

# SOCIB data management system for glider operations



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X. Notario, P. Rotllan, M. À. Rújula, J. G. Fernández, and J. Tintoré

## OUTLINE

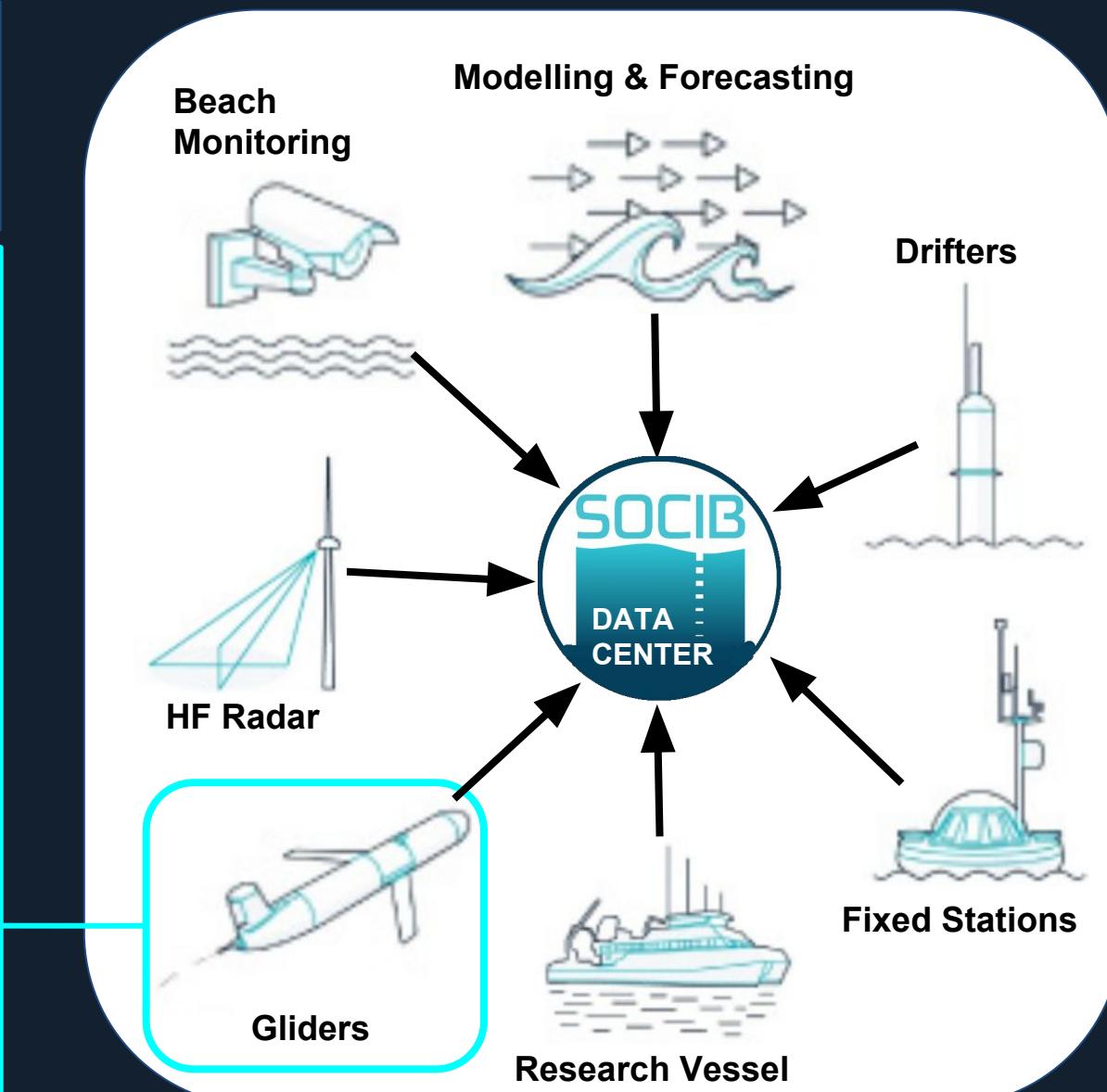
1. Coastal Ocean Observing & Forecasting System of the Balearic Islands (SOCIB)
  - o Multiplatform observing system with global open access
  - o Data distribution
2. Glider program at SOCIB
  - o Glider operations
  - o Glider data flow
3. Glider toolbox
  - o Overview
  - o QC and EGO implementations
  - o Development status in the glider community picture
4. Collaborative project
  - o Collaborative development and international users' community
  - o Processing service

# SOCIB - Multiplatform observing system

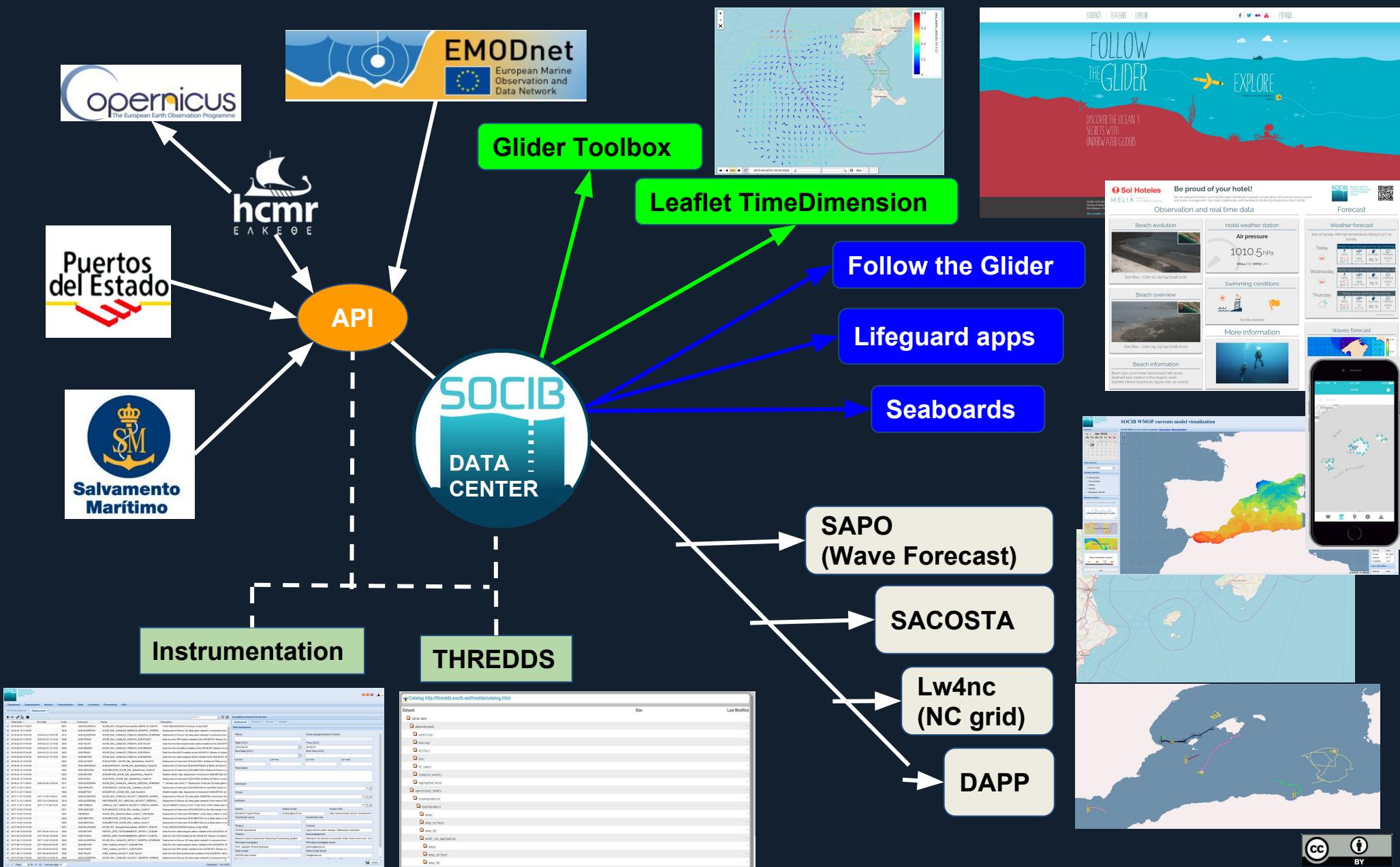


Fully open data  
Three key drivers:  
- science priorities  
- tech. Development  
- society needs

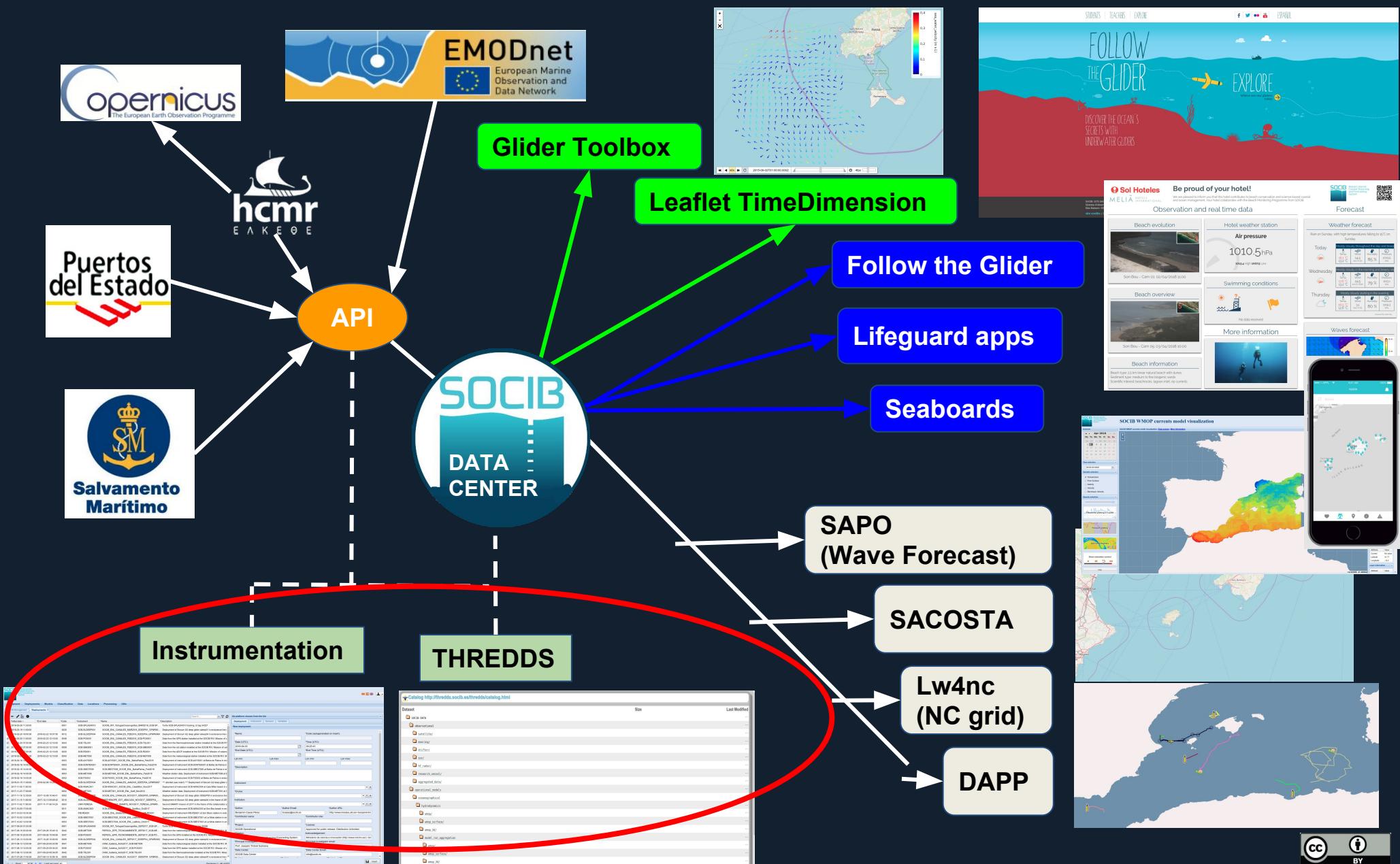
- GLIDERS
  - 3 G1 Slocums
  - 3 G2 Slocums
  - 2 Seagliders 1KA
- MISSIONS
  - ~100 glider missions
  - ~2200 days at sea
  - ~75M profiles
- PROGRAMS
  - 3 endurance lines
  - 5 multiplatform surveys
  - 3 international programs
  - Animal track - gliders
- DATA MANAGEMENT
  - International dissemination
  - SOCIB dissemination tools
  - QC and high quality data calibration (DM) with GARICAST



# SOCIB - Data Distribution



# SOCIB - Data Distribution



# SOCIB - Data Distribution

**EMODnet**



[STREAMS](#) [TOPICS](#) [EXPLORE](#) [FOLLOW](#)

[ESPAÑOL](#) [ENGLISH](#)

