

DESCRIPTION FOR THE GENERAL PUBLIC

The main goal of the project is to perform advanced research and to formulate precise mathematical and statistical description of the complex relationships between optical properties and main biogeochemical and physical properties of suspended particulate matter in the southern Baltic Sea.

The proposed comprehensive research will be characterised by the use of new and accurate methods of measurement. In frame of the project the so-called inherent optical properties such as spectral coefficients of light absorption and scattering by suspended particulate matter in the southern Baltic Sea have to be studied in detail. These studies will be conducted in a possibly wide spectral range of light from the near ultraviolet through the visible range to the near infrared, and with the highest possible resolution. At the same time a broad set of biogeochemical and physical properties of suspended particulate matter will be analysed. Among measured quantities will be total concentration of suspended matter, concentrations of its inorganic and organic fractions, concentrations of main elements in the suspended matter such as carbon and nitrogen, as well as concentrations of different pigments of the marine phytoplankton. All these biogeochemical analyses will be supplemented by precise measurements of the particle size distributions carried out in a wide range (particles from less than one to hundreds of micrometres in size will be analysed). Different regions of the southern Baltic sea will be covered by the proposed research: from river mouths being the potential sources of particulate matter of terrestrial origin, through bays and coastal areas, to open sea waters. The research will be carried out in different seasons of the year, with a special emphasis on seasonal variations associated with the typical spring and summer blooms of marine phytoplankton, and seasonal dynamics of inorganic and organic particle fluxes from land sources. Variations in the suspended matter properties with depth will also be considered.

The most important result of the project will be formulation of a new set of precise mathematical formulas and statistical generalizations describing interrelationships between seawater inherent optical properties and different physical and biogeochemical features of suspended particulate matter. The newly formulated formulas and relationships, in addition to having a purely cognitive value, will also serve to achieve additional utilitarian goal of the project. The additional result will be the development of advanced and effective versions of algorithms underlying optical methods of investigating the spatial distribution and dynamics of biogeochemical and physical seawater parameters in the region of the Baltic Sea. These algorithms are intended to use simultaneously a broad spectrum of information which lies in the spectral characteristics of light absorption and scattering in seawater. All important results of the project will be presented at scientific conferences and in the form of publications in peer-reviewed journals of international scope.