ILICO — SOMLIT Service d'Observation en Milieu Littoral

The French National Monitoring Network

SOMLIT

CONTEXT

Coastal ecosystems:

- Highly-dynamic physical, biogeochemical and biological processes
- High seasonal and spatial variability
- Subject to long-term changes

→ need of long-term time series of sub-monthly resolution

AIMS

A French national monitoring network.

Scientific objectives:

- to understand the pluri-decadal changes in the physico-biogeochemical characteristics of coastal ecosystems
- to identify large-scale, regional and local drivers of changes

Services:

- Free access to the data and to the field
- MySOMLIT: application of automatized statistical tests

Map stations: Wimereux, Roscoff, Luc/mer, Dinard, Brest, La Rochelle, Bordeaux, Arcachon, Sète, Marseille, Villefranche/mer, Banyuls/mer

SCIENTIFIC STRATEGY

12 ecosystems (20 sampling stations) in the English Channel, the Bay of Biscay and the Mediterranean Sea.

Start: January 1996.

Resolution: 2 weeks.

13 parameters for the surface water:
- temperature, salinity, di-oxygen, pH
- nitrate, nitrite, ammonia, phosphate, dissolved silica
- SPM, POC, PON, $\delta^{13}C_{POC}$, $\delta^{15}N_{PON}$, chlorophyll a
- Pico- and nanoplankton

4 parameters along the water column:
- temperature, salinity, PAR, fluorescence

FAIR DATA
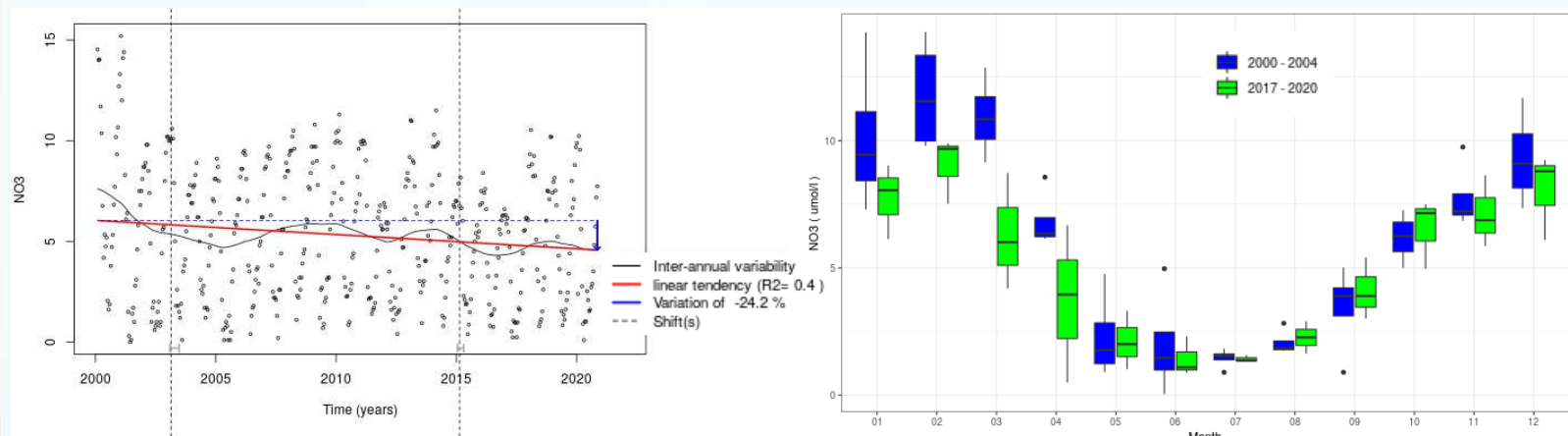
Findable: www.Somlit.fr (English version coming soon)

