

## MONITORING OF COASTAL SEA AQUATORIES USING PASSIVE OPTICAL REMOTE SENSING

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Passive optical remote sensing methods - shipborne, airborne or helicopterborne and satellite based - are discussed. Their main advantages and disadvantages as well as application areas are reviewed.

One of the most informative characteristics of the sea waters of the aquatoria under investigation is the Spectral Radiance Coefficient (SRC). The method of SRC measuring from board a moving ship will be presented (Figure 1).

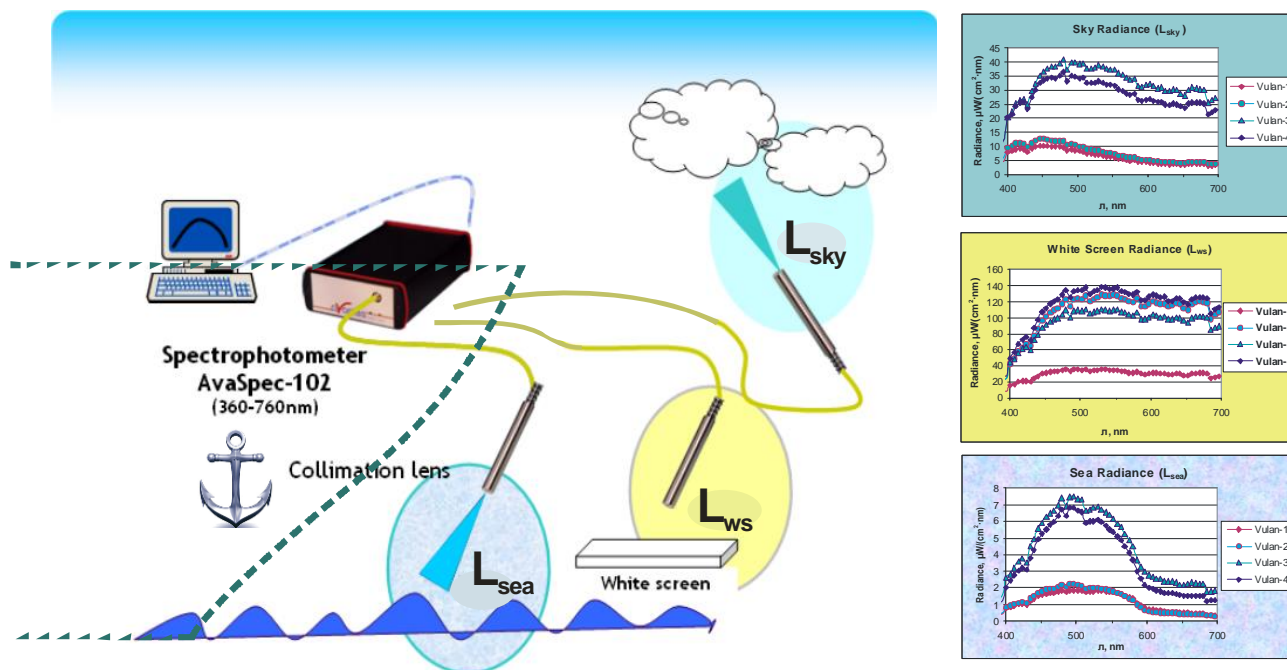


Figure 1: The scheme of measuring to obtain SRC onboard a ship and some examples of the registered spectra of the sea, sky and white screen radiances.

Some examples of SRC spectra obtained in the Atlantic ocean and in the seas washing Europe will be presented and their peculiarities will be discussed. It will be shown there is a real possibility of water type classification on the basis of measured SRC.

However, an adverse effect of the weather conditions on SRC values measured by remote sensing makes it difficult to interpret the obtained spectra. The calibration method usually used in open sea waters is given. It is shown why it is not applicable for mesotrophic and eutrophic waters in coastal areas and inland seas.

A new method of SRC spectra calibration for coastal waters, which uses some peculiarities of pure seawater absorption (WASM – water absorption step method), was suggested by us. The application of WASM is demonstrated for processing the data measured at the Black Sea polygon. As a result of its application we estimate the seawater absorption spectra (Figure 2).

