

1. Project Information

<b>Proposal reference number<sup>1</sup></b>	23/1003408
<b>Project Acronym (ID)<sup>2</sup></b>	SMART
<b>Title of the project<sup>3</sup></b>	Sardinia-Mallorca Repeated Transect
<b>Host Research Infrastructure<sup>4</sup></b>	SOCIB glider facility (SOCIB-GF)
<b>Starting date - End date<sup>5</sup></b>	12/02/23 to 18/02/23 (preparatory phase) 03/07/23 to 10/07/23 (preparatory phase) 11/07/23 to 22/08/23 glider mission 18/09/23 to 22/09/23 (post-mission phase)
<b>Name of Principal Investigator<sup>6</sup></b>	Jacopo Chiggiato, Ph.D.
<b>Home Laboratory Address</b>	Istituto di Scienze Marine (CNR-ISMAR) Consiglio Nazionale delle Ricerche Arsenale - Tesa 104 Castello 2737/F 30122 Venezia - Italy
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2. Project objectives<sup>7</sup> (250 words max.)

The project aims to enhance the monitoring coverage across the Algerian Basin spanning from Palma de Mallorca to Sardinia. Executing this glider mission is intended to extend the dataset previously gathered in the region since 2017, contributing valuable information for inter-annual comparisons and long-term monitoring.

The key objectives of the SMART project include:

- Continuing the collection of oceanographic data along the endurance line between Mallorca and Sardinia, augmenting the dataset acquired through external access SOCIB calls in 2017, 2018, 2020, and 2022.
- Identifying the physical and biological characteristics of surface and intermediate water masses in the region between the Balearic Islands and Sardinia.
- Understanding the dynamics of sub-basins and the intricate interactions arising from eddies.
- Studying the mixing of water masses through microstructure measurements.
- Monitoring trends in oxygen levels.

<sup>1</sup> Reference number assigned to the proposal by the TA-Office.

<sup>2</sup> User-project identifier used in the proposal.

<sup>3</sup> Title of the approved proposal. The length cannot exceed 255 characters

<sup>4</sup> Name of the installation/infrastructure accessed with this project. If more than one installations/infrastructures are used by the same project, please list them in the box.

<sup>5</sup> Specify starting and end date of the project (including eventual preparatory phase before the access).

<sup>6</sup> Fill in with the full contact of the Principal Investigator (user group leader).

<sup>7</sup> Write the short-term, medium and long-term objectives of the project. Use no more than 250 words.

3. Main achievements and difficulties encountered (250 words max.)<sup>8</sup>

Data collected during the SMART mission allowed:

- A real time monitoring of the main physical and biochemical properties of the water column;
- The extension of the glider high resolution dataset;
- Research activities connected to microscale turbulence regimes

From a technical perspective, the glider:

- spent 42 days in water;
- navigated 860 Km (464 Nm);

No particular difficulties were encountered

4. Dissemination of the results<sup>9</sup>

The observations supported by the TNA activity will be published in a peer-reviewed journal and be part of a PhD internship. At the moment the data are still under preliminary scientific processing and not yet completed quality-control procedure (only L0 and L1 available at the moment).

L0 and L1 Data in NETCDF are freely available via THREDDS at:

[https://thredds.socib.es/thredds/catalog/auv/glider/teresa-cnr\\_teresa/L0/2023/catalog.html](https://thredds.socib.es/thredds/catalog/auv/glider/teresa-cnr_teresa/L0/2023/catalog.html)

and

[https://thredds.socib.es/thredds/catalog/auv/glider/teresa-cnr\\_teresa/L1/2023/catalog.html](https://thredds.socib.es/thredds/catalog/auv/glider/teresa-cnr_teresa/L1/2023/catalog.html)

L2 data will be available soon at

[https://thredds.socib.es/thredds/catalog/auv/glider/teresa-cnr\\_teresa/L2/2023/catalog.html](https://thredds.socib.es/thredds/catalog/auv/glider/teresa-cnr_teresa/L2/2023/catalog.html)

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<sup>8</sup> Describe briefly the main achievements obtained and possible impacts, as well as possible difficulties encountered during the execution of the project. Use no more than 250 words.

<sup>9</sup> Describe any plan you have to disseminate and publish the results resulting from work carried out under the Transnational Access activity in JERICO -S3: scientific articles, books - or part of them -, patents, as well as reports and communication to scientific conferences, meetings and workshops. Highlight peer-reviewed publications. **Note that any publications resulting from work carried out under the JERICO -S3 TA activity must acknowledge the support of the European Commission – H2020 Framework Programme, JERICO -S3 under grant agreement No. 871153.**

5. Technical and Scientific preliminary Outcomes (2 pages max.)<sup>10</sup>

The mission successfully covered the Mallorca-Sardinia transect two way, with deployment and recovery in Spanish waters, south of Palma. The figure below show the actual path of the glider, with color code associated to days after the deployment. It can be seen as each 1-way path took 21 days to complete.

