SOCIB Glider - Canales Endurance Line Data Management Plan

DCF, GLF and ETD

Version 1.0

22/12/2021

DOI:10.25704/vj13-eh49

SOCIB
Balearic Islands Coastal Observing and Forecasting System

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List of Acronyms

ANDS: Australian National Data Service

CMEMS-INSTAC: Copernicus Marine Environment Monitoring Service In Situ Thematic Centre

CSIC: Spanish National Research Council (from Spanish, Centro Superior de Investigaciones Científicas)

DCF: Data Center Facility

DM: Delayed mode

DMP: Data Management Plan

DOI: Digital Object Identifier

EMODnet: European Marine Observation and Data Network

ETD: Engineering Technology Development

FAIR: Findability, accessibility, interoperability, and reusability (data principles)

GLF: Glider Facility

CIT: Computing and IT Service

NA: Non Applicable

netCDF: Network Common Data Form

NANOOS: Northwest Association of Networked Ocean Observing Systems

OBP: Ocean Best Practices

OPeNDAP: Open-source Project for a Network Data Access Protocol

QuID: Quality Information Document

RT: Real Time (equivalent to near-real time at SOCIB).

SOCIB: Balearic Islands Coastal Ocean Observing and Forecasting System (from the Spanish, Sistema de Observación y predicción Costero de las Illes Balears)

THREDDS: Thematic Real-time Environmental Distributed Data Service

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1. Introduction

The SOCIB Glider - Canales Endurance Line Data Management Plan (DMP) describes the data management life cycle for the ocean glider data, collected, processed and/or generated by SOCIB. It also includes the Ocean Glider data curation, preservation and the description of the data flows from SOCIB to the main European marine data portals such as, CMEMS-INSTAC, SeaDataNet and EMODnet.

The objective of this DMP is to improve the day-to-day handling of the SOCIB Ocean Glider data, creating a more transparent, collaborative, and sustainable communication system both internally and with the end users. Furthermore, this document helps to enhance the competitive access by clarifying the role and the responsibilities of the teams involved in the different components of the data life cycle.

The present DMP was established after reviewing and harmonizing existing SOCIB DMPs and others available in the international framework (IODE, ORD, ANDS, IMOS, NANOOS). This approach seeks the convergence and the alignment with the main actors in the global scene, also assuring the implementation of Ocean Best Practices (OBPs) procedures across the value chain. Furthermore, recommendations provided by DIGITAL CSIC are followed, and this has enhanced SOCIB's data integration in CSIC repository, pursuing a greater impact of research results to address future challenges.

This document also benefits from the participation and achievements from EU and international initiatives and projects (e.g. CMEMS-In Situ TAC, Jerico-S3, Jerico-DS, EuroSea and Calypso) with regard to GLF data management and the building of an integrated data system of systems. It is in particular aligned with the ongoing efforts in JericoS3 and the related DMP for coastal platforms, following the roadmap established by the EuroGOOS Glider Task Team for promoting the GLF technology and its applications in Europe, being also based on recommendations from the EuroGOOS Data Management, Exchange, and Quality Working Group (DATAMEQ), seeking convergence. The template aims to meet the requirements of different observing programs and platforms with the necessary flexibility and adaptability allowing the stakeholders to design a customized workflow, responding to their needs.

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The DMP is based on the **SOCIB ARCHIVE** “rules”:

- **A**pply to other institution
- **R**espond to internal needs
- **C**over FAIRness recommendation
- **H**andle data lifecycle with simplicity
- **I**dentify tasks, roles & responsibilities
- **V**isualize crucial information
- **E**mphasize platform information