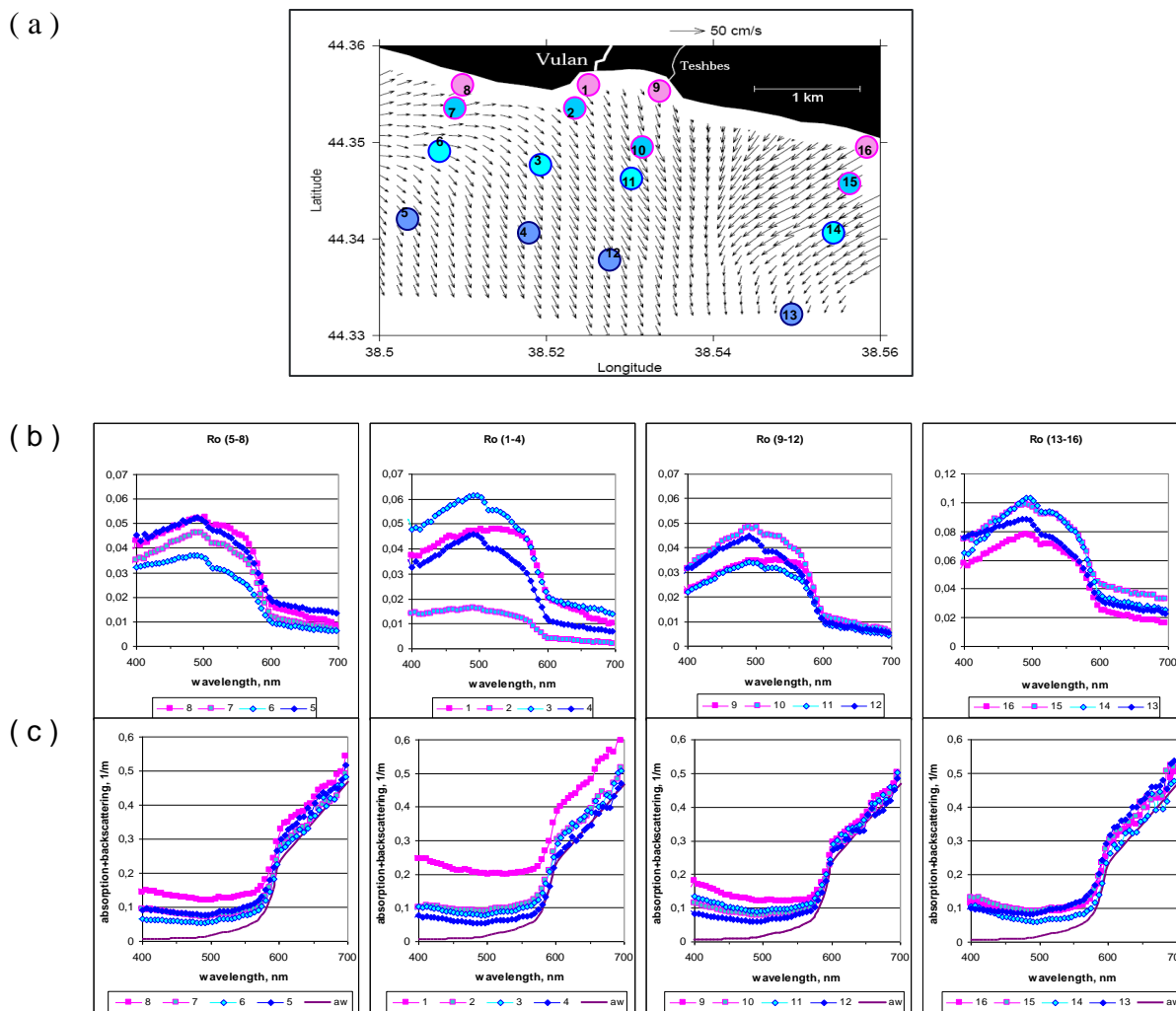


Figure 2: The Vulcan-mouth polygon in the Black Sea (a). SRC measured in every point (b). Absorption spectra calculated using WASM, the new calibration method (c).

Then the seawater main constituents' concentration (phytoplankton pigments, yellow substance and suspended matter) can be estimated using seawater absorption spectra. Comparison of the concentration values obtained from SRC spectra, measured onboard a ship, and the ones estimated traditionally in water samples from the upper sea layer showed satisfactory coincidence. Now it will be possible to map the seawater components distribution over the aquatoria of interest.

A new three-channel optical device EMMA (Ecological Monitoring of Marine Aquatories) for automatic monitoring of sea aquatories is presented. Its algorithm of data processing includes the new calibration method WASM. The results of its testing in the Black Sea and near Taiwan are discussed.

Application of EMMA in ground truth measurements for testing the hyperspectral instruments based on Russian satellite "Resurs-P" is suggested.

This work has been supported by Grant RFMEFI61315X0050 of Russian Education and Science Ministry and by Russian Scientific Fund Project N 14-50-00095 (in part of the device testing).