

A Special Issue on Underwater Optics with Applications

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Preface

SUVI – a study of optical signatures and the ecological state of the Finnish and Estonian lakes and the Baltic Sea

The aim of the optical research in general is to study the optical properties of lakes and the sea, the connections between the optical properties and the ecological state of the water, and the significance of the optical properties to the heat budget of the lakes. The concern about our environment are enhancing the need for more extensive optical research. The optics is also multidisciplinary, since the ecological aspects link physics (hydrology and oceanography) to chemistry and biology (limnology and marine biology). The optical research in general concentrates on the measurements of the following features: underwater light field (up/downwelling irradiance), inherent optical properties (attenuation, absorption, and scattering), remote sensing reflectance and fluorescens.

SUVI is a Finnish-Estonian joint program on optics of lakes and the Baltic Sea. It started in 1994 and the third phase (2000–2002) is continuing. The partners are the Department of Geophysics, University of Helsinki, Estonian Marine Institute (marine optics group), and University of Tartu (environmental physics). The field work has been performed during four one week long periods each summer and shorter periods during winter time. The optical data consist of measurements of boat-borne remote sensing reflectance, underwater light radiation field, inherent optical properties (light attenuation, absorption, and scattering) of the water, and biochemical measurements. The latter to be able to interpret the optical signatures for the water quality and the ecological state of the natural waters. The purpose of these studies is to collect data for joining the optical properties to the biological and physical ones and the subsequent modelling of the processes which connect these properties. One of the more specific aims has been to aid in elaborations of better remote sensing methods (which are highly needed) for turbid waters in lakes and in the coastal areas. The project involves, in addition to the field work and data analysis, an annual seminar and workshops and also educational efforts. Several academic degrees have been (and will be) achieved during this project.

The second part of this issue of GEOPHYSICA is a collection of papers presented in the VI annual SUVU seminar in Helsinki on 21–22 April 1999.

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