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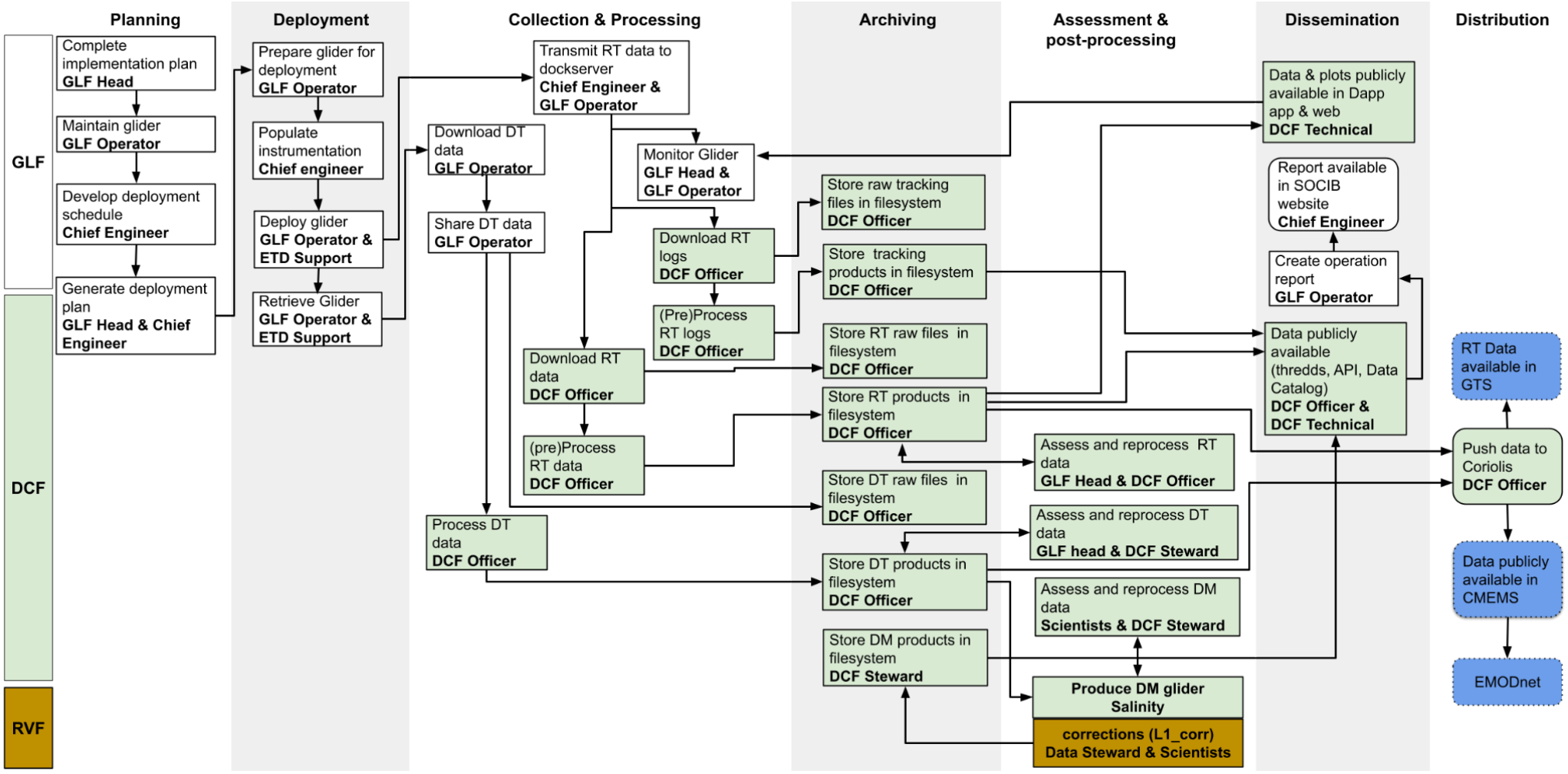
3. Observing program information

This section provides an overview of the SOCIB Glider - Canales Endurance Line observing program: a semi-continuous, near real-time monitoring of Mallorca and Ibiza Channels. The table below also includes discovery information on funding, responsible institutions and people as well as contributors.

Program name	SOCIB Glider - Canales Endurance Line
Platform name	sdeep[xx] - ideep[xx]
Data product Identifier (DOI)	https://doi.org/10.25704/jd07-sv9
Funding information	Ministerio de Ciencia e Innovación (http://www.ciencia.gob.es/). Govern de les Illes Balears (http://www.caib.es/). Consejo Superior de Investigaciones Científicas (https://www.csic.es/en)
Program description	SOCIB Glider - Canales Endurance Line - was initiated in 2011, with in kind collaboration of CSIC (IMEDEA), covering both the Mallorca and Ibiza channel in a semi-continuous operational mode and sampling physical and biogeochemical observations.
Program Website	https://www.socib.es/?seccion=observingFacilities&facility=glider
Institution	SOCIB (Sistema de Observación y Predicción Costero de las Islas Baleares)
Institution URL	https://www.socib.es/
Principal Investigators	Nikolaos Zarokanellos
Principal Investigators email	nzarokanellos@socib.es
Competitive Access	https://www.socib.es/?seccion=gliderCompetitiveAccess&facility=gliderGeneralOverview
Creator Name	Glider facility, Data Center Facility, Engineering Technology and Development division
Creator email	glidertech@socib.es, data.centre@socib.es, etd@socib.es
Creator URL	https://socib.es/?seccion=observingFacilities&facility=glider https://www.socib.es/data
Contributor name	Joaquín Tintoré; Nikolaos D. Zarokanellos; Albert Miralles; Manuel Rubio; Miguel Charcos Llorens; Matteo Marasco; Paz Rotllán; Miquel À. Rújula; Juan Gabriel Fernández; John Allen; Xisco Notario; Benjamin Casas; Nikolaus Wirth
Contributor email	jtintore@socib.es; nzarokanellos@socib.es; amiralles@socib.es; mrubio@socib.es; mcharcos@socib.es; mmarasco@socib.es; protllan@socib.es; mrujula@socib.es; jfernandez@socib.es; jallen@socib.es; xnotario@socib.es; bcasas@socib.es; nwirth@socib.es
Contributor role	ProjectLeader; Researcher; DataCollector; DataCollector, DataManager; DataCurator; DataCurator; DataCurator; DataManager; Researcher; ProjectMember; ProjectMember; ProjectMember
Acknowledgements	Ministerio de Ciencia e Innovación (http://www.ciencia.gob.es/). Govern de les Illes Balears (http://www.caib.es/). Consejo Superior de Investigaciones Científicas (https://www.csic.es/en)
Operation	
Checklist template	Glider_operational_Template SOP_DCF_glider_operational_deployment_Template
Information spreadsheet	Glider_operational_guideline-Planning
Communication channels	Informal communication are provided through different channels

