

EUROMARINE FORESIGHT WORKSHOP:

*Improving the visibility of ocean data from new technologies: a case study of high frequency flow cytometry.*

**March 21-23, 2018 - M.I.O., Marseille, France**

**Co-Organisers:** Véronique Créach (Cefas, UK), Melilotus Thyssen and Gerald Grégori (CNRS-INSU, France), Alain Lefebvre (IFREMER, France)

The phytoplankton diversity in the different marine areas has mainly been studied and monitored from discrete samples collected manually, with the species determined later by microscopy. The development of new technologies and particularly flow cytometry (since the 1980s) has revealed new functional types such as picophytopkankton and has greatly increased the sampling density. By measuring near continuously and at high resolution, automated flow cytometry is giving a better understanding of phytoplankton structure and dynamics and is providing new services for aquaculture, fisheries in coastal and shelf seas. More flexible, and more reliable, the new generation of instruments can also be connected online and remotely operated *in situ* installed in different platforms such as buoy, research vessel, and fixed platforms. During the last 10 years, scientists have developed collaboration around the North Sea, Channel, Baltic and Mediterranean Sea, sharing experience and knowledge on online flow cytometry measurement. The recently funded EU network of coastal observations called JERICO-NEXT aims to integrate biogeochemical and biological observations for ecological assessment. In the case of flow cytometry, the quantity of data produced as well as their different format compared to the traditional approach, makes the integration even more difficult. During the foresight workshop, we propose to discuss the terms of reference, metadata, and quality control processes needed to create the framework of a new database for storing mainly flow cytometry data. This will be done with the collaboration of other scientists involved in SeaDataCloud which is a standardized infrastructure for managing large and diverse data sets collected by the oceanographic fleets and the automatic observation systems. Following a two-day workshop organised by JERICO-NEXT entitled” Algal bloom dynamics and phytoplankton automated observations”, the foresight workshop will be able not only to connect experts in phytoplankton ecology and data managers but also potential users such as monitoring agencies, and remote sensing scientist and modellers.

**Programme**

Wednesday 21th of March 2018: 14:00 PM to 18:00 PM

*“Practical workshop on clustering and identification of phytoplankton functional types”*

During two hours, the participants will be guided by experts on automatic (EasyClus, R-Tools) and manual (Cytoclus) approaches to determine phytoplankton functional types. CYZ files acquired in different seas will be provided but you can bring your own data. 2 or 3 computers will be available to test EasyClus and R-tool, and you can use your personal computer for Cytoclus. Each participant should not be staying more than 40 minutes per working station.

The session will end with presentations on future developments of flow cytometer tools by Thomas Rutten (Thomas Rutten Projects, The Netherlands), Guillaume Wacquet (CNRS-LOG, France) and Rob Lievaart (Cytobuoy, The Netherlands).

Thursday 22nd of March: 9:00 AM to 12:30 PM

*“How to harmonise flow cytometry data: from individual scientist to pan-European research network”*

In the past 15 years, flow cytometry technology has evolved drastically from analysing discrete samples to continuous high-frequency automated measurement. One of next challenge is to move from individual-oriented research to international coastal infrastructure. After a general presentation on high frequency flow cytometry and the role of the *in-situ* biological sensors in the marine observation network, new generic terms for flow cytometry will be presented as well as the accessibility of the flow cytometry data in national and European databases.

Speakers: Melilotus Thyssen (MIO, France), Véronique Créach (Cefas, United Kingdom), Gerald Gregory (MIO, France), Soumaya Lahbib (MIO, France), Elisabeth Debusschere (VLIZ, Belgium)

Thursday 22nd of March: 14:00 PM to 18:00 PM to Friday 23nd of March: 9:00 AM to 10:20 PM

*“user needs: are the in situ data fit for purpose?”*

After chlorophyll, phytoplankton functional types represent important biological ocean environmental variables (OEV) to collect to validate earth observations (EO) and modelling outputs likely to be used for MSFD and WFD assessments in our seas in the near future. Due to new developments in the technology and particularly the versatility of the instruments, the quantity of data collected increased exponentially the last 10 years. In this session, applications of the flow cytometry for monitoring in France, The Netherlands and Italy will be presented following by examples of EO and modelling applications using already phytoplankton functional types.

Monitoring session: Alain Lefebvre (Ifremer, France), Felipe Artigas (CNRS-LOG, France), Machteld Rijkeboer (RWS, The Netherlands), Mark Van Dijk (OGS, Italy).

EO session: Astrid Bracher (WAI, Germany), Anne Helen Reves (CNRS-LOG, France), Emanuele Organelli (PML, United Kingdom).

Modelling session: Johan van der Molen (NIOZ, The Netherlands), Melika Baklouti (MIO, France), Richard Law (Univ. York, United Kingdom).

Friday 23nd of March: 10:50 AM to 12:30 PM

* Summary of all the comments made after each session during the last 2 days
* Establish the priorities and the timeline for future actions.