Towards an integrated network of FloX systems. Focus on FLEX mission

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The calibration and validation (cal/val) of the upcoming ESA Fluorescence Explorer (FLEX) and derived products are central but challenging components of the mission. Aside from vicarious calibration of the sensors, the validation of the mission will rely on a combination of different data collected on the ground with several sensors. In order to exploit the heterogeneity of fluorescence emitted by terrestrial ecosystems, networks of several instruments covering a wide range of plant functional types are needed in order to benchmark the satellite measurement to the ground. Within the ESA DEFLOX project, currently running, we are developing an integrated network with the aim of hosting data collected by the FloX instruments. The FloX (Fluorescence BoX), is made to synchronously acquire upwelling and downwelling radiance, featuring a high-performing spectrometer (FWHM: 0.3 nm, SSI 0.15, SNR 1000) and allows continuous measurement of solarinduced chlorophyll fluorescence (SIF) emission. Furthermore, continuous measurements of spectral down-welling and up-welling radiance, using an additional spectrometer in the VIS-NIR range, allows for the computation of reflectance and different spectral indices. Even if the instrument is standardized in terms of operation and data processing, there is not an established official FloX network with the goal of guaranteeing long terms high quality data acquisition, data exchange and maintenance (e.g. periodic calibration).

With the ESA funded DEFLOX - CCN5 project we propose a detailed solution for this. In particular, the goal of the project is to define and implement the network structure, providing a solution which covers the following aspects:

- Manufacturing of a movable calibration device for in field periodic calibration.
- Create an automatic data processing pipeline including uncertainty propagation.
- Implementation of a data base and final user interface.

In this contribution we provide an overview of these activities and preliminary results running in the context of the FLEX validation framework.