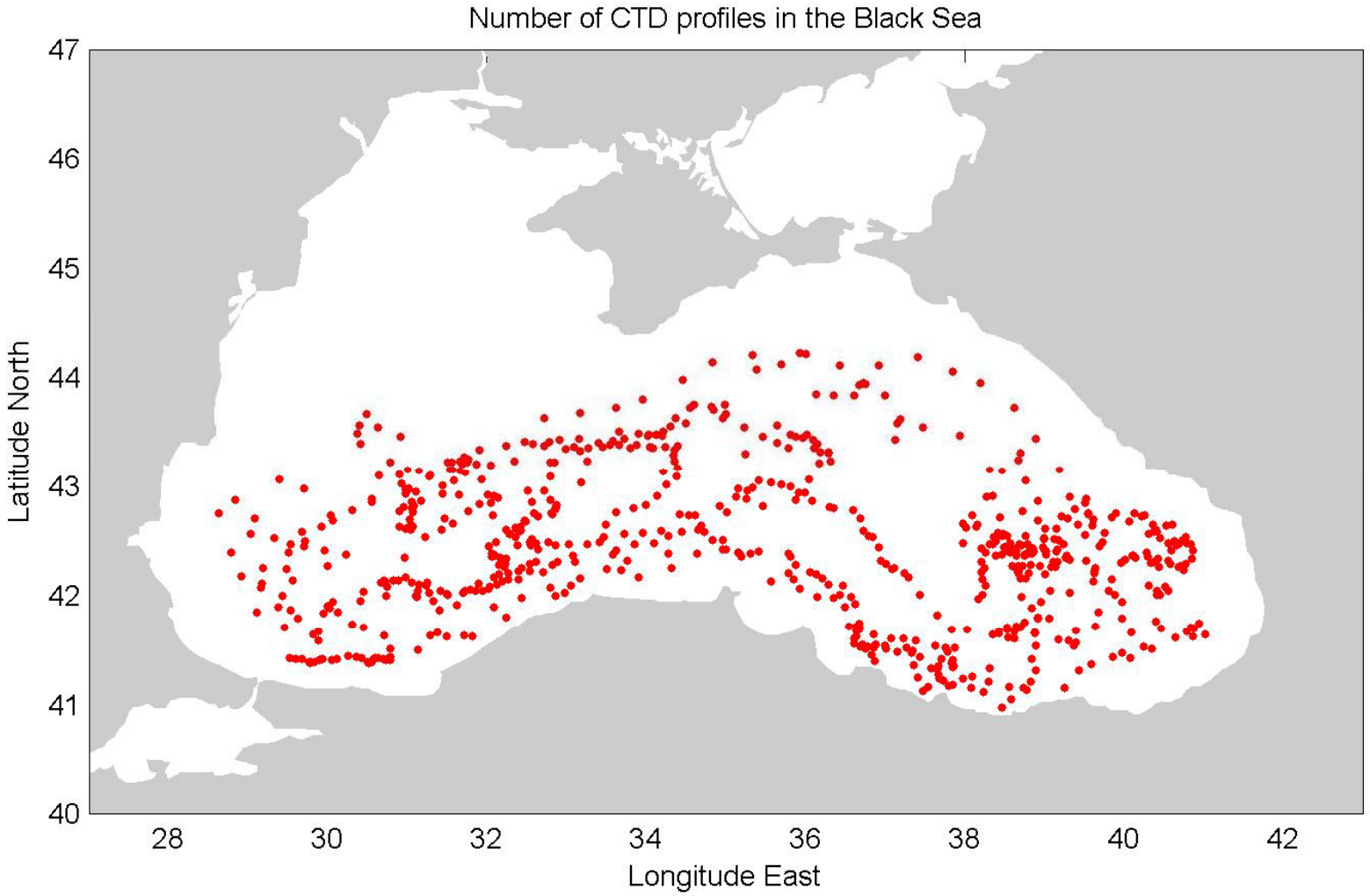
EuroArgo PP Task 6.2 Capacity building & training (new EC / non-EC countries)

Deployment of a Provor float (Kaliakra) on 8 Dec 2009 in the western Black Sea from Bulgarian R/V Akademik

