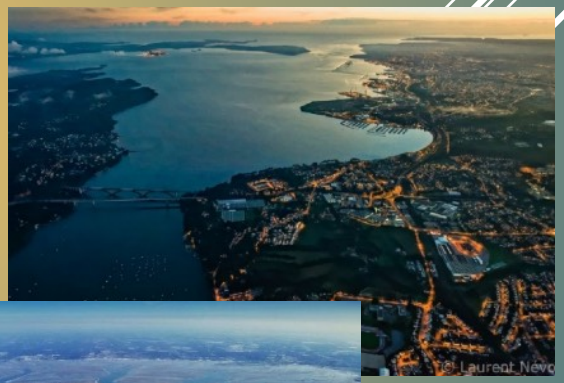
Coast Bordeaux 2017

Decadal evolution of coastal system functioning: nutrients and chlorophyll biomass

Rodriguez S., **Del Amo Y.**, David V., Bourasseau L., Bozec Y., Cariou T., Cordier M.A., Costes L., Ferreira S., Grossteffan E., L'Helguen S., Macé E., Rigaut-Jalabert F., Rimmelin-Maury P., Sauriau P.G. and Savoye N.



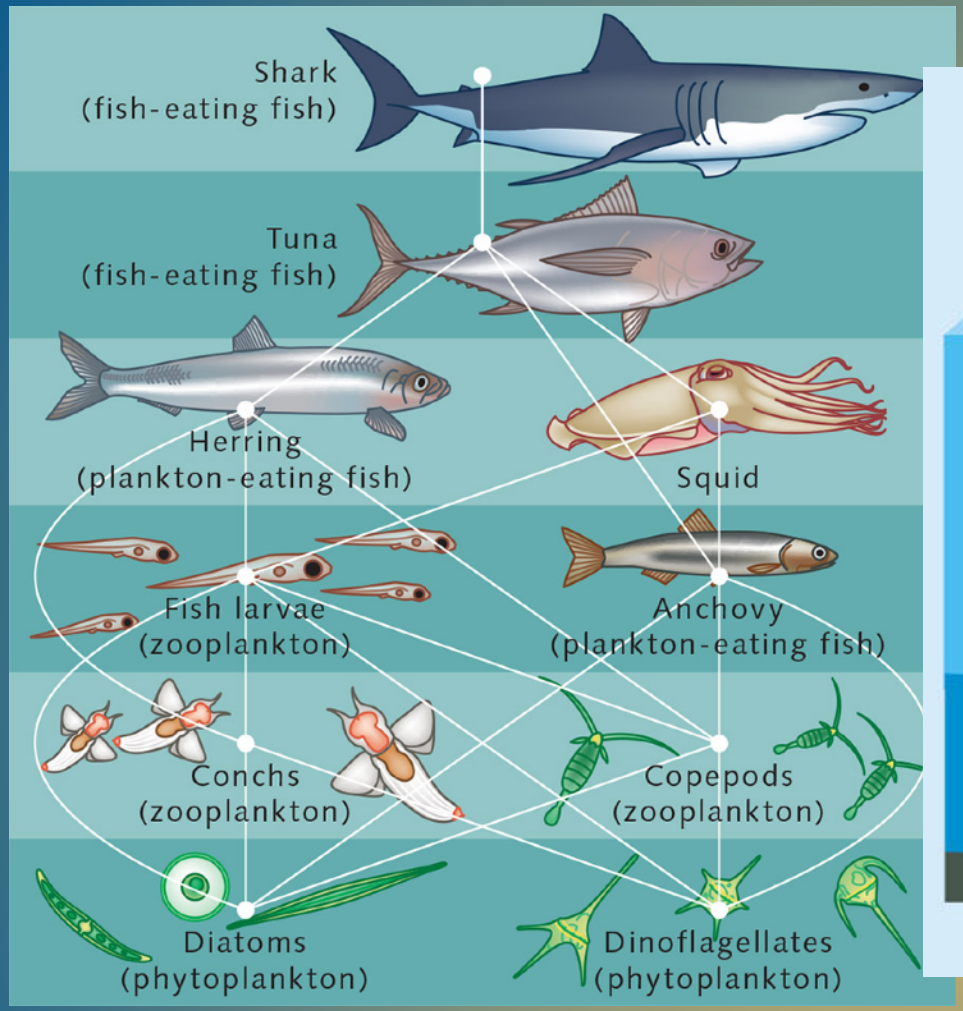
SOMLIT

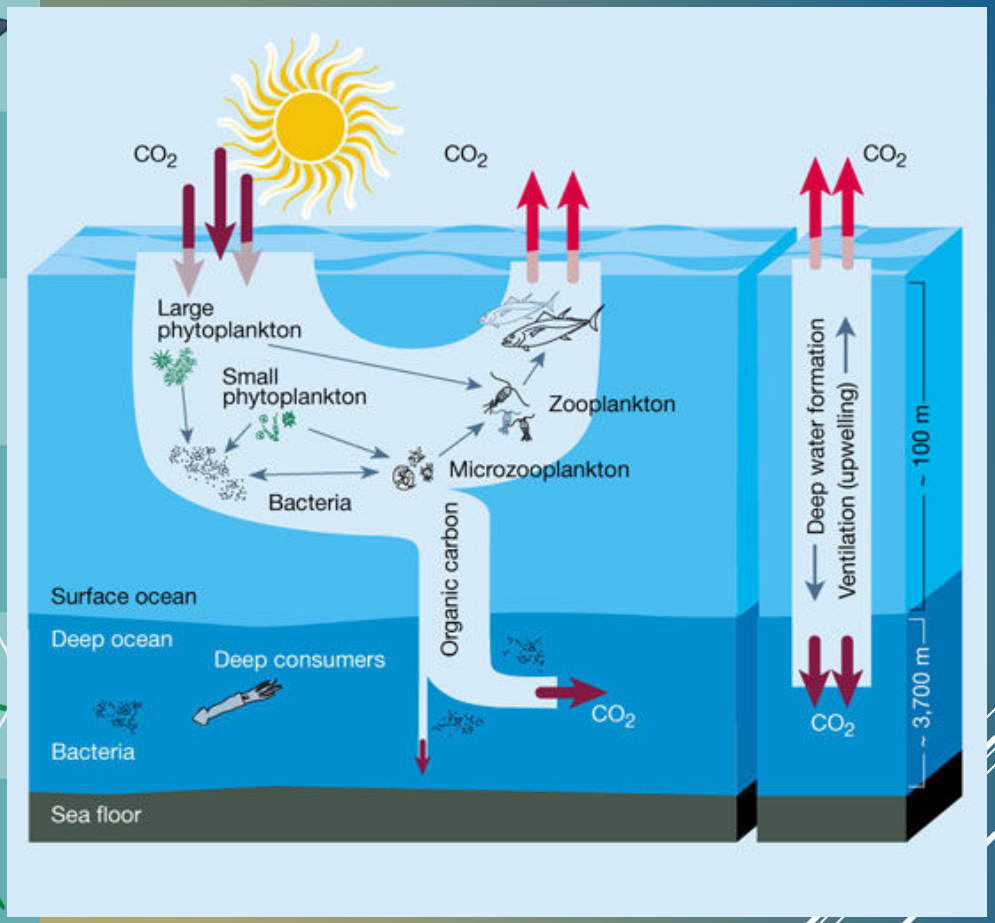
EPOC

cnrs

université de BORDEAUX

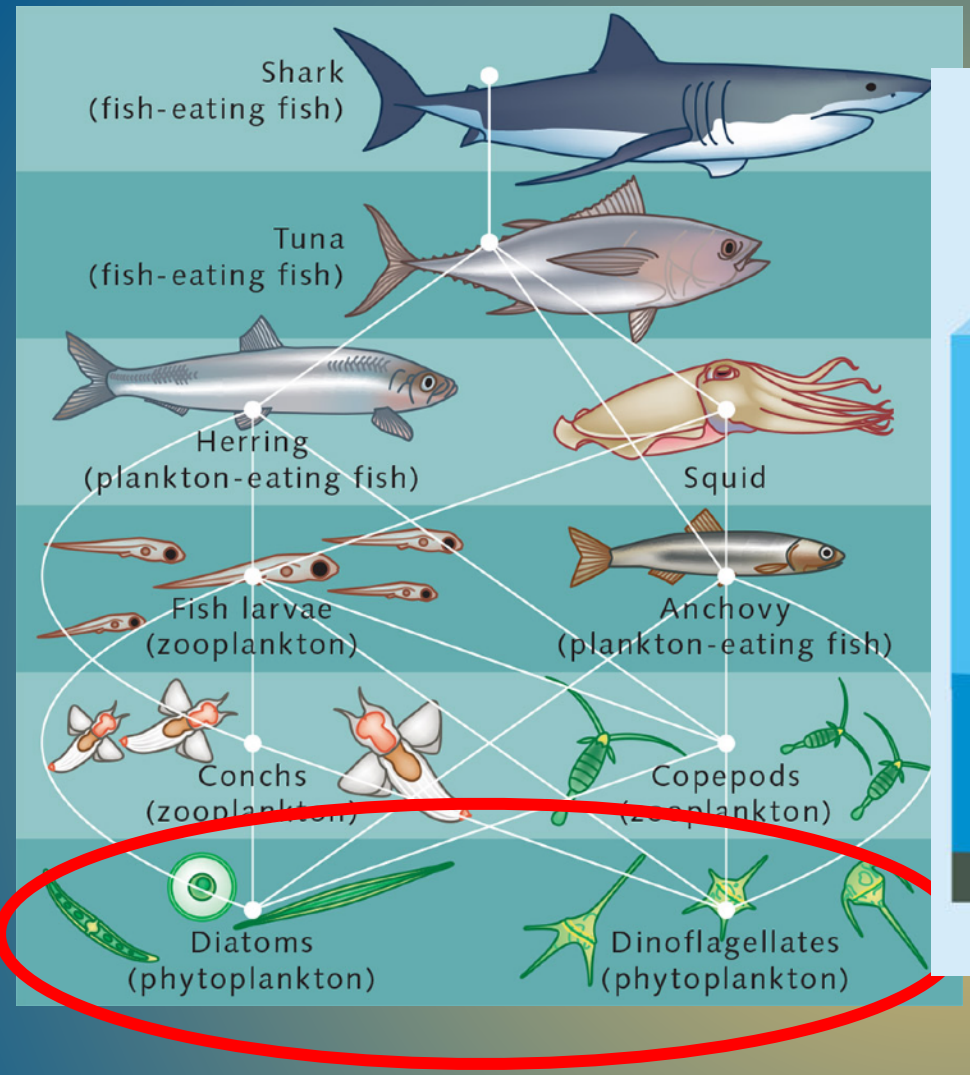
