EUROPEAN COMMISSION
Executive Agency for Small and Medium-sized Enterprises (EASME)

Department A - COSME, H2020 SME and EMFF
Unit A3 - EMFF

Project Full Name: Monitoring the Ocean Climate Change with Argo

European Maritime and Fisheries Fund (EMFF)

MOCCA

D4.1.1 Organization of Float Data Management among DAC and DM-operators

Circulation:	PU: Public
Lead partner:	Euro-Argo ERIC Central Infrastructure
Contributing partners:	BODC, Met Office, Ifremer, BSH, OGS
Authors:	Romain Cancouët, Sylvie Pouliquen
Quality Controllers:	Sylvie Pouliquen
Version:	1.0
Reference	D4.1.1_Organization of Float Data Management among DAC and DM-operators_v1.0.docx
Date:	15.12.2016

Euro-Argo ERIC
European Research Infrastructure
(2014/261/EU)

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Consisting of:

Organisation/Natural person	Represented by	Statute	Contributing entities[1]
Euro-Argo ERIC	N/A	Coordinator	N/A
The French Republic	Ifremer	Member	SHOM, INSU/CNRS, Meteo-France, IRD, IPEV
The Federal Republic of Germany	BSH	Member	GEOMAR, University of Hamburg, Alfred-Wegener-Institute for Polar and Marine Research (AWI)
The Hellenic Republic	HCMR	Member	N/A
The Italian Republic	OGS	Member	N/A
The Kingdom of the Netherlands	KNMI	Member	N/A
The Republic of Finland	FMI	Member	N/A
The United Kingdom of Great Britain and Northern Ireland	Met Office	Member	NOCS, BODC
The Kingdom of Norway	IMR	Observer	N/A
The Republic of Poland	IOPAN	Observer	N/A

Document History

Version[2]	Issue Date	Stage	Content and Changes
0.1	06.08.2016	Draft	Initial document creation
0.2	08.08.2016	Draft	Revision
0.3	12.12.2016	QC	For internal quality control
1.0	15.12.2016	Final	Final version for submission

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[1] As indicated in the "Technical and Scientific description of the Euro-Argo ERIC" July 2013 attached to the Euro-Argo Statutes.

[2] Integers correspond to submitted versions.

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1. INTRODUCTION

This document describes the organization of float data management among partners for the MOCCA project, for the Real-Time (RT) and Delayed-Mode (DM) phases. **Data processing for MOCCA floats is performed using the existing Argo Data System and organized through Euro-Argo data centres.**
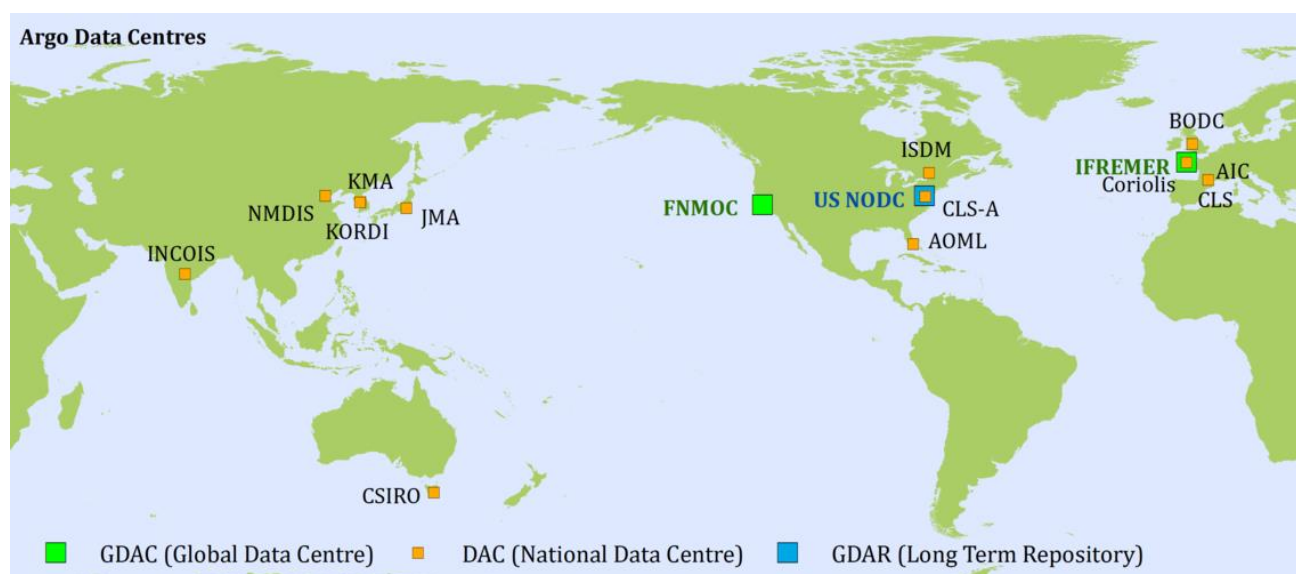
1.1. Argo Data System Overview

