**Assessing the spatial and temporal dynamics of suspended particles in the Rhône River plume based on high resolution ocean colour satellite data.**

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﻿ River plumes are associated to complex and highly dynamic physical and chemical processes, making them difficult to study based on scarce field observations. However, the recent capabilities improvement of ocean colour satellite sensors have made of them an efficient way to assess and monitor river plume dynamics. The prime objectives of this study are to i) test and compare the capabilities in terms of spectral, spatial and temporal resolution of three complementary satellite sensors, L8/OLI, AQUA&TERRA/MODIS and MSG-2/ SEVIRI, for the mapping of suspended particulate matter (SPM) in the moderately turbid waters of the Rhône River plume, and ii) describe the dynamics of SPM in the Rhône River plume using these high spatial and temporal data. Regional relationships between remote-sensing reflectance (Rrs) and SPM concentration are established based on in situ data; the best results obtained are linear relationships between the SPM concentration and Rrs in the red spectral band of the three sensors. Results show that the three sensors provide pretty consistent and complementary observations for the mapping of SPM concentration on the Rhône River plume. OLI and MODIS spatial resolutions (30m, 250-500-1000 m) well reproduce the SPM concentration and plume shape but their temporal resolution (16 days and 1 day, respectively) is limited to study short-term events. Because of its low spatial resolution (~ 4km), SEVIRI tends to slightly underestimate the SPM concentration compared to other sensors and in-situ data. However, its high temporal resolution (15min) makes of it a powerful tool to study the daily dynamics of the Rhône River plume.

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