



Arvor-Provor Technical Workshop

Monitoring Argo floats – Euro-Argo

Ifremer, 28-30 January 2020



Monitoring Argo floats

<https://fleetmonitoring.euro-argo.eu/>

- Targeted audience
- Demo
- Use cases
- Discussions



- “Visualization of Argo profiling float metadata, ocean measurements, trajectories and technical parameters”
- For
 - **Argo fleet operators**
 - PIs
 - General public and communication activities
 - ARCs



- “Visualization of Argo profiling **float metadata**, ocean measurements, trajectories and technical parameters”

[←](#) **Float**
5903795

MAIN INFORMATION TECHNICAL PLOTS
ALL METADATA

About Float

WMO	Maker
5903795	SIO_IDG
Inst reference	Platform type
3017	SOLO
Transmission system	PTT
ARGOS	45827
Owner	Data Centre
	AOML
Sensors	
CTD_PRES, CTD_TEMP, CTD_CNDC	

Deployment

7 years ago

Launched	15/10/2011 23:57:14	
Deployment Latitude	Deployment Longitude	
-9.012	-158.748	
Ship	Cruise	
R/V Kaharoa		
Project	Principal Investigator	
US ARGO PROJECT	DEAN ROEMMICH	

Cycle activity

Status	Age
Active	7.98 years old
Last station date	Cycle
07/10/2019 07:38:25	285
Last Surface Data	
5.5 dbar 28.088°C 36.216 PSU	
Last Bottom Data	
1452 dbar 2.812°C 34.666 PSU	
Stations data	Trajectory data
in Ascii in Netcdf	in Ascii in Netcdf
Grey List	
PSAL	

- “Visualization of Argo profiling **float metadata**, ocean measurements, trajectories and technical parameters”

Hierarchized metadata

Float
3901888

MAIN INFORMATION TECHNICAL PLOTS

ALL METADATA

Float configuration

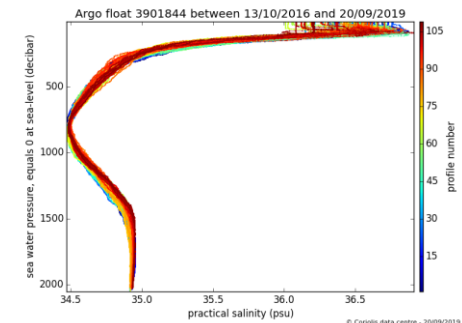
– Mission configurations

Cycles #	1	2>12	13>96
CONFIG_CycleTime_hours	59.5	240	240
CONFIG_DescentToParkPresSamplingTime_seconds	10	0	0
CONFIG_Direction_NUMBER	3	1	1
CONFIG_InternalPressureCalibrationCoef2_NUMBER	-88	-88	-88
CONFIG_ParkPressure_dbar	1000	1000	1000
CONFIG_ProfilePressure_dbar	2000	2000	2000
CONFIG_PumpActionTimeBuoyancyAcquisition_csec	30000	30000	27000

+ Mission parameters

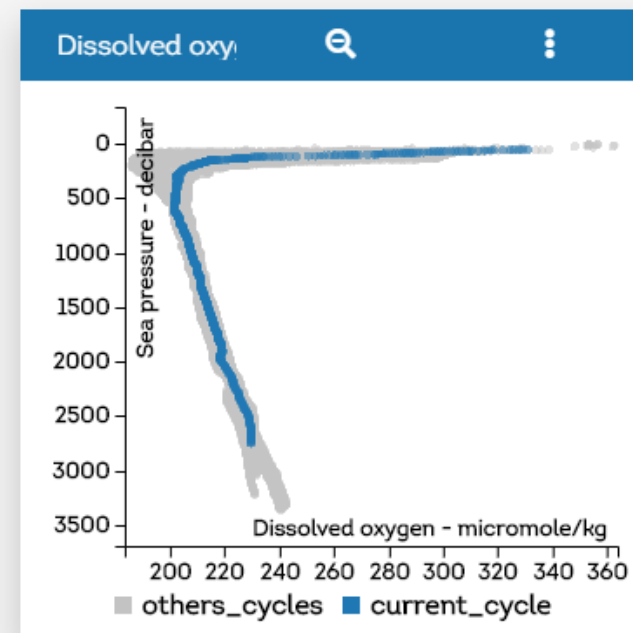
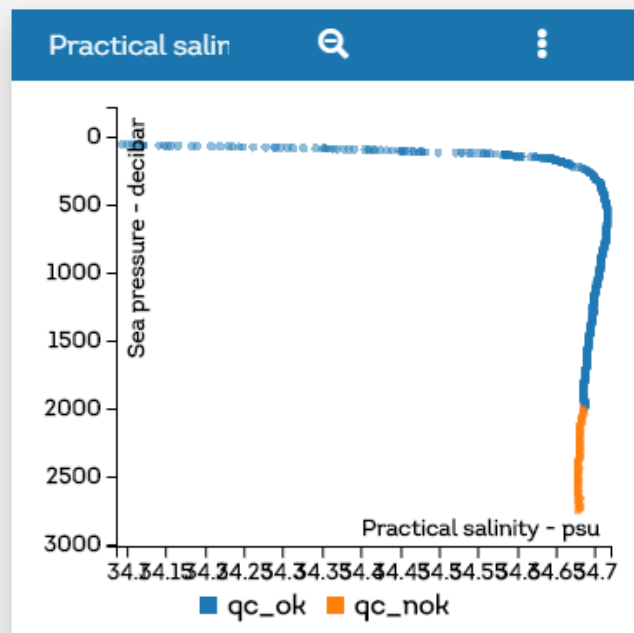
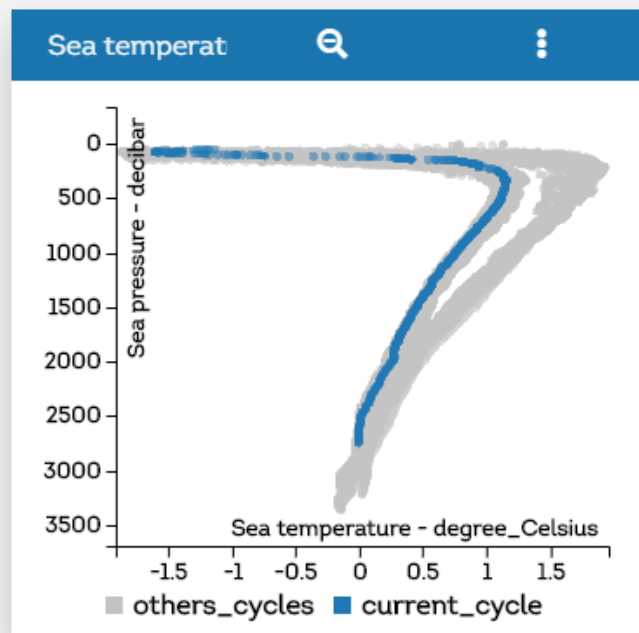
Mission configurations

- “Visualization of Argo profiling float metadata, **ocean measurements**, trajectories and technical parameters”
- In link with popup data selection tool

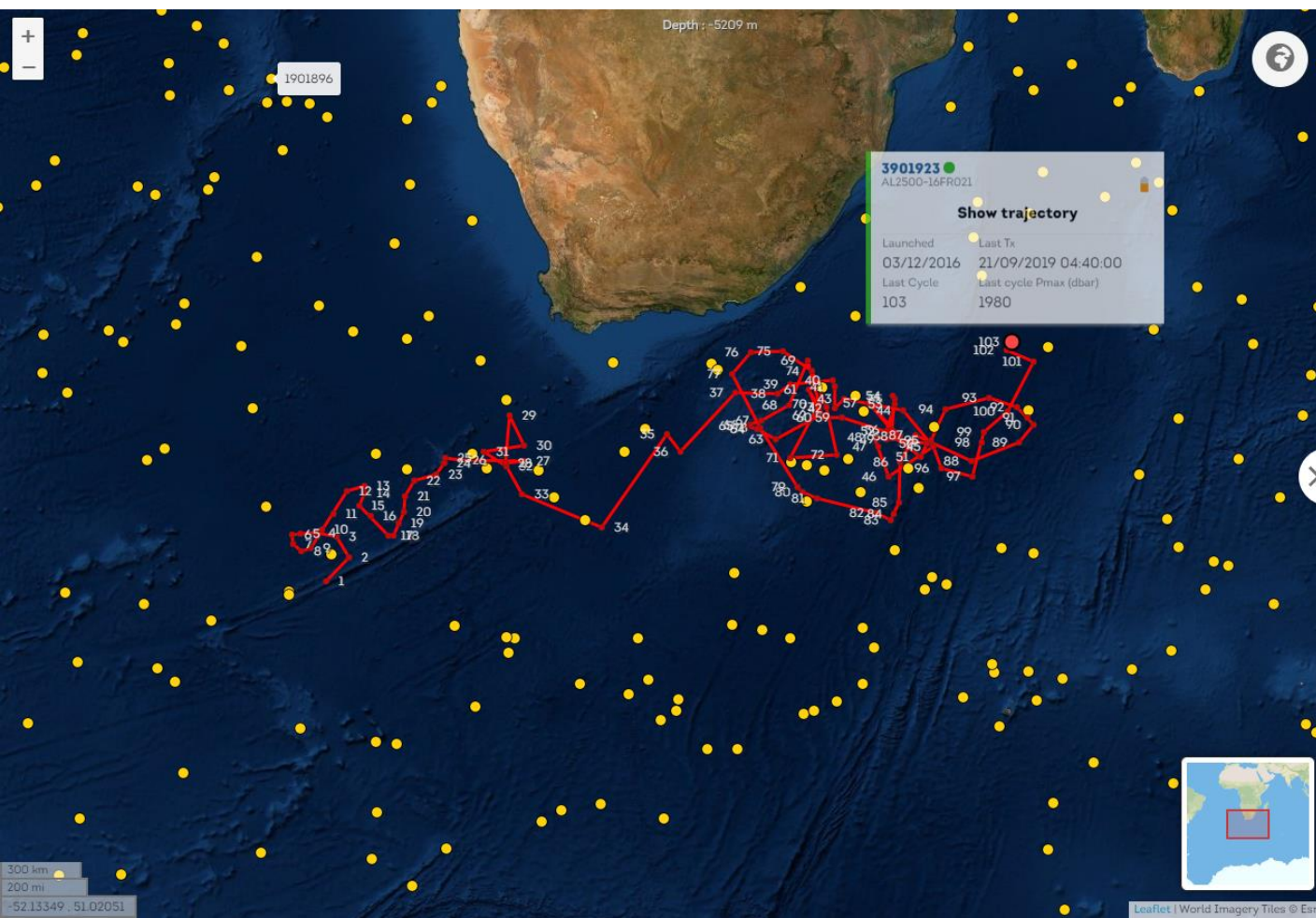


Float 3902129 Cycle 34 ASCENDING

[in Ascii](#) [in Netcdf](#)