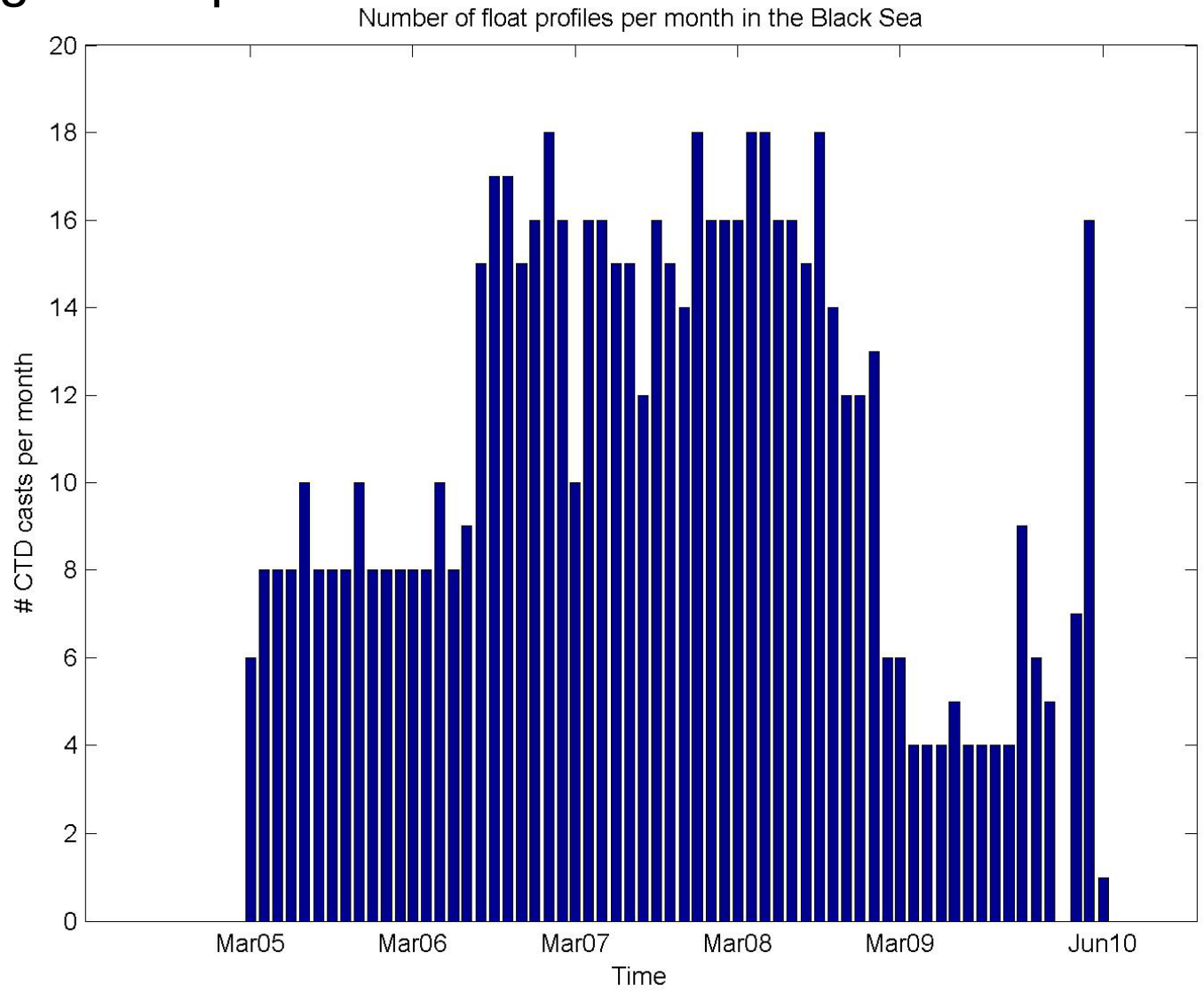



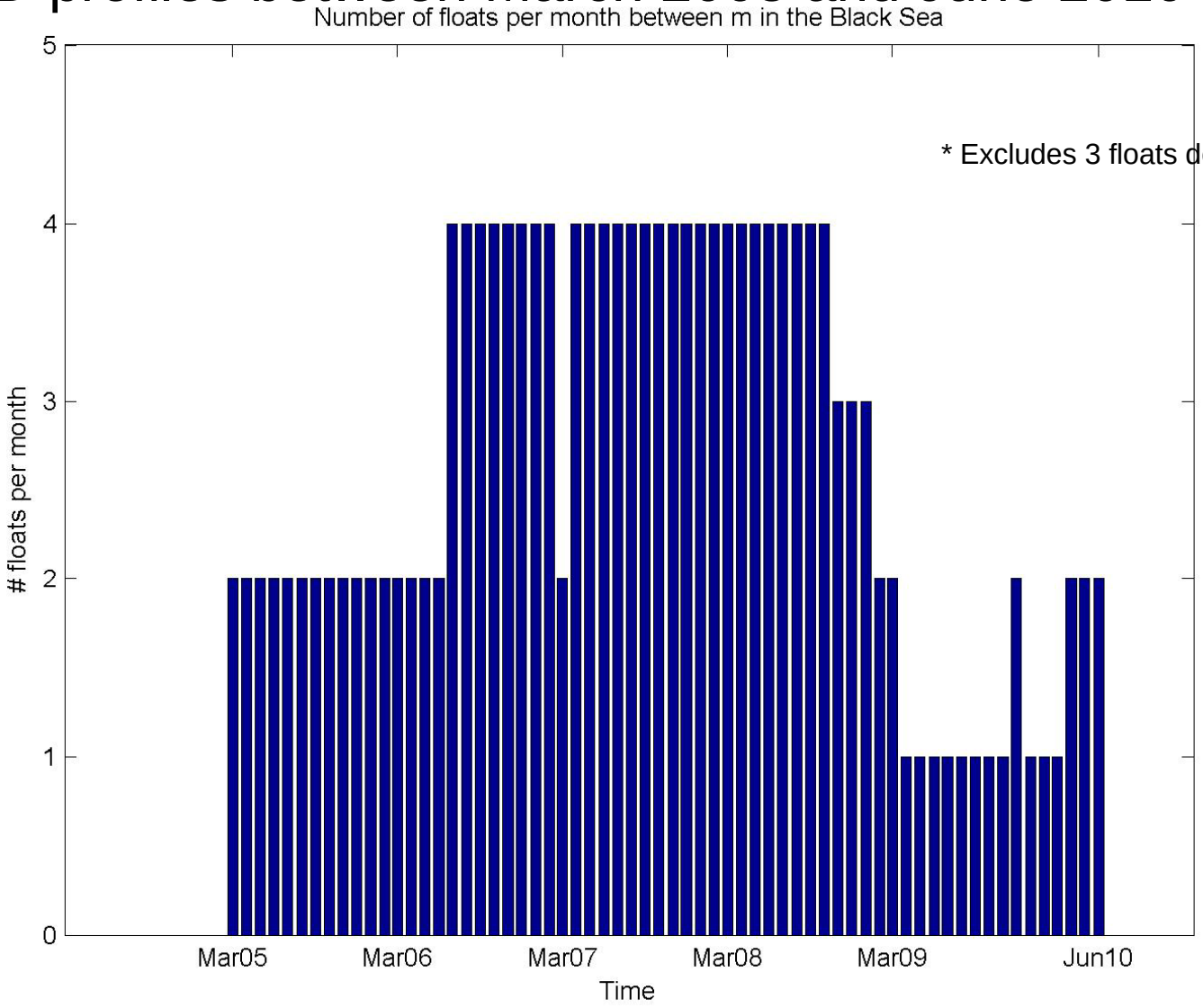
Argo CTD profiles between March 2005 and June 2010 (more than 700 profiles)



Argo CTD profiles between March 2005 and June 2010

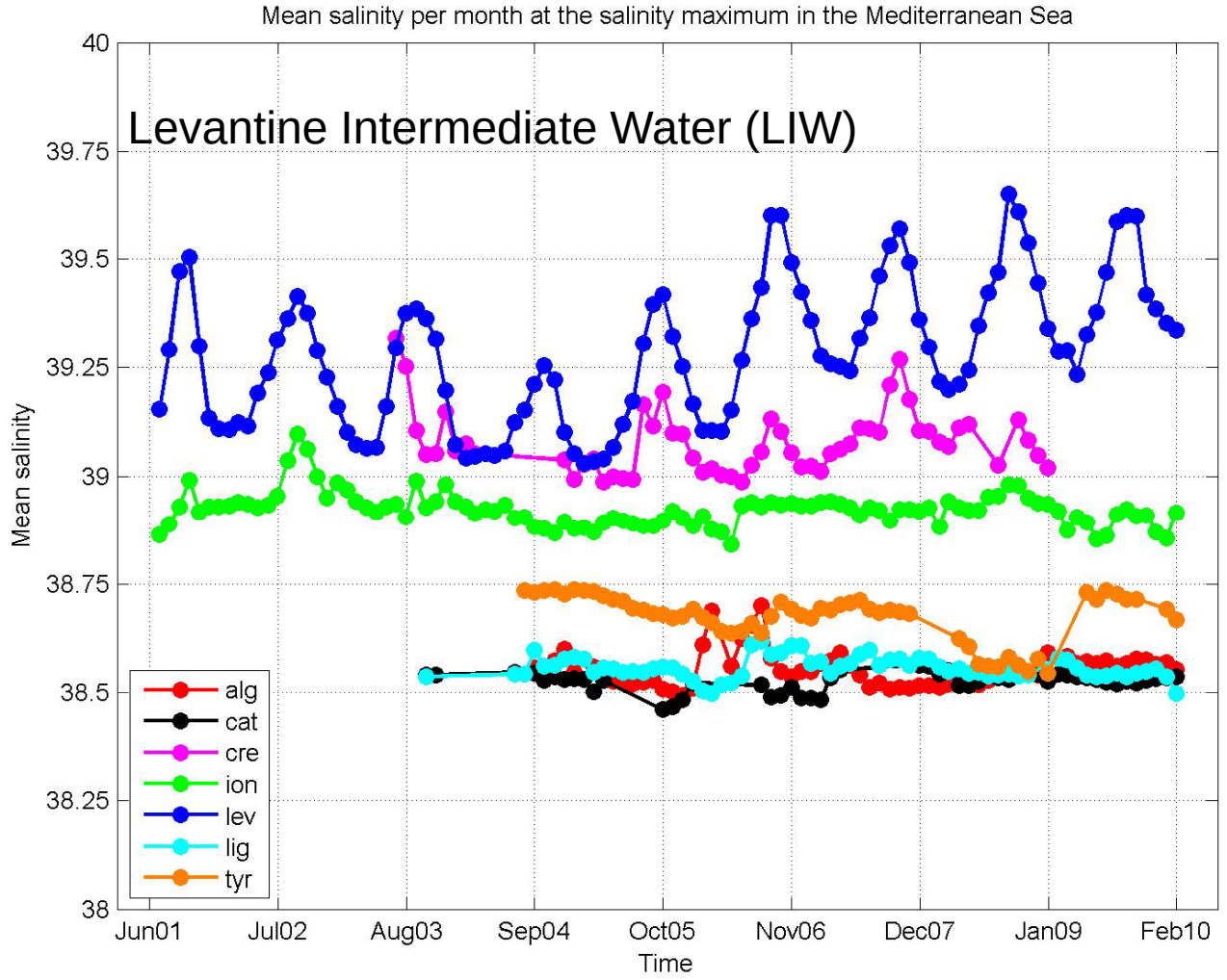


Argo CTD profiles between March 2005 and June 2010 (6 floats*)