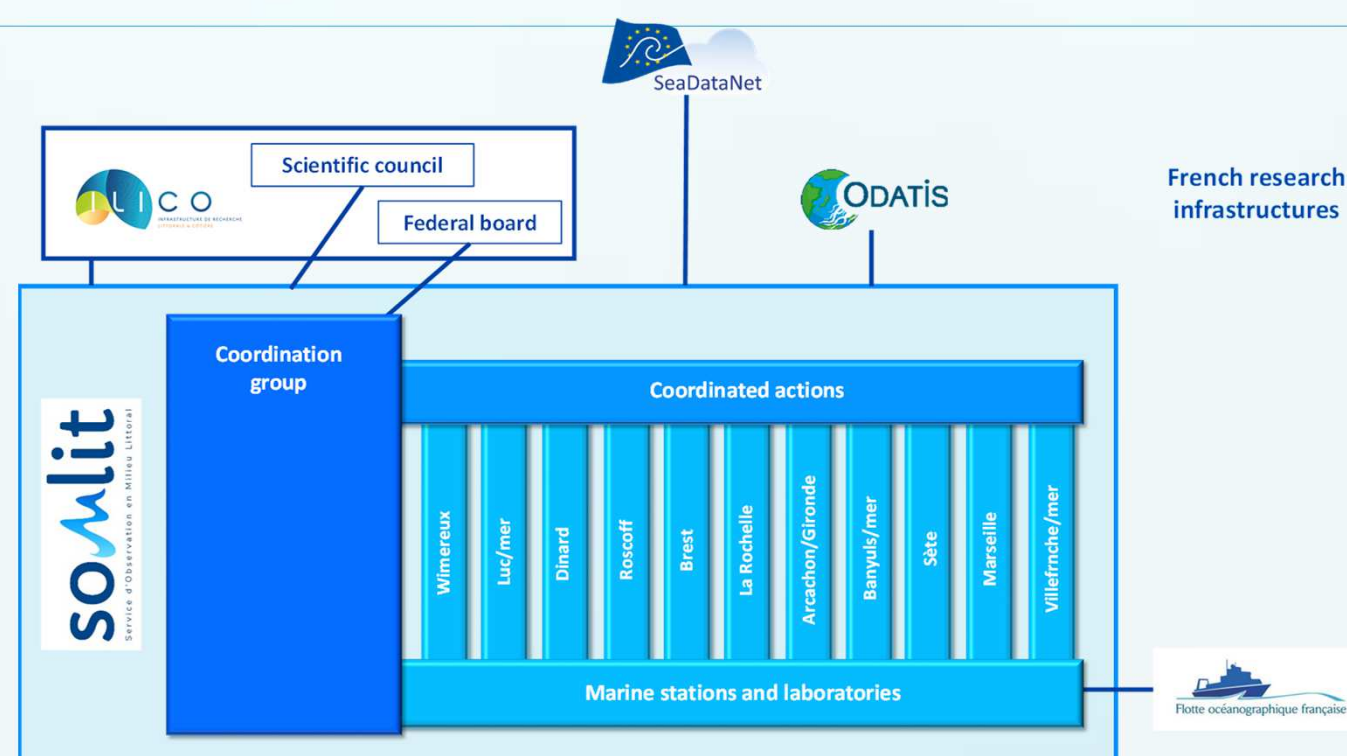**A**ccessible: data and metadata freely available

Interoperable: all the data will be available on SeaDataNet

Reusable: perennial data base

Legend (NO3 time series, left): Inter-annual variability; linear tendency (R2= 0.4); Variation of -24.2 %; Shift(s). Boxplot legend: 2000 - 2004; 2017 - 2020.
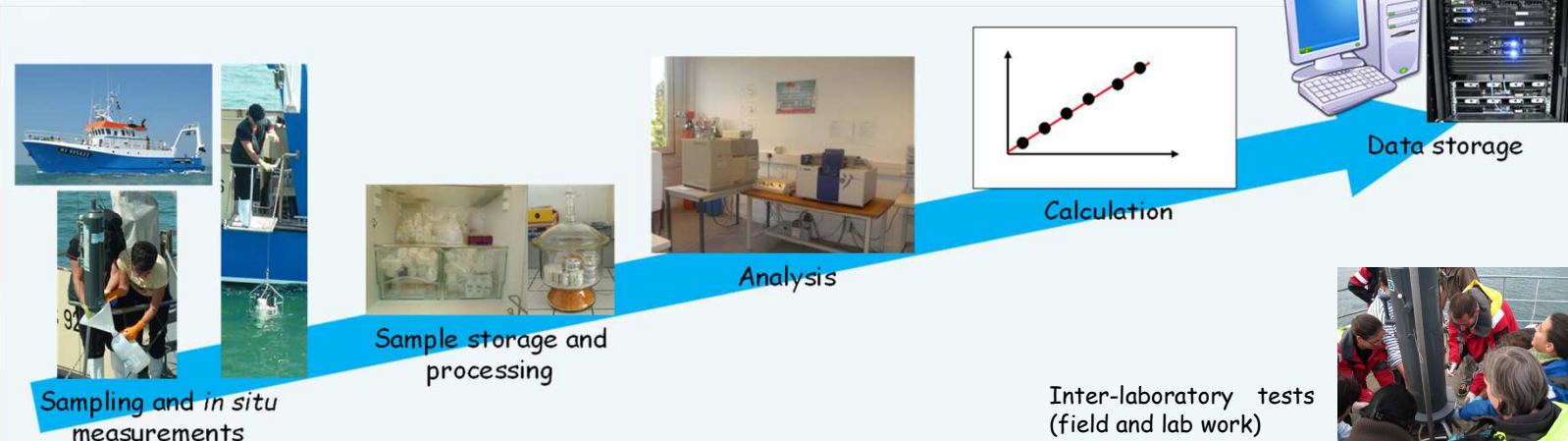
SOMLIT IN THE FRENCH AND EUROPEAN ENVIRONEMENTS