Figure 1: Argo Data System (© Argo Information Center)

The international Argo Data System is based on two Global Data Assembly Centres, a series of 11 national Data Assembly Centres and several Argo Regional Centres. Their functions are summarized below:

- **GDACs** (Global Data Centres), located at Coriolis/France and FNMOC/USA, are in charge of collecting the processed Argo data from the 11 DACs and to provide users with access to the best version of an Argo profile. Data are available, in a standard NetCDF format both on FTP and WWW. The two GDACs synchronize their database every day.

- **DACs** (Data Assembly Centres), they receive the data from the satellite operators, decode and quality control the data according to a set of 19 real time automatic tests agreed by the international Argo programme. Erroneous data are flagged, corrected where possible and then passed to the two GDACs and to the WMO GTS. The GTS data stream does not presently include quality flags and bad data and grey-listed data are not transmitted on the GTS.

- **ARCs** (Argo Regional Centres) provide wide expertise on specific geographical ocean regions in order to provide the most comprehensive data sets (including non-Argo data) of the highest quality. ARCs provide three main services: act as the delayed mode operator for "orphan" floats (i.e. float deployed by an institute that does not have a capability to perform delayed mode QC); gather the recent complementary in situ ship-based data needed for delayed mode validation; check the overall consistency of the Argo dataset in an area.
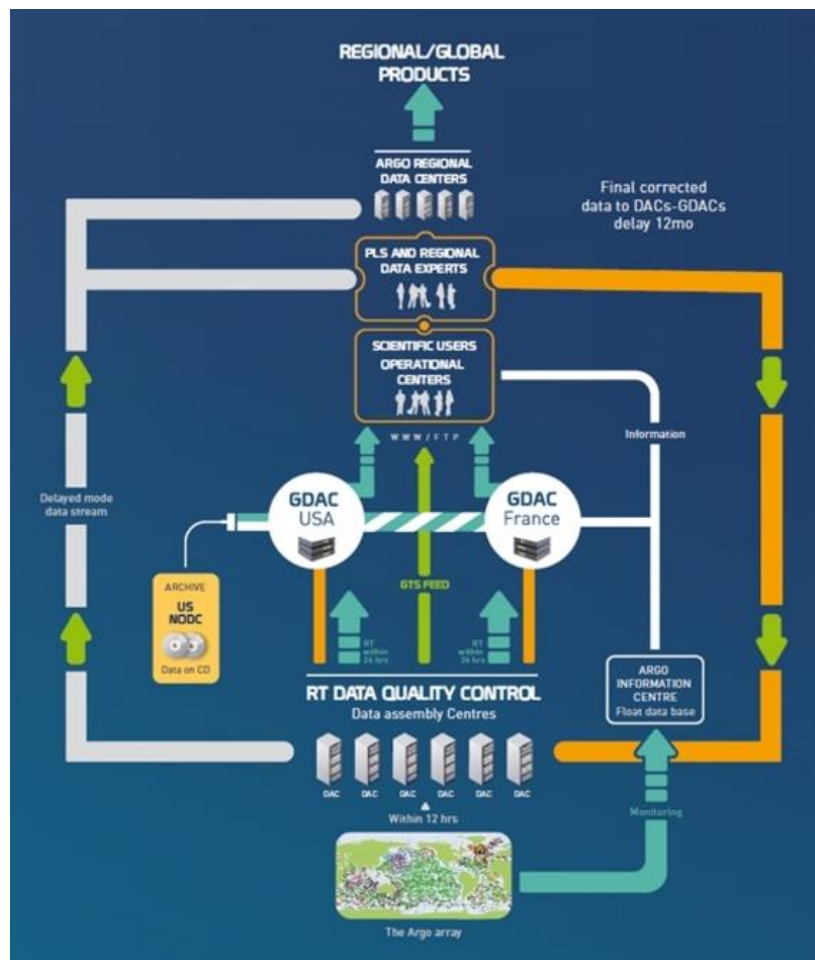
1.2. Euro-Argo Data Centres

