JERICO-RI: Progress toward an automated detection of phytoplankton in European coastal areas

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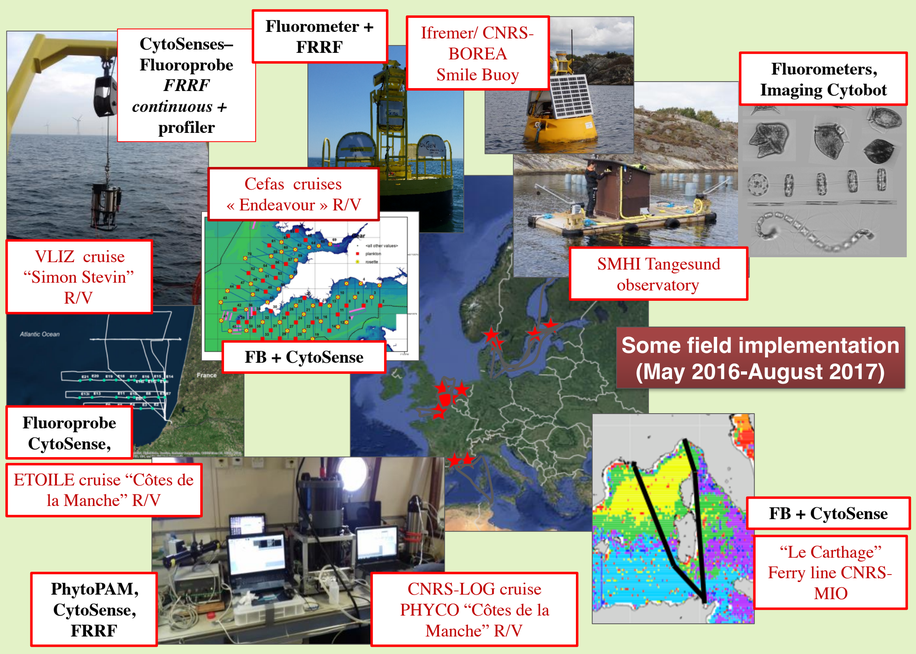
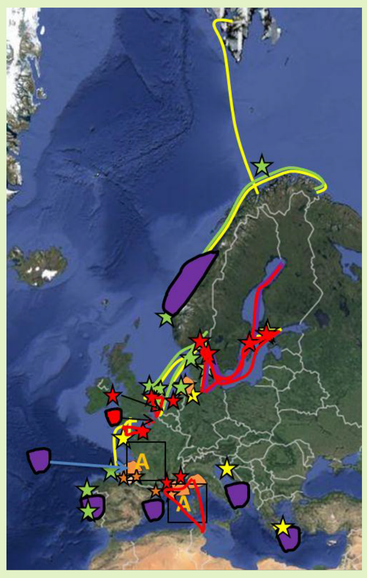
Automated platform for the observation of phytoplankton diversity in relation to ecosystem services

A large set of instruments to qualify and expertise: *SYKE, SMHI, HZG, RWS, VLIZ, CEFAS,CNRS (LOG, BOREA, OSU-V, MIO) & Ifremer (LER/BL)*

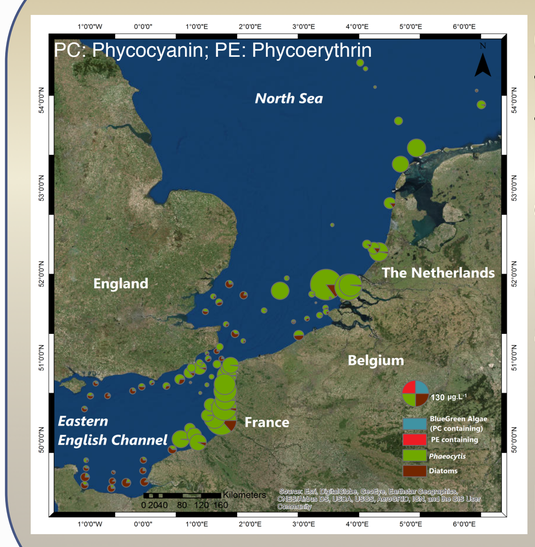


- **Pulse-shape recording flow cytometer (Cytosense)**
- **Imaging in-flow (imaging in-flow Cytobot)**
- **FlowCAM**
- **FastCAM**
- **Spectral fluorometer (AOA, Fluoroprobe, Multiexciter)**
- **Absorption meter (PSI-CAM)**
- **Pulse Amplitude Modulated Fluorometers (PAM)**
- **Fast Repetition Rate Fluorometer (FRRF)**
- **Underwater Vision Profiler (UVP5)**
- **(Semi-)Automated data analysis**



