

Seasonal variation of PCB concentrations in planktonic food web of Marseilles bay during one year (September 2010 – October 2011)

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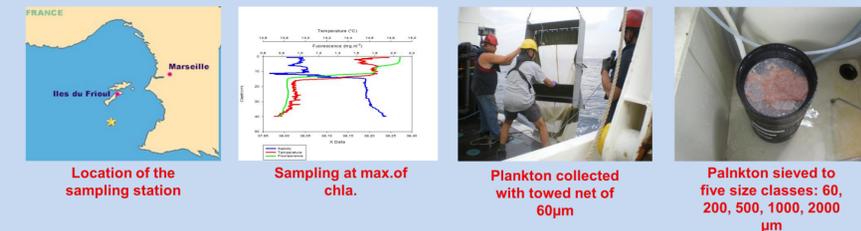
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Introduction

PCBs concentrations and stable carbon and nitrogen isotopes contents were investigated in pelagic planktonic compartments in the bay of Marseilles during 13 months. The main objective of the study was to identify the key factors influencing the variation of PCB levels in plankton, at the base of pelagic food web in the Gulf of Lions.

Material and method



Results1

Stable carbon and nitrogen isotope ratio signatures showed seasonal variation in plankton allowing grouping of the samples to autumn, winter/summer, and spring assemblages. (Fig. 1).
 The ΣPCB7 concentrations ranged from 14,16 ng.g⁻¹ dw to 88 08 ng.g⁻¹ dw, generally their level are not rising with plankton size class increase and show no systematic trends; this may suggest no biomagnification if PCBs in plankton (Fig. 2).

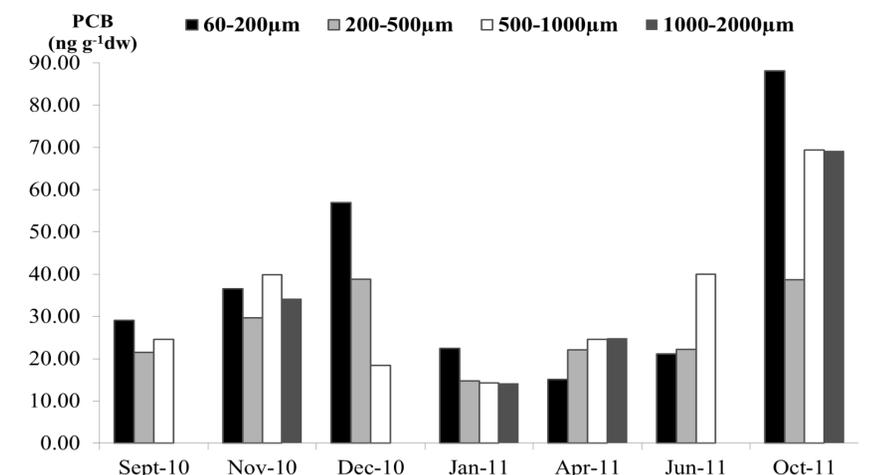


Fig.2 . Concentration (ng.g⁻¹ dry weight) 7 PCB (CB28, CB52, CB101, CB118, CB138, CB153, CB180) of the different plankton size classes

Results 2

The ACP statistics reveals three groups of sample related to varying environmental factors (Fig, 3):
 - Group 1 associated with high PCBs concentration in plankton samples and elevated signatures of δ¹³C, δ¹⁵N, during autumn when strong winds were registered.
 - Group 2 associated with low PCBs concentration in plankton, signatures of δ¹⁵N, during winter, summer and spring when weak winds were registered.
 - Group 3 associated with rain fall and outflow of Huveaune river, low signatures of δ¹³C and PCBs concentration.

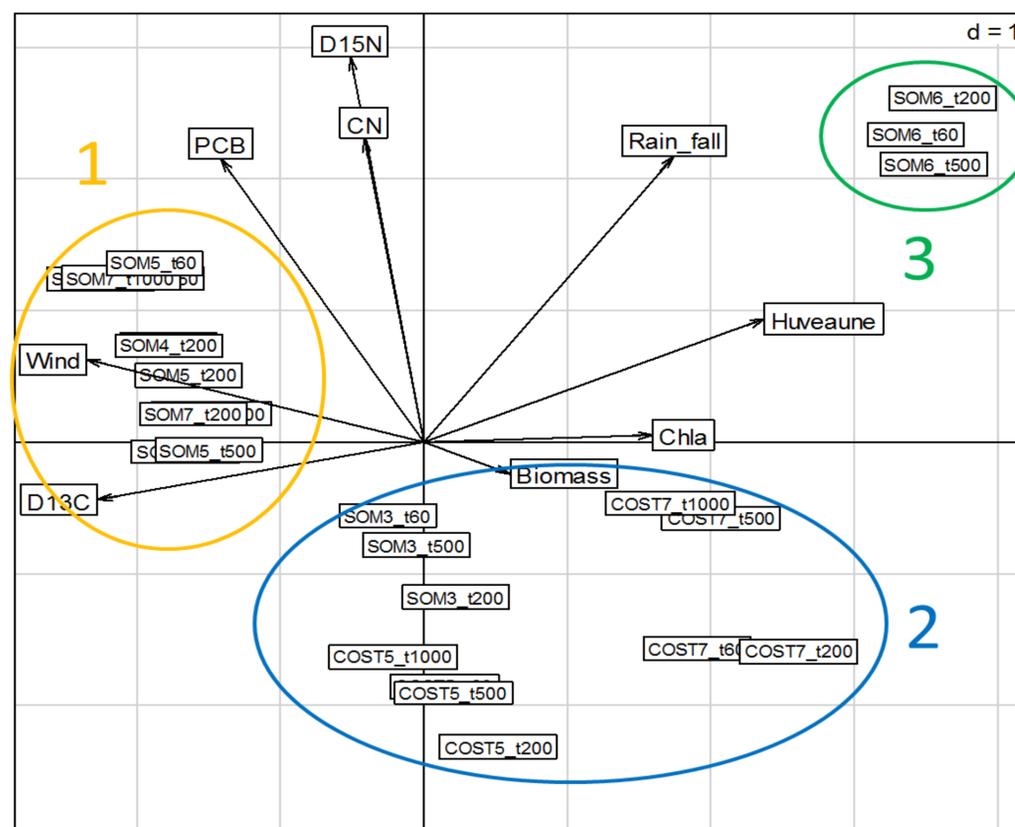


Fig.3 . Principal component analysis (PCA) correlation circle on axes 1 (horizontal) and 2 (vertical)

Conclusion

Significant variation of stable isotopes signatures is possibly linked to changes in plankton community structure and density, likely induced by strong winds. During these periods of strong winds, higher PCB concentrations in plankton were possibly linked to higher air/water diffusive fluxes and wind-induced resuspension of sediments [1]; later observation might be supported by isotopic d13C ratio of sediments in plankton [2]

Bibliography

- 1 - Ko, F.C., Baker, J.E., 1995. Partitioning of hydrophobic organic contaminants to resuspended sediments and plankton in the mesohaline Chesapeake Bay. Mar. Chem. 49, 171–188.
- 2 - Cresson P., et al., 2012. Spatio-temporal variation of suspended and sedimentary organic matter quality in the Bay of Marseilles (NW Mediterranean) assessed by biochemical and isotopic analyses. Marine Pollution Bulletin, 64(6): 1112-1121.