Figure 2: Argo Data Flow (© Argo Information Center)

The Euro-Argo RI plays an active role in Argo data management:

- France **(Coriolis) hosts one of the two Global Data Assembly Centres (GDAC)**

- **Two DACs are operated by France (Coriolis) and UK (BODC)**:

  o The French DAC: The French Argo Data Centre, Coriolis, which is located within Ifremer-Brest and operated by Ifremer with support of SHOM, processes float data deployed by France and from other European (Germany, Spain, Netherlands, Norway, Italy, Finland, Greece, Bulgaria) and several non-European countries (e.g. Chile, Mexico).
  o The UK DAC: The UK Argo Data Centre, which is established at BODC, processes all UK, Irish and Mauritian float data

- Euro-Argo partners lead and contribute to two ARCs:

  o Atlantic ARC (NA-ARC): France has taken the lead in establishing the NA-ARC, which is a collaborative effort between Germany (IFM-HH, BSH), Spain (IEO), Italy (OGS), Netherlands (KNMI), UK (NOCS, UKHO), Ireland (IMR), Norway (IMR), Canada (DFO), and USA (AOML). Within the NA-ARC BSH and Hamburg University coordinate the activities in the Nordic Seas.

o   Mediterranean and Black Seas ARC (Med-ARC): Italy (OGS) has taken the lead in establishing the MED-ARC, which is a collaborative effort between Greece (HCMR), Spain (IEO), France (IFREMER, UPMC/LOV), Bulgaria (IOBAS, USOF).

o   Southern Ocean ARC (SO-ARC): UK has taken the lead in establishing the SO-ARC. This is a collaborative effort between BODC, CSIRO (Australia), University of Washington (USA) and JAMSTEC (Japan) with BODC having responsibility for the South Atlantic sector of the Southern Ocean.

1.3. Real-Time and Delayed-Mode processing

RT processing is carried out by DACs. Procedures flag the gross errors in the data but some subtle errors may remain like sensor drift, float trajectory problems etc. Elaborate procedures have been devised, based on statistical methods, and scientific expertise from principal investigators (PIs). The procedures are constantly assessed and updated as necessary. A minimum of 1 year of data is needed before the delayed mode processing can be performed.

2. MOCCA REAL-TIME PROCESSING

As agreed in the project Grant Agreement, MOCCA RT data processing will be done by the Euro-Argo DACs (Ifremer/Coriolis, NERC/BODC jointly with the Met Office) and GDAC (Ifremer/Coriolis). **The number of floats is shared equally between BODC and Ifremer (75 floats each).**

Ifremer/Coriolis will also integrate all the MOCCA data into the GDAC and provide user access mode adapted to different mode of use: ftp access allowing data download for operational users, and Web access allowing data visualization, selection and extraction with specific temporal and geographical criteria specified by users.

Real-Time data processing will be applied on the MOCCA fleet according the Argo standard procedures. See Argo Data Management (*http://www.argodatamgt.org/*) for further details.

The Real-Time processing phase has already started in May 2016 with the deployments of first floats. The processing chain was developed by Ifremer and is made available to the Euro-Argo and Argo communities. **Ifremer/Coriolis DAC (Data Assembly Centre) and GDAC (Global Data Centre) has implemented the chain for processing the first floats** in May 2016. In December 2016, the transfer of the processing chain to BODC was complete, and **BODC processed their first floats**.