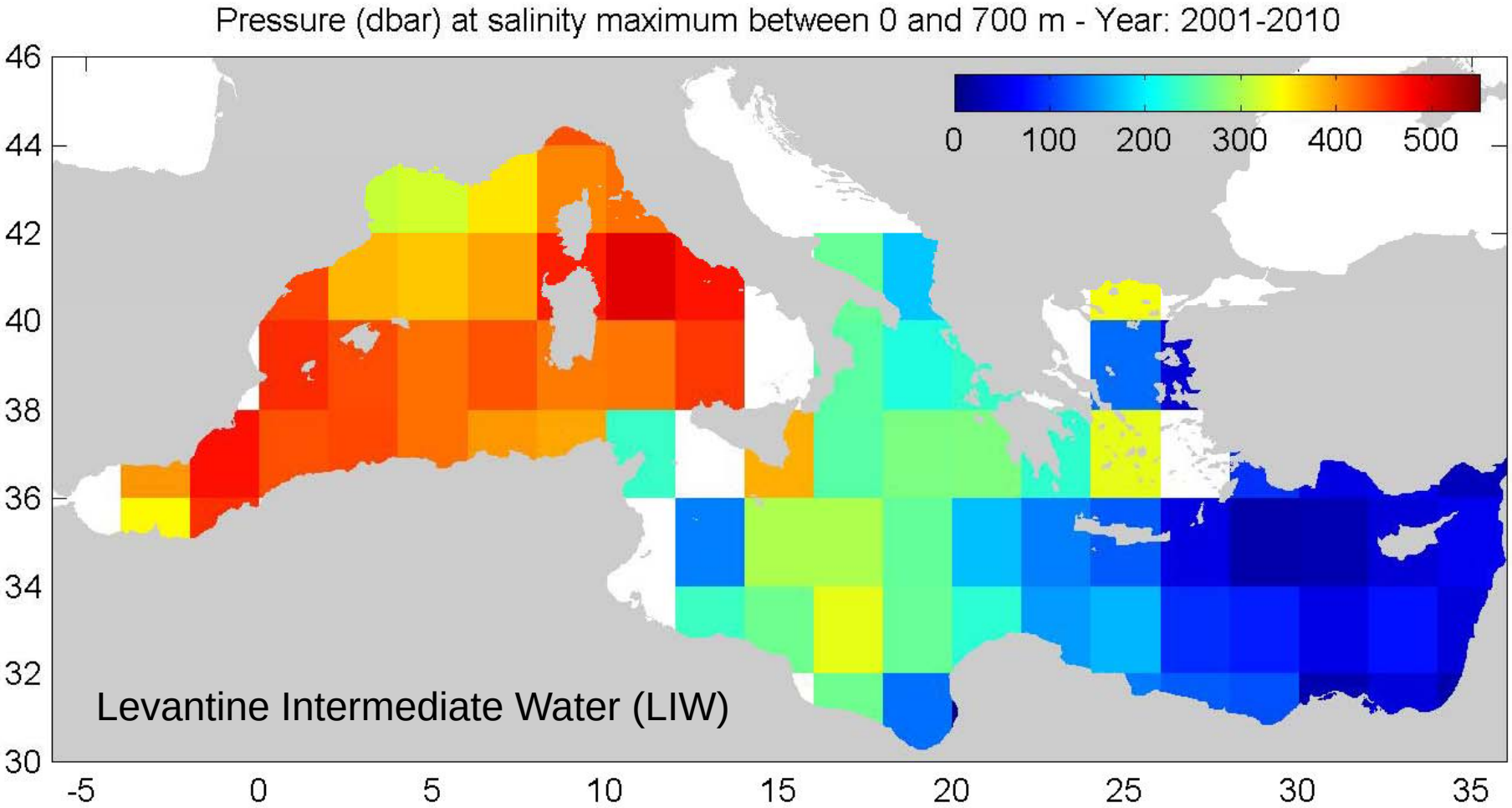
* Excludes 3 floats deployed in 2002

Monthly statistics of T and S in Mediterranean sub-basins between June 2001 and February 2010



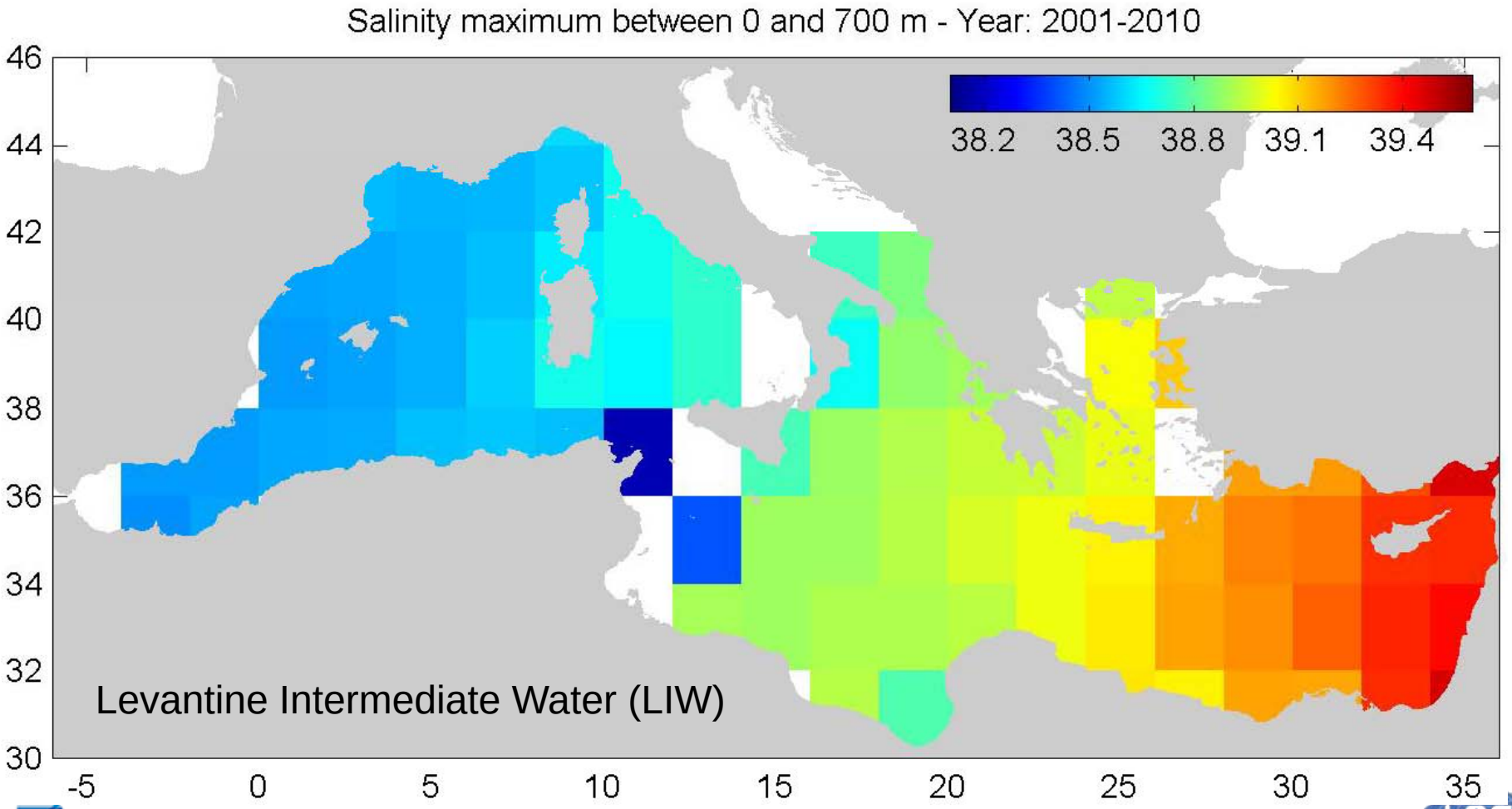
Examples of scientific results for the Mediterranean

Monthly statistics of T and S in Mediterranean sub-basins between June 2001 and Februarv 2010



