Seagrass mapping in two mudflats in the Auray River
About a rapid evolution of seagrasses

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Abstract

Maps of seagrass in two sites in the Auray River. These two sites were studied by Maxime Daviray during his PhD. Seagrass appeared very quickly during his PhD. This work aims to describe this rapid evolution of seagrasses.

Keywords: Remote Sensing, Sentinel-2, Seagrass

The data and scripts used for this work can be found here.

1. Materiel & Methods

1.1. Seagrass mapping using Sentinel-2

To map the seagrass extent over time, the Sentinel-2 constellation has been used. Level-2 images, which are already orthorectified and atmospherically corrected using Sen2Cor, have been downloaded using the Copernicus Platform [1]. One low tide, cloud-free image per year, nearest to the period of maximum seagrass biomass at this latitude, has been used. A total of 8 images have beed used (Table 1).

Table 1: Table 1 : Acquisition dates of Sentinel-2 images used to map seagrass in Auray River. Time time have been retrieved from the SHOM.

Acquisition Date	Low Tide Time	Difference with Low tide
2016-11-03		
2017-10-04		
2018-09-29		
2019-09-14		
2020-08-04		

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Acquisition Date	Low Tide Time	Difference with Low tide
2021-10-08		
2022-08-29		
2023-09-03		

The ICECREAM model (Davies et al., Accepted), a neural network classifier designed to identify and discriminate intertidal vegetation in Europe, has been applied to each Sentinel-2 image. Pixels of the Magnoliopsida class (seagrasses) have been isolated, and the Normalized Difference Vegetation Index (NDVI, [2]), a commonly used remote sensing biomass proxy for vegetation, has been employed. The equation of [3] have been used to transform NDVI values into Seagrass Percent Cover (Equation 1). SPC values below 20%, corresponding to low biomass pixel, with a high risk of confusion with other vegetation classes, have been remove from the rest of the analysis.

$$SPC = 172.06 \times NDVI - 22.18 \tag{1}$$

References

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