Coriolis MOCCA floats data processing chain:
http://dx.doi.org/10.17882/45589

All MOCCA data are accessible through the Argo Global Data Centre and at *http://www.euro-argo.eu/EU-Projects-Contribution/MOCCA/Access-to-MOCCA-Data*
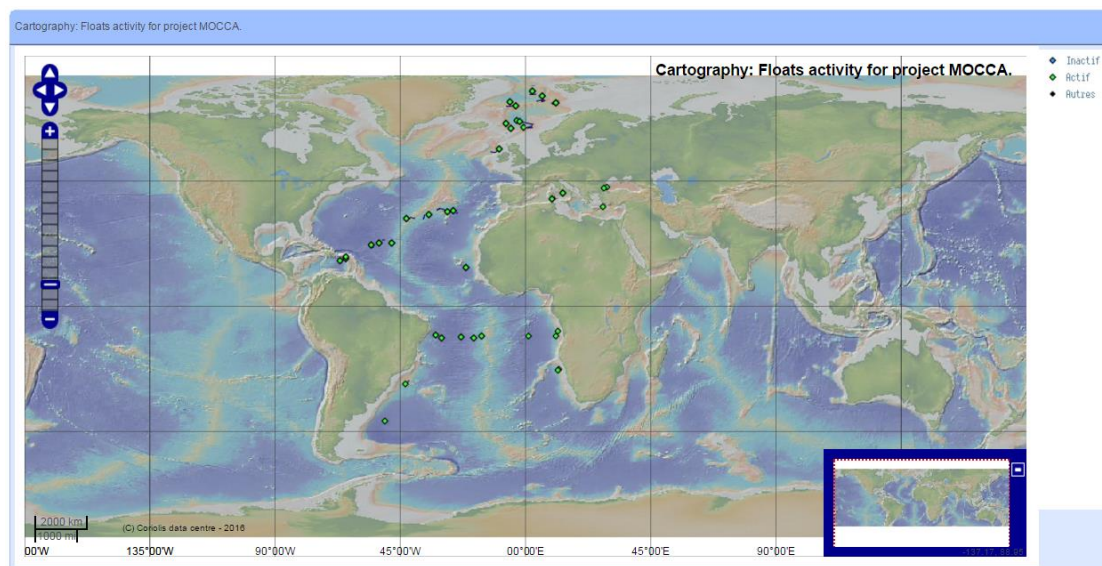