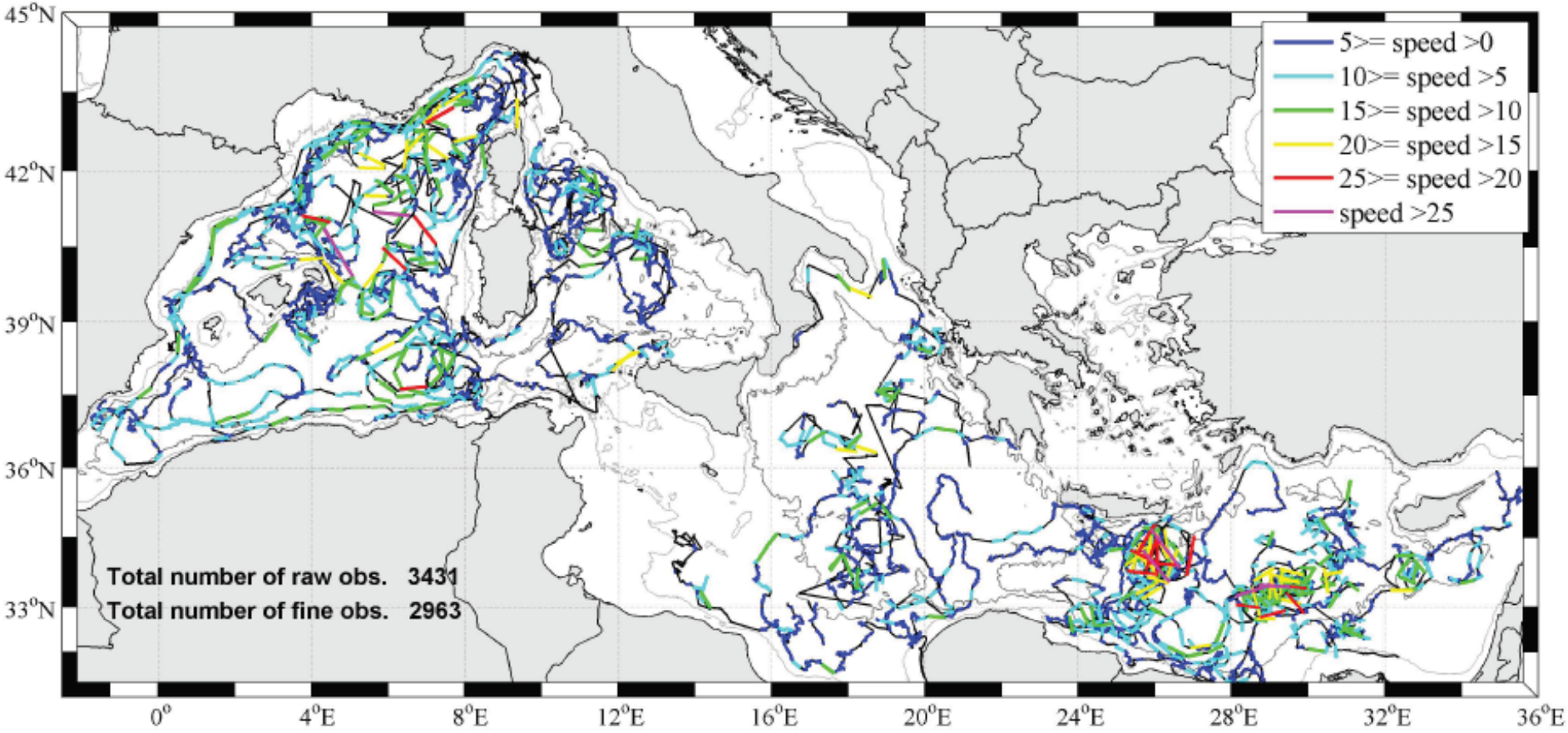
Examples of scientific results for the Mediterranean

Monthly statistics of T and S in Mediterranean sub-basins between June 2001 and February 2010



Examples of scientific results for the Mediterranean

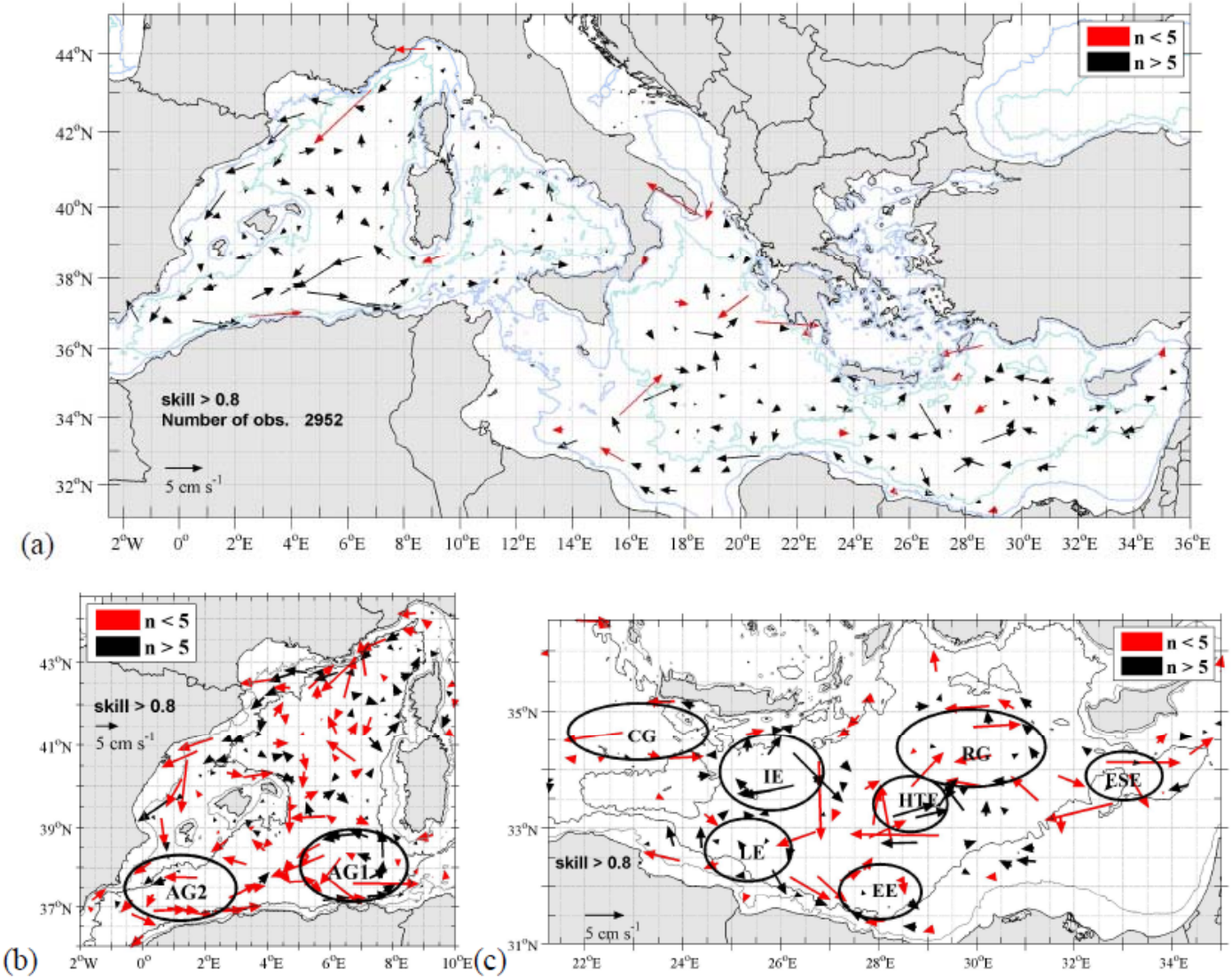
Sub-surface Mediterranean circulation at 350 m



Menna & Poulain, 2010, OS

Examples of scientific results for the Mediterranean

Sub-surface Mediterranean circulation at 350 m



Menna & Poulain, 2010, OS

MedArgo

Mediterranean & Black Sea Argo Centre (MedArgo)

MedArgo's main responsibility is the overall coordination of profiling float operations in the Mediterranean and Black Seas.

As such, MedArgo serves as an Delayed Mode Operator (DMO) for the delayed-mode processing of the Argo data with specific QC tailored for the Mediterranean and Black Seas.