**Equipment** **Deployments** **Models** **Classification** **Data** **Locations** **Processing** **Utils**

Platforms					
Deployments					
Instruments					
Instrument types					
Sensors					
Sensor types					
Calibrations					
Calibration Expressions					
2018-05-28 00:00:00	2018-08-30 19:47:04	0051	SCB-POS001	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Deployment
2018-08-28 06:00:00	2018-08-30 19:46:53	0046	SCB-MET009	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Instrument
2018-08-28 06:00:00	2018-08-30 19:46:58	0011	SCB-SBE9001	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Sensors
2018-08-01 11:00:00		0001	SCB-SPLASH011	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Sensor types
2018-07-30 11:00:00		0001	SCB-SPLASH012	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Calibrations
2018-07-30 11:00:00		0001	SCB-SPLASH014	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Calibration Expressions
2018-07-05 10:00:00		0012	SCB-AWAC003	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Deployment
2018-06-28 15:26:51	2018-08-13 07:45:14	0026	SCB-SLDEEP000	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Instrument
2018-06-21 12:50:00		0001	SCB-BARO008	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Sensors
2018-06-21 11:50:00		0001	SCB-BARO009	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Sensor types
2018-06-20 13:00:00		0004	IME-SBE26003	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Calibrations
2018-06-14 11:00:00		0003	SCB-WAVE002	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Calibration Expressions
2018-06-14 10:00:00	2018-06-28 10:13:01	0025	SCB-SLDEEP000	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Deployment
2018-05-24 15:30:00	2018-07-17 16:15:54	0026	SCB-SLDEEP001	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Instrument
2018-05-24 15:00:45	2018-08-03 17:10:00	0001	SCB-SP056	SOCIB_ENL_CANALES_JUN2018_SDEEP00_GFMR0079	Sensors

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**SOCIB\_ENL\_CANALES\_JUN2018\_SDEEP00\_GFMR0079**

**\*Name:** SOCIB\_ENL\_CANALES\_JUN2018\_SDEEP00 **\*Code ( autogenerated on insert):** 0026 **\*Date (UTC):** 2018-06-28 **\*Time (UTC):** 15:26:51 **\*End Date (UTC):** 2018-08-13 **\*End Time (UTC):** 07:45:14 **Lat min:** **Lat max:** **Lon min:** **Lon max:**

**\*Description:** Deployment of Slocum G2 deep glider sdeep00 in endurance line campaign Canales 2018 (SOCIB operational program), attempting to cover the Eivissa channel (10 transects) and Mallorca channel (1 transect) from June to Aug 2018, sampling physical and biogeochemical parameters (CTD, fluorescence and turbidity and oxygen).

**Instrument:** SCB-SLDEEP000 **Cruise:** glider\_canales2018 **Institution:**



# SOCIB - Data Distribution



THREDDS Data Server

Catalog [http://thredds.socib.es/thredds/catalog/auv/glider/sdeep04-scb\\_sldeep04/L1/2018/catalog.html](http://thredds.socib.es/thredds/catalog/auv/glider/sdeep04-scb_sldeep04/L1/2018/catalog.html)

Dataset: 2018/dep0012\_sdeep04\_scb\_sldeep04\_L1\_2018-02-20\_data\_rt.nc

- Data size: 2.374 Mbytes
- Data type: TRAJECTORY
- ID: auv/glider/sdeep04-scb\_sldeep04/L1/2018/dep0012\_sdeep04\_scb\_sldeep04\_L1\_2018-02-20\_data\_rt.nc

## Access:

1. **OPENDAP:** /thredds/dodsC/auv/glider/sdeep04-scb\_sldeep04/L1/2018/dep0012\_sdeep04\_scb\_sldeep04\_L1\_2018-02-20\_data\_rt.nc
2. **HTTPServer:** /thredds/fileServer/auv/glider/sdeep04-scb\_sldeep04/L1/2018/dep0012\_sdeep04\_scb\_sldeep04\_L1\_2018-02-20\_data\_rt.nc
3. **NetcdfSubset:** /thredds/nccs/auv/glider/sdeep04-scb\_sldeep04/L1/2018/dep0012\_sdeep04\_scb\_sldeep04\_L1\_2018-02-20\_data\_rt.nc
4. **NCML:** /thredds/ncml/auv/glider/sdeep04-scb\_sldeep04/L1/2018/dep0012\_sdeep04\_scb\_sldeep04\_L1\_2018-02-20\_data\_rt.nc
5. **UDDC:** /thredds/uddc/auv/glider/sdeep04-scb\_sldeep04/L1/2018/dep0012\_sdeep04\_scb\_sldeep04\_L1\_2018-02-20\_data\_rt.nc
6. **ISO:** /thredds/iso/auv/glider/sdeep04-scb\_sldeep04/L1/2018/dep0012\_sdeep04\_scb\_sldeep04\_L1\_2018-02-20\_data\_rt.nc
7. **SOS:** /thredds/sos/auv/glider/sdeep04-scb\_sldeep04/L1/2018/dep0012\_sdeep04\_scb\_sldeep04\_L1\_2018-02-20\_data\_rt.nc

## Dates:

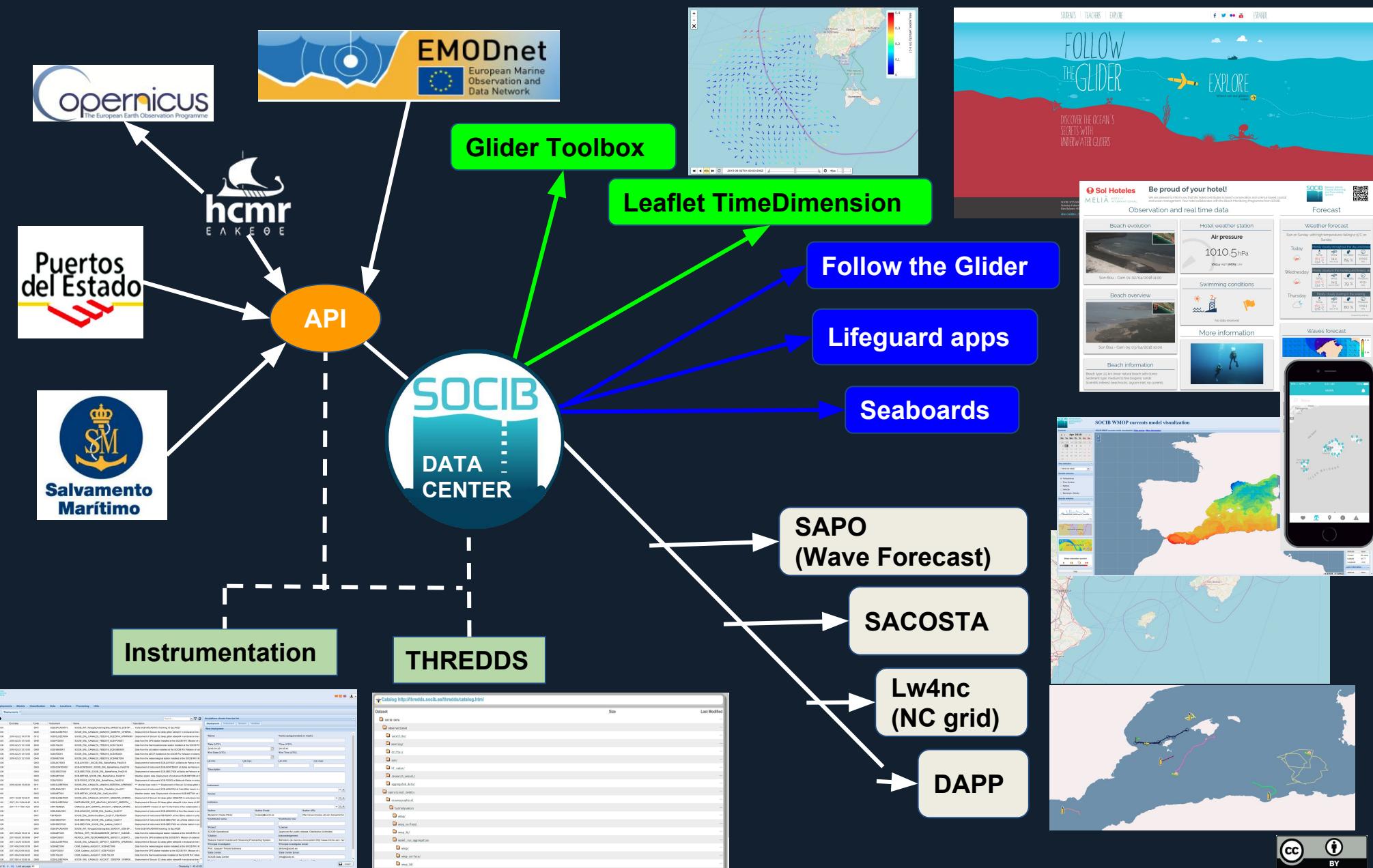
- 2018-02-22T12:00:29Z (**modified**)

## Viewers:

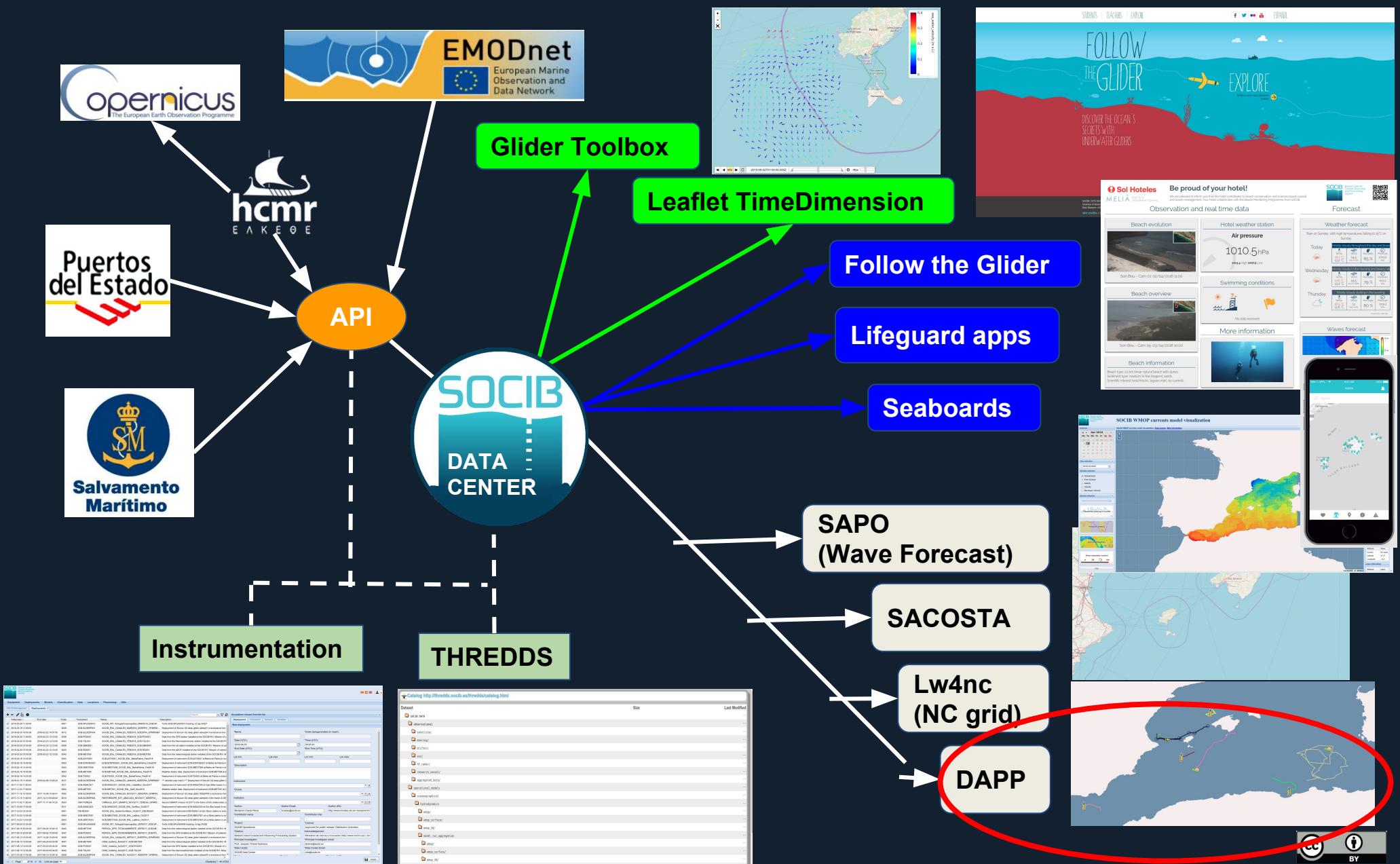
- NetCDF-Java ToolsUI (webstart)
- webncdump
- jwebchart