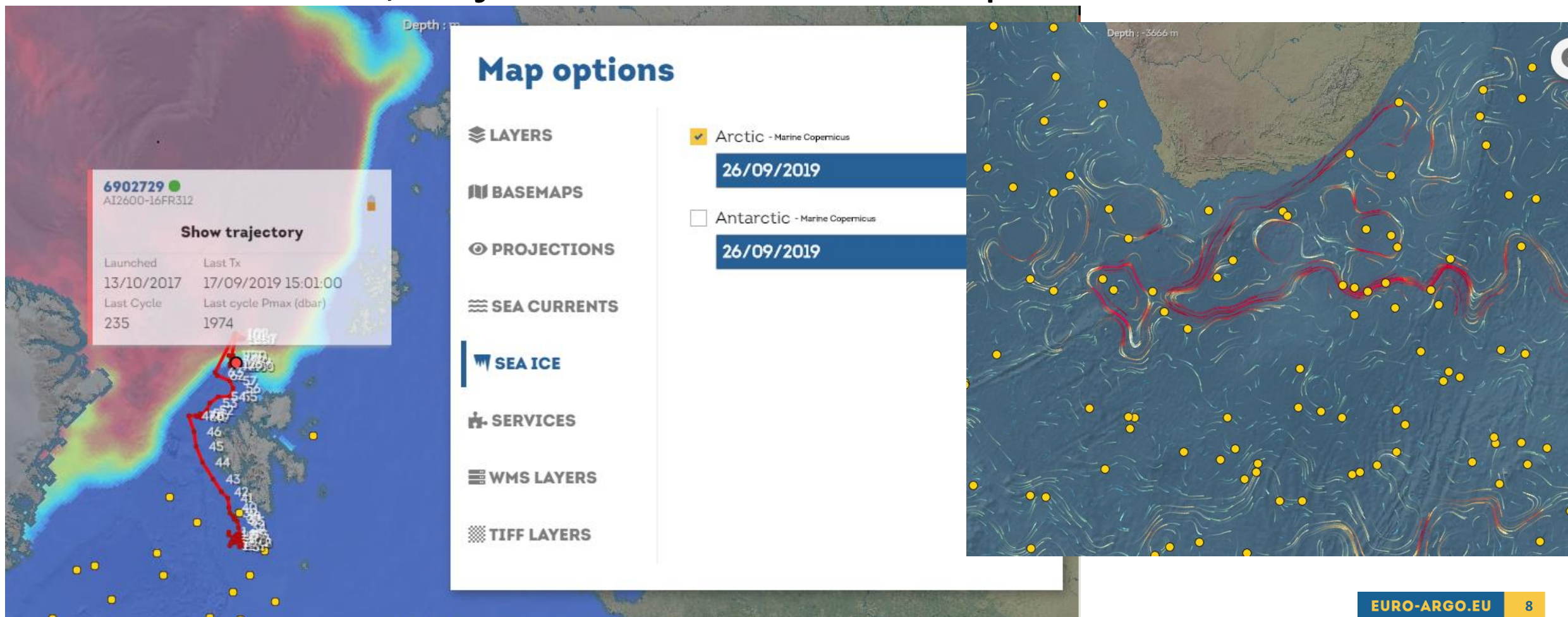


- “Visualization of Argo profiling float metadata, ocean measurements, **trajectories** and technical parameters”



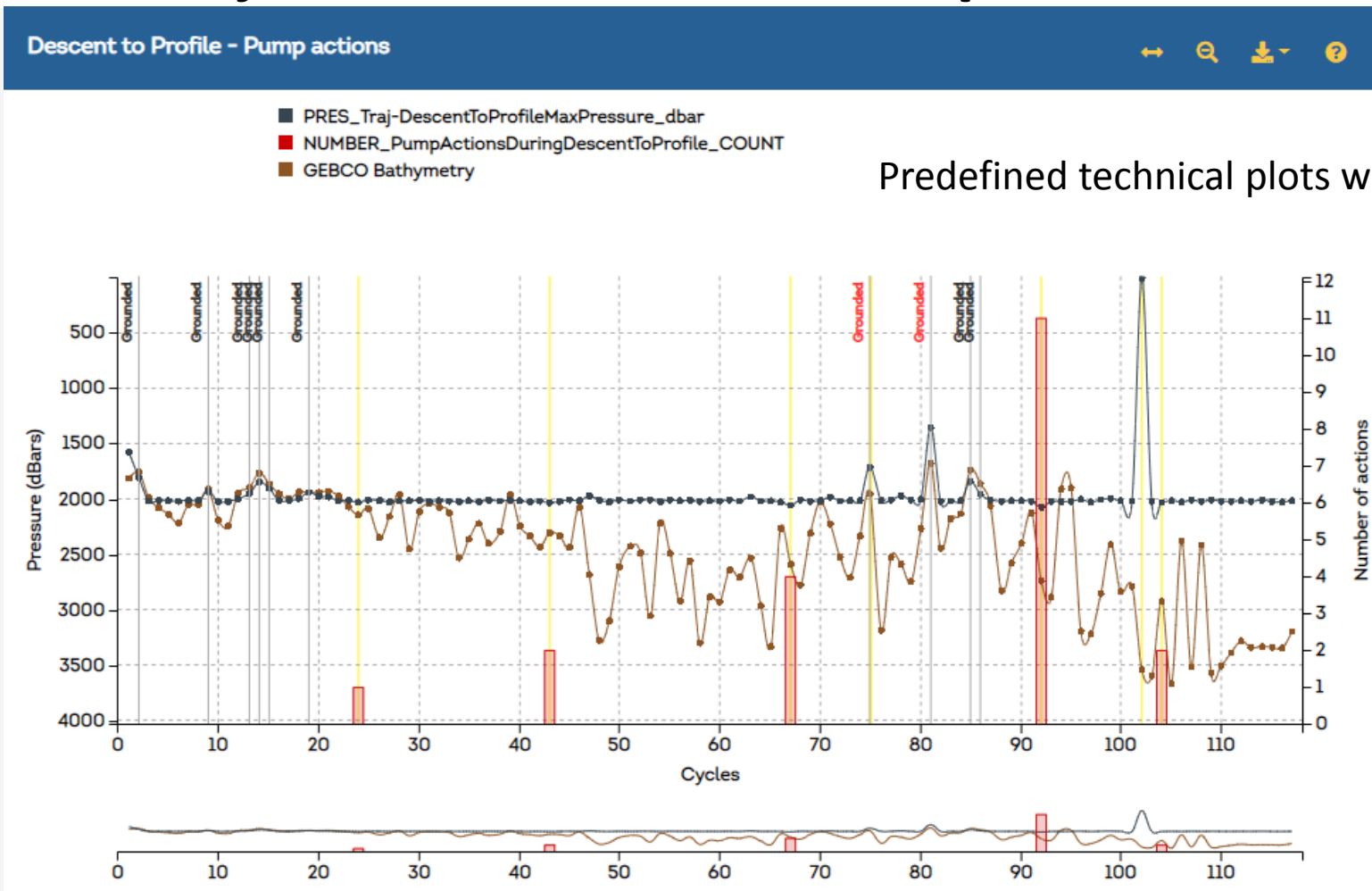
- Basemaps
- Projections
- Context (depth, sea ice, sea currents, etc.)
- Last position of all floats
- ...

- “Visualization of Argo profiling float metadata, ocean measurements, **trajectories** and technical parameters”

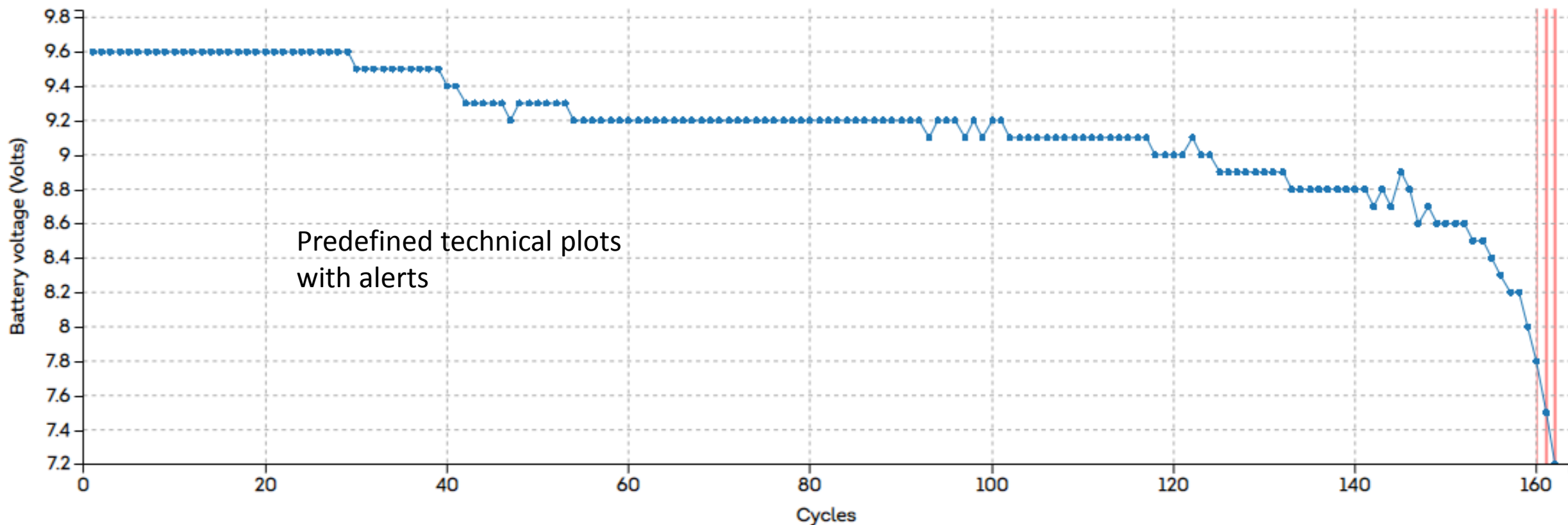


- “Visualization of Argo profiling float metadata, ocean measurements, trajectories and **technical parameters**”

- DESCENT TO PARK**
 - Pump Actions
 - Valve Actions
- DRIFT**
 - Pump Actions
 - Valve Actions
- DESCENT TO PROFILE**
 - Pump Actions
 - Valve Actions
- PROFILE DRIFT**
 - Hydraulic Actions
- ASCENT TO SURFACE**
 - Pump Actions
- POSITIONING**
 - Positioning
- ICE**
 - Ice Detection Related Parameters
- DATA TRANSMISSION**



- “Visualization of Argo profiling float metadata, ocean measurements, trajectories and **technical parameters**”





• Dashboard

DASHBOARD ↻

Status

Inactive 263

Active 612

Year of deployment

2019 495

2018 660

2017 699

2016 612

...

