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Remote Sensing, Laser Probing, and Imagery in Natural Waters

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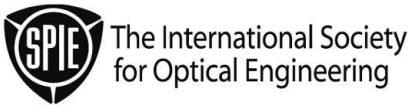

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Introduction

In 2001, a new international conference series on Current Problems in Optics of Natural Waters (ONW-2001) was initiated in St. Petersburg, Russia. Further conferences were held in 2003 and 2005 (ONW-2003 and ONW-2005), also in St. Petersburg. Conference organizers hope that this series will provide a modern continuation of the Plenums on Ocean Optics held in the Former Soviet Union between 1974 and 1990, but now with international participation. Approximately 100 scientists from 10-15 different countries have participated in each conference, stimulating scientific discussion and new, collaborative international research projects.

This volume brings together extended versions of selected papers from ONW-2003 and ONW-2005 that describe significant progress in the topics of passive remote sensing of the ocean; theory and data analysis related to active laser systems; and advances in imaging through the sea surface. One paper describes laboratory measurements that support the sea surface modulation transfer function developed several decades ago by the Russian scientist, Mullaama. Another describes a method to correct image distortion and breakup through the wavy sea surface using auxiliary measurements of the sky radiance. A third details a method for statistically removing the instantaneously curved part of the sea surface, while leaving the flat areas, and then building up an undistorted image of a submerged target by accumulating the image segments through the flat areas.

Other papers address the issues of using laser radars and imagers (LIDARs), including one that discusses work that profiles a water body's optical properties with depth. Other topics pertinent to remote sensing include the use of Secchi disk data to extract inherent and apparent optical properties; measurements of the scattering properties of sea water with newly developed instrumentation; a new and improved mathematical model of scattering; and the use of remote sensing combined with in situ measurements to investigate the rapidly changing dynamic state of the optics of the surf zone. These are only a few examples of the topics that have been covered in ONW conferences. The international flavor of the conference is evidenced by the diverse nationalities of authors in this volume.

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*These comments are the views of the author and do not reflect official ONR opinion.

From the Editors

The first two conferences on Current Problems in Optics of Natural Waters (ONW-2001 and ONW-2003) were held in St. Petersburg during the month of September in 2001 and 2003. These meetings introduced a new international conference series where Current Problems in Optics of Natural Waters were presented and discussed. Historically plenums on Ocean Optics had been held in the Former Soviet Union (FSU) from 1974 to 1990. However due to the world politics of the time a weakness of these plenums was that attendance was restricted to Soviet hydroopticians. Thus there was no interchange of ideas between Soviet hydroopticians and their Western colleagues.

The present ONW series are a modern continuation of the plenums, but with the great advantage that FSU hydro-opticians and their Western counterparts may meet in person to introduce and discuss problems and solutions of common interest. The first two meetings have resulted in collaborative Western/FSU joint projects on issues pertinent to global environmental and oceanographic problems. It is an economic reality that FSU scientists although rich in ideas can seldom afford to attend conferences in Europe or the USA. One great advantage to the advance of the science of hydro-optics is that these conferences foster fruitful discussions between FSU scientists and their international colleagues.

Although the tragic events of September 11, 2001, in the USA reduced the number of American participants, the other nations of the world were well represented in the ONW-2001 and the conference was a success. No such tragedy interfered with the ONW-2003 conference, which was well attended by scientists from the USA as well as Europe and Asia. Personal contacts lead to the mutual exchange of useful and interesting ideas and results. A perusal of the papers submitted for ONW-2005 demonstrate many cooperative efforts between FSU scientists and their international partners. Based on the successes of ONW 2001 and 2003, ONW 2005 has been convened and the plan is to continue the series in successive odd-numbered years as a complement to the ONR-sponsored Ocean Optics conferences held in even numbered years.

The ONW-2005 conference was organized by the St. Petersburg Branch of the P.P. Shirshov Institute of Oceanology, the D.S. Rozhdestvensky Optical Society, and the S.I. Vavilov State Optical Institute, St. Petersburg. The main conference topics are unchanged from ONW-2001 and 2003. They are the fundamental problems of radiative transfer theory and light propagation in water including optical properties of natural waters and their effects on optical remote sensing and underwater imaging. The conference program contains about 90 presentations of authors from 15 countries.

In addition to the organizers previously noted we are grateful to the following organizations for their support and sponsorship: the Russian Academy of Sciences, Russian Foundation for Basic Research, Russian Federal Agency of Science and Innovations, Office of Naval Research, Office of Naval Research Global, National Aeronautics and Space Administration, P.P.Shirshov Institute of Oceanology (Moscow), Institute of Applied Physics (N. Novgorod). Finally we would like to extend our grateful thanks to Vladimir Arpishkin, Vladimir Osadchy, Victor Savtchenko, Tamara Radomyslskaya, and Natasha Rybalka for their strenuous efforts in preparing the conferences.

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