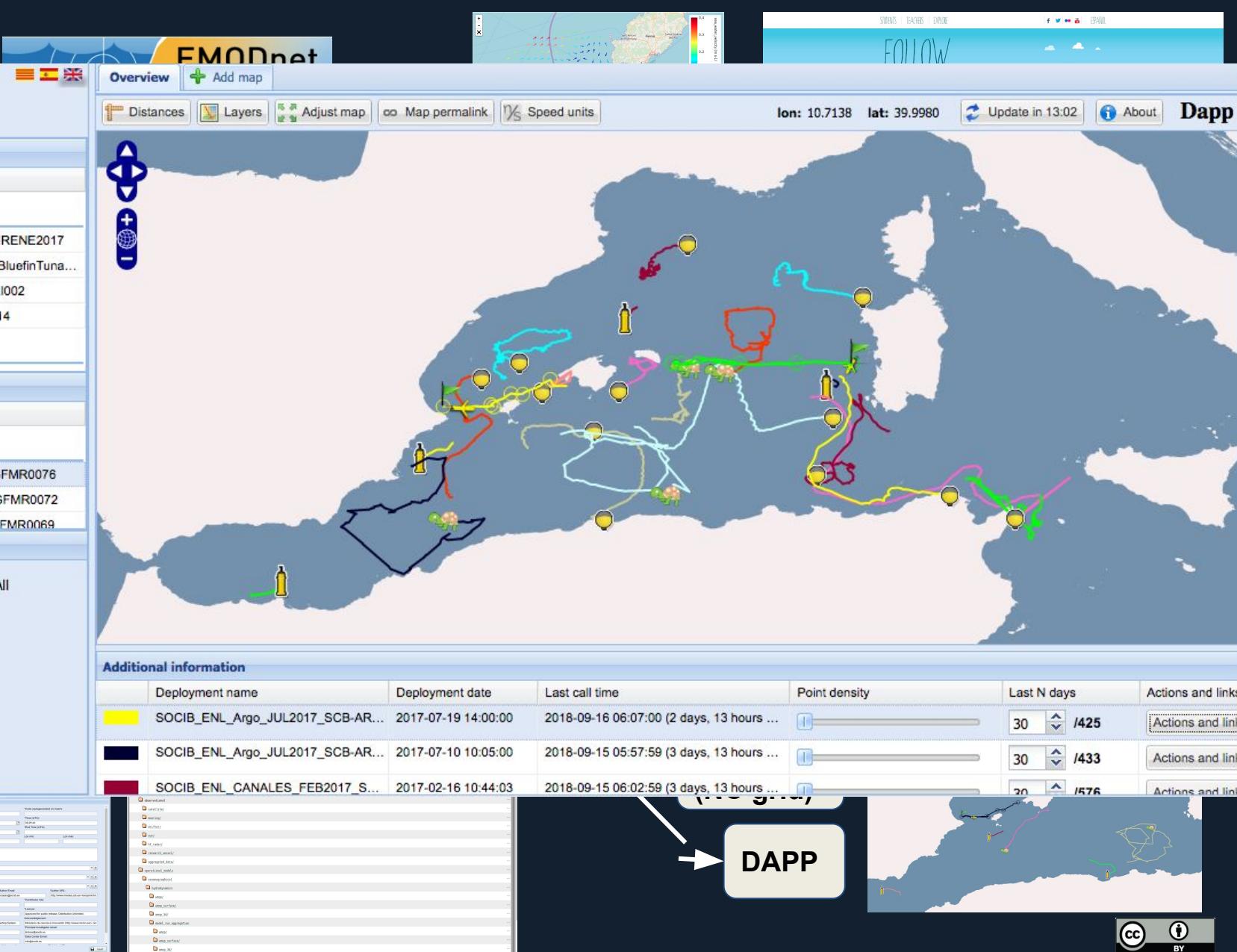
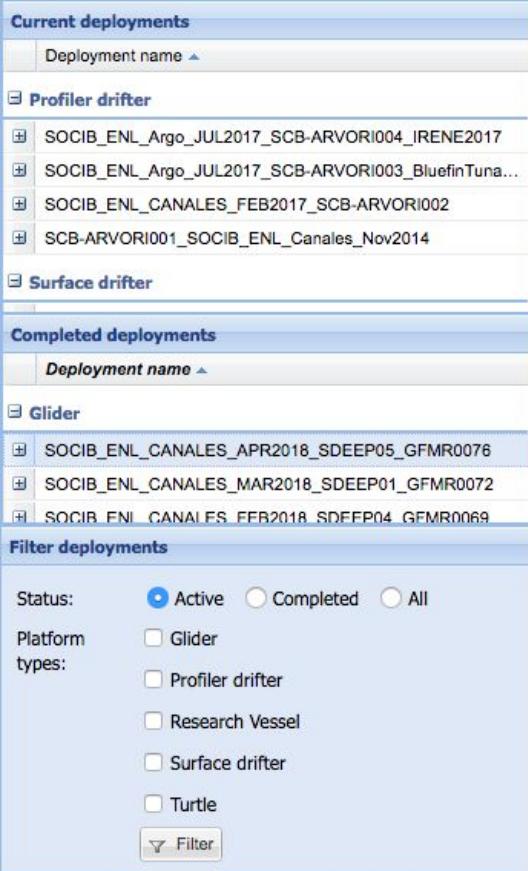
# SOCIB - Data Distribution



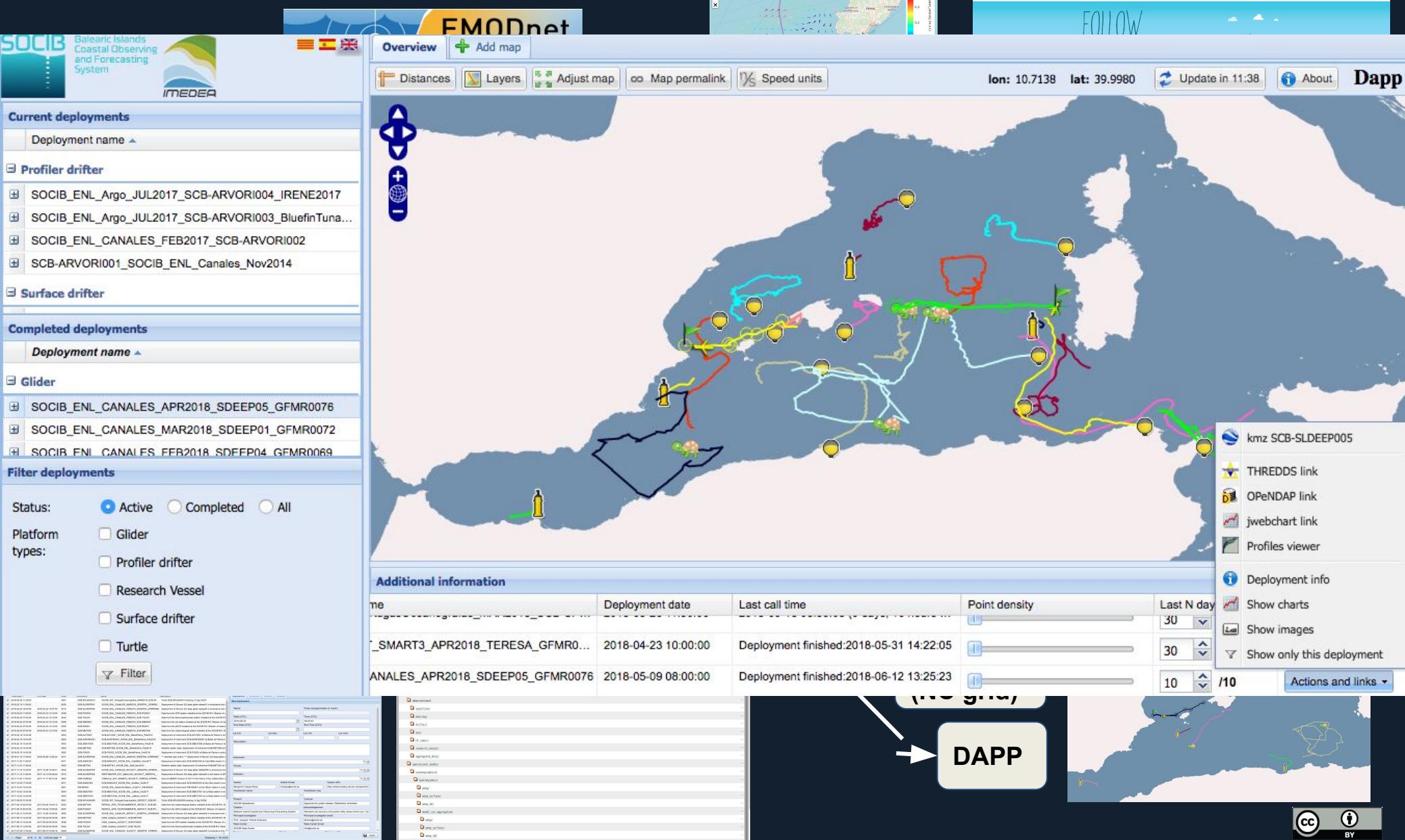
# SOCIB - Data Distribution



# SOCIB - Data Distribution



# SOCIB - Data Distribution



# SOCIB - Data Distribution

**SOCIB** Balearic Islands Coastal Observing and Forecasting System **IMEDEA**

**Current deployments**

Deployment name ▾

- Profiler drifter
- SOCIB\_ENL\_Argo\_JUL2017\_SCB-ARVORI004\_IRENE2017
- SOCIB\_ENL\_Argo\_JUL2017\_SCB-ARVORI003\_BluefinTuna...
- SOCIB\_ENL\_CANALES\_FEB2017\_SCB-ARVORI002
- SCB-ARVORI001\_SOCIB\_ENL\_Canales\_Nov2014

**Surface drifter**

**Completed deployments**

Deployment name ▾

- Glider
- SOCIB\_ENL\_CANALES\_APR2018\_SDEEP05\_GFMR0076
- SOCIB\_ENL\_CANALES\_NOV2017\_SDEEP05\_GFMR0065
- SOCIB\_ENL\_CANALES\_FEB2017\_SDEEP05\_GFMR0054

**Filter deployments**

Status:  Active  Completed  All

Platform types:

- Glider
- Profiler drifter
- Research Vessel
- Surface drifter
- Turtle

Deployment name	Date (UTC)	Date (local)	Actions
SOCIB_EXT_Alnitak_JUL2018_SCB...	2018-07-03 11:00:00	2018-07-03 10:00:00 (0 days, 10 hours ...)	<input type="button" value="30"/> /51
SOCIB_INT_TortugasOceanografas_...	2018-03-26 11:30:00	2018-09-18 08:35:08 (0 days, 11 hours a...)	<input type="button" value="30"/> /177
CNRismar_EXT_SMART3_APR2018_...	2018-04-23 10:00:00	Deployment finished:2018-05-31 14:22:05	<input type="button" value="30"/> /39
SOCIB_ENL_CANALES_APR2018_S...	2018-05-09 08:00:00	Deployment finished:2018-06-12 13:25:23	<input type="button" value="10"/> /10

**EMODnet**

Overview Add map

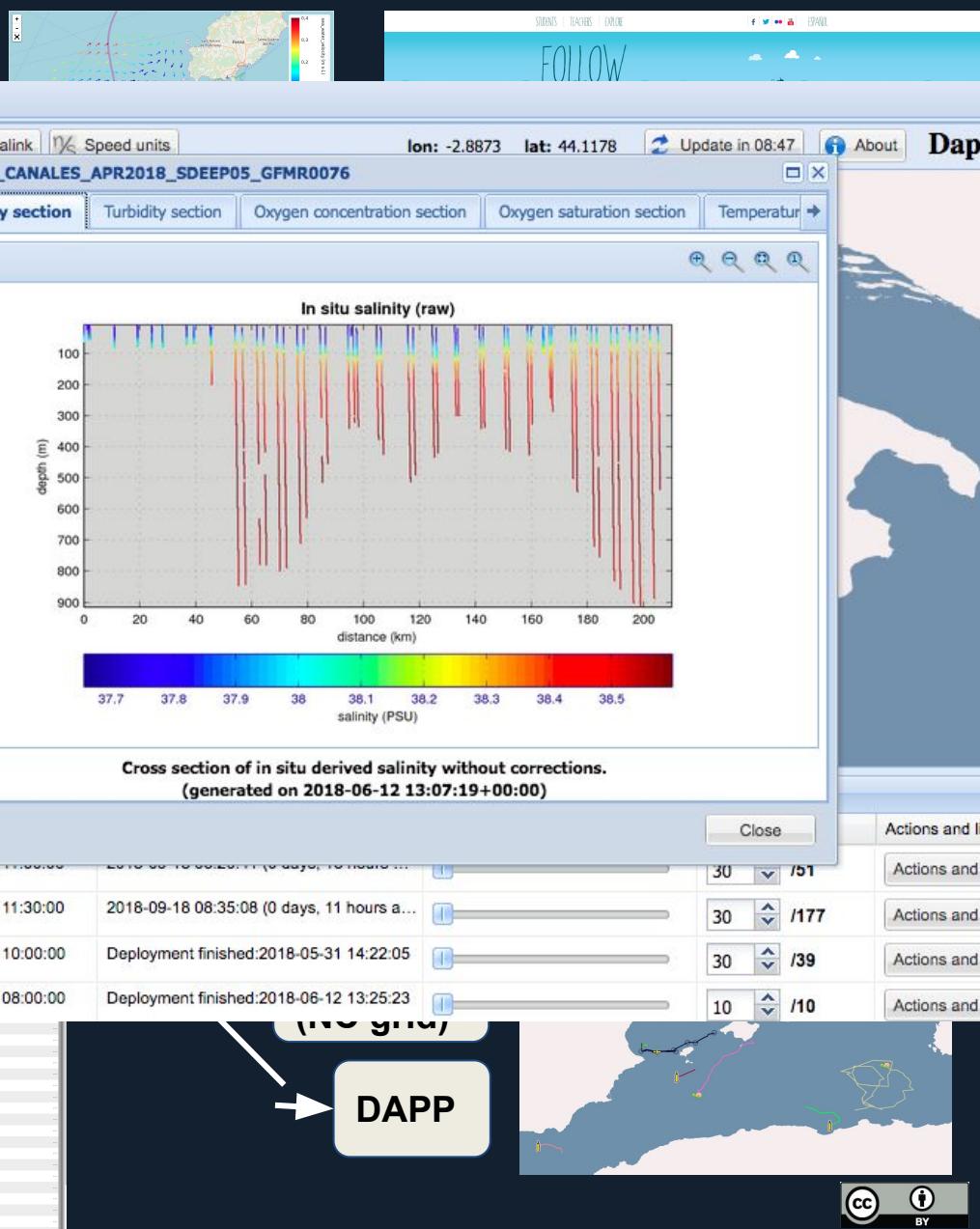
Distances Layers Adjust map

Map permalink Speed units

lon: -2.8873 lat: 44.1178 Update in 08:47 About Dapp

**Additional information**

Deployment name	Date (UTC)	Date (local)	Actions
SOCIB_EXT_Alnitak_JUL2018_SCB...	2018-07-03 11:00:00	2018-07-03 10:00:00 (0 days, 10 hours ...)	<input type="button" value="30"/> /51
SOCIB_INT_TortugasOceanografas_...	2018-03-26 11:30:00	2018-09-18 08:35:08 (0 days, 11 hours a...)	<input type="button" value="30"/> /177
CNRismar_EXT_SMART3_APR2018_...	2018-04-23 10:00:00	Deployment finished:2018-05-31 14:22:05	<input type="button" value="30"/> /39
SOCIB_ENL_CANALES_APR2018_S...	2018-05-09 08:00:00	Deployment finished:2018-06-12 13:25:23	<input type="button" value="10"/> /10