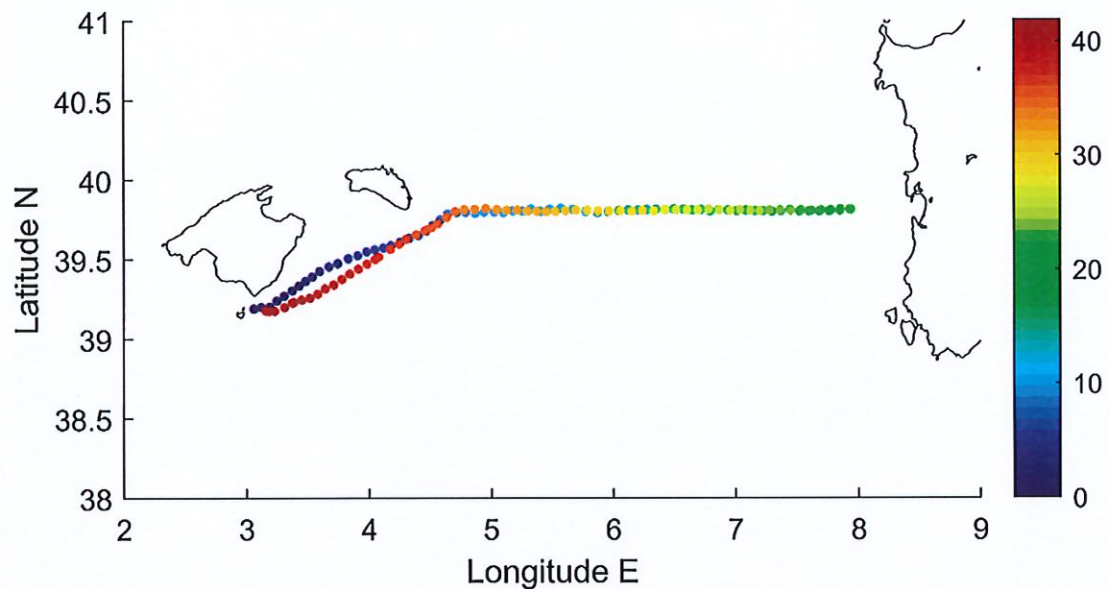


Figure 1: the transect

Scientific data are still under quality control analysis, so at the moment only raw data are available, thus limiting any scientific interpretation in depth, left after the QC. Based on these preliminary dataset, temperature and salinity data show a seasonal thermocline due to summer heating (see temperature plot below) and the Atlantic Water – Intermediate Water interface marked by salinity change at some 100-150 m depth. Below, it is clear the core of the Intermediate Water of eastern mediterranean origin (38.7+ salinity core) that is at the centre of the salinity plot, that means it is found along the Sardinia boundary (as the plot covers the full 2-way track), where the Intermediate Waters travel north and are relatively less diluted than in the western part of the transect. There is no sign of intermediate water of Western Mediterranean origin (WIW), probably as by the summer it already moved away from the area. Small scale tiltings of the pycnocline are associated to dynamical structures that are under investigation.

Soon the data will be confronted with previous dataset, outlining recent trends in tracers and differences of dynamical behaviour at the mesoscale.

<sup>10</sup> Describe in detail results and main findings of your experiment at the present stage.