4. Workflow diagram



The diagram shows the workflow of the SOCIB-GLIDER-CANALES ENDURANCE LINE Observing Program, which covers both the Mallorca and Ibiza channels in a semi-continuous operational mode. Distribution to the European aggregator is a responsibility of the Coriolis (highlighted in blue within the diagram).

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5. Workflow information

The table below describes how the different tasks along the data value chain are being done. People in charge of the tasks, their sequence, their frequency as well as the available resources (e.g documents, software, tools) are also shown.

Phase	Operation step	Frequency	Description	Operator	Resources
Planning	Calibrate glider and sensors	Every 2 years	A mandatory biannual glider sensors lab refurbishment or earlier if needed. In addition, to evaluate the status of each sensor before each deployment, the Glider Facility (GLF) team perform Bench checks	GLF Chief engineer & GLF Operator	Glider sensors details (Private)
	Complete implementation plan	Annually	A quarterly review of the glider operations is carried out by both the Scientific and Engineer Team.	GLF head & GLF Chief engineer	
	Develop deployment schedule	Every 4 months	The schedule is regularly updated and evaluated every 4 months or on a monthly basis depending on both the instrument availability and human/funding resources. Gliders are calibrated during this phase.	GLF Chief engineer & GLF Operator	Operation Glider Plan (Private)
	Generate and develop deployment plan	Monthly	Each deployment plan is based on the objectives to be achieved during the relative mission.	GLF Head & GLF Chief engineer	
Deployment	Prepare glider for deployment	Every mission	The glider components are tested as the deployment approaches. Other tests on Comms, bench Science (SCI), batteries, ballasting and sealing are performed.	GLF Operator	Glider_operational_guideline-Planning (Private)
	Update Instrumentation database	Every mission	The glider operator proceeds with the activation of the instrument and relative sensors, states, variables and calibrations on the instrumentation application database.	GLF Chief engineer & GLF Operator	PUM-DCF_instrumentation-database-processing-configuration (Private) SPEC_DCF_instrumentation-database-naming-convention (Private)

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	Deploy glider	Every mission	Engineering Technology and Development (ETD) division and the operator deploy the instrument(s). Time is strictly related to the weather conditions and it may vary.	GLF Operator & ETD	Internal GLF Operations (Private)
	Retrieve glider	Every mission	ETD team together with the GLF prepares the necessary equipment to retrieve the instrument. Time is strictly related to the weather conditions and it may vary.	GLF Operator & ETD	
Collection & Processing	Transmit RT to dockserver	Every surfacing	Real Time (RT) data are automatically transmitted to the dockerver via Iridium.	GLF Chief engineer & GLF Operator	Script folder (Private)
	Download RT data	Every surfacing	The glider toolbox downloads available data every 30 minutes. Only new data are downloaded from the dockserver, and in practice it happens at every instrument surfacing.	DCF Data officer (Glider toolbox)	PUM_DCF_glider-toolbox-quickstart_v1.3.0 (Public)
	Download RT logs	Every surfacing	Slocums-download script downloads the available data every hour. Only new data are downloaded from dockserver at every surfacing.	DCF Data officer (Download script)	IREP_DCF_external-data-download-and-synchronization (Private)
	(Pre)Process RT data	Every surfacing	The glider toolbox (pre)processes the data when new data are downloaded. It uses the information of the instrumentation database and the configuration files of the code. Default configurations are used to process data.	DCF Data officer (Glider toolbox)	PUM_DCF_glider-toolbox-quickstart_v1.3.0 (Public)
	Produce EGO RT files	Every surfacing	RT files are formatted according to the EGO standards.	DCF Data officer (Glider toolbox)	

