

Introductory information

- This dataset details all data used for a manuscript submission entitled "Spotting green tides over Brittany from space: three decades of monitoring with Landsat imagery". It presents data derived from Earth observation detection on the macroalgae surface on four studied sites in Brittany, France. These estimates were made using Landsat 5 and 8 satellite imagery, using the Google Earth Engine environment. Spectral signatures of natural features found on the study sites (sand, water and algae) are also presented. Additional datasets include 1) green macroalgae surface estimates made by an external source, CEVA (French Algae Technology and Innovation Center) and derived from aerial photography. This data was used for comparison with our results 2) nitrogen concentrations for four water stations close to the study sites. Nitrogen is considered the main physico-chemical factor controlling algae growth.
- The dataset is in an Excel format and is comprised of five spreadsheets
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Methodological information

- Method description:
 - (1) *Earth observation surface estimates*. The data presented in the 'Green_tide_surfaces' datasheets correspond to estimates on the extent of green macroalgae blooms, from Landsat 5 and 8 satellite imagery.

The data details the estimates surfaces for each available image found between 1984 and 2019, in low tide conditions and with no or sparse cloud coverage.
 - (2) *Spectral signatures*. The data presented in the 'Spectral_signatures' datasheet was collected through visual examination on a subset of the Landsat image collection analyzed. 36 spectral signatures of algae, sand and water pixels from Landsat 5 were collected, and 22 for the Landsat 8 dataset. The values present the reflectance values found for these pixels, at different wavelengths. Additional spectral signatures of algae pixels were also collected and are presented, at different locations on the studied sites, corresponding to different densities in algae coverage.
 - (3) *CEVA estimates*. The data presented in the 'CEVA_estimates' sheet presents the data collected over a 7-month period [April-October] by CEVA (French Algae Technology and Innovation Center), from 2002 to 2019 for the four studied sites. It details the yearly averaged surfaces of green tides (in hectares), estimated through interpretation of aerial imagery.

The data is publicly available at: <https://bretagne-environnement.fr/echouages-algues-vertes-littoral-breton-analyse-evolution-annuelle-depuis-2002-datavisualisation>
 - (4) *Nitrogen concentrations*. The data presented in the 'Nitrogen_concentrations' datasheet presents the yearly mean concentrations in nitrogen from four downstream water stations on rivers. These water stations are located along the rivers draining the studied sites: the Roscoat (for Saint-Michel-en-Grève), the Douron (for Locquirec), Gouessant (for Morieux) and the Urne (for Yffiniac). The data is publicly available at: <https://bretagne-environnement.fr/nitrates-cours-eau-bretons-datavisualisation>

Data specific information

- (1) *Green tides surface estimates*. **Date**: date at which the Landsat imagery was taken. The date format is Month/Day/Year. **SiteName_ha**: surface estimates, expressed in hectares. **Total_ha**: total surface estimate for the two site locations adjacent to each other's, expressed in hectares.
- (2) *Spectral signatures*. **Wavelengths**: central wavelength values of six Landsat 8 bands (bands 2-3-4-5-6-7) and six Landsat 5 bands (bands 1-2-3-4-5-7). Wavelengths are expressed in nanometers (nm). **Spectral reflectance values**:
- (3) *CEVA estimates*. **SiteName_ha**: surface estimates, expressed in hectares.

- (4) *Nitrogen concentrations*. **SiteName**: one-year average nitrogen concentrations, expressed in mg/L at the water station site.

Sharing and access information

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