SIMP: Slicks as Indicators of Marine Processes

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Abstract

SIMP is an international project funded by INTAS, that is aimed at improving the information content which can be inferred from multi–sensor satellite imagery of marine coastal areas. Scientific teams from Germany, UK, Portugal, and Russia form the project consortium and focus on the development of novel tools for marine remote sensing of the coastal zone. In particular, the project teams benefit from the fact that marine surface films, which are often present in coastal areas, may enhance the signatures of hydrodynamic processes, such as plumes, internal waves, eddies, etc., on microwave, optical, and infrared imagery. The projects objectives are to develop a robust methodology for identifying slick–related phenomena/processes through their surface signatures and thereby, to improve the discrimination capabilities between slicks and other oceanic and atmospheric phenomena by taking into account information gained from satellite imagery quasi–simultaneously recorded at microwave, visible and IR wavelengths. Laboratory and field experiments are being conducted in order to investigate those physical mechanisms which are responsible for variations in slick visibility at different electromagnetic frequencies, and particularly to determine the sensitivity of radar and optical signatures of marine surface films to variations of the wind speed and of the wave field and to hydrodynamic phenomena such as internal waves, eddies, and currents. We will summarize results from joint field and laboratory experiments conducted in the Black Sea and in laboratory wind–wave tank facilities, respectively, and we will demonstrate how the interpretation of satellite radar imagery can benefit from a deeper knowledge of the very mechanisms responsible for slick signatures and from auxiliary information provided by sensors working at different electromagnetic frequencies.