A new approach to obtain high-resolution ground-truth data by marine LIF LiDAR from the upper water layer for the satellite bio-optical models of water quality parameters retrieval and environmental survey

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Currently, an in-demand area of research is the development of regional bio-optical satellite algorithms for restoring concentrations of key water quality parameters for inland reservoirs and coastal marine areas that are influenced by various factors, such as continental runoff, coastal erosion, algae blooming, or active hydrological processes.

A new approach to a high-performance collection of subsatellite data on concentrations of chlorophyll a, organic, and mineral dissolved and suspended matter together with Rrs high-resolution data is proposed, which allows obtaining large ground-truth datasets simultaneously with satellite imagery and which are statistically reliable for the development of bio-optical models. The approach uses self-designed LIF LiDARs and a 3-channel spectrometer [1]. Survey examples in various water basins are given.

The report will also address issues related to a) the spatiotemporal variability of inhomogeneous wind-driven currents affecting the subpixel variability and time interval between satellite overpass and in situ measurements; b) the effect of high chlorophyll concentrations on the evaluation of aerosol optical depth (AOD) by standard algorithms, and the approach to consider it by utilizing a fixed AOD value calculated through a certain percentile of pixels with clean water where black water assumption works [2].

Keywords: Laser-Induced Fluorescence; LIF lidar; chlorophyll; CDOM; TOC; TSS; Sentinel.

References
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