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TITLE: Spatial distribution and seasonal variability of chlorophyll-a concentration in the Azov Sea turbid waters by means of remote sensing and continuous fluorescence measurements.

PRESENTATION TYPE: Poster Requested

CURRENT SECTION/FOCUS GROUP: Global Environmental Change (GC)

CURRENT SESSION: GC16. Regional Climate Impacts 7. Environmental, Socio-economic and Climatic Changes in Northern Eurasia and their Feedbacks to the Global Earth System: The Role of Remote Sensing and Integrative Studies

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ABSTRACT BODY: The goal of this study was to apply continuous fluorometric and remote estimation of chlorophyll-a concentration (Cchl) techniques to complex turbid waters of Azov Sea and explore Cchl temporal variation and spatial pattern. Azov Sea is the shallowest sea in the world with maximum depth below 15 m. Its maximum salinity is about 14‰; total suspended solids and chlorophyll-a concentrations reach 120 [tex]g m^{-3}[/tex] and 100 [tex]mg m^{-3}[/tex] respectively in Taganrog Bay, daily production varies up to 3.5 [tex]gC_{org} m^{-3}[/tex].
Chlorophyll-a concentrations were measured in 2008-2010 year-round spectrophotometrically, 446 water samples were taken to calibrate fluorometerical and remote sensing data. The highest recorded concentration was 149.3, the lowest – 0.3 [tex]mg m^{-3}[/tex].
Continuous-flow fluorometer was applied in the course of 3 expeditions to Taganrog Bay to measure chlorophyll-a fluorescence (Fchl) each 30 meters along the ship path. Two-cuvette fluorometer was used to discount the influence of dissolved organic matter. Fchl measurements were calibrated and Cchl profiles derieved to estimate Cchl spatial heterogeneity in close scale. Fchl measurements were also made during moorings each 6 seconds to estimate temporal Cchl variability.
Recently published algorithm based on reflectance in the red and the near-infrared (NIR) spectral regions was applied to MERIS data for the remote estimation of Cchl. Taking in account fluorometric Cchl spatial heterogeneity estimation, the algorithm for culling the outliers in Cchl fields derived from satellite data was developed. 74 images were processed to Cchl maps and then averaged monthly.
Consequently, Cchl spatial distribution and seasonal variability were studied. Spectrophotometric, flourumetric measurements and values obtained by NIR-red algorithm showed strong correlation in turbid Case II waters of Azov Sea. Fluorometric and remote measurements showed high Cchl variations in short and long terms. Highest temporal variability was observed in Taganrog Bay, where Don River flows in - Cchl may variate up to 20 [tex]mg m^{-3}[/tex] for few hours. Two plankton growth periods were detected: the first in March, and the second from June to October with highest concentrations in July and August. Highest concentrations occurred in the most freshwater, shallow and warm Taganrog Bay and in the center of the sea, probably because of water flows scheme. The lowest values were observed in distance from shores.

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INDEX TERMS: [0480] BIOGEOSCIENCES / Remote sensing, [0496] BIOGEOSCIENCES / Water quality, [0460] BIOGEOSCIENCES / Marine systems, [0438] BIOGEOSCIENCES / Diel, seasonal, and annual cycles.
