

## IodysseHux - Studying planktonic bloom

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### The bloom of coccolithophores

Coccolithophores are a type of single-celled nano-phytoplankton and they have an important role in carbon absorption and oxygen production. Their chlorophyll content is rather low (rarely more than 2 microgram/L). They have been present on Earth for over 200 million years and are at the origin of sedimentary layers in chalky soils, such as the cliffs of Etretat (hence the name of the geological period “the Cretaceous”).



Coccolithophores's illustration

### Who's Iodysséus ?

Iodysséus is an NGO created in 2016, focused on ocean preservation. The first concrete action developed by Iodysséus are :

- A sailing oceanography program offering innovative solutions
- An awareness-raising program for future generations
- An ocean data mining program to increase understanding of certain oceanic phenomena

**What is IodysseHux ?** One of our mission is to study episodic blooms of the calcareous microalgae called *Emiliana huxleyi* (or Ehux), the majority species of coccolithophores in the North Atlantic.

### Methods :

Based on historical data from the Sextant IFREMER database, correlations between coccolithophores blooms and environmental parameters have been investigated.

The parameter of Ehux presence/absence is Suspended Particulate Matter (SPM). Environmental parameters are Surface Solar Irradiance (SSI), Sea Surface Temperature (SST) and the concentration of Chlorophyll-a (CHL-A).

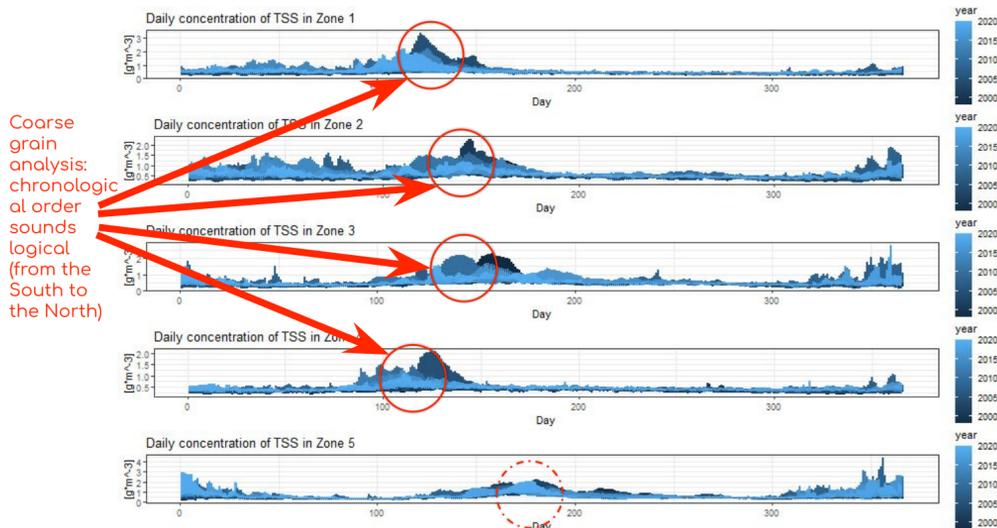
Key parameters (features) have been extracted from satellite data over 5 regions of interest, generating time series over 23 years (1998-2020).

These 5 areas spread from the South of the Bay of Biscay (north of Spain) to the Celtic Sea (South and West of Ireland), along the continental shelf. These zones are of particular interest because of upwelling phenomena bringing nutrients to the upper layer.

Analysis and assessment tools used for this study are Python, QGIS, and Script R.

**Question : can we relate the inter-annual variability of Ehux blooms to climatic variations ?**

### Results: raw data / time series (MES/TSS)

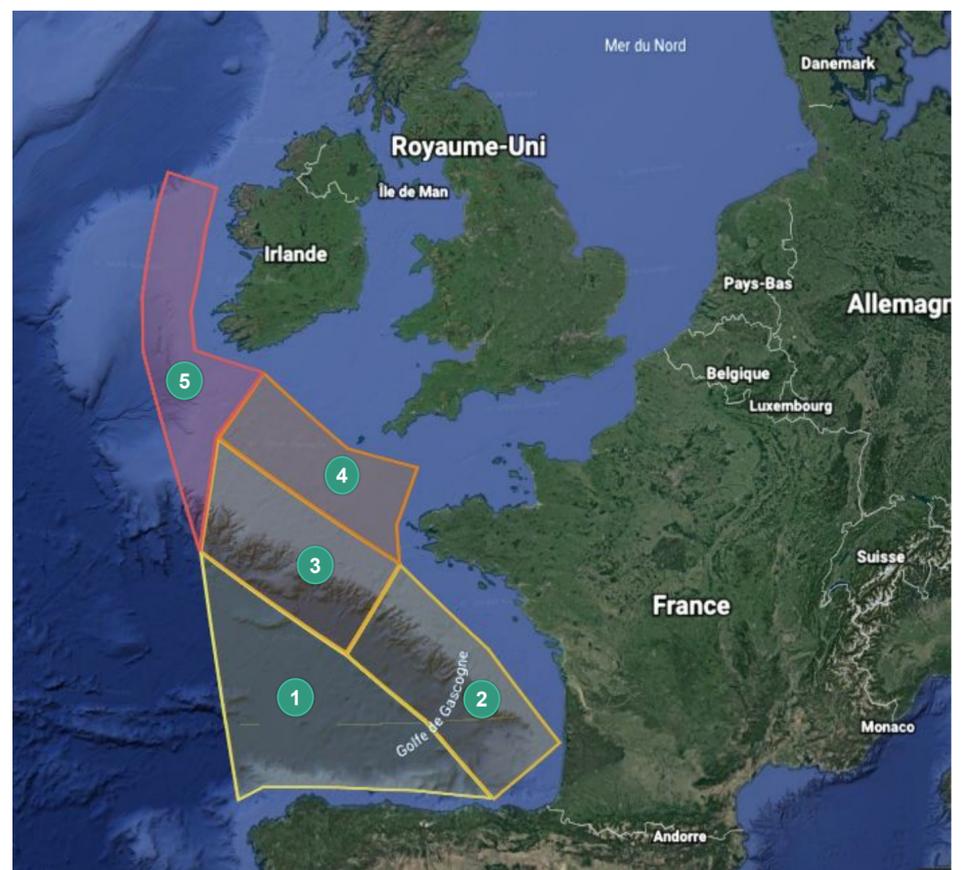


### Results :

Negative trends in abundance are observed for all zones except for Zone 1 (south-east of the bay of Biscay), maybe because of the exceptional abundant blooms in springs 2013 and 2019.

No conclusion can be drawn on a potential climate change effect because the analyzed period is too short. Yet it seems that there is a trend for peaks to happen earlier.

On the 1998-2020 period, a linear relationship is observed between the SPM and CHL-A parameters. These two parameters are directly correlated and this could be understood as a co-development of coccolithophores together with diatoms' populations.



### Conclusion :

Until now, a very precise predictive model is achieved from a temporal perspective, and progress still need to be done with regard to intensity of predicted blooms.

### Next steps :

- Checking at sea the validity of the temporal prediction in May 2021.
- Improving the intensity prediction through the combined use of other data (pH, etc.).
- Developing a version for prediction over smaller areas.
- Trying to implement this model for other places in the world (for example the Great Calcite Bell).