

A near-shore phytoplankton bloom in Belgian waters observed from space

Vanhellemont Quinten¹

¹ REMSEM, OD Nature, Royal Belgian Institute of Natural Sciences, Gulledele 100, 1200 Brussels, Belgium
E-mail: quinten.vanhellemont@naturalsciences.be

With the launch of the first Sentinel-2 (S2) satellite on June 23, 2015, the capabilities of space-borne remote sensing of coastal and inland water quality improved considerably. A single S2 satellite has a revisit time of 10 days globally, but can observe the Belgian coast twice in every 10 day period. A second S2 unit will be launched in 2017, effectively doubling this revisit frequency. The main imager on board of S2, the MultiSpectral Imager (MSI), has a spatial resolution of 10-60 m and is hence able to resolve small features in surface turbidity of aquatic ecosystems. Moreover, thanks to the inclusion of a spectral band at the red spectral edge, the chlorophyll a absorption in the red can be quantified. In the past year, the mapping of chlorophyll a concentration at 20 m spatial resolution with S2 imagery has been demonstrated by various teams.

Here we present the discovery of a near-shore phytoplankton bloom that occurred early May 2016 in the very near-shore part of the Belgian coastal zone, in front of the port of Oostende. The satellite image reveals a bloom with an extremely high chlorophyll a concentration. This kind of bloom would be very difficult to detect with ship-borne measurements, due to the bloom location and extent, and the shallowness of the water. Traditional ocean colour satellites lack the required spatial resolution to resolve these near-shore events. With a five or ten day revisit time, and these novel chlorophyll and suspended sediment mapping capabilities, the S2 mission will contribute significantly to the understanding of near-shore phytoplankton dynamics and sediment transport not only in Belgian waters, but also globally. S2 derived data will be of significant importance for the near-shore monitoring required by the European Water Framework Directive.

Keywords: coastal zone; remote sensing; phytoplankton bloom; chlorophylla