SOMLIT is part of the French Research Infrastructure (RI) ILICO for coastal ocean and nearshore observations (Cocquempot et al., 2019). SOMLIT data are accessible via the ODATIS ocean and coastal data cluster of the French DATA TERRA RI and part of them are available on SeaDataNet.
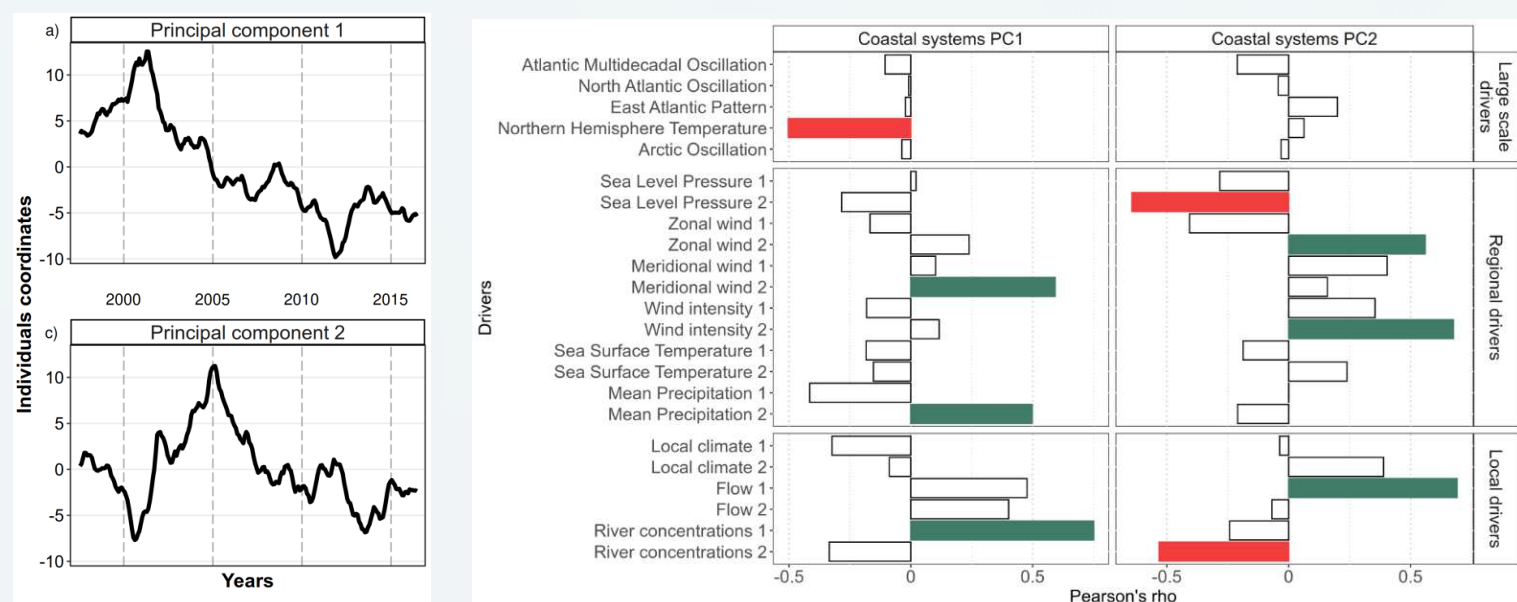

QUALITY ASSURANCE

Based on ISO 17025

Sampling and *in situ* measurements → Sample storage and processing → Analysis → Calculation → Data storage

Inter-laboratory tests (field and lab work)

COMPOSITION OF THE PARTICULATE ORGANIC MATTER

The composition of the particulate organic matter was determined using elemental and isotopic ratios. Its spatial variability mainly depend on the proximity of the sampling stations to the continent and on the trophic status of each ecosystem.