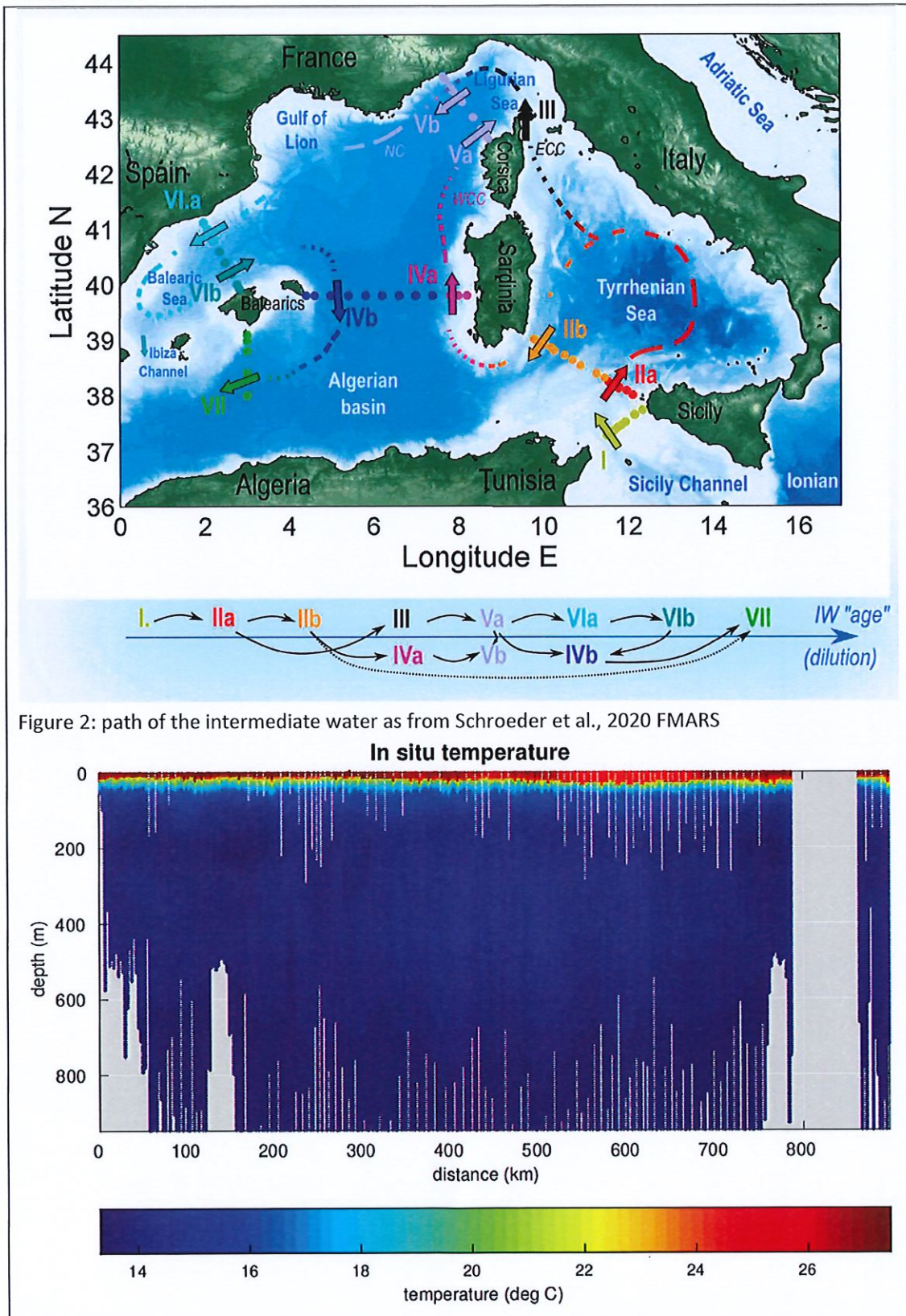


Figure 2: path of the intermediate water as from Schroeder et al., 2020 FMARS

Figure 3: temperature data from the glider (raw data)

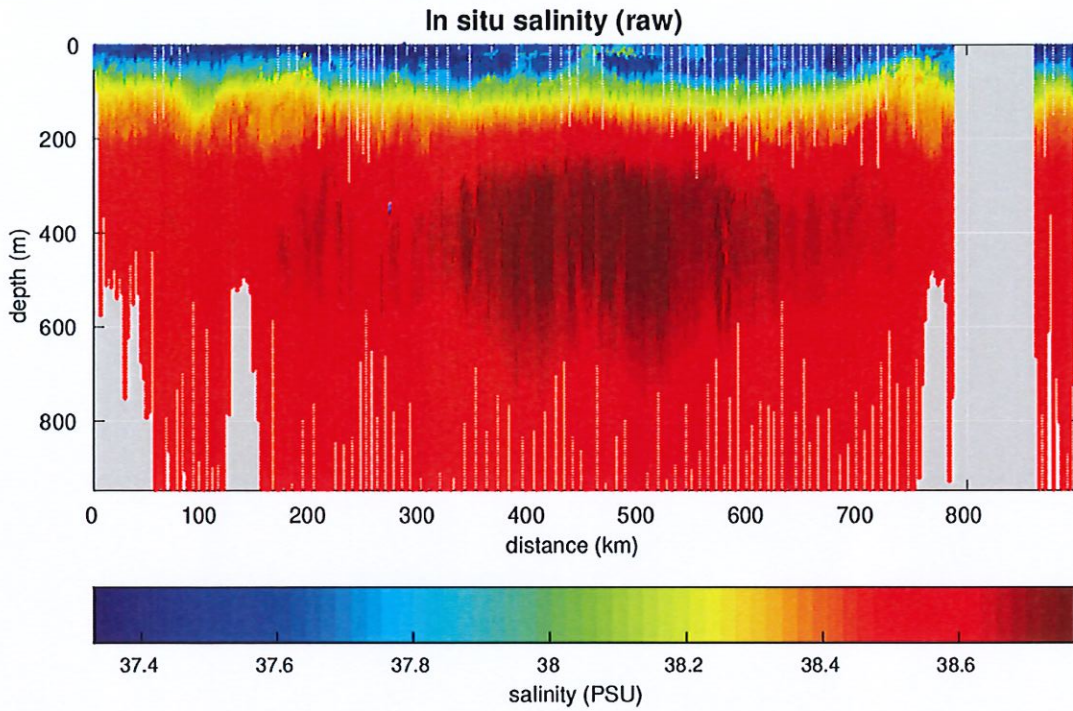


Figure 4: temperature data from the glider (raw data)

Venezia, 15/12/2023

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Location and date

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Signature of principal investigator