OPERATIONAL MULTI-SENSOR MONITORING OF WATER QUALITY IN TRANSNATIONAL RIVER, LAKE AND COASTAL WATER SYSTEMS

Thomas Heege[1], Magnus Wettle[1], Abhay S. Mittal[2]

[1]EOMAP GmbH Co.KG, Friedrichshafener Str. 1, 82205 Gilching, heege@eomap.de
[2]EOMAP Asia Pacific Pte. LTD, 131 Serangoon Av 3 #05-12, Chiltern Park Condominium, Singapore 556112, abhay.mittal@eomap.com

Abstract: Satellite based mapping of water quality has been developed and established in the past decades as a powerfully tool to monitor ocean and coastal areas worldwide. With an increasing number of spatially high resolved satellite sensors and using physics-based algorithms linked together in a fully automated processing chain, it is nowadays capable to monitor also smaller inland waters and rivers harmonized and at pan-continental level.

In the frame of FRESHMON, a EU funded project to foster space applications, and WISDOM, a bilateral German-Vietnamese project, significant efforts were done to create continuous and well accepted services for inland water monitoring at European level and for Asia. Water quality products such as turbidity, secchi depth, organic absorbers and chlorophyll were generated and validated for a variety of temporal and spatial scales of inland waters in various countries. Various satellite sensors such as WV-2, Rapideye, Landsat 5,7,8, MODIS and MERIS were used. The results underline that the method is now capable for harmonized monitoring on intercontinental levels, covering long-term measurements as well ongoing near-real-time deliveries from fully operational processors. The technology is limited to where the spatial resolution of the sensor is still able to resolve the width of the aquatic system. Furthermore, chlorophyll is accessible only from few sensors such as MERIS, MODIS in larger water bodies. Still two components, turbidity and the organic absorbers can be determined with the higher resolved sensors such as Landsat 7 and 8. We recently installed such a system for Asia and Australia, integrating various satellite resources (MODIS, Landsat 7, 8) to cover multiple scales from small lakes, river to whole river systems and coastal areas, and intend to expand this with the upcomming SENTINEL satellite of the European Copernicus program. The capabilities, validation examples and also the technical restrictions of the new technology are discussed on base of various freshwater systems and applications in various countries.

Key words: Water quality, river, lake, coastal