Country

France 34

Germany 30

Europe 30

United Kingdom 25

...

Basin

Pacific ocean 223

Indian ocean 200

Atlantic ocean 154

Arctic ocean 15

...

Telecom

IRIDIUM 502

ARGOS 110

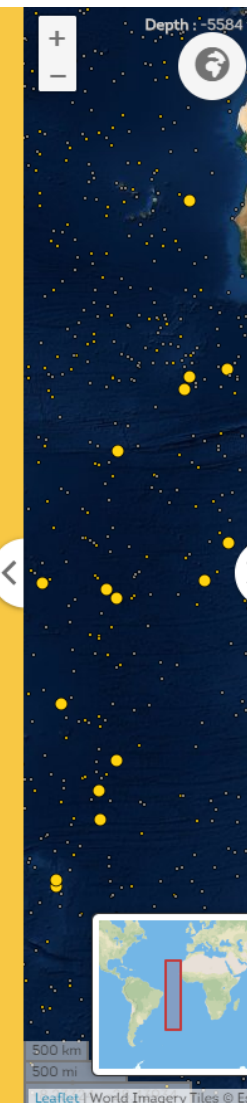
DAC

AOML 351

CORIOLIS 105

612 floats 📊 ⌵

A	WMO	Float S/N PTT	Float	Last Tx	Last cycle	Battery	Launch date	Cruise
	5902480	0474 n/a	SOLO_II	08/10/2019 18:57:01	112	█	18/10/2016	
	5902521	6017 n/a	SOLO_D	03/10/2019 05:20:59	88	█	18/10/2016	
	4902351	7370 n/a	S2A	21/09/2019 ▲ 05:17:27	111	█	18/10/2016	
	6902737	OIN-15-S4-08 lovbio103c	PROVOR_III	08/10/2019 04:37:00	372	█ 9.3	18/10/2016	SoCLIM
	6902736	OIN-15-S4-06 lovbio101c	PROVOR_III	07/10/2019 02:39:00	373	█ 9.5	18/10/2016	SoCLIM
	4902352	7372 n/a	S2A	03/10/2019 15:30:54	112	█	18/10/2016	
	5902481	8473 n/a	SOLO_II	30/09/2019 07:50:01	111	█	19/10/2016	
	6902735	OIN-15-S4-05 lovbio100c	PROVOR_III	01/10/2019 ▲ 06:01:00	369	█ ▲ 5.4	19/10/2016	SoCLIM
	5902523	6019 n/a	SOLO_D	06/10/2019 23:05:00	90	█	20/10/2016	
	5902482	8474 n/a	SOLO_II	29/09/2019 14:10:02	111	█	20/10/2016	
	3901846	AI2600-16FR009	ARVOR	07/10/2019 17:43:30	109	█ 10.5	20/10/2016	M131



- Indexes
- Results table
- Link to float pages
- Alerts
- Map



Monitoring Argo floats

<https://fleetmonitoring.euro-argo.eu/>

- Use cases

- Your floats (selection through indexes)
- Sort by Alert
 - **Missing Profile** (today > cycle_period + last Tx): your float is probably dead or not decoded
 - **Battery**: your float will probably die soon; consider recovery?

The dashboard displays information on float last cycle only

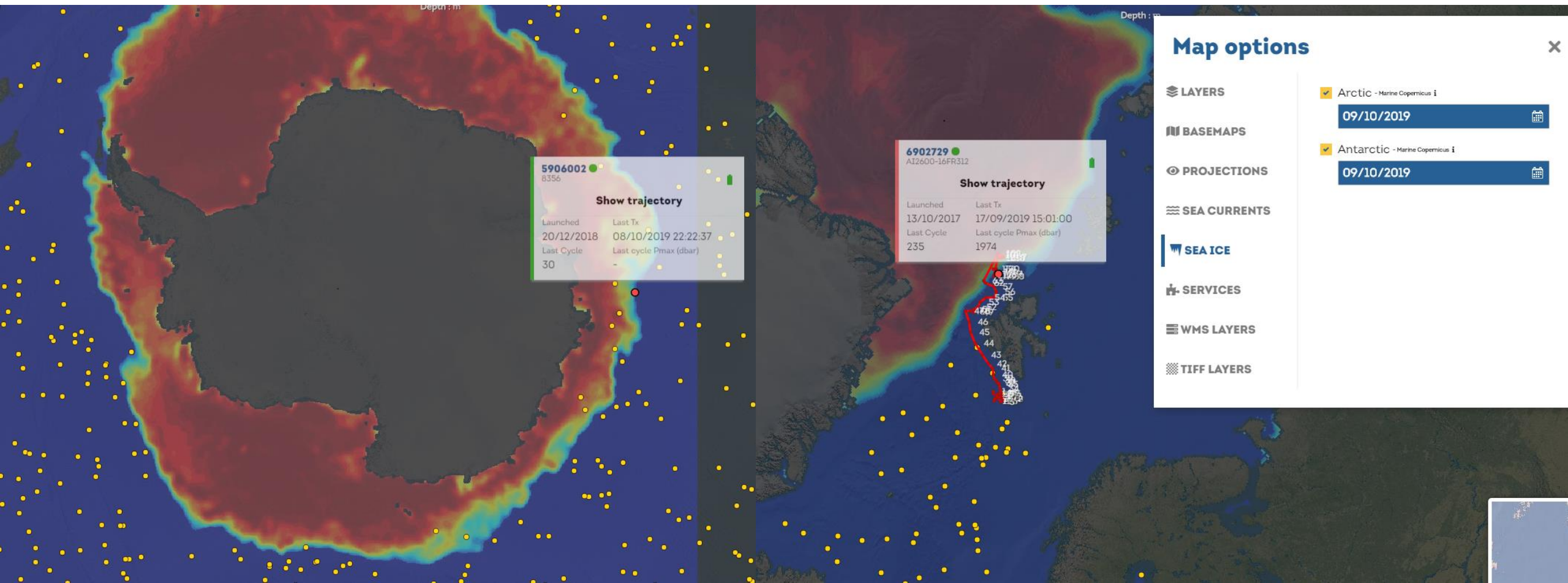
6901677	OIN-14-AR-32 140824	ARVOR	08/10/2019 07:27:00	154	 6.9	29/07/2015
6902631	OIN-15D-ARL-11 152046	ARVOR	25/09/2019 12:13:00	141	 6.9	15/11/2015
6901735	OIN-14-AR-74 144178	ARVOR	28/09/2019 20:31:00	165	 6.9	31/03/2015

- **Surface** (EOL messages, grounded @ 0 dbar, tech messages but not profile data, saturation of valve actions during buoyancy reduction phase, etc.): check your float!
- **Grounding** (alert if not coherent with bathy; to be refined)
- **Profile max pressure:** your float did not reach its target profile pressure +/- tolerance

6902753	30/09/2019 23:55:00	77	9.2	2070 ⚠
6902904	09/10/2019 09:24:00	83	9.7	1950 ⚠
6900900	02/10/2019 06:13:00	170	9.5	1990 ⚠

A	WMO	Last Tx	Last cycle	Battery	Last cycle Pmax (dbar)	Surface float	Last cycle grounded
	3901860	12:22:55		10.6			
	3901941	10/09/2019 ⚠ 02:03:00	382	10	0	10/09/2019 ⚠ 06:28:23	G ⚠
	6902811	30/09/2019 07:04:40	79	12.6	2967		G
	6901269	01/10/2019 05:54:00	48	9.5	1360		G ⚠

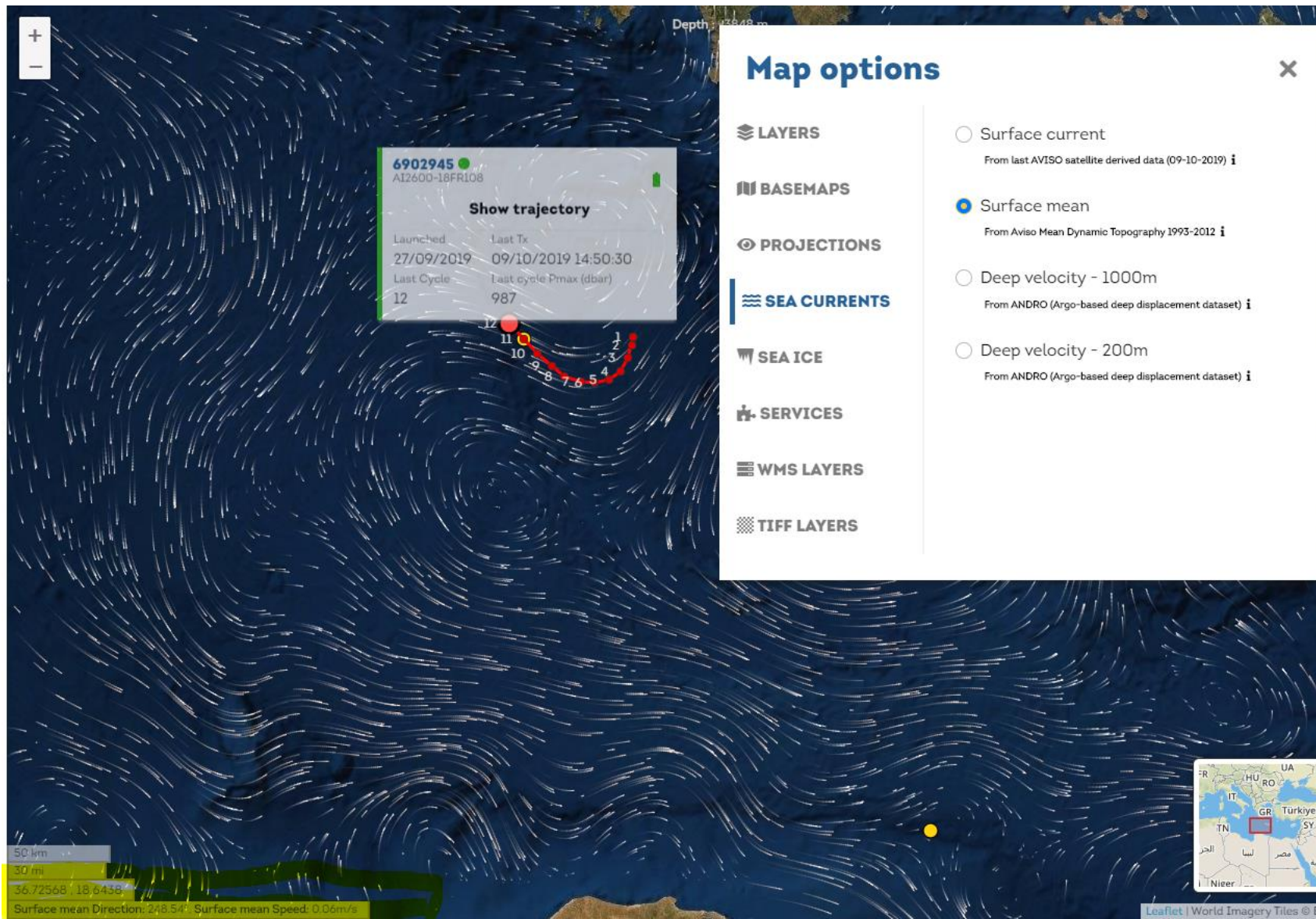
- **Check float positions with last sea ice edge:**
adjust float parameters (ISA, cycle period etc.) before the float is trapped under ice;
- Go back in time to check ice edges with float trajectory and profile dates



