Generation of high spatial resolution gap-free ocean colour satellite products in the northern Adriatic Sea and the Belgian coastal zone.

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Satellite data are a unique tool to study and monitor complex coastal ocean areas at high spatial and temporal resolution. Ocean colour satellites with high spatial resolution sensors like MSI onboard Sentinel-2 provide 10-60 m resolution data, enough to correctly resolve complex coastal dynamics. However, the revisit time is (2-5 days) is far from optimal. Satellites like Sentinel-3 offer daily revisit time but their 300m spatial resolution is less adequate. All ocean colour satellite sensors are hindered by the presence of clouds, resulting in large amounts of missing data.

Both Sentinel-3 and Sentinel-2 data are highly complementary in terms of their spatio-temporal resolutions. We present a methodology to derive gap-filled, high resolution ocean colour products from the synergistic use of Sentinel-2 and Sentinel-3 data. Applying DINEOF (Data Interpolating Empirical Orthogonal Functions), we combine both the high-resolution spatial variability information contained in Sentinel-2 data as well as the high temporal information of Sentinel-3. By providing both datasets as a unique product, DINEOF is able to extract part of the high-spatial variability and infer it into the low-spatial resolution data. Both Sentinel-2 and Sentinel-3 products are generated using the Copernicus Marine High-Resolution processor, which uses automated switching algorithms adapted to the local water conditions (at the pixel level) to retrieve optimal remote sensing spectra and water quality variables. With this approach, we address the high variability of different water types with small scale changes. The combined Sentinel-2 and Sentinel-3 products consist of Chlorophyll-a concentration and turbidity retrieved through a multi-algorithm approach with optimized quality flagging.

An analysis of turbidity and chlorophyll gap-free daily data at 100 m resolution in the northern Adriatic Sea and the Belgian coastal zone will be presented, with a description of the system dynamics. An analysis of the spatial scales resolved by the original and merged DINEOF datasets will be also presented.