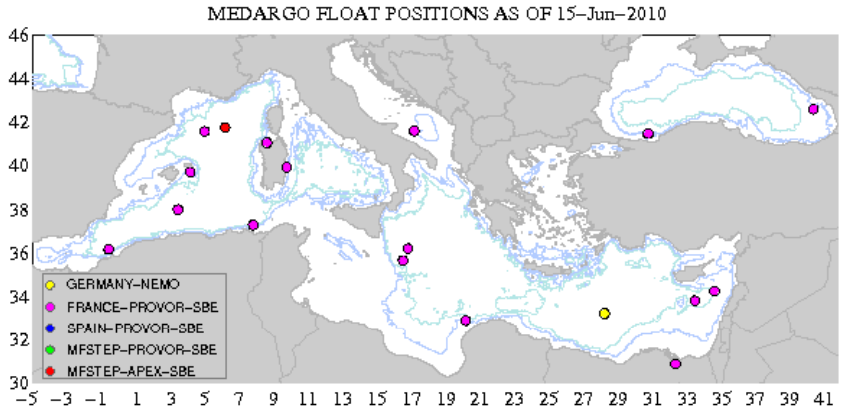
In addition, MedArgo is a component of the North Atlantic Argo Regional Centre (ARC) and conducts the following activities:

1) the coordination of float deployments in the Mediterranean and Black Seas;

2) the preparation and distribution of Mediterranean and Black Sea Argo products and services;

3) and the comparison of the Mediterranean and Black Sea Argo data with ancillary hydrographic data and model products.

MedArgo is part of the Italian "Gruppo Nazionale di Oceanografia Operativa" (GNOO) and of the Mediterranean Operational Oceanography Network (MOON). Partial support is provided by the EuroArgo and MyOcean projects.



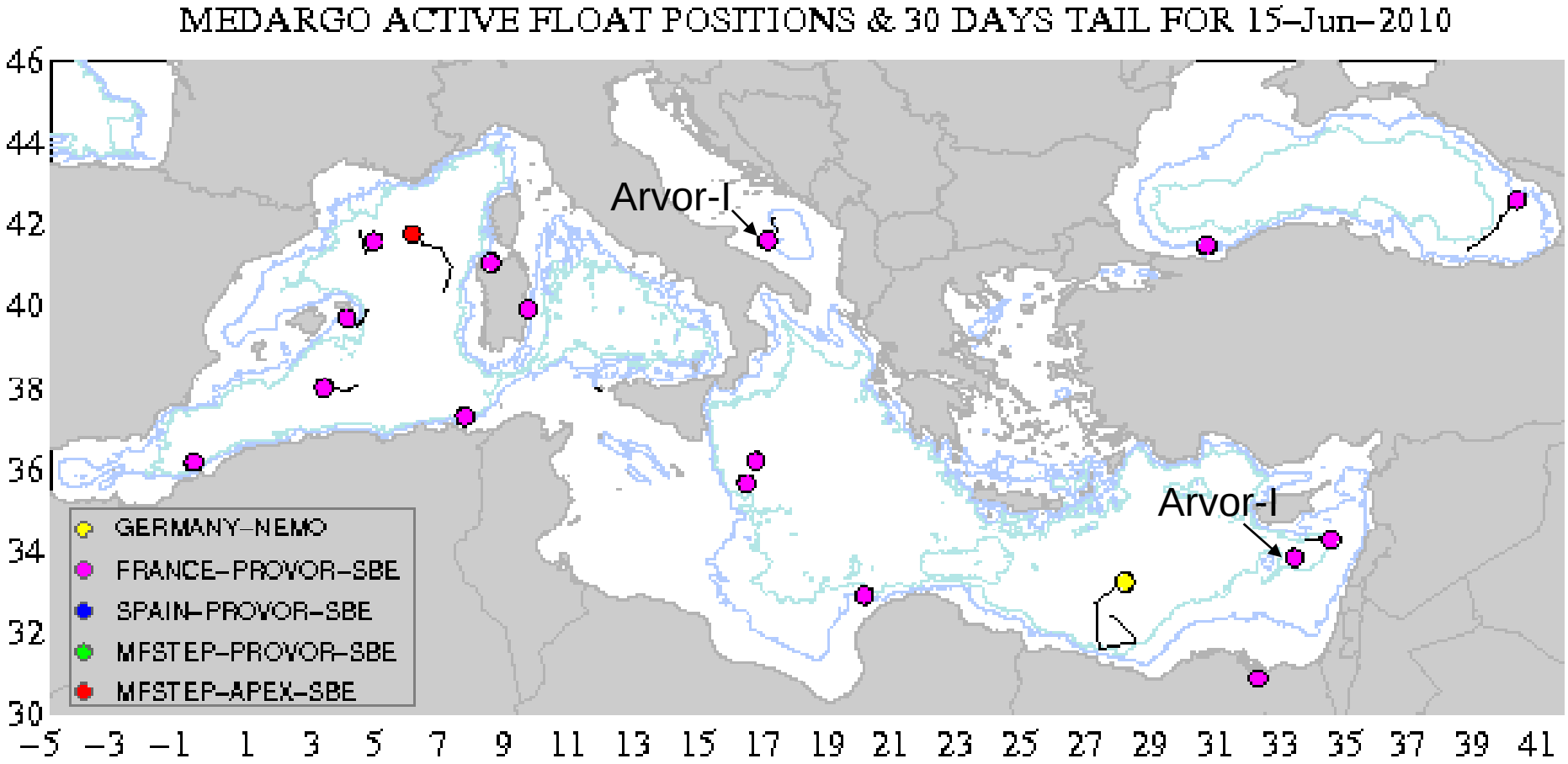
NRT Products
- Float Trajectories
- Float Profiles
- Status Table Active
- Status Table All
- Monthly Maps
- Data
- CORIOLIS

Projects
- MFSTEP

Other
- Partners
- Documentation
- Links
- MedArgo Main Page
- Photo Gallery

For more information please contact P.-M. Poulain or A. Bussani

The Mediterranean Argo Programme (MedArgo)
http://poseidon.ogs.trieste.it/sire/medargo/



In total, 16 (Med) + 2 (Black Sea) = 18 active floats on 15 June 2010

MFSTEP-Argo Status Table (15/6/2010, 1 floats alive)

Model	WMO	Argos	Deploy Date	Lat	Lon	Cycles	Last Date	Lat	Lon	Status	Cycle	Dmqc
Apex	6900453	35504	05-Jul-2006 10:20	38.98	3.08	288	14-Jun-2010 06:44	41.72	6.17	A	5	
TOTAL						288						

FRANCE-Argo Status Table (15/6/2010, 16 floats alive)

Model	WMO	Argos	Deploy Date	Lat	Lon	Cycles	Last Date	Lat	Lon	Status	Cycle	Dmqc
Provor CTS3	1900602	63657	10-Apr-2006 14:54	33.31	21.13	152	10-Jun-2010 07:28	35.63	16.55	A	10	
Provor CTS2	1900603	63658	23-Apr-2006 04:06	33.6	26	151	11-Jun-2010 08:00	30.84	32.36	A	10	
Provor CTS2	1900605	63660	11-Apr-2006 04:15	33.31	23.46	152	11-Jun-2010 07:56	32.9	20.18	A	10	
Provor CTS2	1900849	63668	03-Dec-2009 20:02	33.38	32.46	38	13-Jun-2010 07:14	34.18	34.41	A	5	
Provor CTS3	6900501	78638	23-Jan-2008 12:38	43.4	7.83	87	14-Jun-2010 01:22	36.21	359.45	A	10	
Provor CTS3	6900502	78639	26-Jan-2008 23:55	42.01	4.94	86	07-Jun-2010 00:51	41.61	5.03	A	10	
Provor CTS3	6900503	78640	28-Jan-2008 10:10	42.91	5.41	86	09-Jun-2010 00:32	37.26	7.66	A	10	
Provor CTS3	6900504	78641	24-Jan-2008 02:33	42.9	6.66	87	14-Jun-2010 21:29	41	8.64	A	10	
Provor CTS3	6900663	78655	07-Jul-2008 05:45	33.95	18.45	141	15-Jun-2010 01:24	36.15	16.78	A	5	
Provor CTS3	6900700	88387	19-Feb-2009 11:43	43.38	7.59	95	12-Jun-2010 01:38	39.68	4.17	A	5	
Provor CTS2	1901200	88403	08-Dec-2009 05:57	42.92	28.88	37	14-Jun-2010 01:29	42.53	40.46	A	5	
Provor CTS3	6900699	88415	03-Apr-2009 01:28	42.28	5.37	87	15-Jun-2010 01:07	37.99	3.45	A	5	
Provor CTS3	6900712	88420	23-May-2009 07:38	40.79	11.13	77	14-Jun-2010 21:30	39.97	9.78	A	5	
Provor CTS3	5902291	9944875	16-Apr-2010 06:30	41.43	29.31	16	03-Jun-2010 07:18	41.43	30.79	A	2	
Arvor I	1900848		27-Feb-2010 21:44	42.39	17.49	40	14-Jun-2010 04:27	0	0	A	5	
Arvor I	6900794		04-Dec-2009 11:12	33.94	32.92	193	15-Jun-2010 00:54	0	0	A	1	
TOTAL						1525						