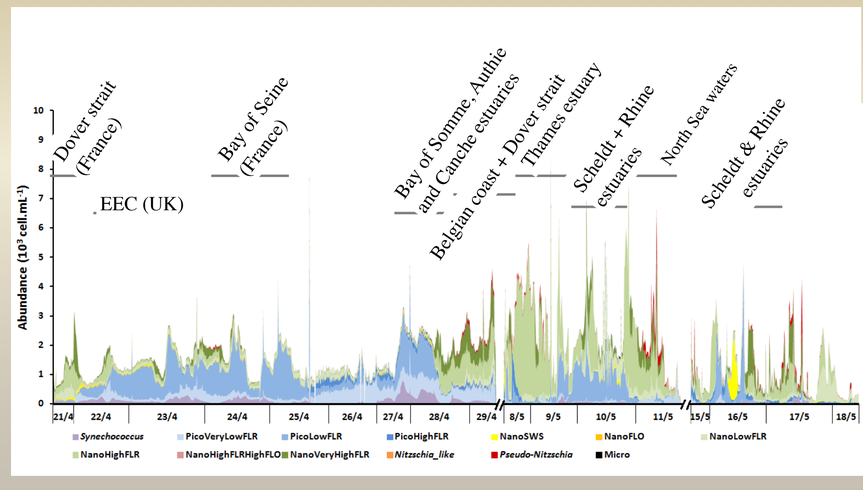
Outcomes:
A set of **recommendations** of the most suitable and relevant **combination of methods** according to the environment considered, their limits and ways of implementing them as **complementary sensors in combined platforms**. A JERICO-NEXT deliverable to come by one year.

Phytoplankton groups discriminated by automated pulse-shape recording flow cytometry (Cytobuoy b.v.)



Chlorophyll *a* equivalent of the multispectral fluorometry (fluoroprobe bbe Moldaenke): discrimination of 4 pigmentary groups (Haptophytes, brown algae, phycocyanin and Phycoerythrin) containing micro-algae during a *Phaeocystis globosa* bloom.

EEC-SNS JERICO-NEXT 2017 cruises

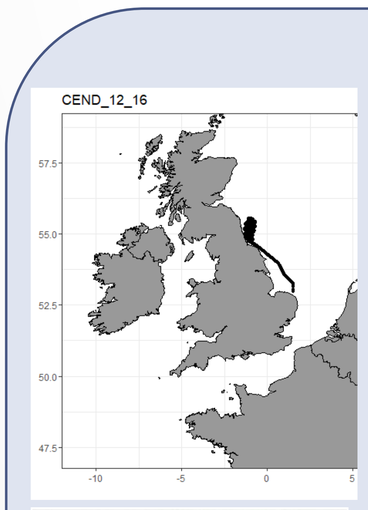


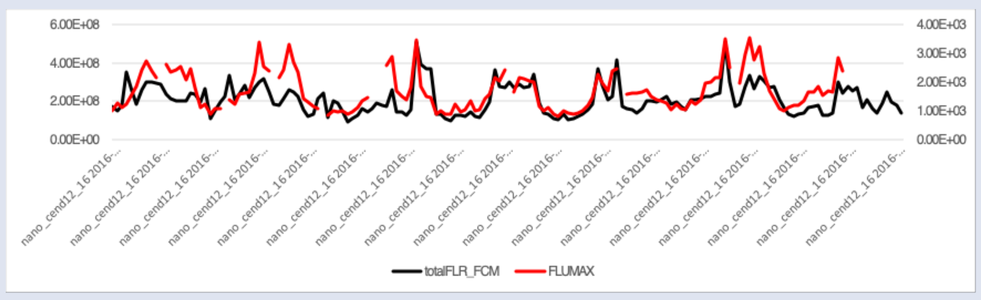
JERICO-NEXT spring Channel-North Sea cruises (April-May 2017)