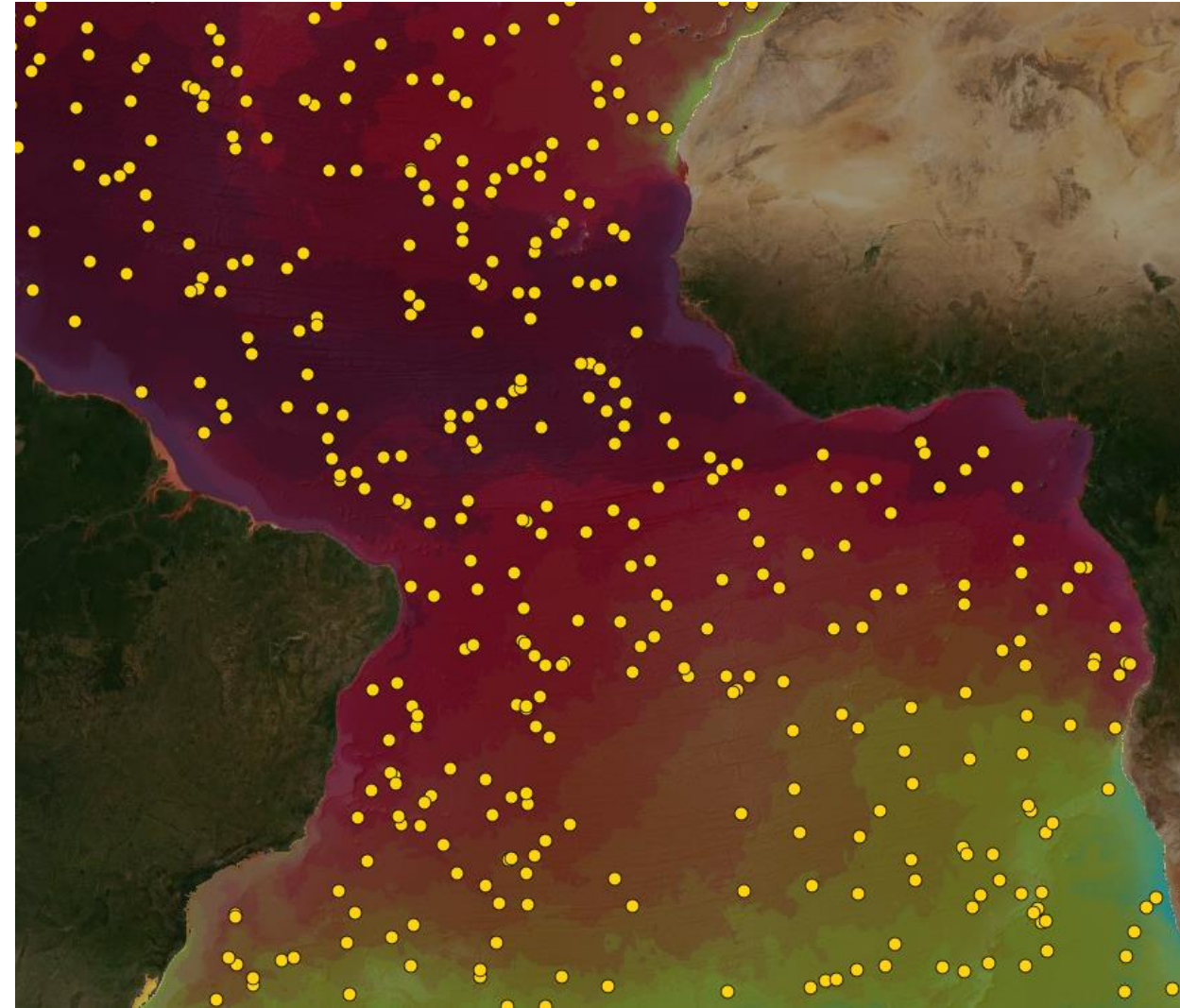
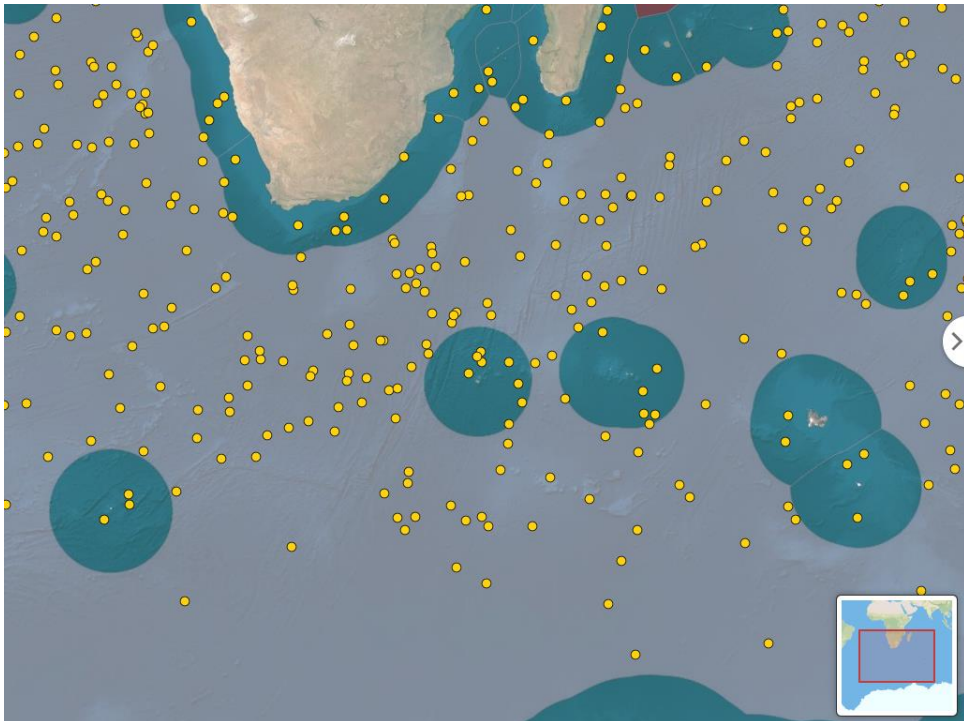


Dashboard – Map – CURRENTS

- Float trajectory with surface current (AVISO) deep current (ANDRO)



- Sea Surface Temperature
- EEZ
- *(GetFeatureInfo not working currently)*





Float page – Technical plots – HYDRAULIC

- *Stabilisation problems during drift (pump actions)*
- *Increased tolerance after cycle 161*