# SOCIB - Data Distribution

**SOCIB** Balearic Islands Go forward one page Pull down to show history **IMEDEA**

**EMODnet** Overview Add map Distances Layers Adjust map Map permalink Speed units lon: -2.8873 lat: 44.2057 Update in 08:22 About

**SOCIB\_ENL\_CANALES\_APRA2018\_SDEEP05\_GFMR0076** Section Temperature - Salinity diagram Chlorophyll and turbidity profiles

**DAPP**

**Temperature-Salinity diagram on sigma-t contours**

Diagram of temperature versus salinity without corrections over constant sigma-t contour levels.  
(generated on 2018-06-12 13:07:19+00:00)

**Additional information**

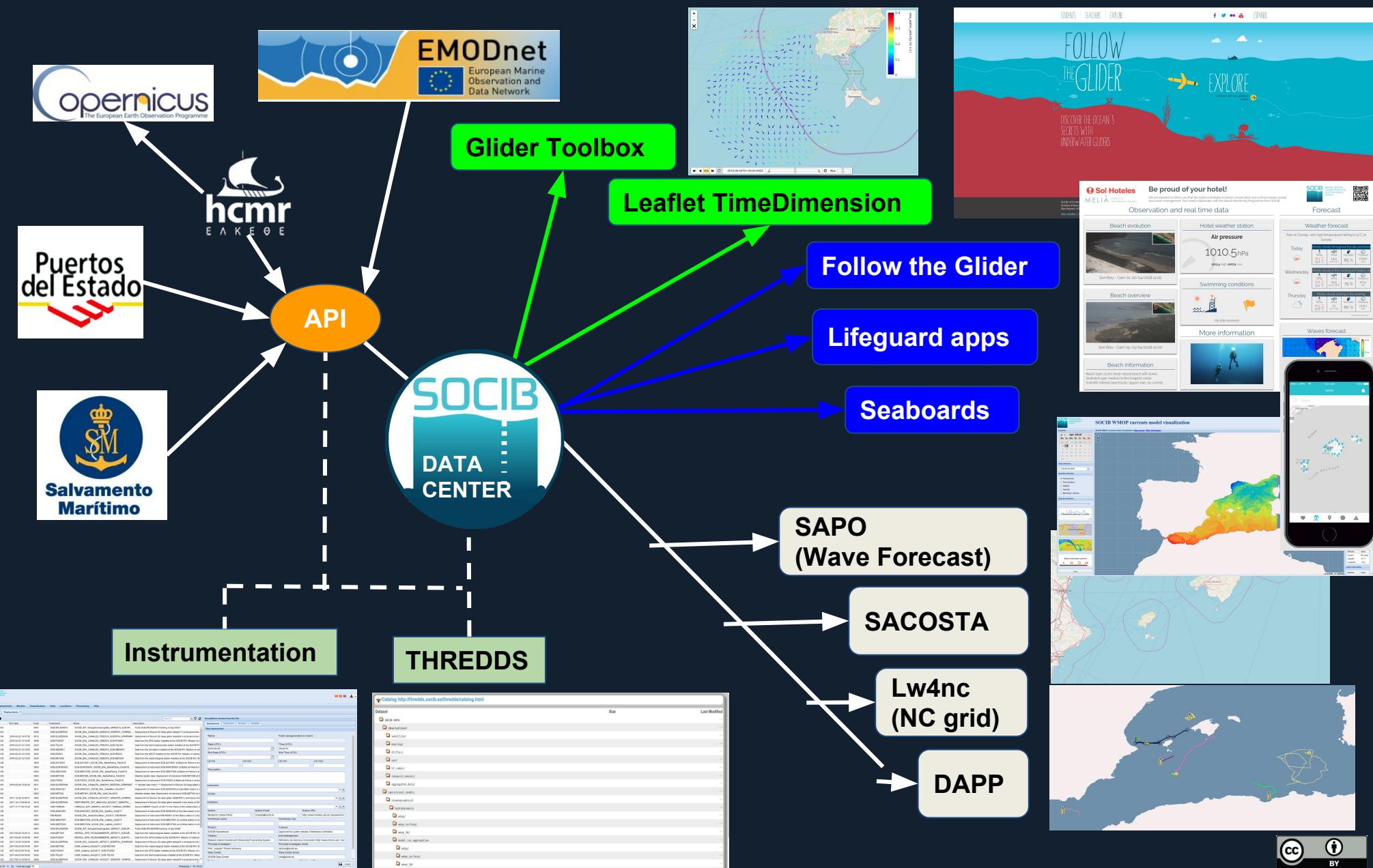
	Deployment name	Date (UTC)	Date (local)	Duration	Actions and links
Black	SOCIB_EXT_Alnitak_JUL2018_SCB...	2018-07-03 11:00:00	2018-07-10 08:20:11 (6 days, 19 hours ...)	30 / 51	Actions and links
Maroon	SOCIB_INT_TortugasOceanografas_...	2018-03-26 11:30:00	2018-09-18 08:35:08 (0 days, 11 hours a...)	30 / 177	Actions and links
Green	CNRismar_EXT_SMART3_APRA2018_...	2018-04-23 10:00:00	Deployment finished:2018-05-31 14:22:05	30 / 39	Actions and links
Yellow	SOCIB_ENL_CANALES_APRA2018_S...	2018-05-09 08:00:00	Deployment finished:2018-06-12 13:25:23	10 / 10	Actions and links