Up to 13 groups discriminated

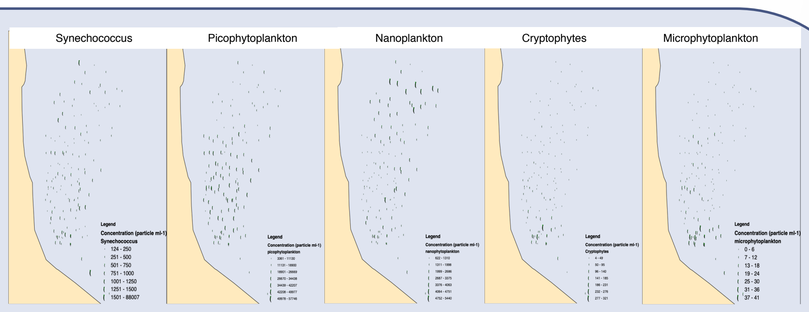
Waters under brackish influence: Dominated by nanophytoplankton (and microphytoplankton).

Offshore and other coastal waters: Dominated by pico-eukaryotes, *Synechococcus-like (*and NanoSWS coccolithophores-like)

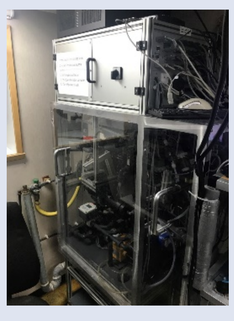


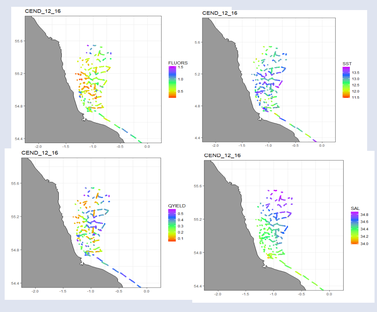


Same trend between the total fluorescence from the ferrybox and the total red fluorescence from the flow cytometer (FLR-cytosense) during the survey.



Distribution of the number of particles.ml-1 according to the phytoplankton functional types





FerryBox: Fluorescence (Fluores),Quantum yield (QY), Salinity (SAL), Temperature (SST)

✓ More than 90 % of the particles = phytoplankton, ~ 93% of the total fluorescence.

✓ No relationship between salinity, temperature and the number of particles per functional types: Synechococcus, picophytoplankton, nanoplankton and microphytoplankton.

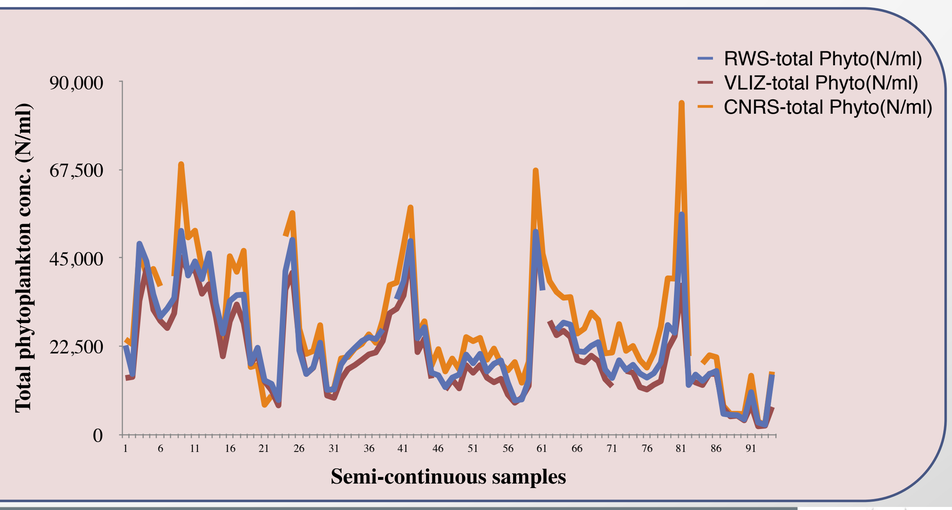
✓ Difference in the distribution of the phytoplankton functional types with a higher density of nanoplankton in the north of the area.

Intercomparison exercise: 3 pulse shape recording automated low cytometers (fcm) (VLIZ, RWS and CNRS-LOC) during the JERICO-NEXT – LifeWatch spring cruise 2017 (8–12 May 2017).led by VLIZ

✓ Similar trends in measured total cell/colony abundance per ml.

✓ Automatedfcm: high potential for large scale data collection at high temporal and spatial resolution.

✓ Harmonizing the sampling protocol will increase data comparison and greatly improve the insights into phytoplankton community dynamics.



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