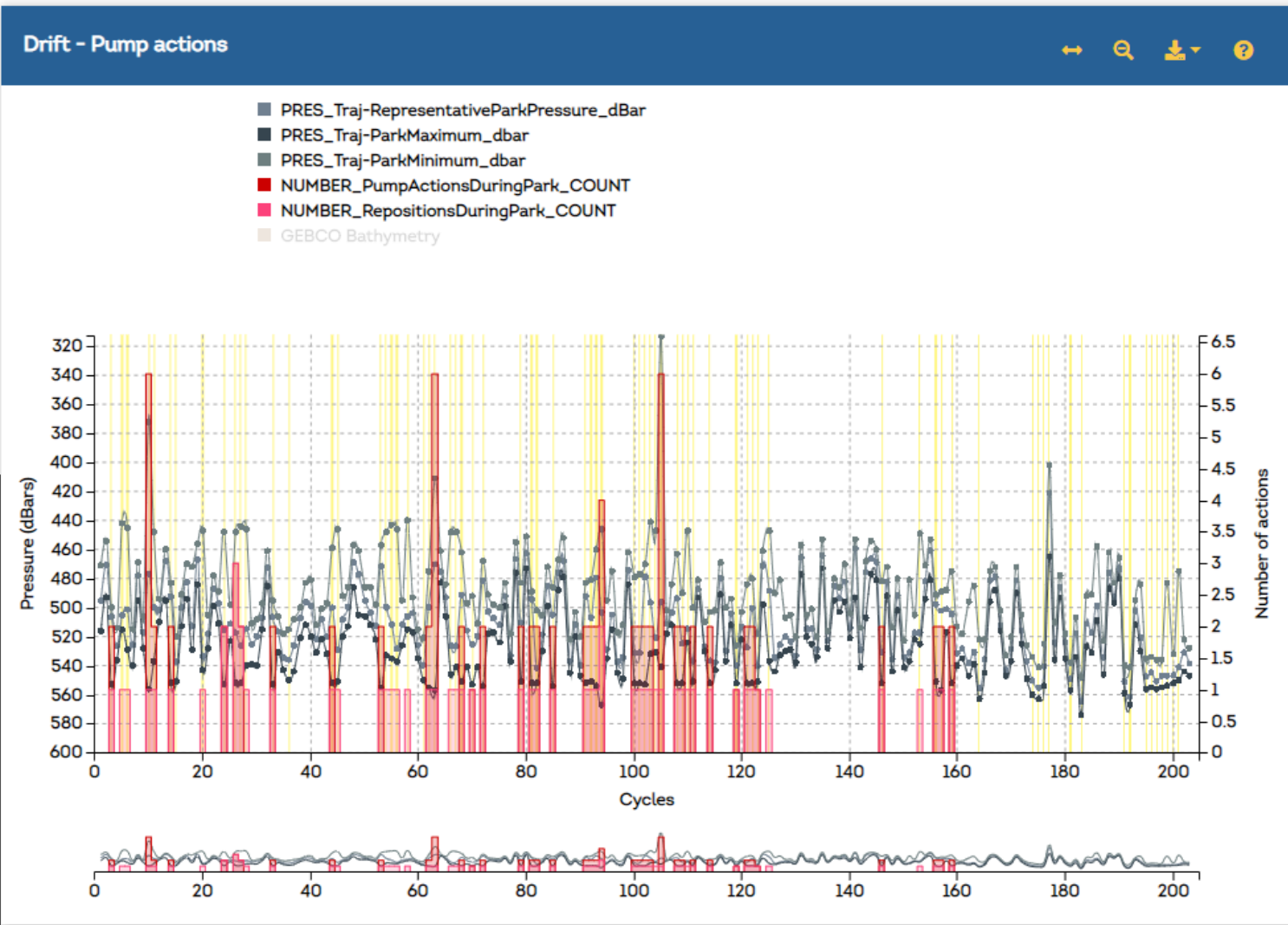


Float 3901986

MAIN INFORMATION

TECHNICAL PLOTS

ALL METADATA



Float 3901986

MAIN INFORMATION

TECHNICAL PLOTS

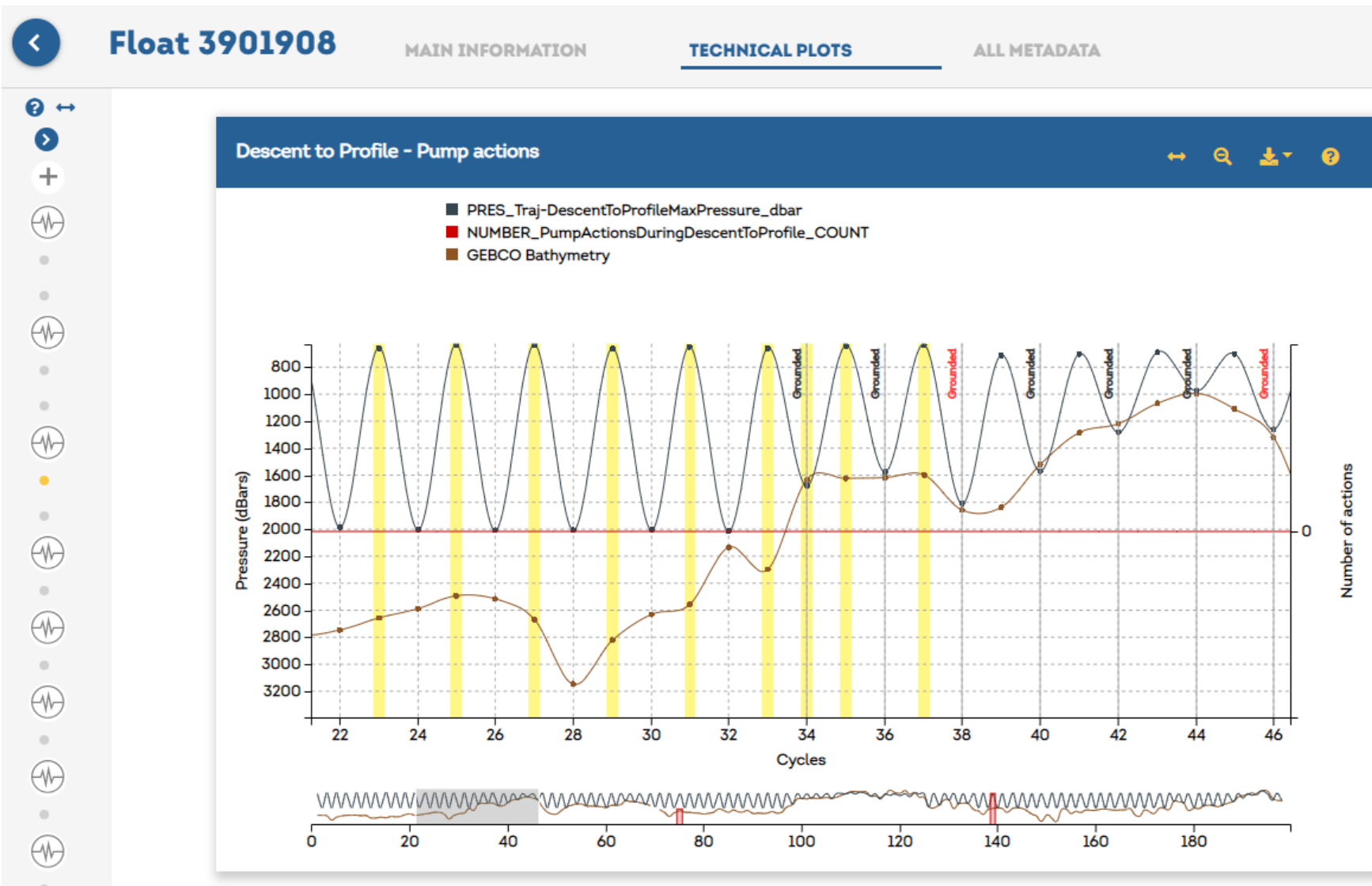
ALL METADATA

Float configuration

Mission configurations

Cycles #	1	2>160	161>203
CONFIG_CycleTime_hours	60.5	72	72
CONFIG_DescentToParkPresSamplingTime_seconds	10	0	0
CONFIG_Direction_NUMBER	3	1	1
CONFIG_InternalPressureCalibrationCoef2_NUMBER	-133	-133	-133
CONFIG_ParkPressure_dbar	500	500	500
CONFIG_PressureTargetToleranceDuringDrift_dbar	50	50	100
CONFIG_PressureTargetToleranceForStabilisation_dbar	30	30	50
CONFIG_ProfilePressure_dbar	2000	2000	2000

- Targeted profile pressure not reached for alternate cycles (@700 dbar)
- Decrease DescentSpeed after cycle 38





Dashboard – Statistics – MISSING CYCLES

- Check the floats that have missing cycles

(difference between number of cycles and max cycle number)

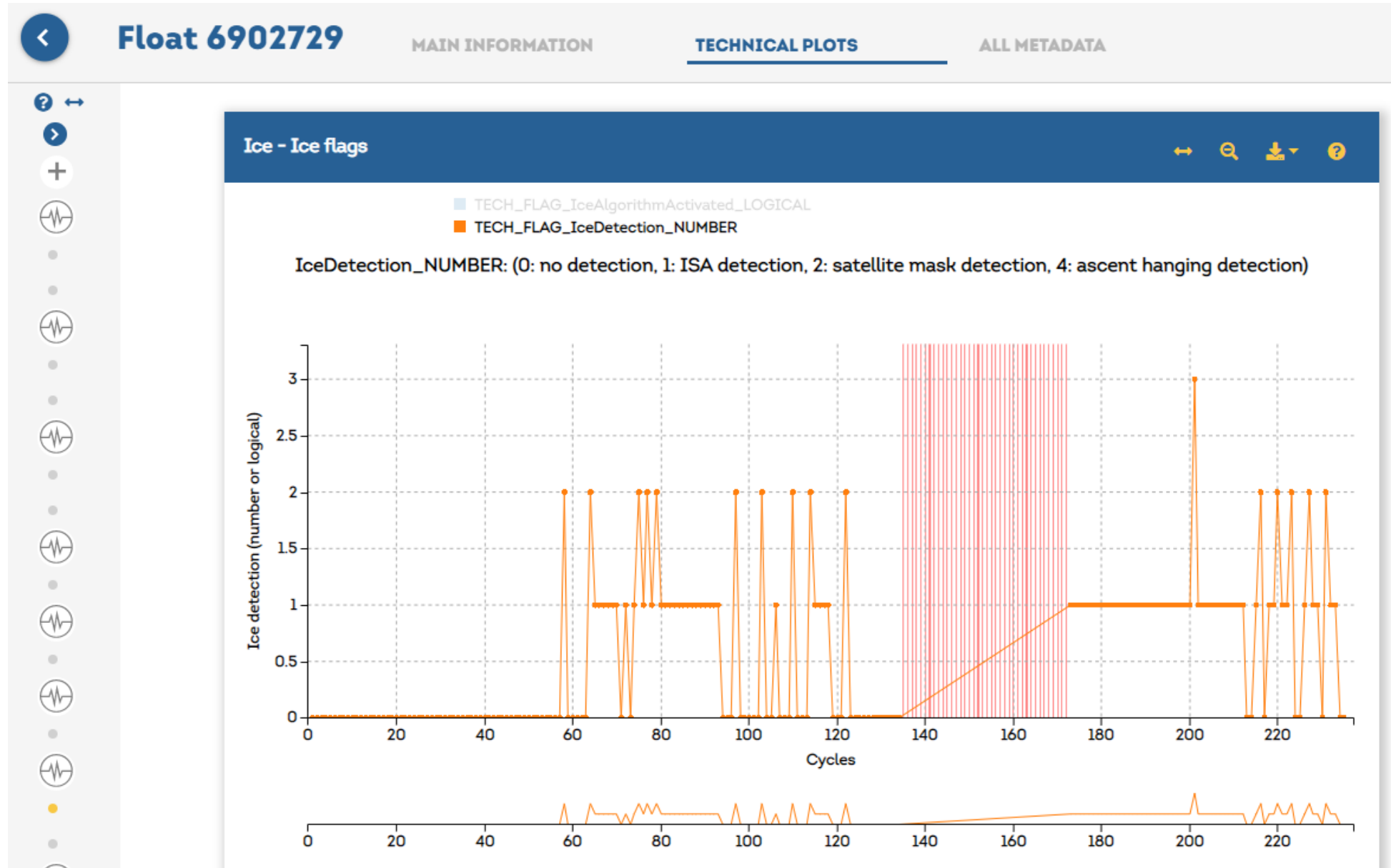
- Under ice, not decoded, etc.