**Actions and links**

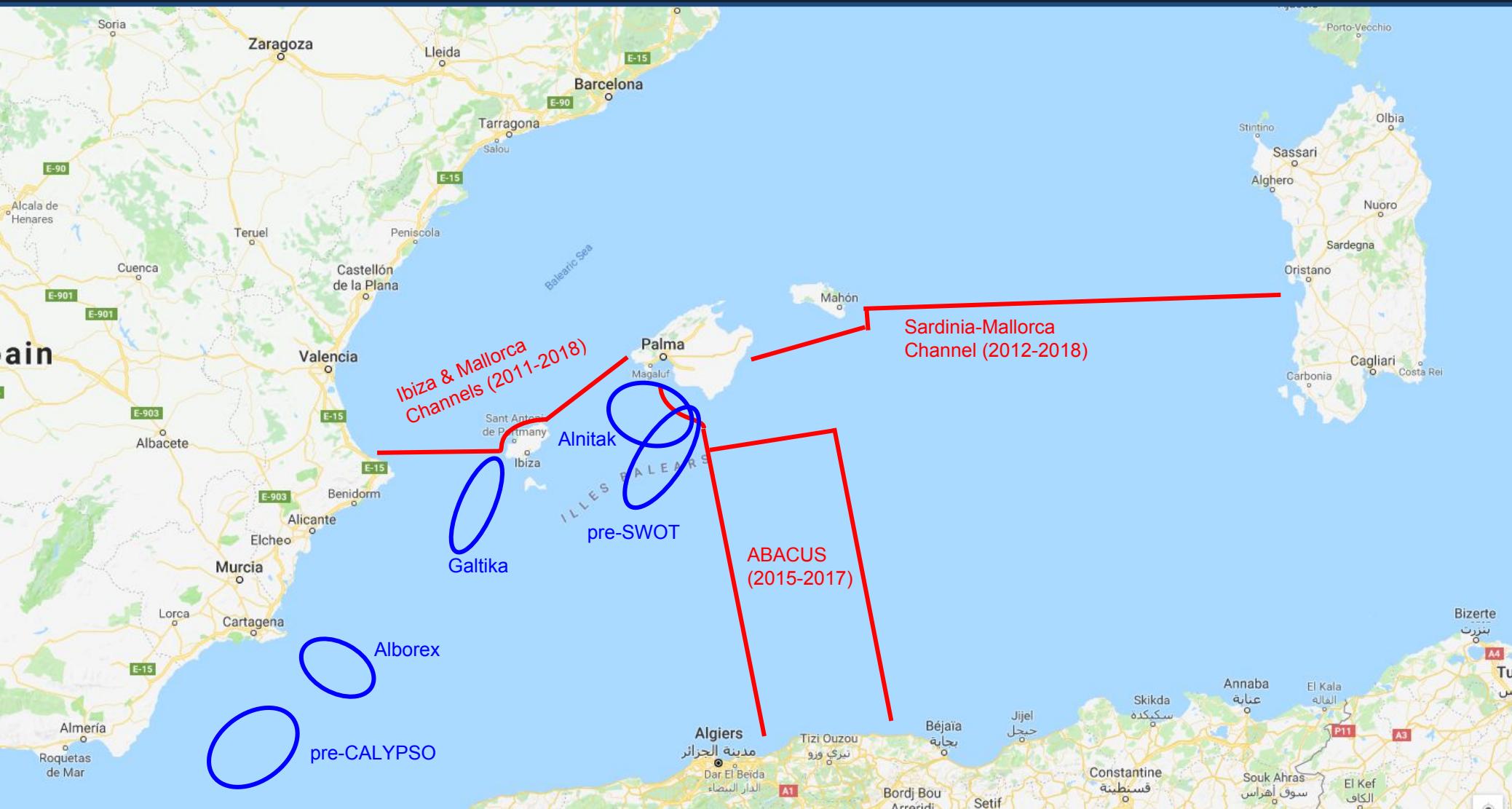
**DAPP**

**CC BY**

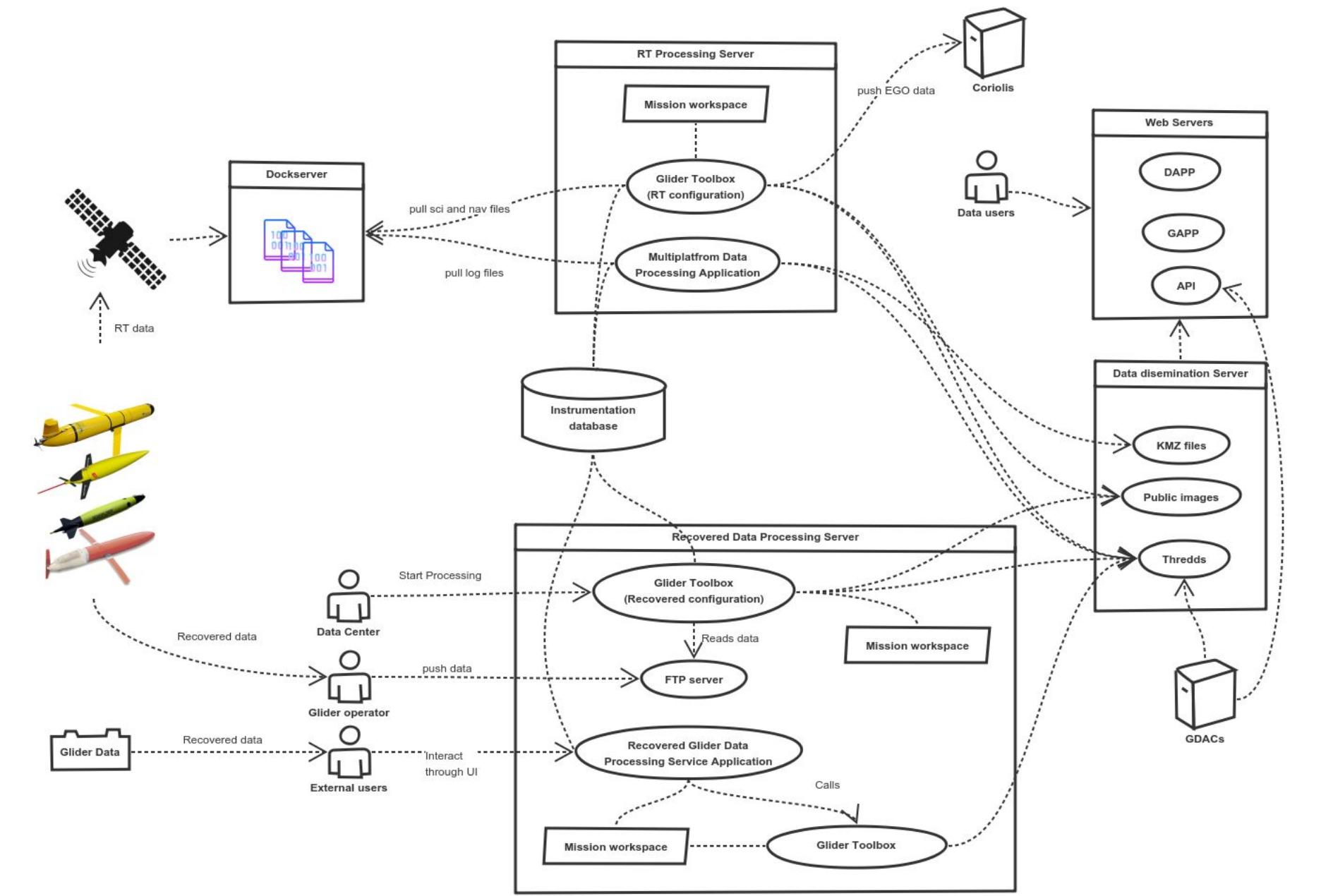
# SOCIB - Data Distribution



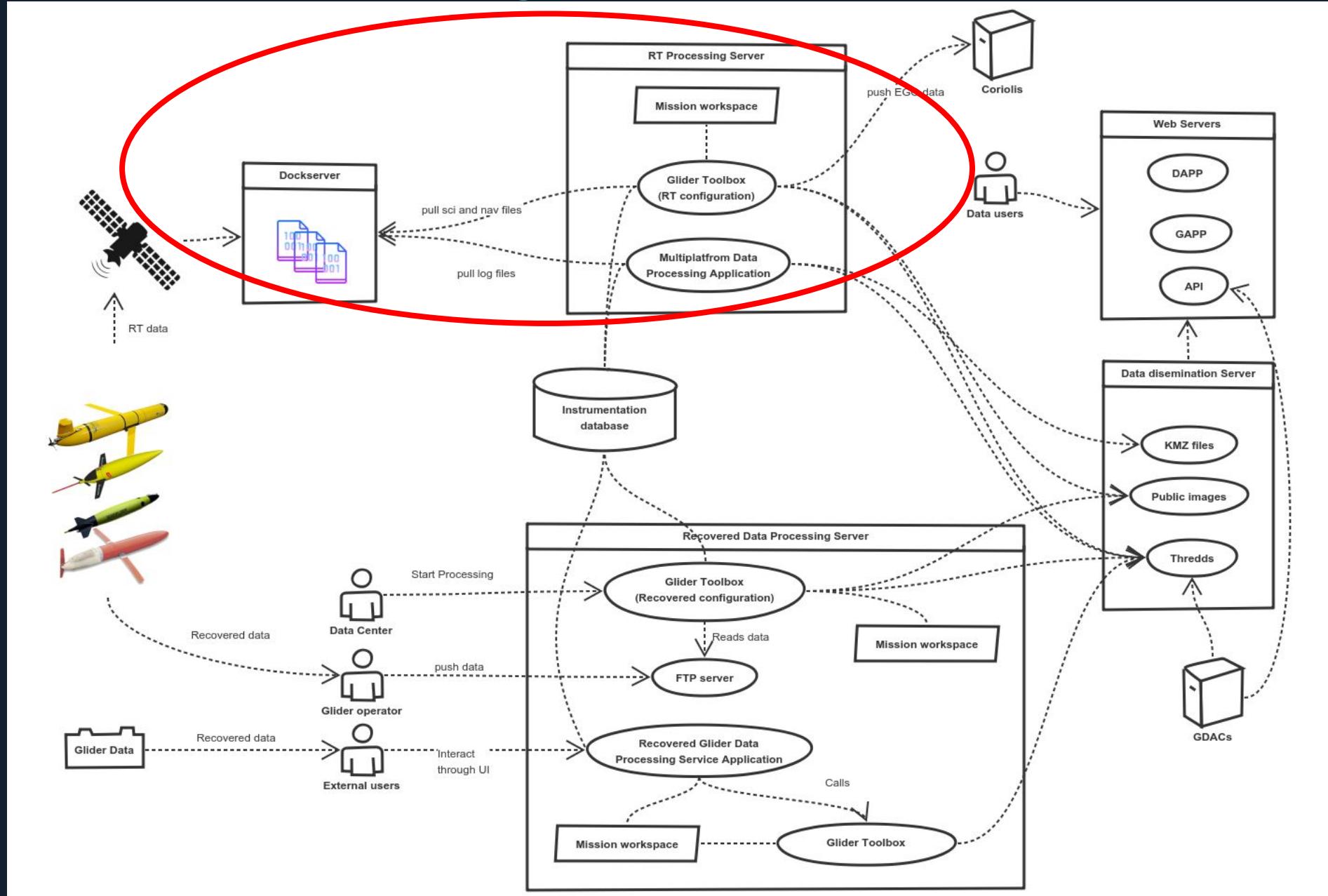
# SOCIB Operational System - Glider Operations



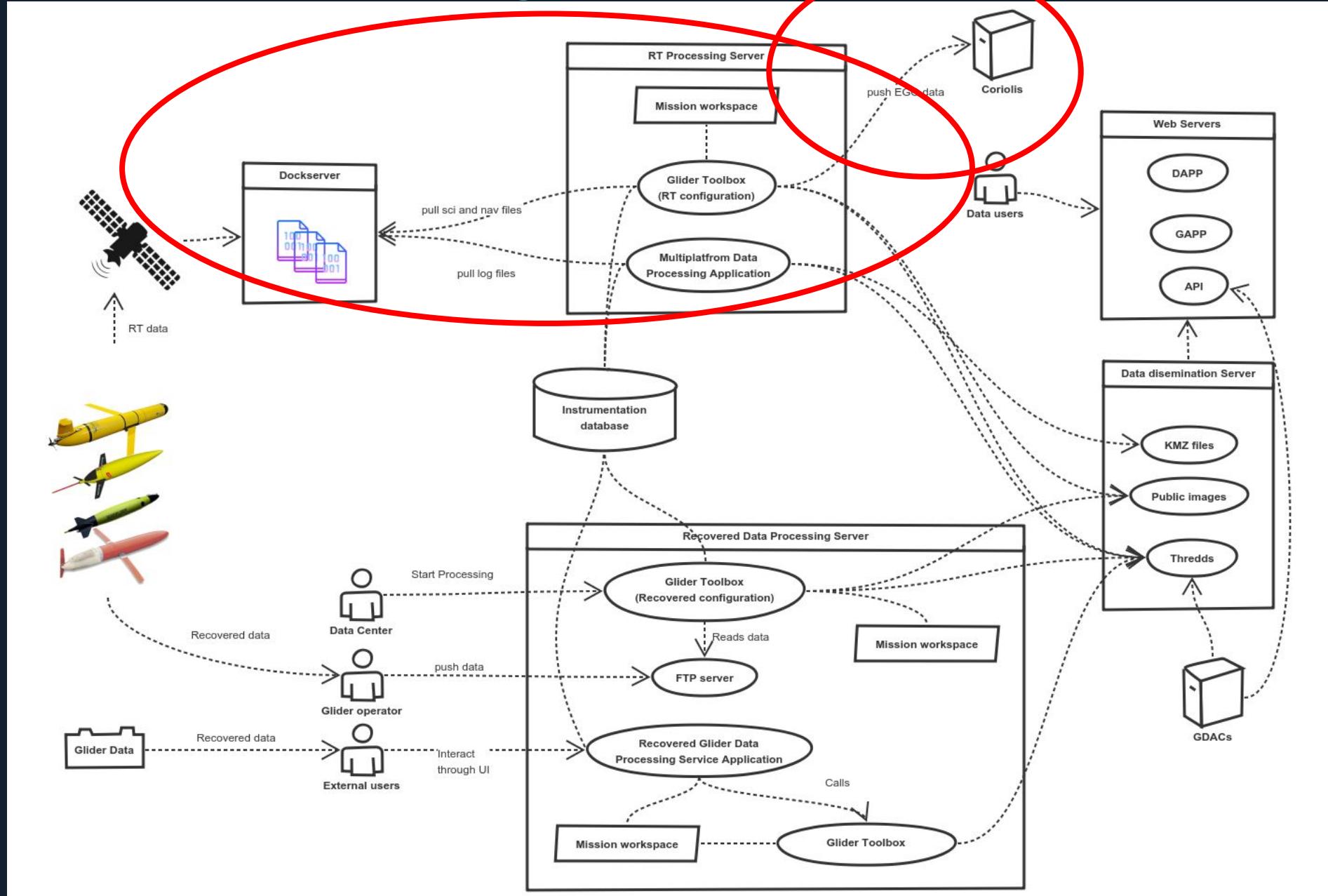
# SOCIB Operational System - Glider Data Flow



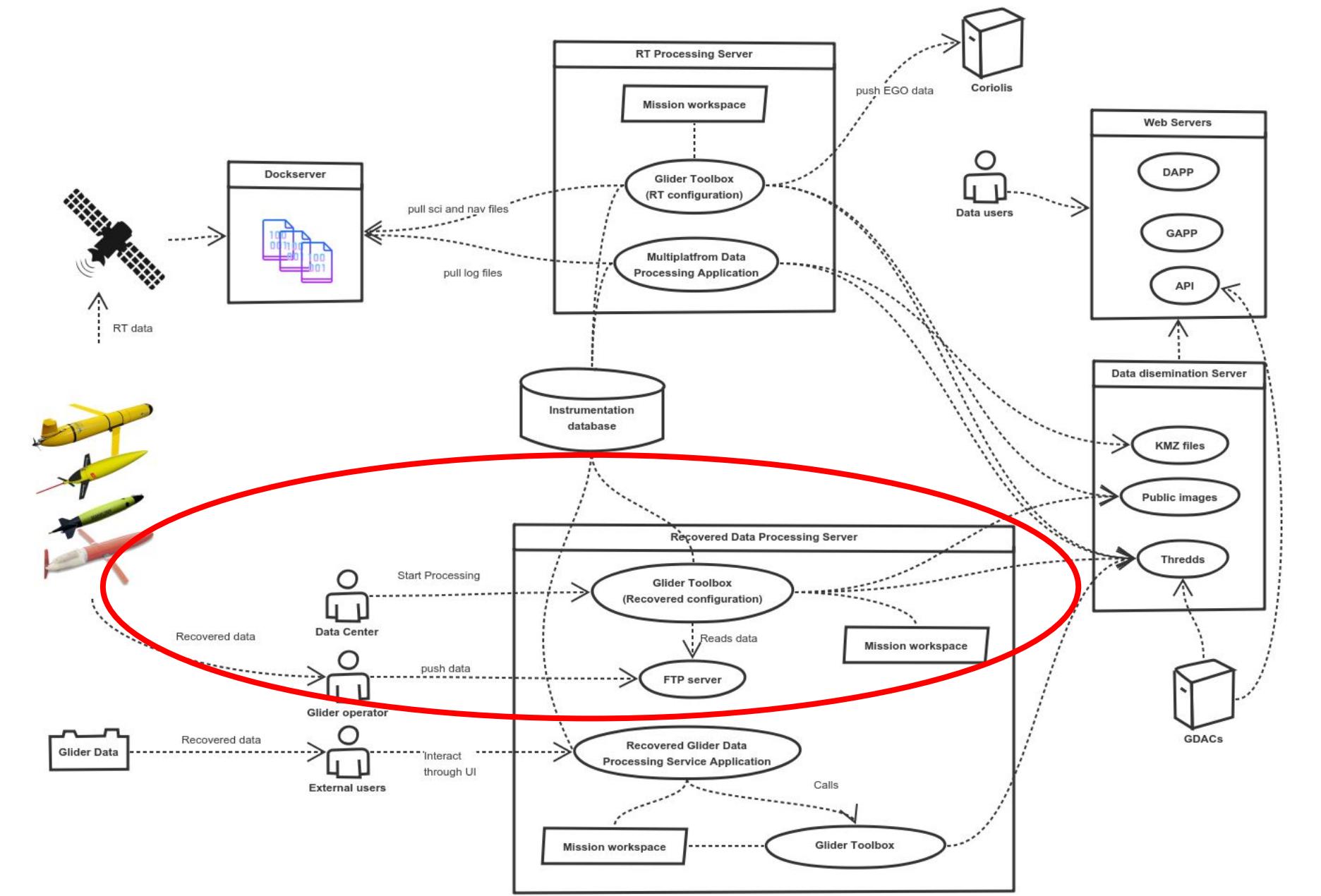
# SOCIB Operational System - Glider Data Flow



