Abstract
This communication focuses on the features of the WAVY Operation Software, addressing the needs of research teams in supporting the planning and operation of WAVY drifters in the scope of field research missions. The WAVY Operation Software is planned to be distributed alongside with the WAVY drifters to provide an interactive way of managing the campaign related data, as well as tools for exploratory visualization, cooperative annotation and sharing duly cleansed and curated datasets.

Keywords - MELOA, Observation and Measurements, Sensor Observation Service, SensorThings, WAVY drifters

I. INTRODUCTION
Field campaigns require on site organization and annotation of acquired measurements, such as the context in which they were acquired, device calibrations, user notes over measurements in the acquired datasets and exploratory visualization of the data collection in progress since it may provide important insight for possible observation procedure adjustments. This communication describes how such tasks are accomplished in the scope of MELOA (Multi-purpose/Multi-Sensor Extra Light Oceanography Apparatus) project, particularly in the scope of littoral campaigns, in which WAVY drifter units are deployed near shore to the sea and again collected by multi-disciplinary research teams. Researchers from multiple institutions taking part in the campaign interact with the WAVY Operation Software (WOS) allowing users to collaborate in providing context and managing the measurements acquired by the devices.

II. METHODS
The WOS leverages on the conceptual model of the Observation & Measurement (O&M) standard [1], enhancing it with the necessary organizational, methodologic and contextual elements to support the planning, in-situ operation and post-processing phases of a multi-disciplinary research campaign. It follows a RESTful architectural style, building into a service ecosystem that incorporates other components such as catalogue systems and mobile applications for diverse application domains.

Features in the WOS include but are not limited to:
- Planning and management of a research campaign, including organizational aspects such as involved researchers and associated role-based access control (by user or participating institution), characterization of the desired area including map overlays, equipment to be used in a particular campaign and their characteristics, etc…
- Exploratory visualization of incoming data, allowing dynamic adjustment of campaign procedures and initial planning, as well as facilitating on-site recovery of WAVY drifter devices;
- Cooperative annotation of data streams, providing an interactive alternative to traditional log books for the record of relevant in-loco events and context information, that can provide additional input for post-processing;
- Support the creation of derived datasets, resulting from the post-processing of the original ones with the aid of data cleansing functionalities (possibly based on prior annotations), outliers identification, and other tools allowing the identification of inaccurate or meaningless data;
- Publishing data to DEIMOS catalogue and other external O&M compliant systems such as the SOS (Sensor Observation Service) [2], SensorThings API [3], or even different catalogues such as FIWARE.

III. RESULTS
The WAVY Operation Software is composed by three main components: Server, Web Client and Real Time Data Streamer.

The Server is the core component of the WOS, storing all the relevant information of the system, mapping the measurements received to the current context and providing a RESTful API service allowing technical users to develop custom applications.

The Web Client offers a responsive user-friendly interface with simple CRUD (CREATE, READ, UPDATE and DELETE) interfaces to manage all the research campaign related data. Additionally, it offers a map-engine with the basic functions to navigate the georeferenced measurements in real-time, or load the georeferenced measurements from prior launches. The Real Time Data Streamer is a message broker that allows the WOS to subscribe and consume real-time messages sent by the WAVY drifters with virtually no data loss (assuming that data reaches the streamer), even in an unlikely event of server unavailability or maintenance, the Real Time Data Streamer will store the measurements until they are successfully transmitted to the WOS server component. The WAVY drifters send the measurements to the Real Time Data Streamer using the HTTPS (Hyper Text Transfer Protocol Secure) protocol, which then delivers them to the Server using the AMQP (Advanced Message Queuing Protocol) protocol.

IV. CONCLUSIONS
This communication introduces the WAVY Operation Software (WOS), a software system to be distributed alongside the WAVY drifters, which is under development in the scope of the EU project MELOA. Although this is a work in progress, given that MELOA is still in the first of its three year duration, a set of functionalities is in place, allowing WOS to be tested during the scheduled campaigns. User feedback and lessons learned in the scope of field campaigns will allow the refinement of existing features and the incorporation of new functionalities to enhance end-user experience.

REFERENCES

Fig 1. WAVY Operation Software - History Map