	Nb floats	Nb cycles
+ CTD	6 3.95%	14 0.09%
+ FLAG_InvalidSalinity_LOGICAL	6 3.95%	7 0.05%
+ FLAG_InvalidTemperature_LOGICAL	2 1.32%	7 0.05%
+ Hydraulic	151 99.34%	6413 41.32%
+ FLAG_Park_ImmersionDriftOutTolerance_LOGICAL	147 96.71%	2593 16.71%
+ FLAG_ProfileMaxPressureAnomaly_LOGICAL	142 93.42%	2158 13.9%
- FLAG_MissingCycle_LOGICAL	13 8.55%	103 0.66%

3901842 3901851 3901863 3901874 3901879 3901885 3901899 3901902 3901906 3901909
3901938 3901957 3901982

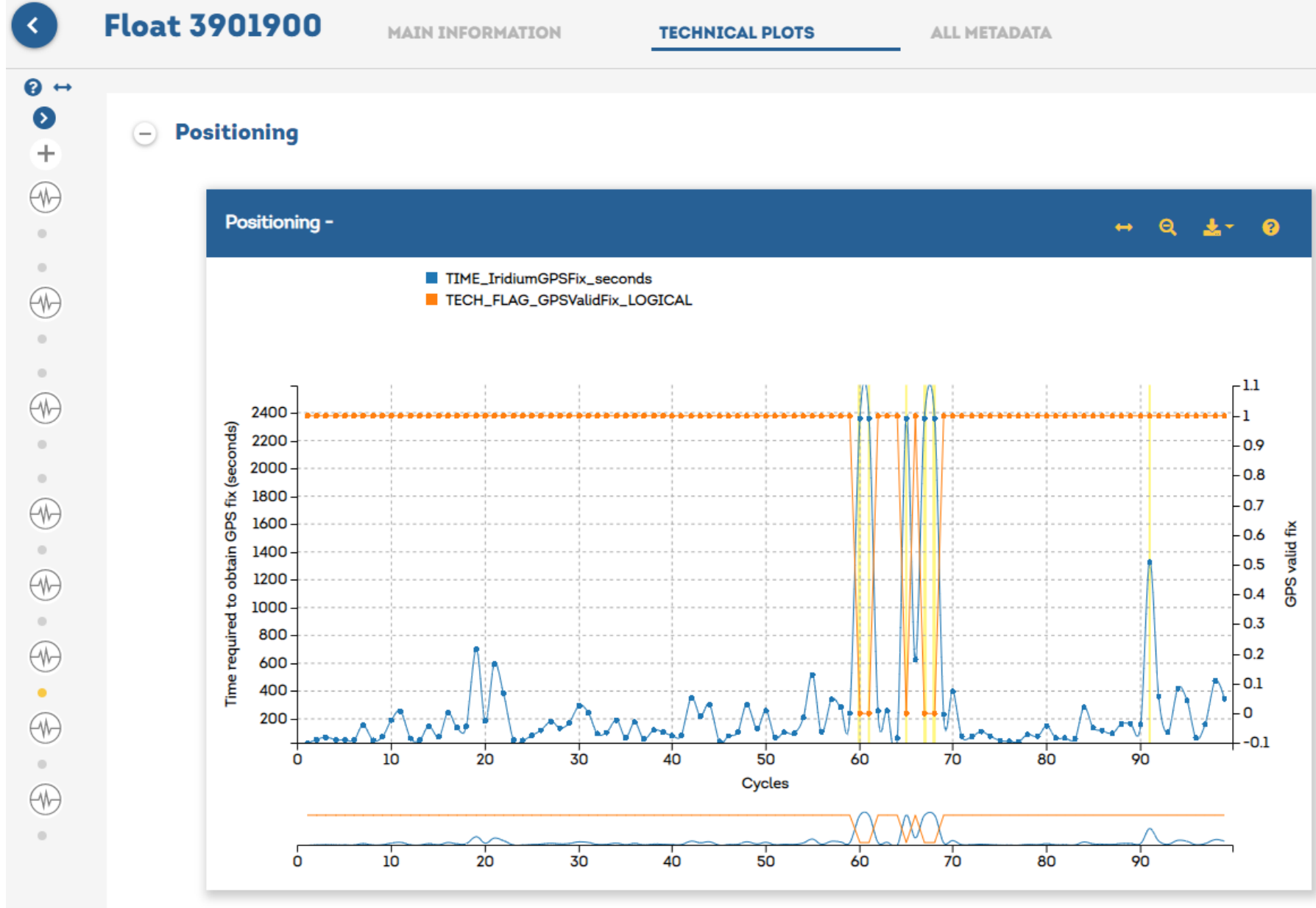


- Ice detections





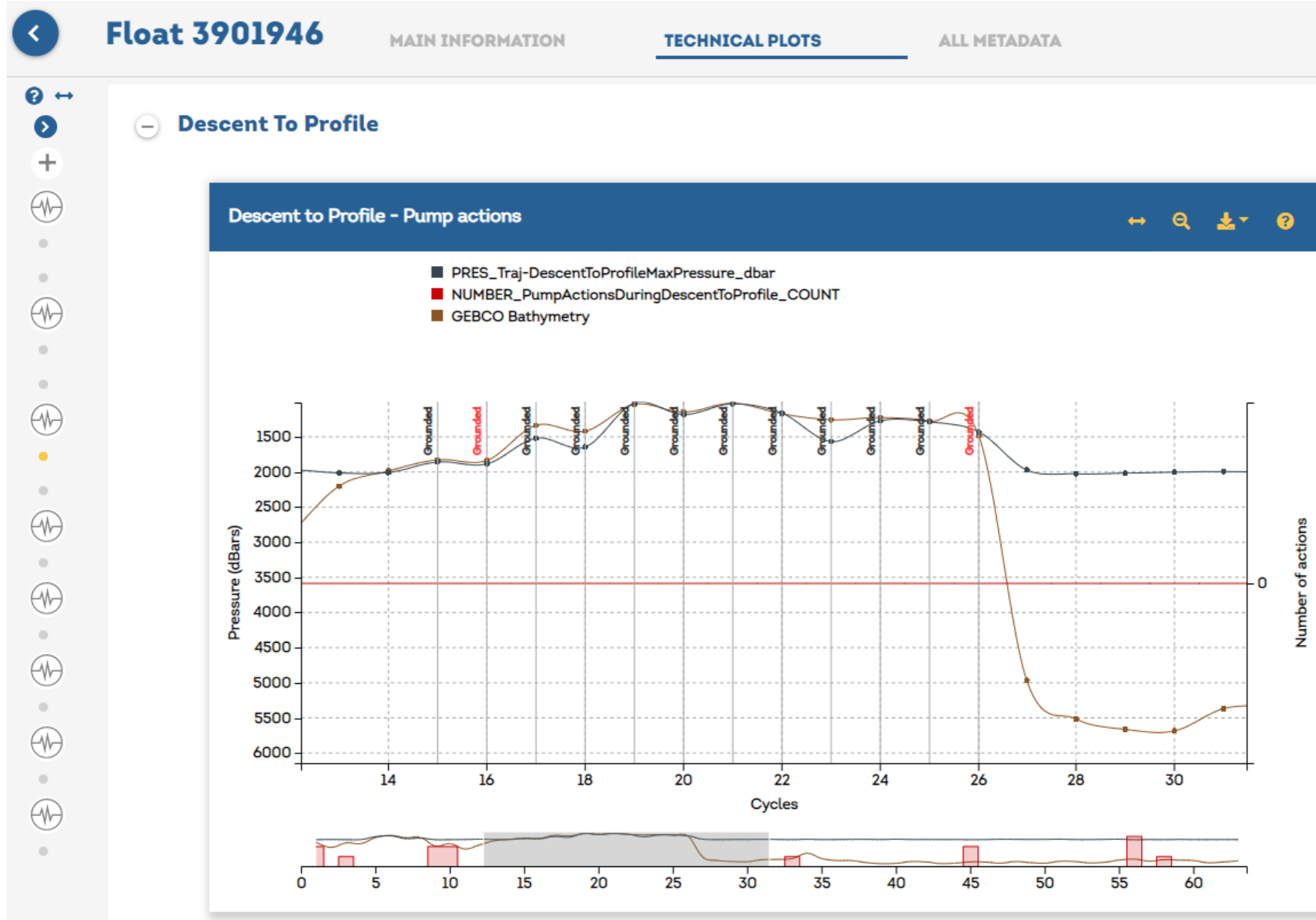
- *GPS valid fix*





Float page – Technical plots – GROUNDING

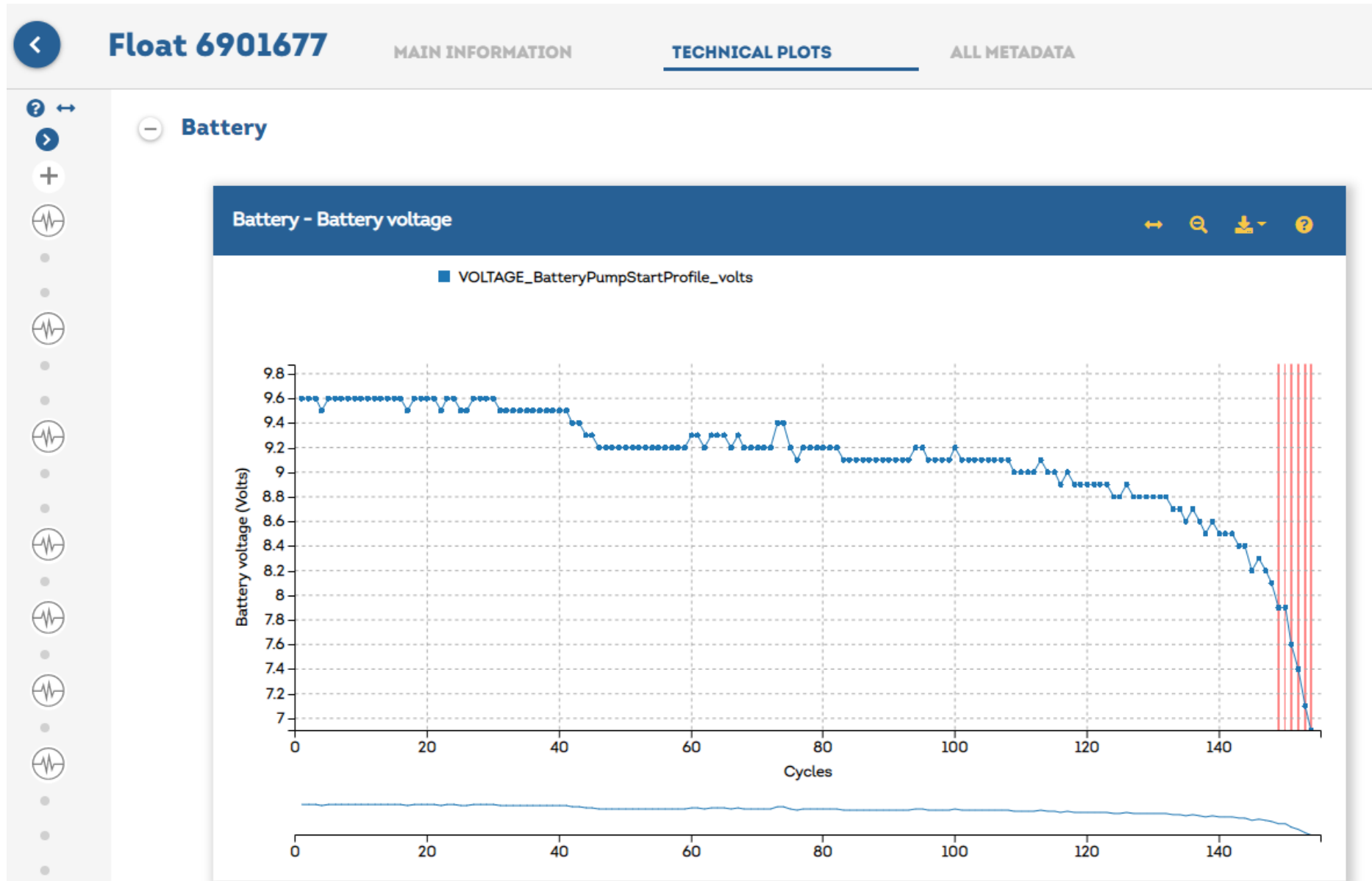