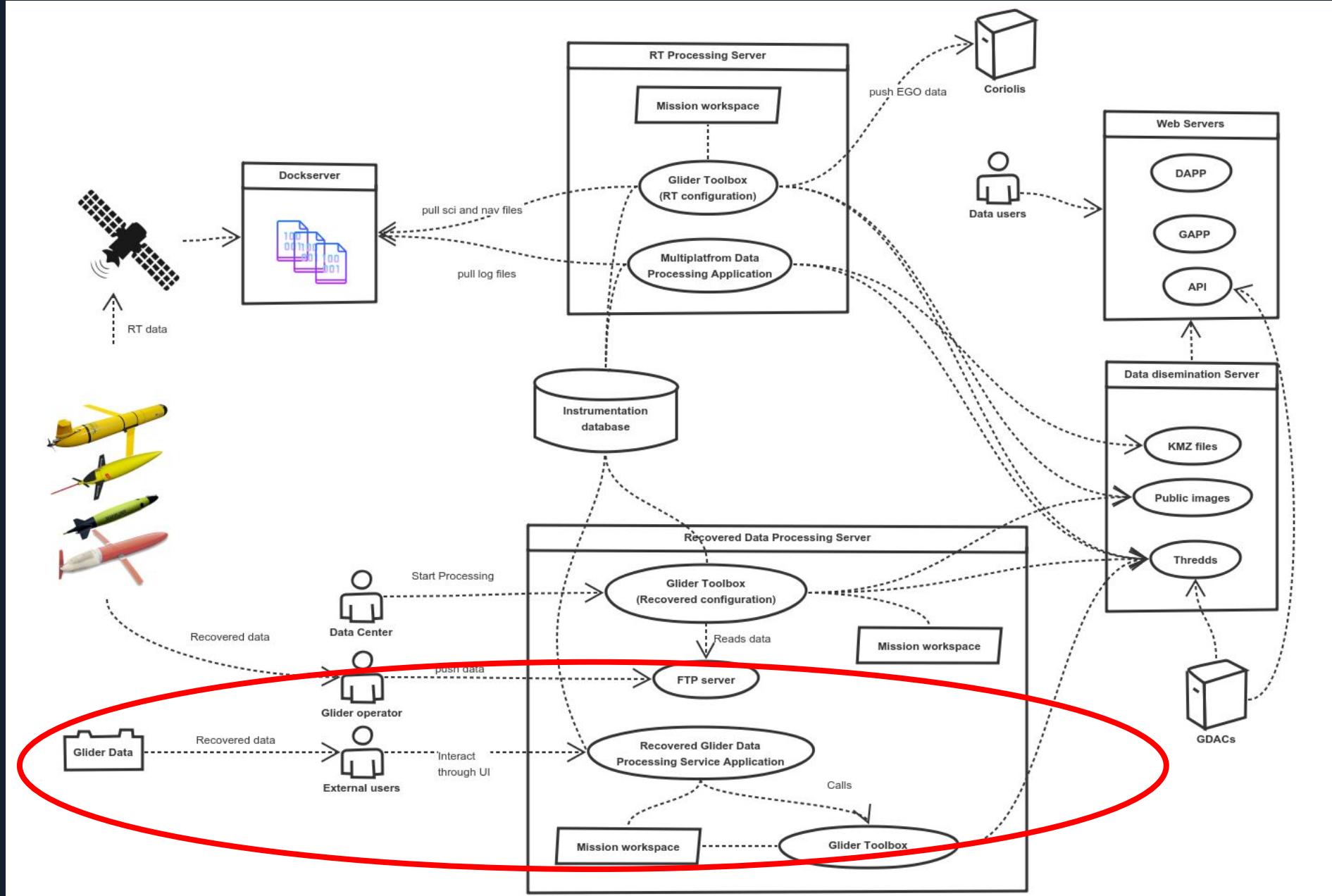
# SOCIB Operational System - Glider Data Flow



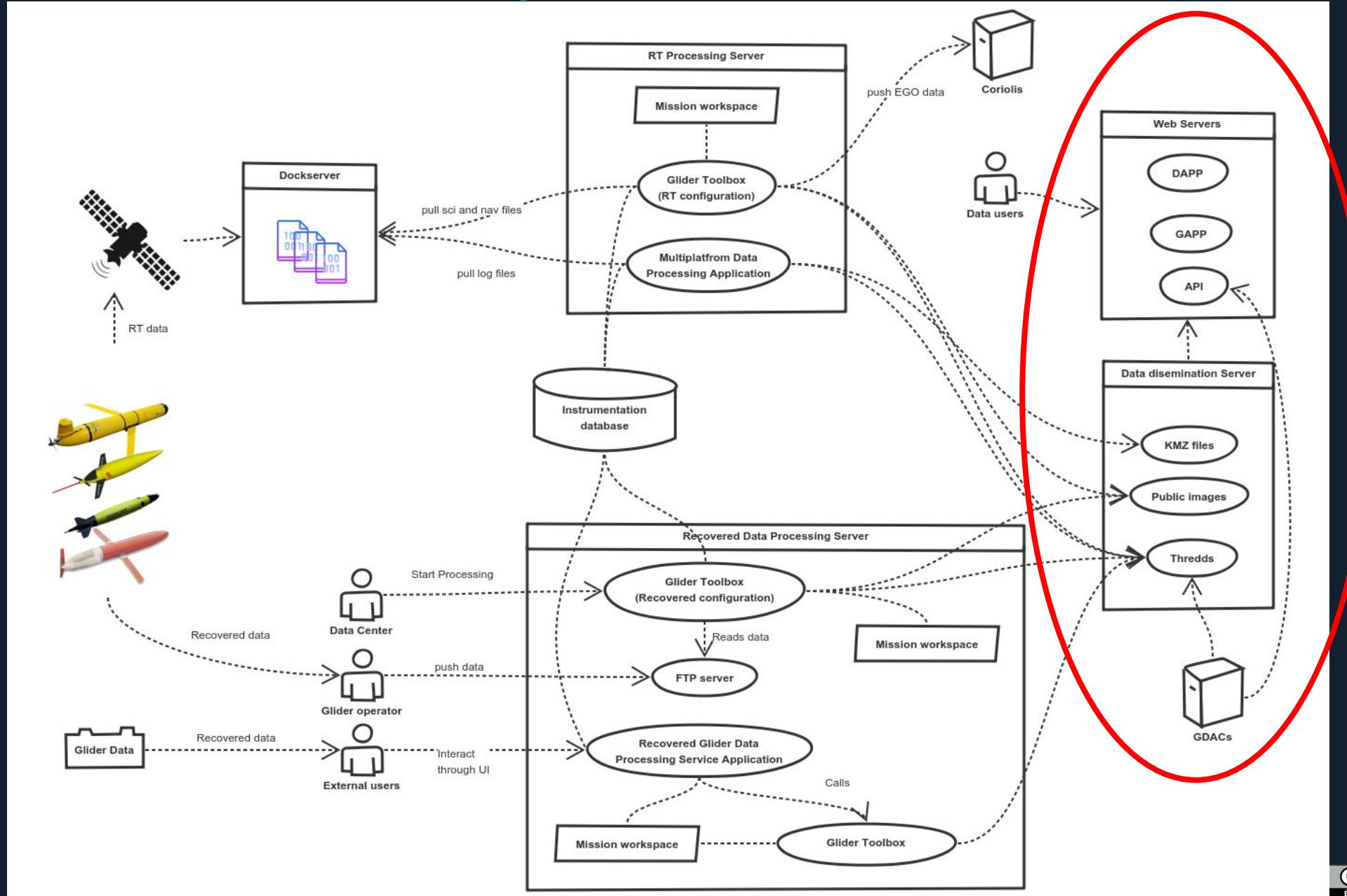
# SOCIB Operational System - Glider Data Flow



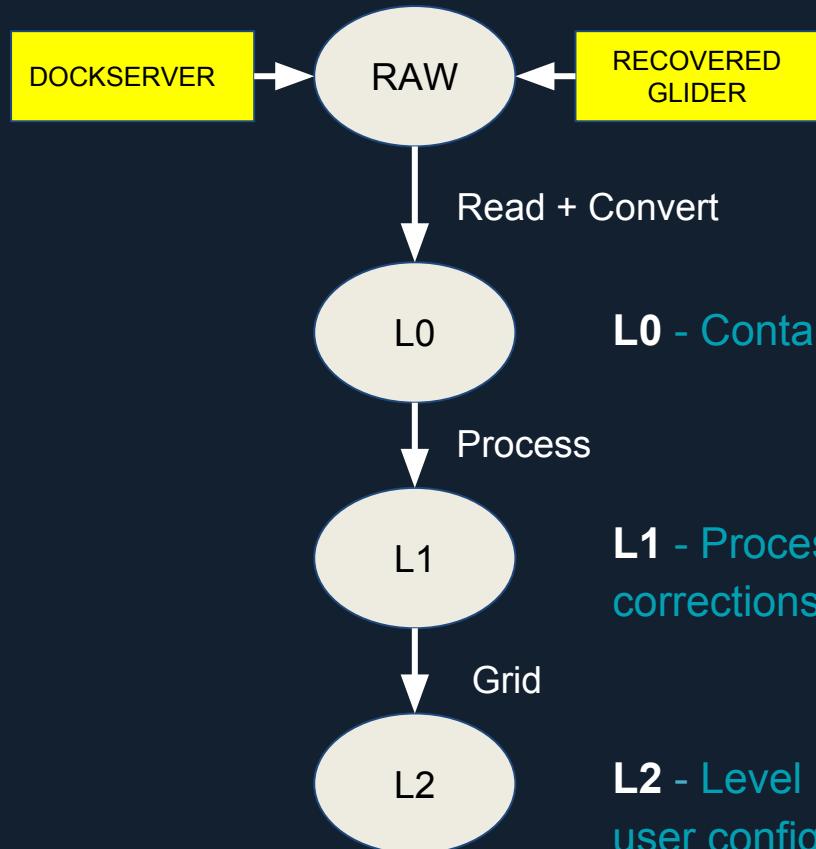
# SOCIB Operational System - Glider Data Flow



# SOCIB Operational System - Glider Data Flow



# SOCIB Glider Toolbox - Overview



Three levels of data outputs:

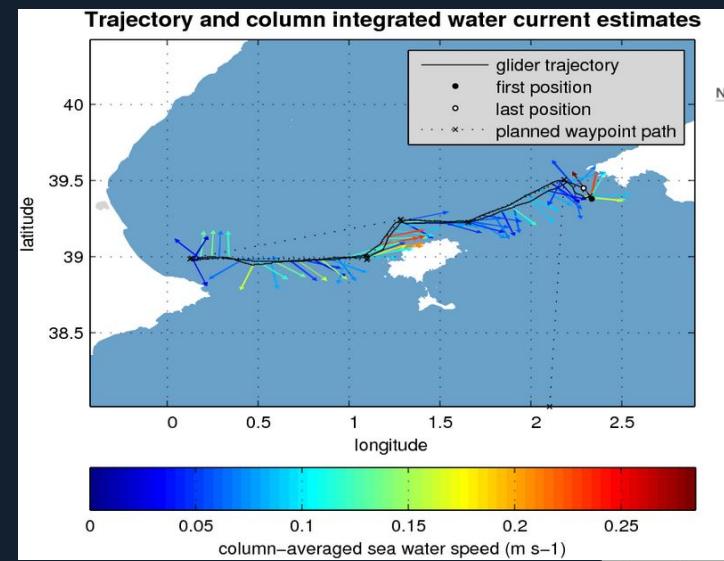
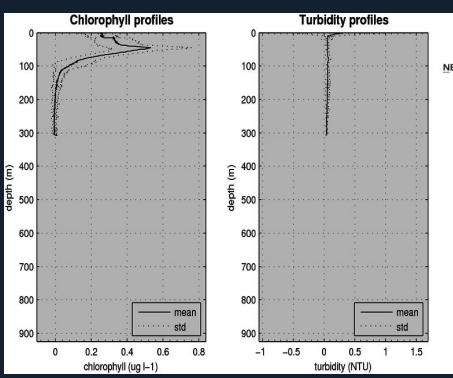
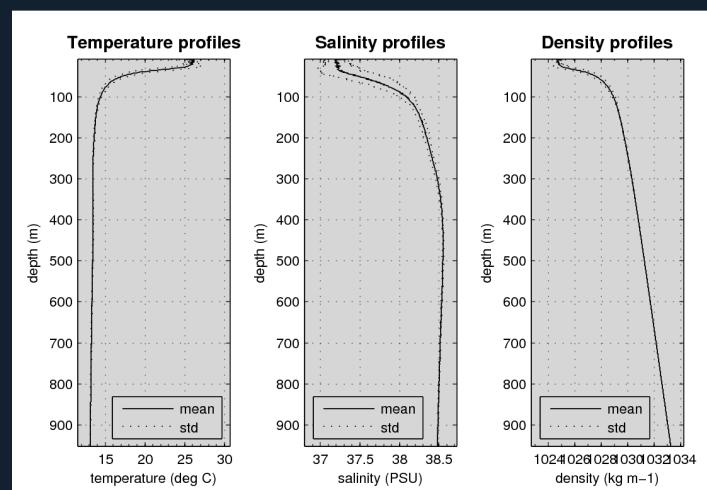
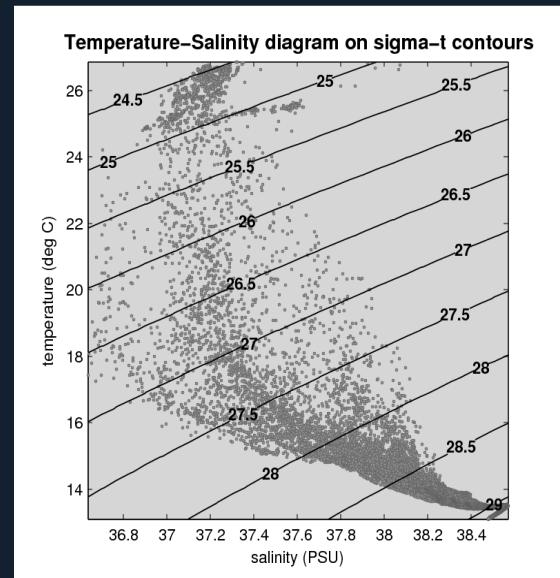
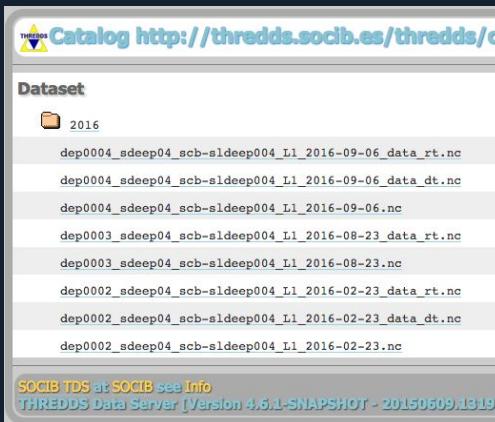
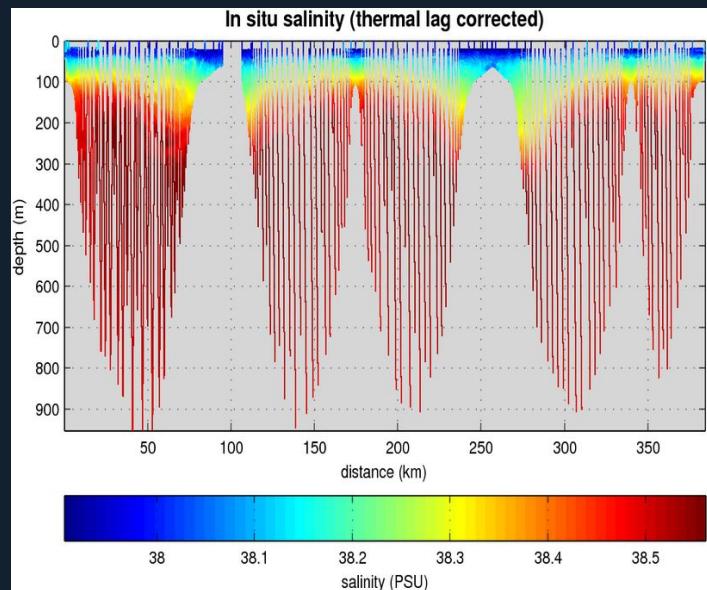
- Output data files are netCDF format & follow standard climate and forecast (CF) metadata conventions
- Two levels of figures: Level 1 and Level 2

