Results from campaign in the Channel-North Sea and Belgian Coastal Zone – RV Simon Stevin

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Third JERICO-NEXT Workshop on Phytoplankton Automated Observation/
MIO/ Marseille/ France/ 19th to 21st March 2018
Map of the working area (Eastern English Channel, Southern Bight of the North Sea, Thames estuary) with scheduled sampling stations marked from 1 to 44.

Total trajectory: 1281 km
• Primary production measures (FRRf):
  - Along the water column, at station. F. Lizon, CNRS-LOG/UL
  - Relationship between PP and ETR, C-fixation and phytoplankton composition. J. Kromkamp, NIOZ
  - PP of the area? Coupled to PSFCM? H.M. Aardema, RWS

• Spatial distribution of phytoplankton functional groups (by PSFCM):
  - Towards multispectral fluorometry. A. Louchart, CNRS-LOG/ULCO
  - Biodiversity difference with bulk sensor. M. Rijkeboer, RWS
  - Specialy harmful algae. R. de Blok, U.Gent

• Zooplankton diversity: WP2 net + zooscan, CTD, pigment. J.Mortelmans, VLIZ

Area submitted to high nutrient input (coastal areas) with responses of phytoplankton specially *Phaeocystis globosa* and diatoms during spring bloom
Comparison of the three flow cytometers, analysis done by Machteld Rijkeboers (RWS)
All phytoplanton cells/ml

All three fcm’s show us the same trend!
Analyzed volume

Reduction in analyzed volume due to turbidity, increases the variation in phytoplankton groups
RWS Total Fl. red
CNRS Total Fl. red

Legend
- EEZ shapefile
- CNRS
- Sum of Fields
  - picoR
  - nanoR
  - microR

- 320,000,000
PCA on Instrumental Variables (PCAIV) on size groups of each fcm separately
Axis 1: Salinity, T, NH4, SiO2
Axis 2: N:P ratio, NO2
High salinity, depth, high nutrient conc

High N:P ratio
Axis 1: Salinity, T, NH4, N:P:Si, SiO2
Axis 2: N:P ratio

Not significant! Explained variance cannot be ascribed to environmental parameters
Axis 1: Salinity, T, SiO2, nutrients
Axis 2: N:P ratio, NO2
HPLC CHEMTAX pigment fingerprinting
Pigments - HPLC CHEMTAX fingerprinting

North Sea matrix (Muylaert et al. (2006)):

<table>
<thead>
<tr>
<th>Class / Pigment</th>
<th>perid</th>
<th>fuco</th>
<th>chlc3</th>
<th>diadino+diato</th>
<th>lut</th>
<th>zea</th>
<th>chl_b</th>
<th>chl_a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorophytes</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.06</td>
<td>0.03</td>
<td>0.24</td>
<td>1.00</td>
</tr>
<tr>
<td>Cyanobacteria</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.23</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Diatoms</td>
<td>0.00</td>
<td>0.38</td>
<td>0.00</td>
<td>0.04</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Dinoflagellates</td>
<td>0.37</td>
<td>0.00</td>
<td>0.00</td>
<td>0.15</td>
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<tr>
<td>Euglenophytes</td>
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<td>0.00</td>
<td>0.00</td>
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<td>0.00</td>
<td>0.28</td>
<td>1.00</td>
</tr>
<tr>
<td>Phaeocystis</td>
<td>0.00</td>
<td>0.39</td>
<td>0.08</td>
<td>0.01</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Axis 1: Current velocity, NO2, NO3
Spatial analysis of zooplankton
Spatial correlation: pcaiv with latitude and longitude

Zooplankton and environmental parameters strongly correlated to Latitude and longitude → data detrending necessary through Orthogonal PCAIV
Moran’s Eigenvector Maps

Six significant spatial trends, explaining together 47% of variance
PCAIV on MEMs (under spatial constraint)
Conclusion

Some parameters could not be used as they were only measured during day time
→ Next cruise: samples will only be taken during daytime

The combination of nutrient ratios and concentrations, salinity, depth, temperature and current velocity are important for phytoplankton and zooplankton groups

Suggestions to incorporate extra environmental parameters?
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 654410.