Thursday, October 11
Oral Session 9
08:30–10:30

08:30–08:50

CONTINUOUS INTEGRATING CAVITY MEASUREMENTS OF ABSORPTION SPECTRA AND THEIR EVALUATION WITH RESPECT TO PHYTOPLANKTON DISTRIBUTION

The absorption properties of natural waters can vary considerably due to differences in the concentration and composition of their optically active constituents (phytoplankton, CDOM, and non-algal particles). Due to this dependence, absorption coefficient measurements can provide information about these parameters. Of special interest is the investigation of phytoplankton by this means, because different groups can be characterized by their absorption signature. Furthermore, absorption coefficient spectra are important as input for models calculating the underwater light field and for the validation of remote sensing observations. Integrating cavity approaches have been shown to be very suitable to obtain accurate absorption coefficient measurements, as they overcome problems like the often low concentration of absorbing material and errors introduced by light scattering on particles. However, these instruments require frequent calibration, because their optical path length changes with the reflectivity of the integrating cavity, which is subject to contamination and aging. While feasible for lab application, this is a major obstacle for the long-term deployment of flow-through integrating cavity instruments. In this contribution, we describe the development and current status of a completely automated integrating cavity instrument designed for flow-through operation. The Hyperspectral Absorption Sensor (HyAbS) is based on a point-source integrating cavity absorption meter (PSICAM), and the challenges and potential solutions with respect to its long-term automated operation are highlighted. Example data from field deployments is shown, and a special focus is put on the approach used to evaluate the obtained absorption spectra in real time for phytoplankton biomass and taxonomy.

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