GERMANY Status Table (15/6/2010, 1 floats alive)

Model	WMO	Argos	Deploy Date	Lat	Lon	Cycles	Last Date	Lat	Lon	Status	Cycle	Dmqc
Nemo	6900810	82687	16-Oct-2009 19:22	36.17	21	48	13-Jun-2010 15:31	33.21	28.2	A	10	
TOTAL						48						

A: Active with position ANP: Active with no position D: Dead

In total, 18 floats are active in the Med and Black seas on 15 June 2010

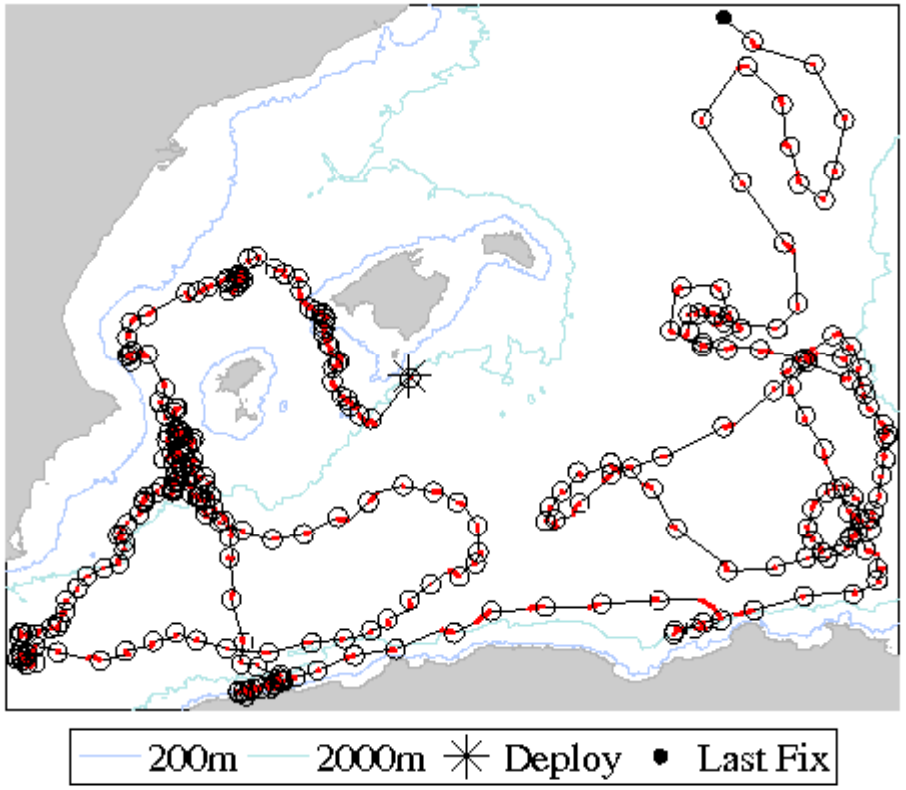
Most of them have Argos positioning and data telemetry

Two units (float Arvor) have GPS positioning and Iridium telemetry

“Oldest” Mediterranean float (almost 300 cycles, 4 years)

Model	WMO	Argos	Deploy Date	Lat	Lon	Cycles	Last Date	Lat	Lon	Status	Cycle	Pdf
Apex	6900453	35504	05-Jul-2006 10:20	38.98	3.08	288	14-Jun-2010 06:44	41.72	6.17	A	5	

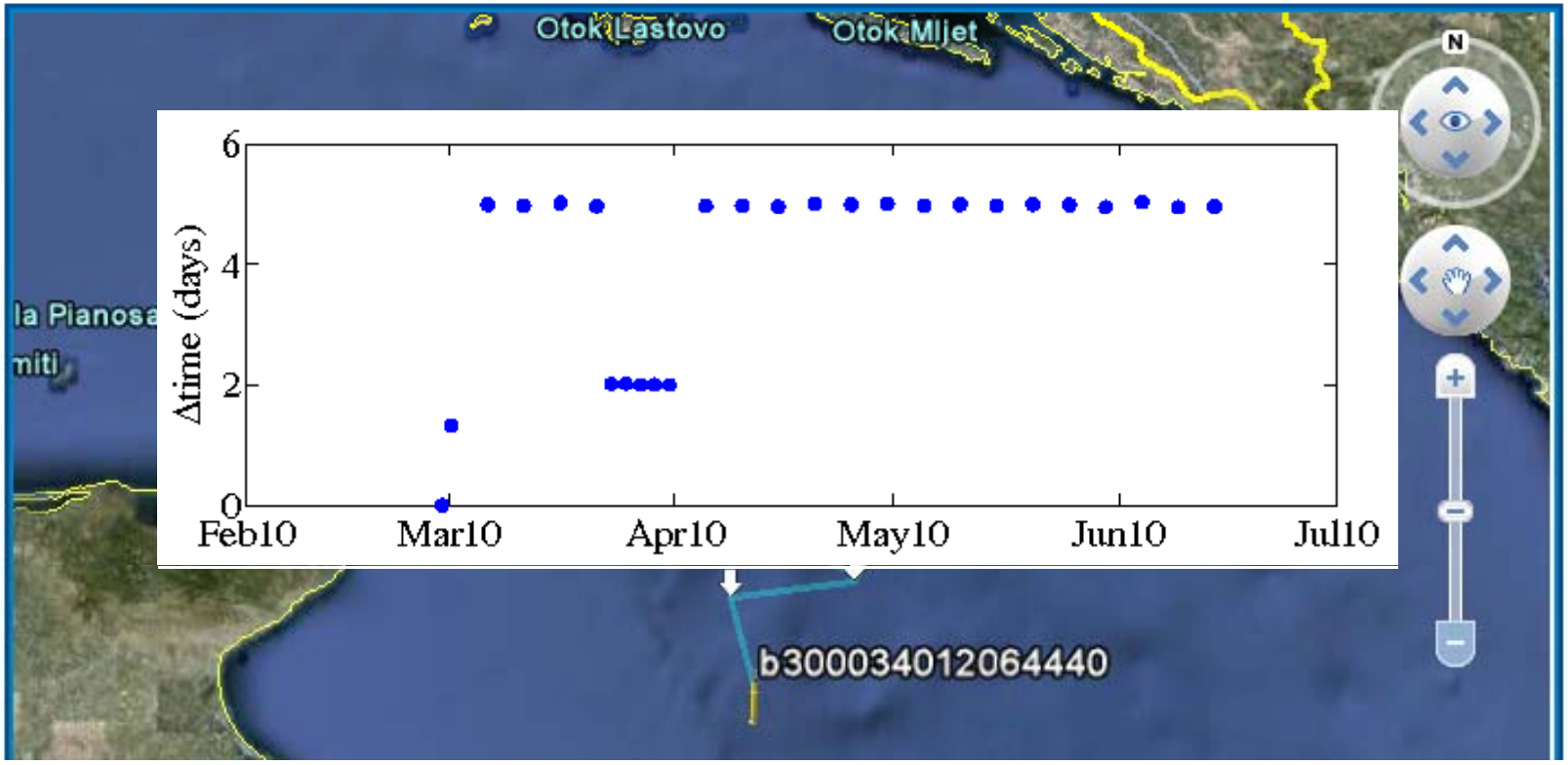
APEX FLOAT: b35504 POSITIONS AS OF 14–Jun–2010 11:50:03