Figure 3: Positions and trajectories for all active MOCCA floats
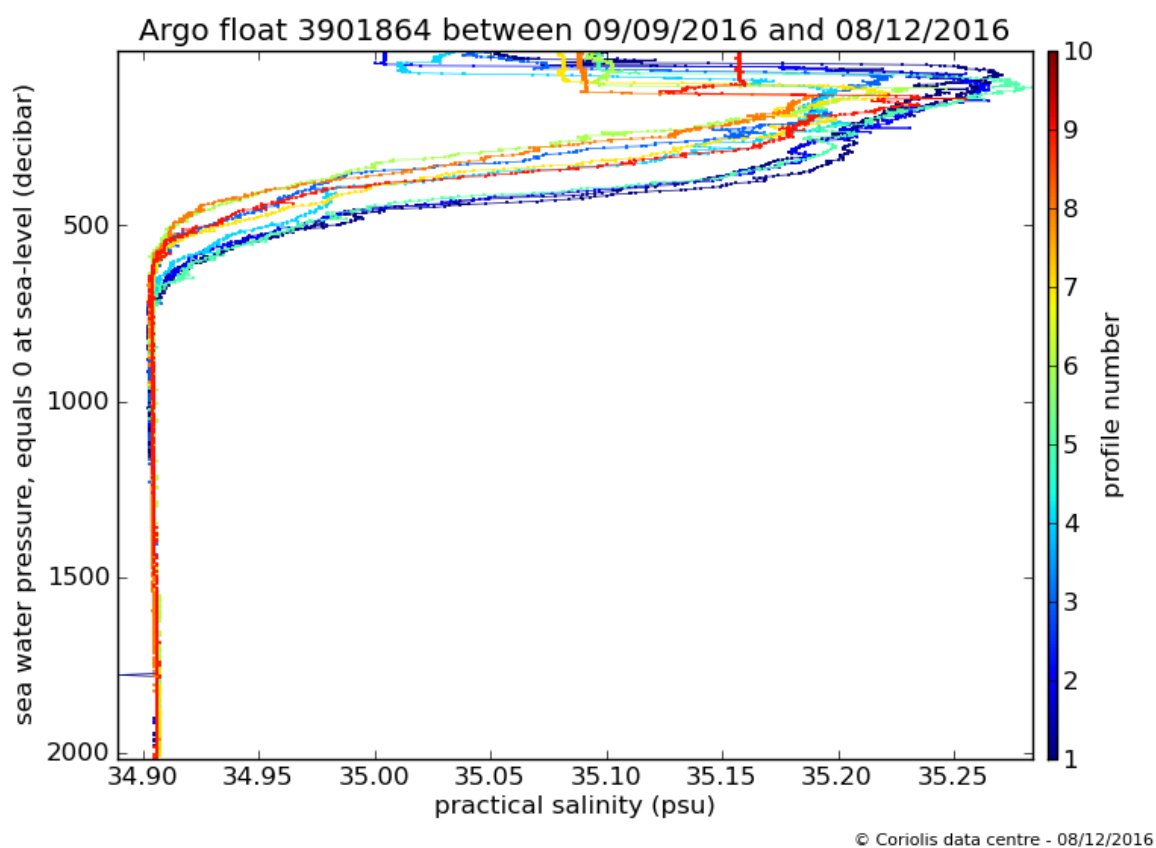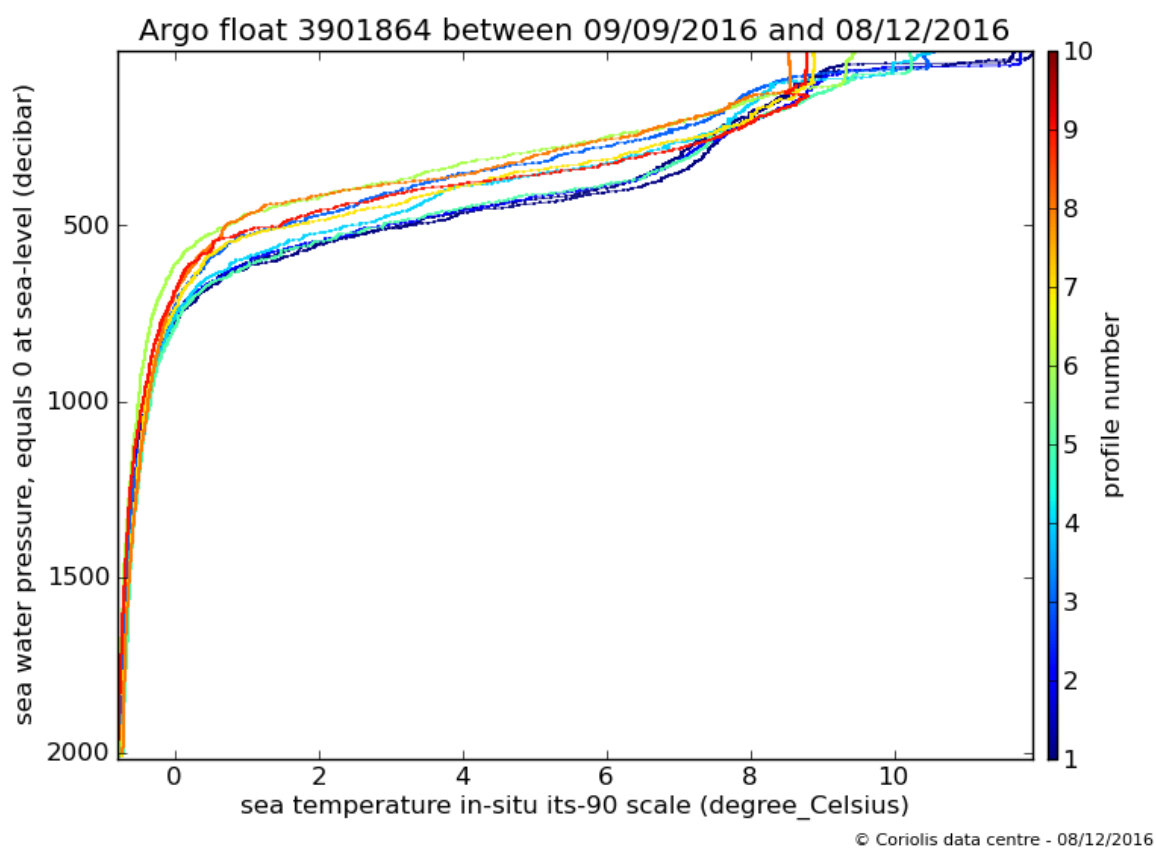
Figure 4: Example of one MOCCA float Temperature (top) and Salinity (bottom) data for first 10 cycles

3. MOCCA DELAYED-MODE PROCESSING

The DM processing for MOCCA floats will be shared equally between the four institutes taking into account their area of expertise (120 floats):

- Mediterranean and Black sea for OGS,
- Nordic Seas and Atlantic Ocean for BSH,
- Southern Ocean and Atlantic Ocean for BODC,
- Atlantic Ocean for Ifremer.

