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Mapping small-scale river plumes in the Black Sea using shipboard spectrophotometry and fluorimetry

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Because of their confined nature and strong interactions with the continent, inland and marginal seas generally differ from the open ocean in the terms of their optical properties, and often exhibit significant regional peculiarities. This is especially true for the regions of freshwater discharge influence.
Shipboard spectrophotometry and fluorimetry data were collected in the areas of mixing between river and sea water near several small river estuaries in the Russian shelf of the Black Sea (Mezyb, Pshada, Vulan, Ashamba rivers). The field campaign was conducted in the summer of 2007. The data from passive spectrophotometer (rho-meter) were used to reconstruct the brightness spectra of the sea radiance coefficient, while the data of the fluorescence lidar were used to produce high resolution maps of chlorophyll, dissolved organic matter, and suspended matter concentration in the study area. The observations were accompanied by CTD profiling and ADCP measurements. It was observed that while the radiance and fluorescence spectra are good proxies for fluvial discharges in the coastal ocean, the mixing zones traced thereby do not always coincide with those inferred from physical hydrographic measurements.