- *By cycle phases*





Float page – Technical plots – BATTERY VOLTAGES

- *Below threshold*
- *Drop (difference x% compared to last cycle)*





Float page – Technical plots – BATTERY VOLTAGES

- *APEX Alkaline*

Float 6900366

MAIN INFORMATION

TECHNICAL PLOTS

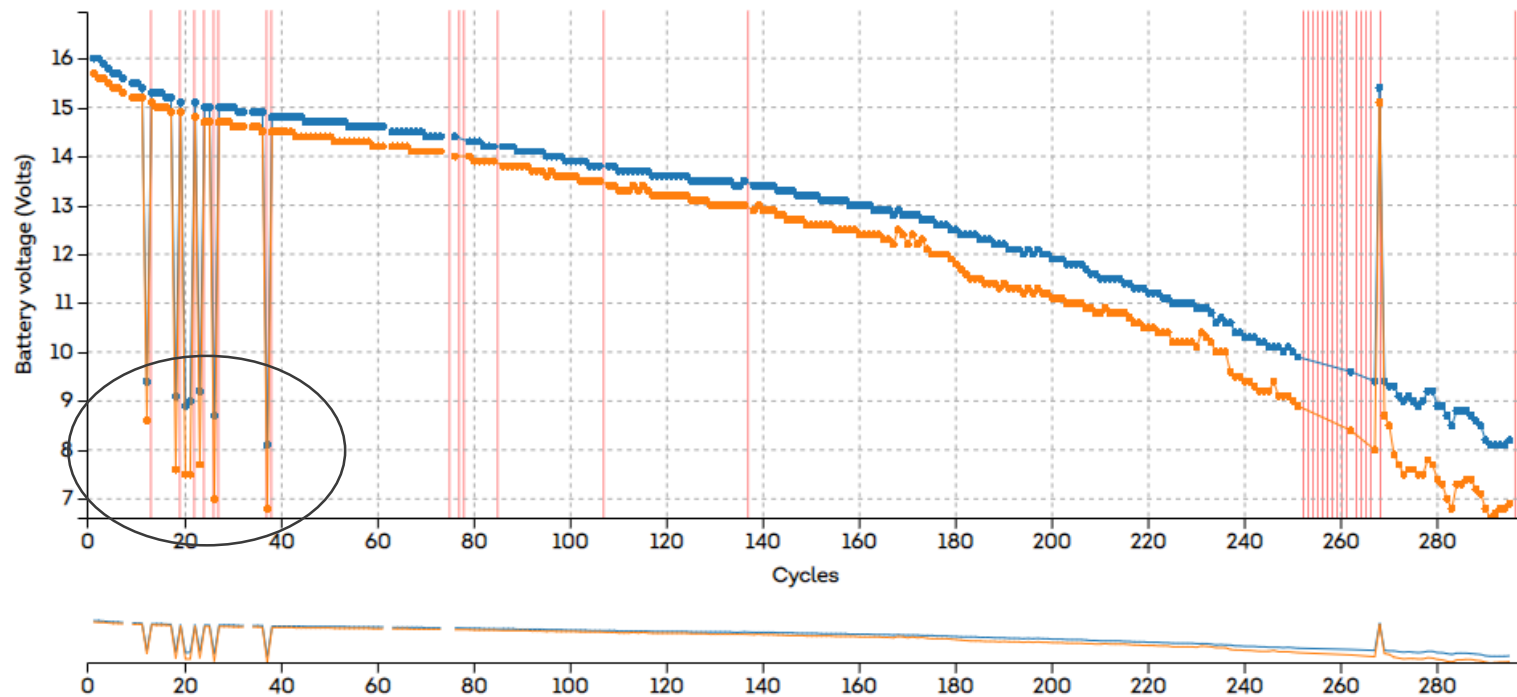
ALL METADATA

– Battery

Battery - Battery voltage



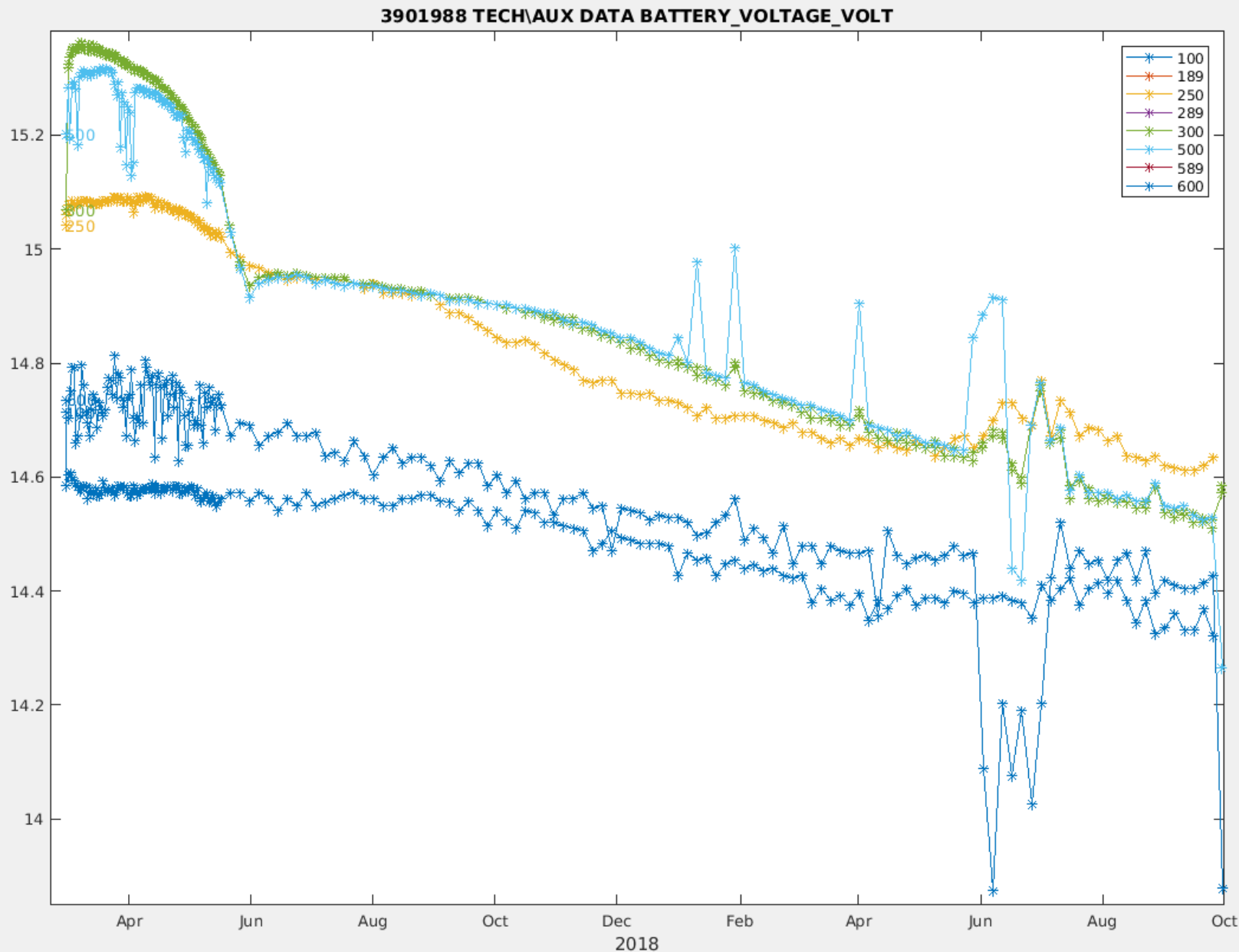
VOLTAGE_BatteryParkEnd_VOLTS
VOLTAGE_BatterySBEAscent_VOLTS





Float page – Technical plots – BATTERY VOLTAGES

- *Recent APEX floats (APF11)*
- *Battery voltages stored as timeseries*
- *Currently technical timeseries incompatible with Argo format...
How to deal with it?*





