

Tutorial 5: Synthetic Aperture Radar polarimetry for sea oil slick monitoring.

Abstract

Oil marine pollution due to anthropogenic and natural activities represents one of the most serious threats for the whole ocean environment including marine ecosystems. Hence, an effective and systematic monitoring of macro accidental oil spills and micro deliberate oil spills due to illegal operations as well as the occurrence of natural seepages is a hot topic of paramount environmental and economic relevance. In this framework, polarimetric synthetic aperture radar (POLSAR) imagery represents a valuable and unprecedented remote sensing source of information for sea oil slick observation. Nevertheless, the extraction of useful information from POLSAR data is not at all straightforward since proper modeling and analysis tools are needed to take full benefits of polarimetric information. In this tutorial, the audience will learn how to develop and generate robust and effective added-value products in the frame of marine oil pollution monitoring, including oil detection masks and oil properties maps (zoning). The audience will also learn how to effectively process POLSAR measurements with the professional and free ESA (European Space Agency) software SNAP (Sentinel Toolbox).

All this matter will be clearly detailed during the 4-hour tutorial by means of selected showcases with the aim of providing critical analysis and interpretation of POLSAR imagery in the framework of sea oil slick monitoring, pointing out the role played by imaging parameters (polarimetric architecture, frequency, incidence angle, noise floor) and environmental conditions (sea state, oil properties). The target audience will range from remote sensing users to people interested to enhance their knowledge into new enabling technologies for satellite marine oil slick monitoring.