Legend: Phytoplankton; Diazotrophs; River POM; Anthropogenic POM; Macrophytes; Microphytobenthos; Terrestrial POM

Main panel: contribution of sources to the particulate organic matter. Right panel: redundancy analysis (correlation circles and plots of the samples scores). From Liénart et al. (2017, 2018).

COASTAL ECOSYSTEMS: TRAJECTORIES AND FORCINGS

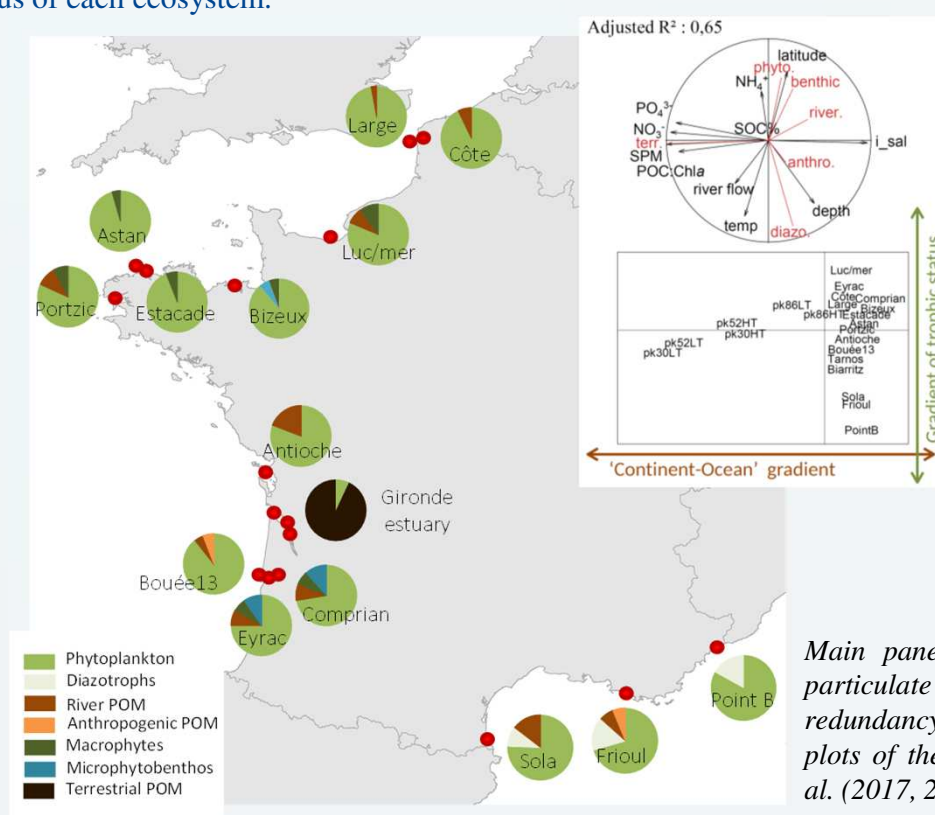Results of Principal Component Analysis exhibit shifts around 2001 and 2005.
Results of correlations highlight the sensitivity of coastal ecosystems to large-scale climate, regional climate as well as river flow and river concentration in nutrients and SPM.

Left panel: variability of the first and second principal components (PCs) of the PCA of all parameters at all stations from 1997 to 2016. Right panel: correlations between the first 2 PCs of the PCA and the drivers of change; coloured bars represent strong positive (green) and negative (red) correlations (r > 0.5), and white bars show non-significant correlations. From Lheureux et al. (2021).

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REFERENCES

Cocquempot L. et al. (2019). Coastal Ocean and Nearshore Observation: A French Case Study. *Frontiers in Marine Science*, 6:324.

Lheureux A. et al. (2021). Bi-decadal variability in physico-biogeochemical characteristics of the temperate coastal ecosystems: from large-scale to local drivers. *Marine Ecology Progress Series*, 660, 19-35.

Liénart C. et al. (2017). Dynamics of particulate organic matter composition in coastal systems: a spatio-temporal study at multi-systems scale. *Progress in Oceanography*, 156, 221-239.

Liénart C. et al. (2018). Dynamics of particulate organic matter composition in coastal systems: forcing to the spatio-temporal variability at multi-systems scale. *Progress in Oceanography*, 162, 271-289.

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