**L0** - Contains selected raw data files (no modification)

**L1** - Processed glider data on a common time base, with conversions, corrections and adding derived variables

**L2** - Level 1 data presented vertical interpolated profiles onto a user configured grid

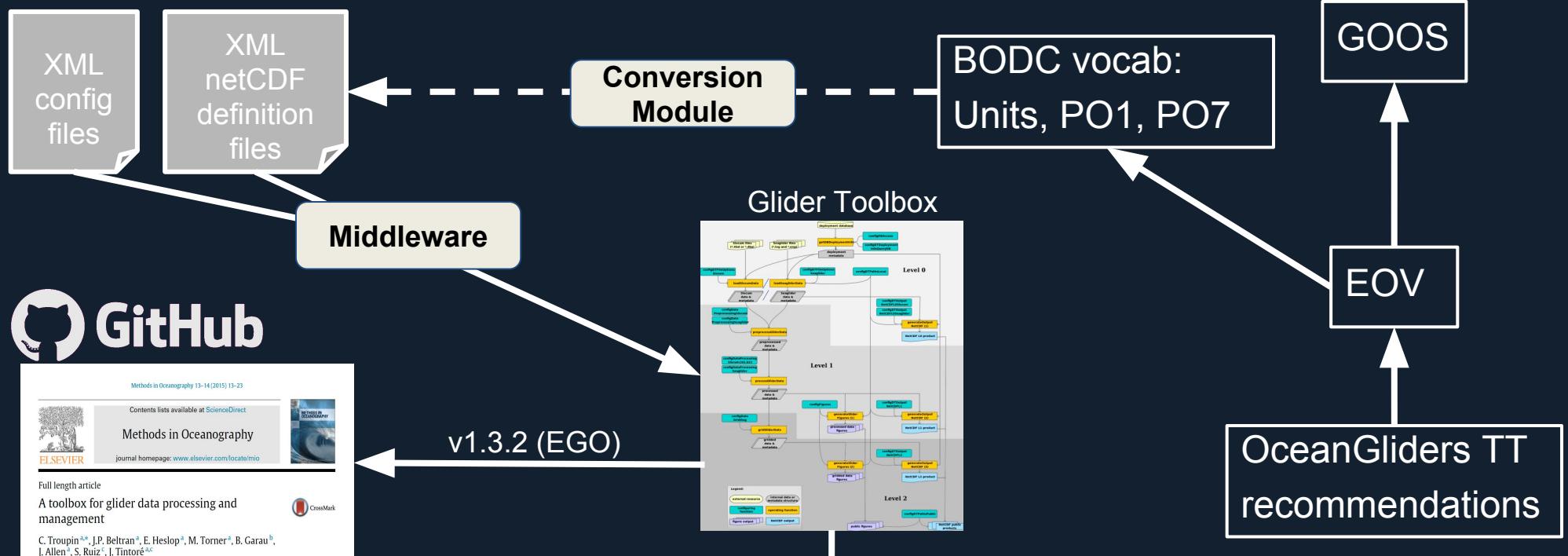
# SOCIB Glider Toolbox – Outputs



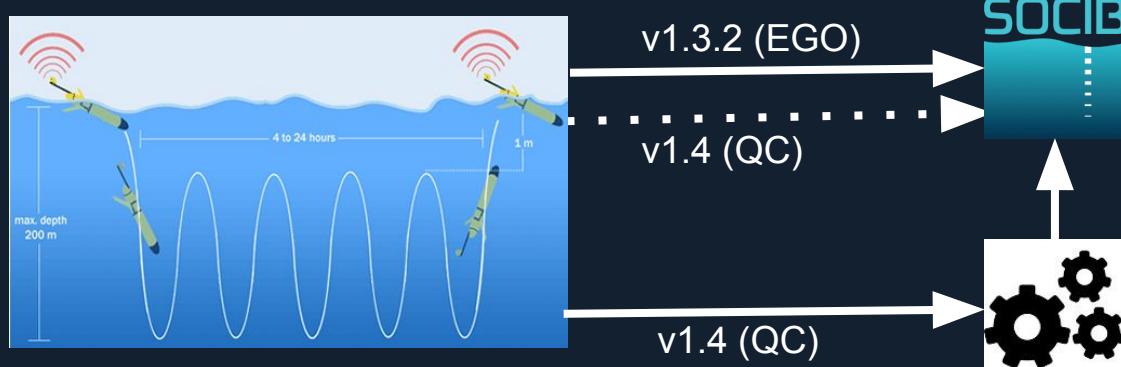
# SOCIB Glider Toolbox – QC and EGO

- Quality Control:
  - **NaN check, impossible date, impossible location**
  - **Global range (FLag 4)**
    - Variables: Chla, turbidity, temperature, salinity, conductivity, & O2 concen. and saturation
    - Sources: Argo Quality Control Manual For BGC, Datameq, Argo user manual
  - **Regional range (Flag 4)**
    - Variables: Temperature, salinity, location and waypoints
    - Sources: Datameq, Argo
  - **Instrument range (Flag 4)**
    - Variables: turbidity, Chla, temperature, pressure, conductivity, & O2 concen. and saturation
    - Sources: Instruments specs Wetlabs, Slocum glider payload, Aandera oxygen optode
  - **Spike (Flag 4)**
    - Variables: temperature and salinity
    - Sources: Datameq
- EGO Format:
  - Implementation that pass checker and can aggregate to Coriolis
  - Future improvements:
    - Further use of History variables (versus source and method attributes)
    - Uncertainty propagation

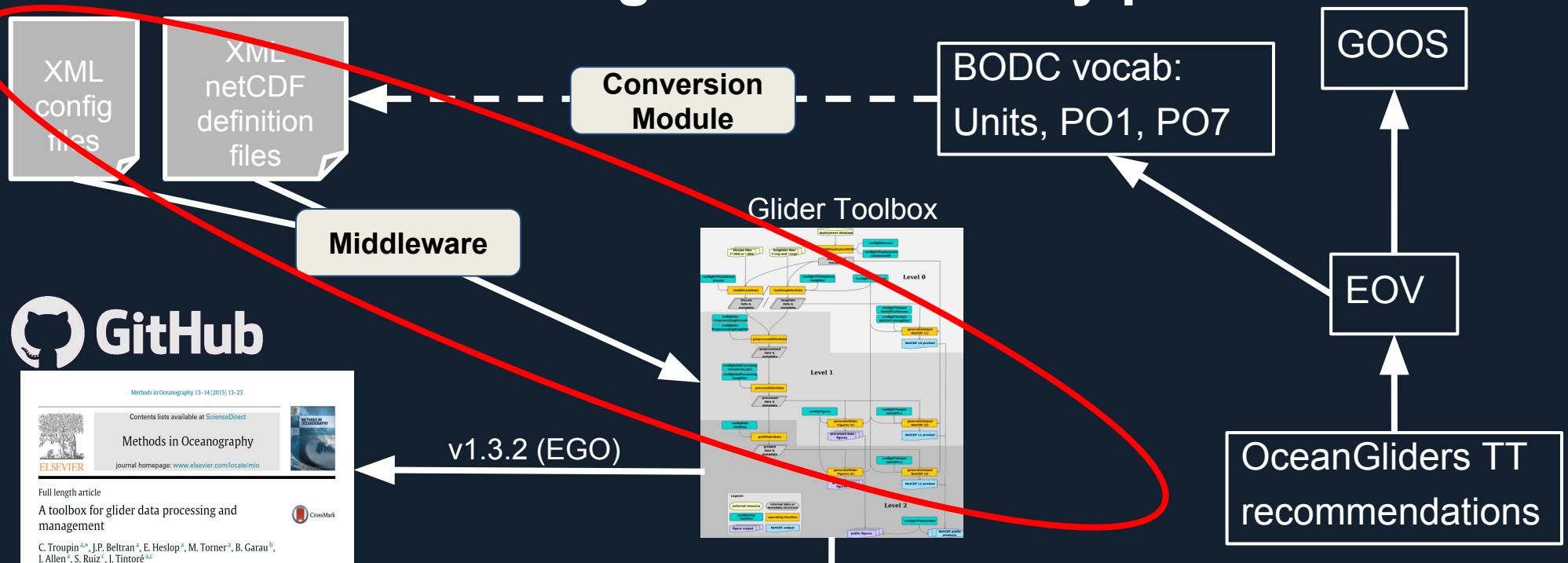
# SOCIB Glider Toolbox - Development Status in the glider community picture