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	Process RT logs	Every surfacing	The processing application processes the data when new data are downloaded. It uses the information of the instrumentation database.	DCF Data officer (Processing application)	PUM_DCF_processing-application-enviroment-execution-implementation (Public) PUM_DCF_processing-application-user-manual (Public)
	Monitor glider	Daily	Engineering and parameters for monitoring and evaluating the status of the sensors and the glider platform. An aid software is recommended and Centynel will contribute to perform this step.	GLF Head & GLF Chief engineer (MATLAB & Python code)	
	Download DT data	Every surfacing	Delayed Time (DT) data are downloaded and archived in the filesystem.	GLF Operator	
	Share DT data	Every surfacing	Data are pushed to the File Transfer Protocol (FTP) server.	GLF Operator	
	(Pre)Process DT data	Every mission	The glider toolbox is assessed manually by the data officer. Once the toolbox is set, the DT data are automatically (pre)processed.	DCF Data officer (Glider toolbox)	PUM_DCF_glider-toolbox-quickstart_v1.3.0 (Public)
	Produce EGO DT files	Every surfacing	DT files are formatted according to the EGO standards.	DCF Data officer (Glider toolbox)	
	Index files	Every mission	After files are processed, these are indexed automatically (RT and DT) and manually (DM) to be available through the API and be exploitable for further assessment and application.	DCF Data technical	
Archiving	Store raw tracking files in filesystem	Every surfacing	Raw tracking files are automatically stored by the download script. Timeline is strictly related to the scientific and engineering team requirements (e.g. lack of communication/battery, ship traffic, RT transmission).	DCF Data officer	glider_tracking_data_process_description (Private)
	Store tracking products in	Every surfacing	The processing application is set by the Data officer. The store phase of the tracking products is therefore	DCF Data officer (Processing	

	filesystem		automatically carried out by the processing application.	application)	
	Store raw RT files in filesystem	Every surfacing	Data are automatically stored by the download script.	DCF Data officer (Download script)	IREP_DCF_external-data-download-and-synchronization (Private)
	Store RT products in filesystem	Every surfacing	Data are automatically stored by the processing application.	DCF Data officer (Processing application)	PUM_DCF_processing-application-user-manual (Public)
	Store raw DT files in filesystem	Every mission	Data are manually reallocated by the DCF Data officer so that the GTB can find it.	DCF Data officer	
	Store DT products in filesystem	Every mission	Data are automatically stored by the processing application.	DCF Data officer (Processing application)	
	Store DM products in filesystem	Every (required) mission	Data are stored by the DCF Data Steward using the Glider Correction Toolbox (GCTB). The process may happen locally and therefore data are uploaded in the filesystem.	RVF Scientist & DCF Data Steward (GCTB)	PUM_DCF_salinity-correction-toolbox-user-manual (Public)
Assessment & Post processing	Assess and reprocess RT data	Every surfacing	Manual quality check of the data is performed by GLF Head. Potential assessment and data reprocessing is therefore carried out by the DCF Data officer or Data Steward.	GLF Head & DCF Data officer (or Data steward)	
	Assess and reprocess DT data	Every (required) mission	Manual quality check of the data is performed by GLF Head. Potential assessment and data reprocessing is therefore carried out by the DCF Data steward.	GLF Head & DCF Data steward	
	Process DM data	Every (required) mission/biannual	Ship-based CTD corrected salinity is used with the DT glider salinity to cross calibrate the Delayed Mode (DM) glider salinity. The Glider Correction Toolbox is used to produce the glider calibration data.	RVF Scientist & DCF Data steward (GCTB)	PUM_DCF_salinity-correction-toolbox-user-manual (Public)
	Assess and reprocess DM data	Every (required) mission	Manual quality check of the data is performed by the Scientist. Potential assessment and data reprocessing is therefore carried out by the Data officer.	RVF Scientist & DCF Data steward (GCTB)	PUM_DCF_salinity-correction-toolbox-user-manual (Public)