The co-funded floats (30 floats) are managed:
- By BSH for German ones,
- By OGS for Italian one,
- By WP4 partners for Netherlands and Poland ones.

In October 2016, the following deployment plan was elaborated for MOCCA floats. DM operators were then identified according to their area of expertise.
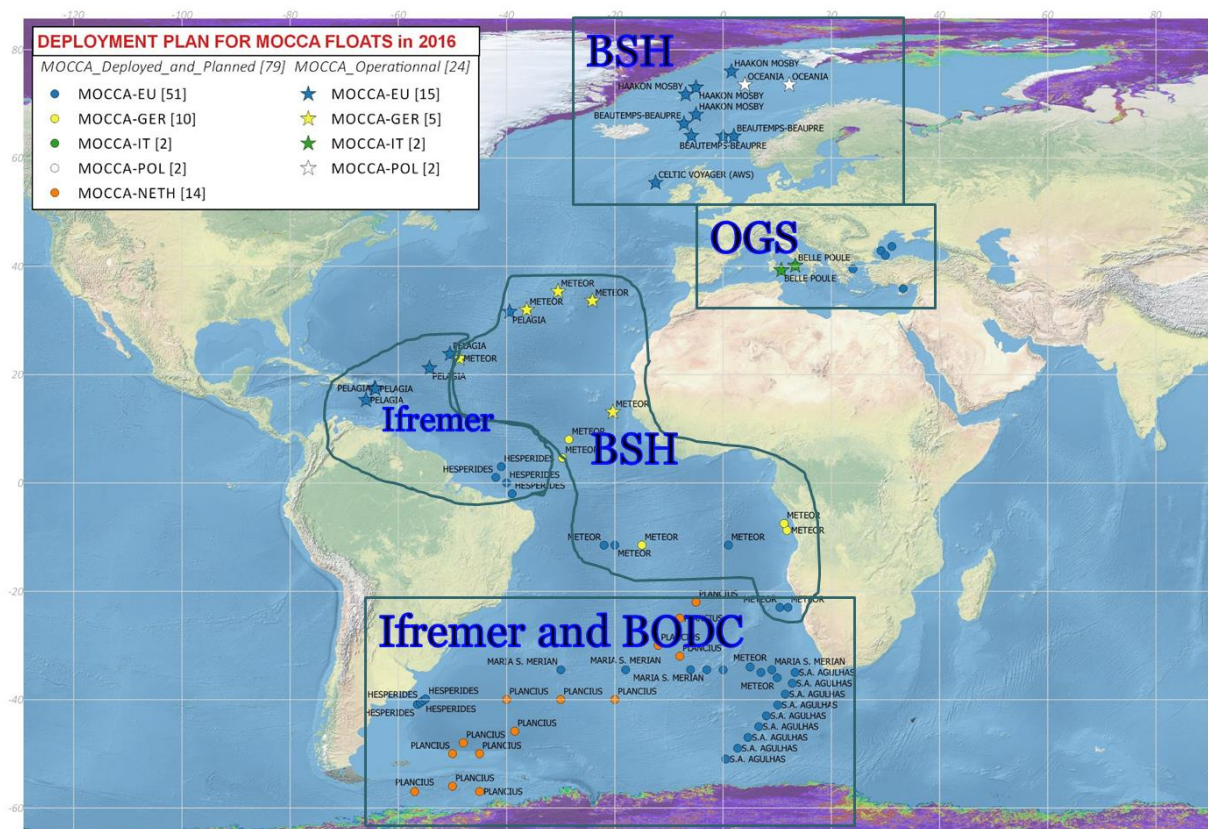

Figure 5: Repartition of DM operators for the MOCCA floats deployed in 2016