“Youngest” Mediterranean float (4 months)

Model	WMO	Argos	Deploy Date	Lat	Lon	Cycles	Last Date	Lat	Lon	Status	Cycle	Pdf
Arvor I	1900848		27-Feb-2010 21:44	42.39	17.49	40	14-Jun-2010 04:27	0	0	A	5	

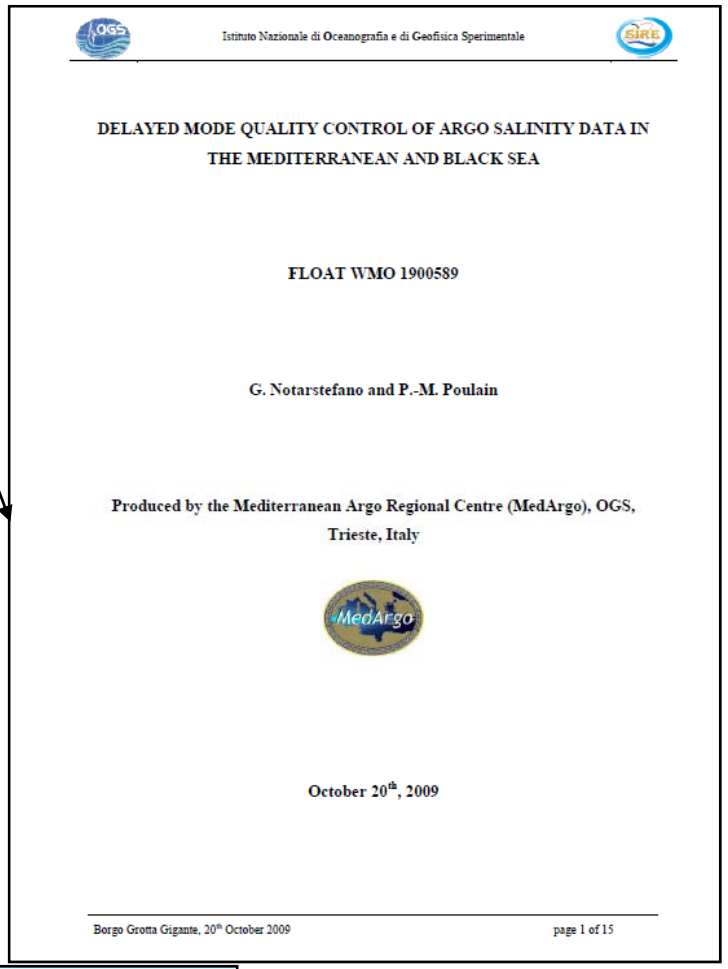
Embedded KML Viewer



Delayed Mode Quality Control (DMQC)

FRANCE-Argo Status Table (15/6/2010, 34 floats deployed)

Model	WMO	Argos	Deploy Date	Lat	Lon	Cycle	Last Date	Lat	Lon	Status	Cycle	Dmqc
Provor CTS2	6900674	00001	08-Jul-2008 10:40	33.85	18.58	57	24-May-2009 10:42	0	47	D	5	
Provor CTS2	6900677	00002	01-May-2008 08:18	43.39	7.91	76	24-May-2009 10:49	0	49	D	5	
Provor CTS2	6900679	00003	27-Jun-2008 16:09	33.66	32.61	59	27-May-2009 09:45	0	6	D	5	
Provor CTS2	1900589	52112	14-Nov-2005 14:28	34	21.65	112	30-May-2007 05:13	35.18	24.22	D	5	pdf
Provor CTS2	1900590	54006	15-Nov-2005 09:52	33.11	24.35	167	01-Mar-2008 06:27	31.33	27.49	D	5	pdf
Provor CTS2	1900591	54011	15-Nov-2005 23:44	33.02	26.82	40	05-Jun-2006 07:02	31.38	27.21	D	5	pdf
Provor CTS2	1900592	54055	02-Feb-2006 06:50	32.74	24.52	25	09-Jun-2006 06:04	31.5	26.58	D	5	pdf
Provor CTS2	6900454	54069	14-Mar-2007 07:58	33.17	25.95	28	09-Aug-2007 07:15	32.26	26.89	D	5	pdf
Provor CTS2	6900455	54070	13-Mar-2007 21:10	33.98	25.91	122	19-Nov-2008 05:18	31.06	28.56	D	5	pdf
Provor CTS2	1900593	54073	02-Feb-2006 14:23	32.51	26	75	14-Feb-2007 03:41	0	0	D	5	pdf
Provor CTS3	1900602	63657	10-Apr-2006 14:54	33.31	21.13	152	10-Jun-2010 07:28	35.63	16.55	A	10	
Provor CTS2	1900603	63658	23-Apr-2006 04:06	33.6	26	151	11-Jun-2010 08:00	30.84	32.36	A	10	
Provor CTS3	1900604	63659	18-Apr-2006 12:05	32.71	24.97	88	16-Sep-2008 06:13	31.81	31.51	D	10	pdf
Provor CTS2	1900605	63660	11-Apr-2006 04:15	33.31	23.46	152	11-Jun-2010 07:56	32.9	20.18	A	10	
Provor CTS3	1900606	63661	22-Apr-2006 10:20	33.58	25	100	15-Jan-2009 15:28	31.48	26.69	D	10	pdf
Provor CTS2	1900849	63668	03-Dec-2009 20:02	33.38	32.46	38	13-Jun-2010 07:14	34.18	34.41	A	5	
Provor CTS2	6900456	63668	22-Mar-2007 15:07	42.27	8.02	65	11-Feb-2008 10:58	44.06	9.87	D	5	
Provor CTS2	6900457	63670	22-Mar-2007 15:54	42.61	7.74	168	16-Jul-2009 07:03	38.73	3.65	D	5	
Provor CTS3	6900501	78638	23-Jan-2008 12:38	43.4	7.83	87	14-Jun-2010 01:22	36.21	359.45	A	10	
Provor CTS3	6900502	78639	26-Jan-2008 23:55	42.01	4.94	86	07-Jun-2010 00:51	41.61	5.03	A	10	
Provor CTS3	6900503	78640	28-Jan-2008 10:10	42.91	5.41	86	09-Jun-2010 00:32	37.26	7.66	A	10	
Provor	6900504	78641	24-Jan-2008	42.9	6.66	87	14-Jun-2010	41	8.64	A	10	



Istituto Nazionale di Oceanografia e di Geofisica Sperimentale

DELAYED MODE QUALITY CONTROL OF ARGO SALINITY DATA IN THE MEDITERRANEAN AND BLACK SEA

FLOAT WMO 1900589

G. Notarstefano and P.-M. Poulain

Produced by the Mediterranean Argo Regional Centre (MedArgo), OGS, Trieste, Italy