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	Index files	Every mission	After files are processed, these are indexed manually (RT, DT and DM) to be available through the API and be exploitable for further assessment and application.	DCF Data technical	
Dissemination	Complete operation report	Every mission	A technical report with preliminary results is produced when the mission is completed.	GLF	GLF reports web page (Public)
	Publish netCDF files	Every mission	RT, DT and DM files are disseminated on the SOCIB Thredds Data Server (OPeNDAP).	DCF	PUM_DCF_SOCIB-insitu-measurements-netcdf-format-manual (Private) SOCIB THREDDS Data Server (Public) SOCIB list of variables (Private)
	Publish & update DOI	Every 4 months	SOCIB data products are collections of datasets wrapped together to represent the outcome of certain observation programs, campaigns and projects. The GLF data products are disseminated in the SOCIB data catalog with the corresponding Digital Object Identifiers (DOI). For data-products with DOIs,the available versions of the data-products are also exposed to facilitate its download.	DCF	SOCIB Data Catalog - GLF Landing Page (Public) SOCIB Data Catalog - Product User Manual (Public)
Distribution	Push data to Coriolis	Every mission	During the mission, RT EGO formatted files are automatically pushed to Coriolis, which integrates the data into CMEMS-INSTAC. Data are therefore available for external users on different infrastructures (i.e EMODnet).	DCF Data officer	IREP_DCF_data-dissemination-report_DMPr (Private)

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6. Data process

This section focuses on the flow of Ocean Glider processed data and information, in terms of data format and type, inputs and outputs, as well as the tools and technologies used. Both, real time (RT) and delayed (DM) data modes are considered in the workflow.

Mode	Data flow step	Data format Input	Data format Output	Type Input	Type Output	Tools and Technologies
Track	Acquisition	log	log	glider	dockserver	Satellite transmission
	Transfer	log	log	dockserver	raw	Iridium -> CLS -> SOCIB
	Processing	log	nc, kmz	raw	L0, L1	Processing application
	Reprocessing	log	nc, kmz	raw	L0, L1	Processing application
RT	Acquisition	sbd, tbd, mlg	sbd, tbd, mlg	glider	dockserver	Satellite transmission
	Transfer	sbd, tbd, mlg	sbd, tbd, mlg	dockserver	raw binary	Glider toolbox
	Pre-processing	sbd, tbd	dba	raw binary	raw ascii	Glider toolbox
	Processing	dba	nc, png	raw ascii	L0, L1, L2, L1_EGO	Glider toolbox
	Reprocessing	dba	nc, png	raw ascii	L0, L1, L2, L1_EGO	Glider toolbox
DT	Acquisition	dbd, edb	dbd, ebd	glider	flashcard	SD card reader or RF link
	Transfer	dbd, edb	dbd, edb	flashcard	ori	ftp://portal.socib.es/deployments
		dbd, edb	dbd, edb (symlinks)	ori	raw binary	gtp import_dtbin
	Pre-processing	dbd, edb	dba	raw binary	raw ascii	Glider toolbox
	Processing	dba	nc, png	raw ascii	L0, L1, L2, L1_EGO	Glider toolbox
	Reprocessing	dba	nc, png	raw ascii	L0, L1, L2, L1_EGO	Glider toolbox
DM	Post-Processing	nc	nc	L1_corr (CTD), L1 (glider)	L1_corr (glider)	salinity_correction_toolbox

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7. Contacts

This section includes the list of SOCIB's facility/service contributing to the tasks included in the workflow and their contact information.

Facility	Role	Name	Email
GLF	GLF Head	Nikolaos Zarokanellos	glider@socib.es
	GLF Chief Engineer	Albert Miralles	
	GLF Operator	Manuel Rubio	
RVF	RVF Scientist	John Allen	catamaran.cruises@socib.es
DCF	DCF Head	Juan Gabriel Fernandez	data.center@socib.es
	DCF Data officer	Miguel Charcos	
	DCF Data officer	Paz Rotllán	
	DCF Data officer	Miquel Àngel Rújula	
	DCF Data Technical	Xisco Notario	
	DCF Data Steward	Matteo Marasco	
ETD	ETD Head	Benjamin Casas	etd@socib.es
	ETD Support	Niko Wirth	
CIT	CIT Officer	Miquel Gomila	it.support@socib.es

8. Future improvements

In the future, SOCIB plans to improve the DMP as follow:

- Include guideposts, operation, sensor and piloting protocols, reports linked with the missions, services,visualization tools and products.
- Support and improve the reusability, accessibility and discoverability of the Ocean Glider data.

9. How to cite

When using this Data Management Plan, please use the following citation:

Marasco, M., Zarokanellos, N.D., Charcos, M., Fernández, J.G., Miralles, A., Rotllán, P., Tintoré, J. (2021). SOCIB Glider - Canales Endurance Line Data Management Plan (Version 1.0). Balearic Islands Coastal Observing and Forecasting System, SOCIB. https://doi.org/10.25704/vj13-eh49

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