Breakout Workshop:

Challenges on Optical Remote Sensing for Marine Litter and Floating Matter

Co-Chairs:

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Scope and Goals

Optical remote sensing, and particularly ocean colour techniques, plays an important role in monitoring and assessing floating matter, complementing existing techniques with the advantage of spatial coverage and temporal sampling that the various instrument platforms may offer. The possible use of satellite, airborne, and UAV-based sensors to detect, classify, and quantify man-made floating matter, by analysing light reflectance properties in the visible (VIS), near-infrared (NIR), and short-wave infrared (SWIR) spectrum has been the scope of substantial research during the last decade. The main scope of interest in this field includes developing methodologies to distinguish the different concurrent floating materials, natural or otherwise, improving algorithms to enhance detection accuracy and advancing sensing technologies for better sensitivity and application to user needs.

This workshop aims to discuss the strengths, limitations, and future directions in this field, with key areas of interest including:

- Enhancing Spectral Differentiation: Refining multispectral and hyperspectral imaging to distinguish various floating materials based on their unique spectral signatures.
- Improving Retrieval Algorithms: Development and validation of algorithms that leverage remote sensing optical data to detect and track riverine, coastal and offshore floating matter in general, and marine litter in particular.
- Monitoring Spatiotemporal Variability: Establishing long-term datasets to analyse seasonal and regional trends and their links to environmental drivers.
- Integrating AI for Automated Detection: Applying machine learning techniques to classify floating matter in optical imagery with higher precision.
- Validating Remote Sensing Observations: Conducting in-situ measurements and radiometric analyses to enhance the accuracy of remote sensing data interpretation.
- Assessing the Impact of Observational Conditions: Understanding how environmental factors and observation conditions affect floating matter detection in optical imagery.
- Supporting Mitigation Strategies: Providing insights for policymakers, environmental agencies, and marine conservation efforts to foster stakeholder engagement in technological advancements.

Key Questions

1. How can optical remote sensing techniques be optimized to enhance the spectral differentiation of various floating materials, particularly marine litter, in complex environments?

2. What are the main challenges in developing and validating retrieval algorithms for detecting and tracking floating matter, and marine litter in particular, and how can AI and machine learning contribute to improving accuracy?

3. How can remote sensing data be effectively integrated with in-situ observations and models to support long-term monitoring, reporting, and mitigation strategies for marine litter pollution?