Float page – Technical plots – DATA TRANSMISSION

Float 3901929

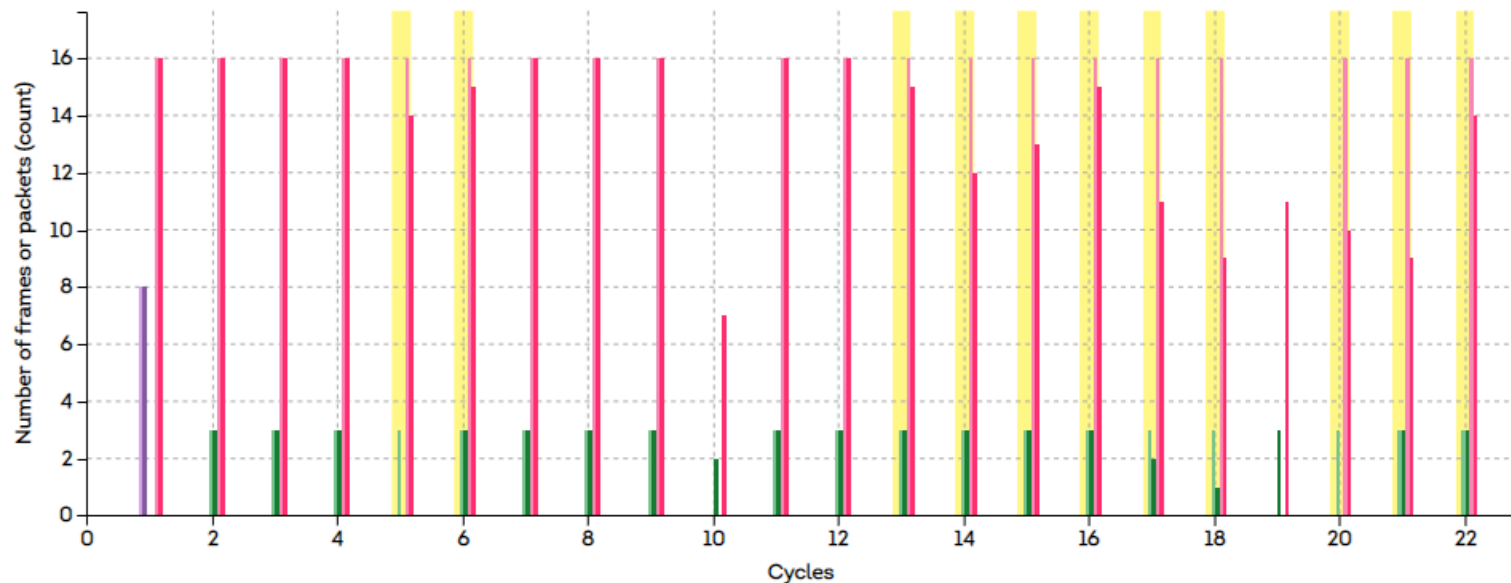
MAIN INFORMATION

TECHNICAL PLOTS

ALL METADATA

Data Transmission

Data Transmission - CTD messages



- ARGOS transmission problems
- Some packets sent by the float are not received on shore



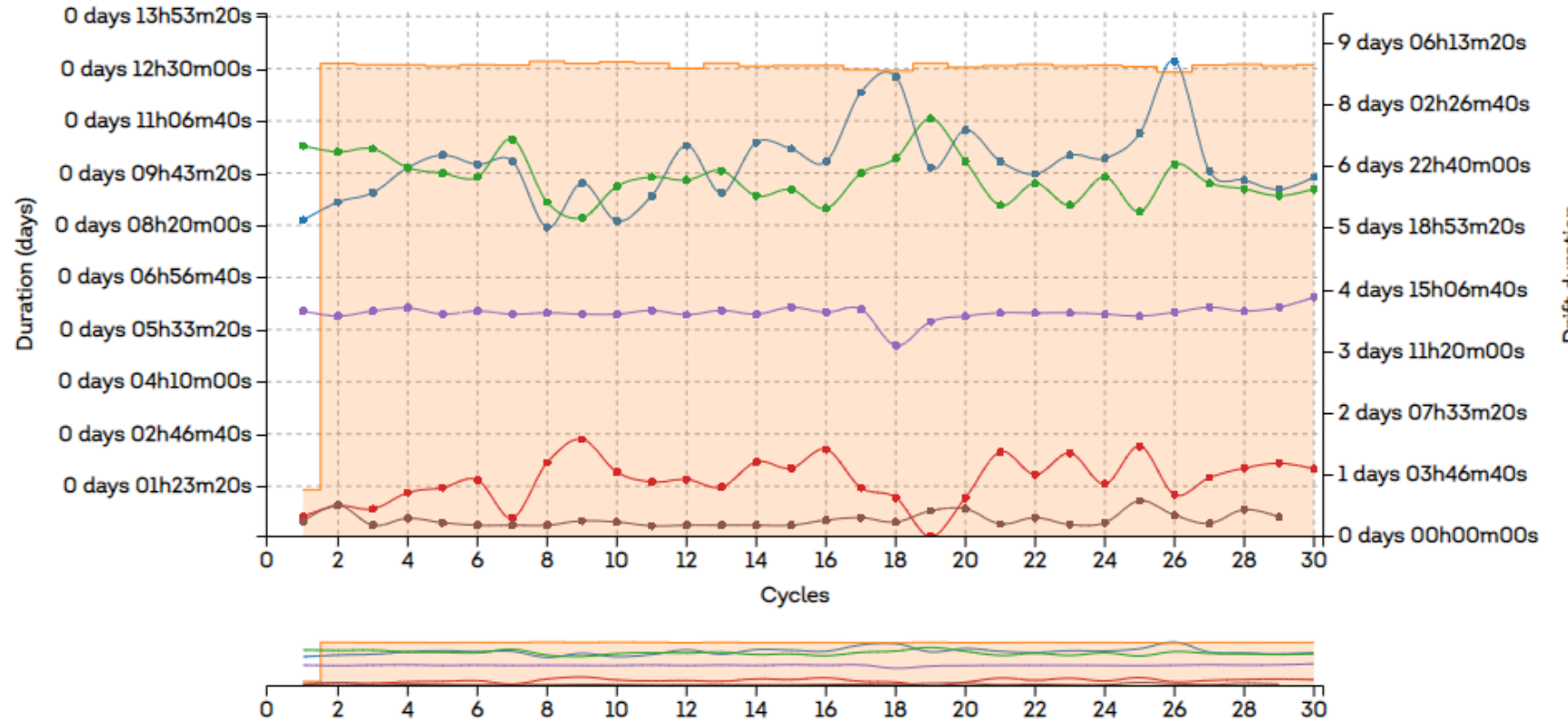
Float page – Technical plots – DURATIONS

Cycle phases durations - Deep cycle phases durations



Durations of the different float cycle phases

- Descent to Park
- Parking Drift
- Descent to Profile
- Profile Drift
- Ascent to Surface
- Surface Drift





Float page – Technical plots – ANY PARAMETER

Plot any technical parameter

Float
3901887

MAIN INFORMATION

TECHNICAL PLOTS

TIME_PreviousIridiumSession_seconds

NUMBER_Traj-ClockOffset_FLOAT

CLOCK_EndDescentToProfile_HHMM

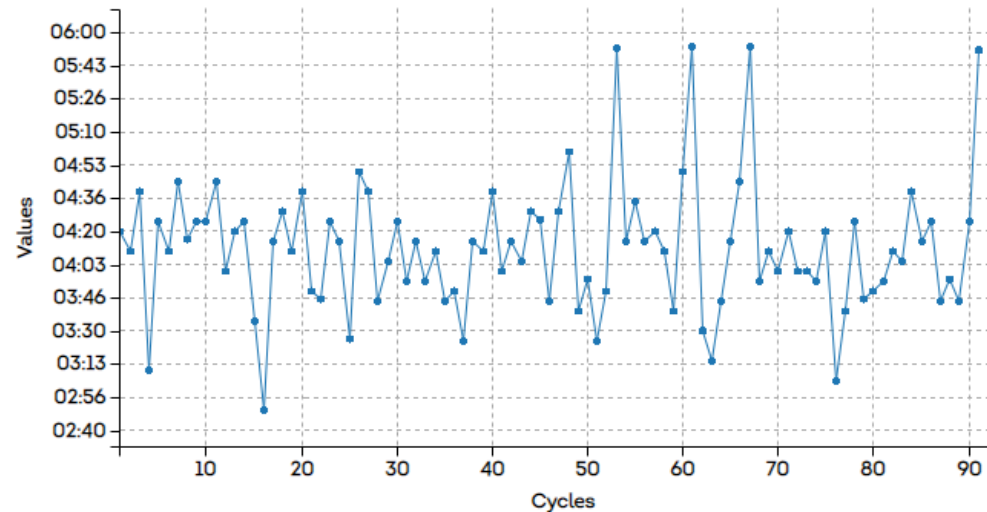
CLOCK_InitialValveActionDescentToPark_HHMM

CLOCK_Traj-JuldParkend_DDMMYYYYHHMMSS

FLAG_InitialCheckError_NUMBER

» CLOCK_EndDescentToProfile_HHMM » TECH_NUMBER_AscentIridiumPacketsReceived_COUNT

CLOCK_EndDescentToProfile_HHMM



Technical Parameters

Select the technical parameters from here

» CLOCK_EndDescentToProfile_HHMM » TECH_NUMBER_AscentIridiumPacketsReceived_COUNT



Conclusion on <https://fleetmonitoring.euro-argo.eu/>

- Some developments still to be done (bugs, etc.)
- Feedback (this WS, ADMT, Science Meeting, etc.)
- Working groups discussions
- Working groups to enrich the technical part of the website with information from other float types?

!!! Your feedback is welcome !!!



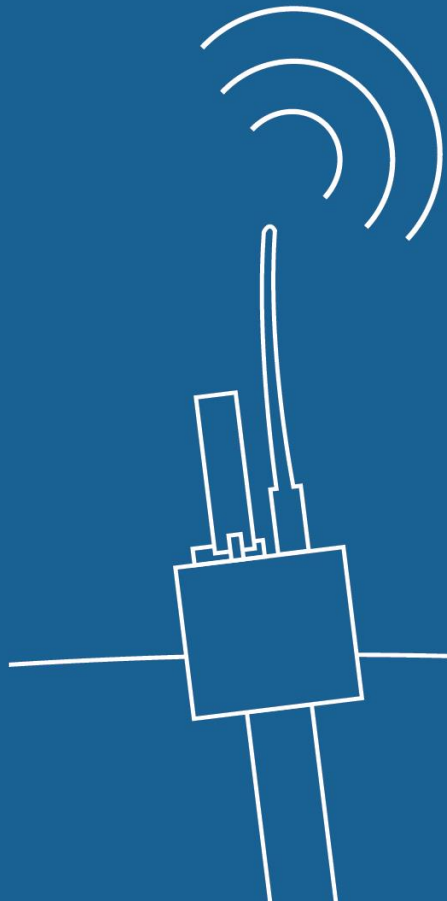
Monitoring Argo floats – Other tools

- AIC/JCOMMOPS
- Database
- GDAC
- Telecom provider + analysis of consumption
- NKE parser + Excel
- DAC tools
- Coriolis processing chain
- etc.



Further ideas/work?

- Improve life expectancy
- Standardised End Of Life report for every dead float



EURO-ARGO.EU

euroargo@ifremer.fr

 @EuroArgoERIC