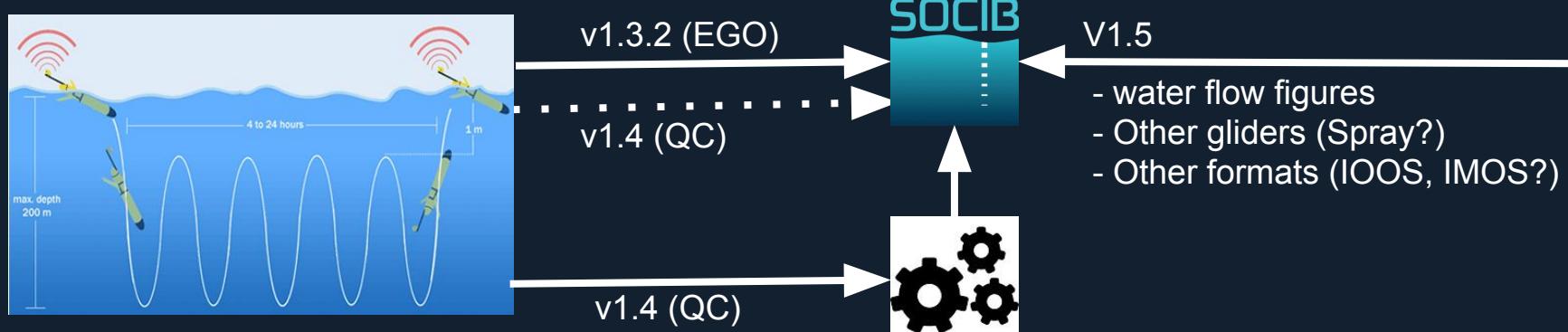
Summary in Troupin et al. 2015



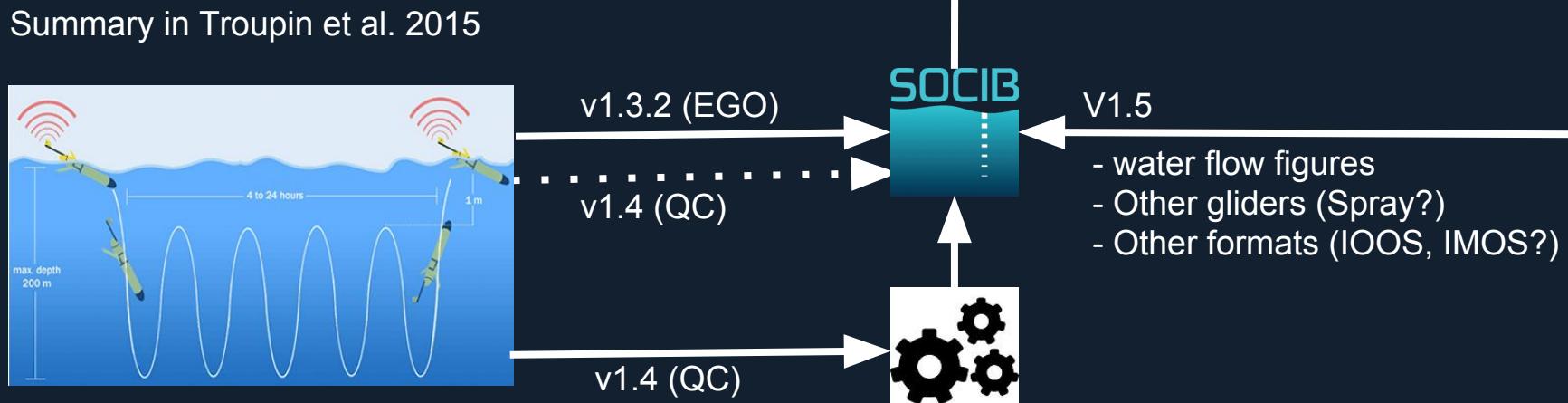
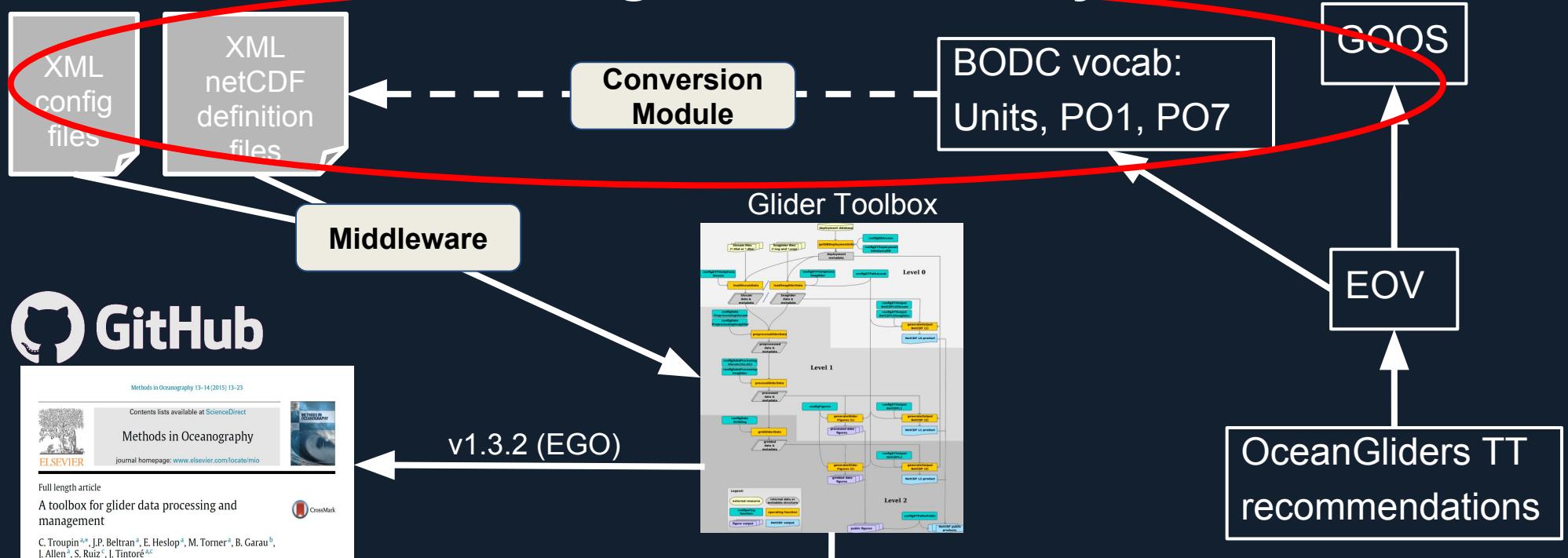
# SOCIB Glider Toolbox - Development Status in the glider community picture



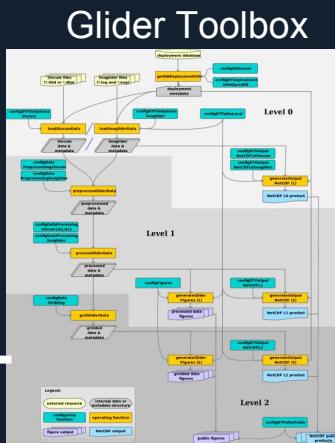
Summary in Troupin et al. 2015



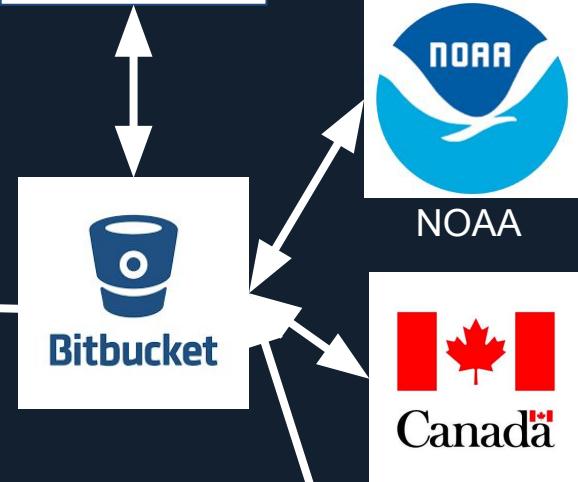
# SOCIB Glider Toolbox - Development Status in the glider community picture



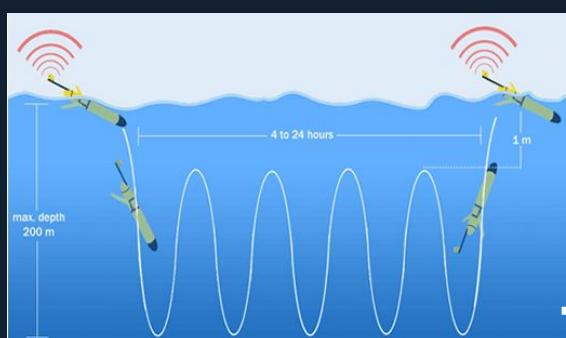
# Collaborative Project - Development & Users



OTHERS?



Summary in Troupin et al. 2015



v1.3.2 (EGO)

v1.4 (QC)

v1.4 (QC)

SOCIB

V1.5 (?)



# Collaborative Project - Processing Service

The Glider Processing Tool is a django app that interfaces with SOCIB Glider Toolbox (GitHub) for enable glider data processing in delay time. This tool is one SOCIB many efforts towards the concept of platform as a service (PaaS) to better spread advances in the scientific community and society.

**OVERVIEW STEPS**

- Gliders** Define your gliders  
Manage your gliders at your Glider site  
Here you will be able to add and modify gliders.
- Deployments** Define your deployments  
Manage your deployments at Deployment site  
Here you will be able to add and modify deployments.
- Configurations** Define the configurations to process your glider's data  
Manage your configurations at your Configuration site  
Here you will be able to add and modify the configurations to process your glider data.
- Process** Process your deployments (upload its binary files and choose processing configuration)  
Trigger the processing for a deployment at your Processing site  
Here you will be able to process any of your deployments.
- Monitor** Monitor your deployments  
Monitor the processing of a deployment at your Monitor site  
Here you will be able to track the processing of your deployments (i.e requested, in-processing, processed, results)

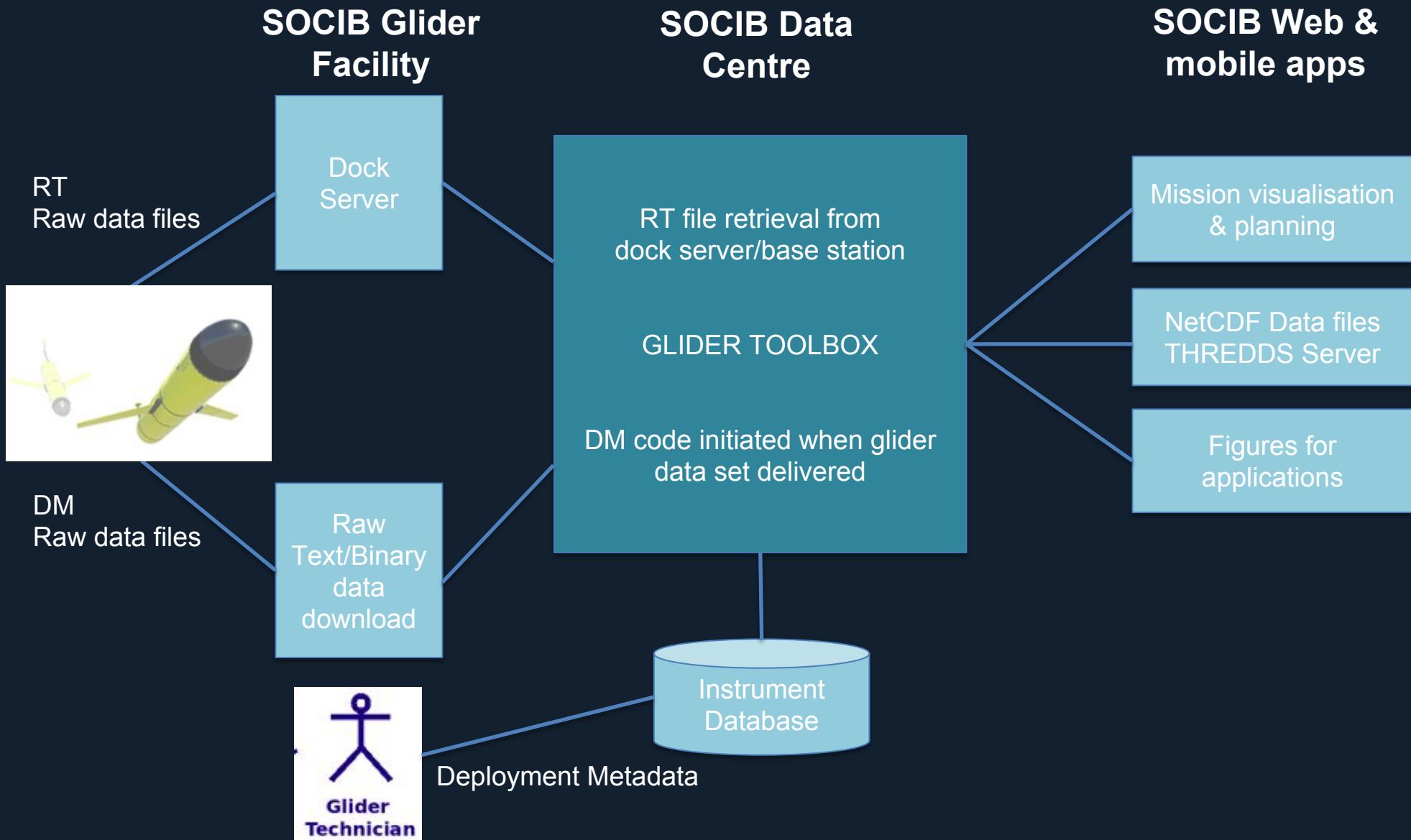
*Thanks for listening!*

*Questions?*

*Miguel Charcos Lloréns  
Contact Info: mcharcos@socib.es*



# Glider Toolbox - Overview



# Glider - SOCIB experience

## SUSTAINED OBSERVATIONS & PROCESS TYPE STUDIES (OPEN ACCESS)



## CTD & BIOGOCHEM CALIBRATION



## GLIDER FLEET

**TELEDYNE WEBB RESEARCH Everywhereyoulook**

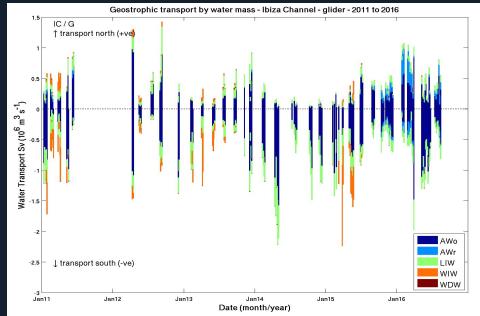


**iRobot**



Name	Model	(m)Depth Range	Science Sensors	Days Max. Autonomy	Property Of	Mgt/Managed	Year Purchase
sdeep00	Slocum G2	0-1000	CTD, Oxygen, FLNTU	60	SOCIB	SOCIB	2011
sdeep01	Slocum G2	0-1000	CTD, Oxygen, FLNTU	60	SOCIB	SOCIB	2011
sdeep04	Slocum G2	0-1000	CTD, Oxygen, FLNTU	60	SOCIB	SOCIB	2015
sdeep05	Slocum G2	0-1000	CTD, Oxygen, FLNTU	60	SOCIB	SOCIB	2015
sdeep02	Sea Glider	0-1000	CTD, Oxygen, FLNTU	60	SOCIB	SOCIB	2012
sdeep03	Sea Glider	0-1000	CTD, Oxygen, FLNTU	60	SOCIB	SOCIB	2012

## WATER MASS FLOW TOOLS



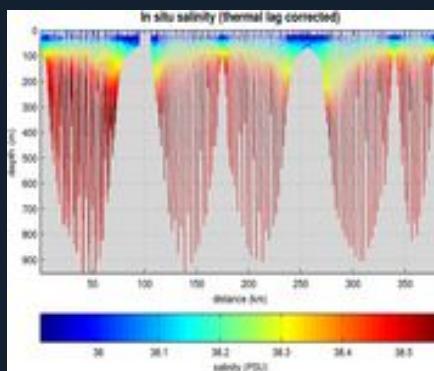
## GLIDER LAB



## GARICAST



## GLIDER TOOLBOX



## GLIDER DATA DISTRIBUTION