October 20th, 2009

Borgo Grotta Gigante, 20th October 2009 page 1 of 15

So far, 15 floats have been DMQC'ed

Delayed Mode Quality Control (DMQC): salinity

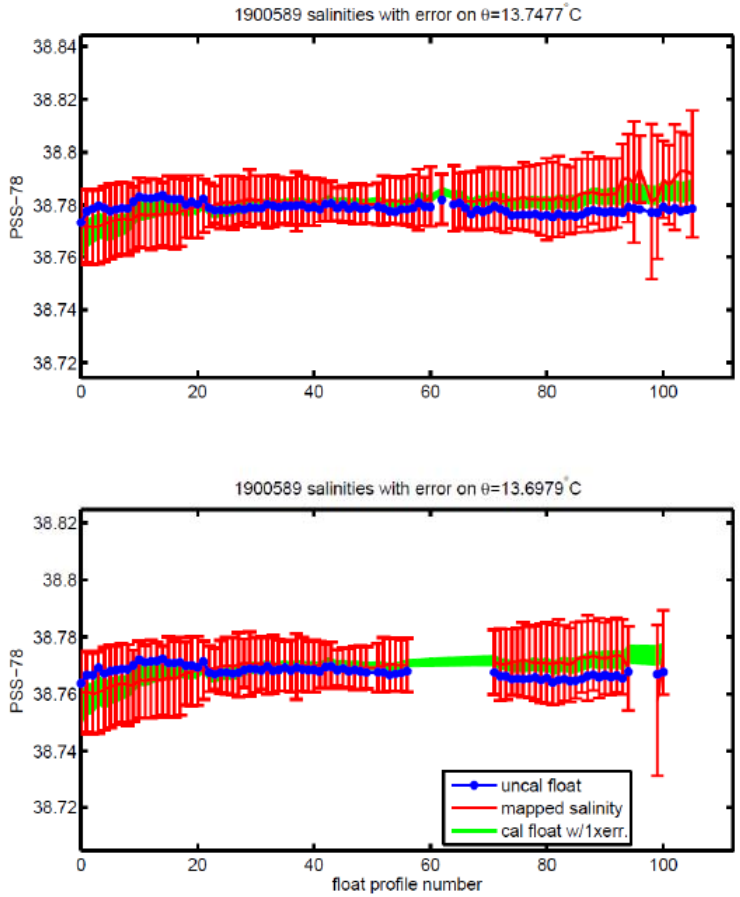


Figure 12. Comparison between the float salinity data and the mapped salinity, on θ-levels.

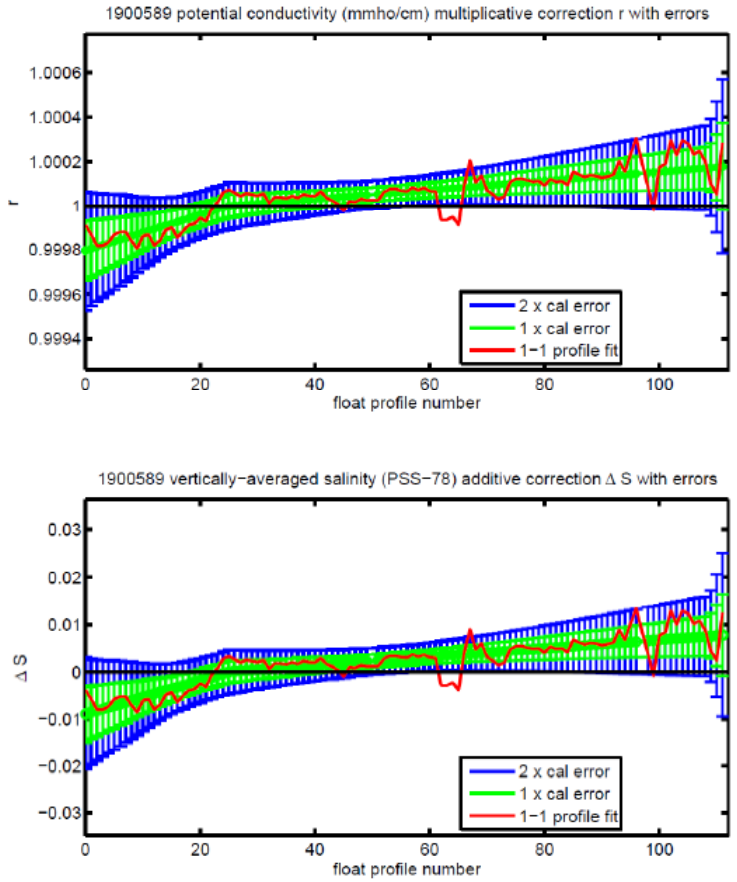


Figure 14. Correction proposed by the OW method.

EuroArgo PP Task 4.4. Define long term strategy for float deployment in marginal seas

Proposed Argo sampling in the Mediterranean and Black Seas

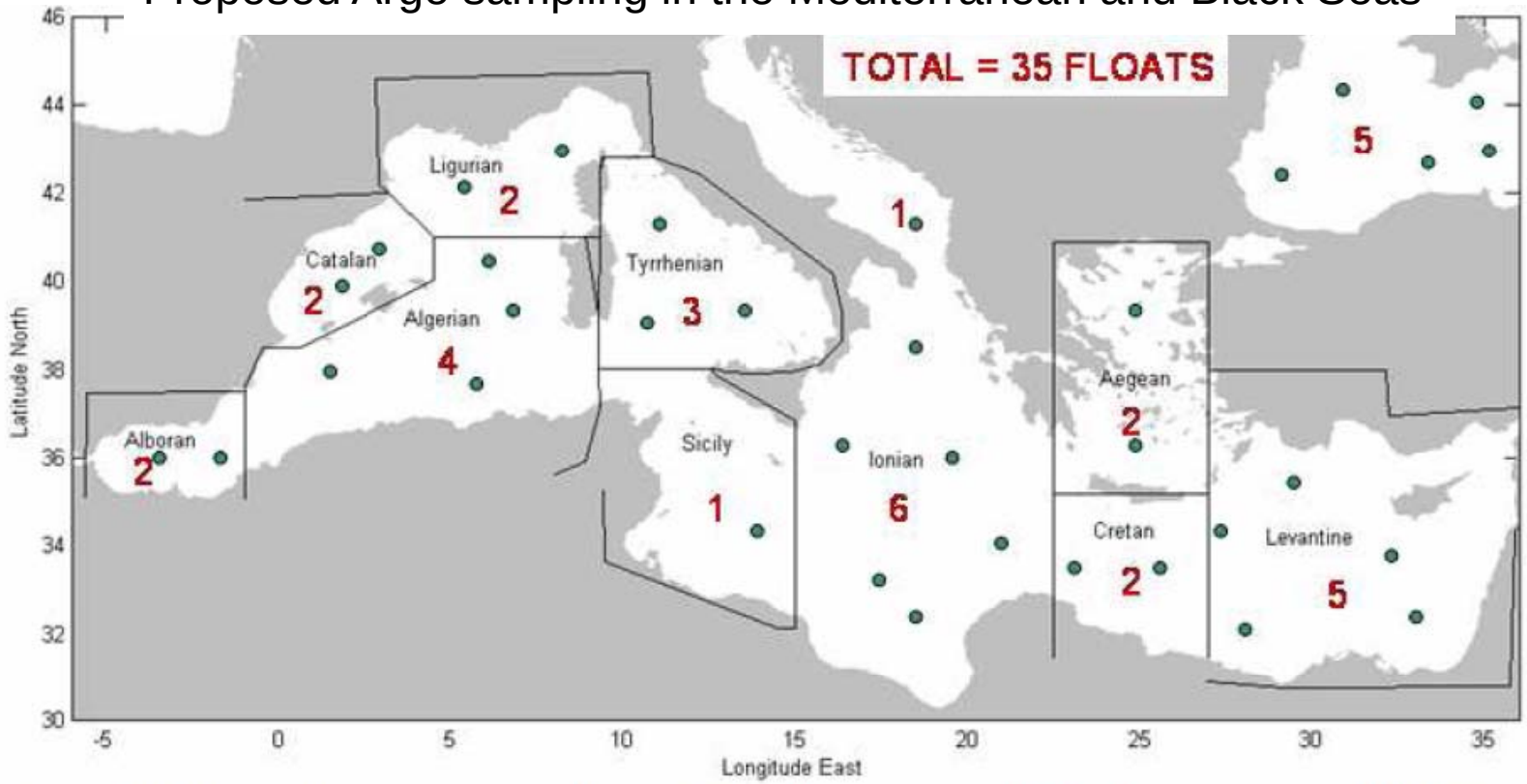


Figure 23. Proposed minimum distribution of the float array in the Mediterranean and Black Seas for the continuation of the Argo project. Numbers indicate the quantity of proposed floats in the sub-basins.

EuroArgo PP Task 4.4. Define long term strategy for float deployment in marginal seas

Proposed Argo sampling in the Mediterranean and Black Seas

- Maintain a minimum of 30 floats in Mediterranean by deploying about 10 new floats per year mainly along SOP lines

- Maintain a minimum of 5 floats in the Black Sea by deploying about 2 new floats per year

Upcoming deployments:

2 (Italy), 4-8 (Spain), 1 (Greece) and N? (France)

Thank you for your attention!

Any questions?