

DESCRIPTION FOR THE GENERAL PUBLIC

Satellites measurements of the Baltic Sea and correct interpretation of the signal measured by the satellites still constitutes a high challenge for scientists. Because of inland location of the Baltic Sea, the properties of its waters are highly determined by allogenic material supplied mainly by water terrestrial runoff and offshore winds. Such waters containing both autogenic constituents, i.e. products of the local ecosystem, and allogenic components, are classified as Case 2 waters (Morel i Prieur, 1977). The elements which occur in natural waters as a standard are divided into suspended particulate matter (SPM) and chromophoric dissolved organic matter (CDOM). These substances reacting with light in the process of absorption and scattering modify water color which constitutes the basic source of information in remote monitoring of water regions. Observations and analysis of initial measurement results carried out by the author of this project, present that in the water of the Baltic in the spring season occurs one more very crucial element which hasn't been taken into consideration until now. These are pine pollen which float on the surface of water in very large quantity and they may periodically alter water color. It appears from my observations carried out while May-cruises in the years of 2011-2014 that yellow pollen based suspension is observed not only in the coastal zone but also at more considerable distances from the land e.g. central areas of Gdańsk Bay or Bornholm surrounding.

Initial measurements by the meter LISST-100X (Laser In-Situ Scattering and Transmissometry) depicted that locally pollen in near surface layer may constitute even more than 40% of all suspensions existing in the water (Pawlik and Ficek 2016).

Referring to the above, the main objective of this project is to examine and characterize optical properties of pine pollen grains to determine their local concentration in the sea water as well as to determine the influence of this constituent on the quality of satellite measurements analyzing optical concentration of crucial water constituents (chlorophyll *a*, SPM, CDOM).

To effect the objective, a series of lab experiments is required as well as carrying out the research directly in marine environment. In the laboratory chemical and optical characteristics of pollen itself will be examined. The pine pollen grains will be used as a research material which has been collected directly from the tree. Because in the Baltic Sea pollen occurs along with other elements of OAC therefore, it is planned to examine biooptical characteristics of pine pollen mixture and monoculture of various species of phytoplankton.

Species which dominate in the Baltic in the period of pine pollinating will be selected to this experiment. Prepared mixtures will contain various proportions of pine pollen as well as phytoplankton cells.

During the period of pine pollinating, in situ measurements are planned, and while which using special research equipment measurements of optical sea water characteristics will be carried out. From the ship deck, the following measurements will be performed:

- Volume concentration of suspensions in 32 size classes (LISST-100X, Sequoia Scientific)
- Underwater and above water light field (Hyper Spectral Radiometer HyperPro, Satlantic)
- Absorption and light attenuating coefficient in sea water (ac9, WET Labs)
- Light backscattering coefficients in water (Hydroscat, WET Labs; Eco VSF, WET Labs)

Moreover, in selected measuring points, environmental samples will be collected to be analyzed in the laboratory (among others quantitative and qualitative composition of marine phytoplankton, concentration of suspended particulate matter (SPM), the absorption coefficient of phytoplankton, non-pigmented particles, colored dissolved organic matter (CDOM)).

Complex measurement of optical properties of pine pollen itself as well as grains of this pollen occurring in sea water as well as its mixtures with various quantity of optically crucial water constituent, will result in updating the knowledge from the range of natural water optics.

Examining the disturbing influence of this constituent on the quality of remote measurements of the concentration of OAC in the water will allow for reducing the mistakes made at creating and interpreting satellite maps.