LabEx COTE

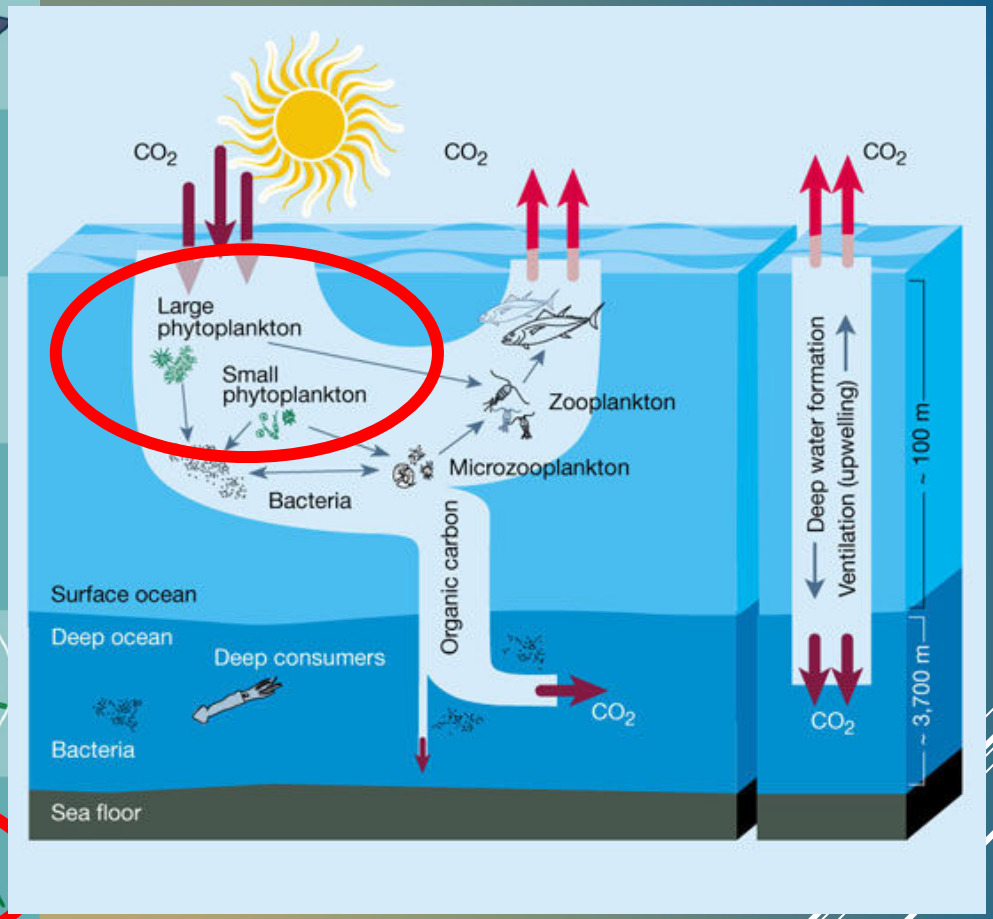




Chisholm 2000 ; http://worldoceanreview.com

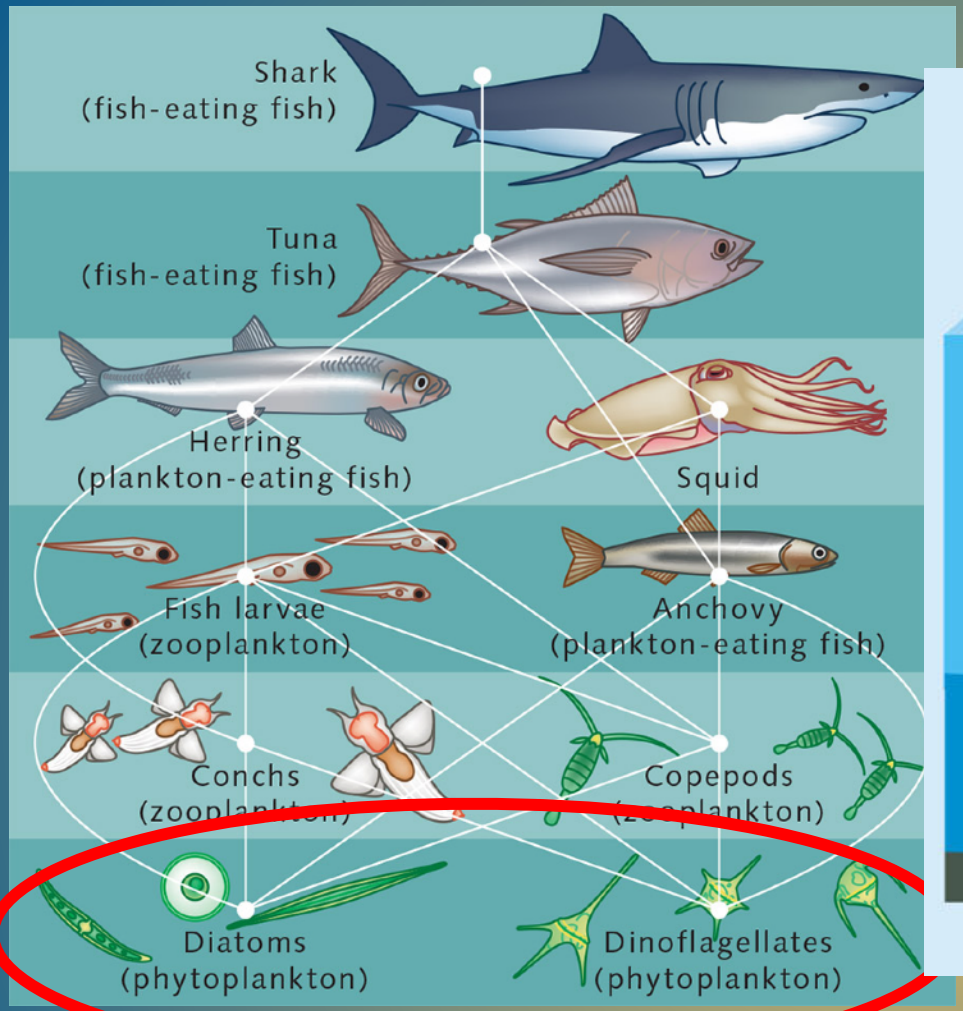
Y. Del Amo – Coast Bordeaux 2017

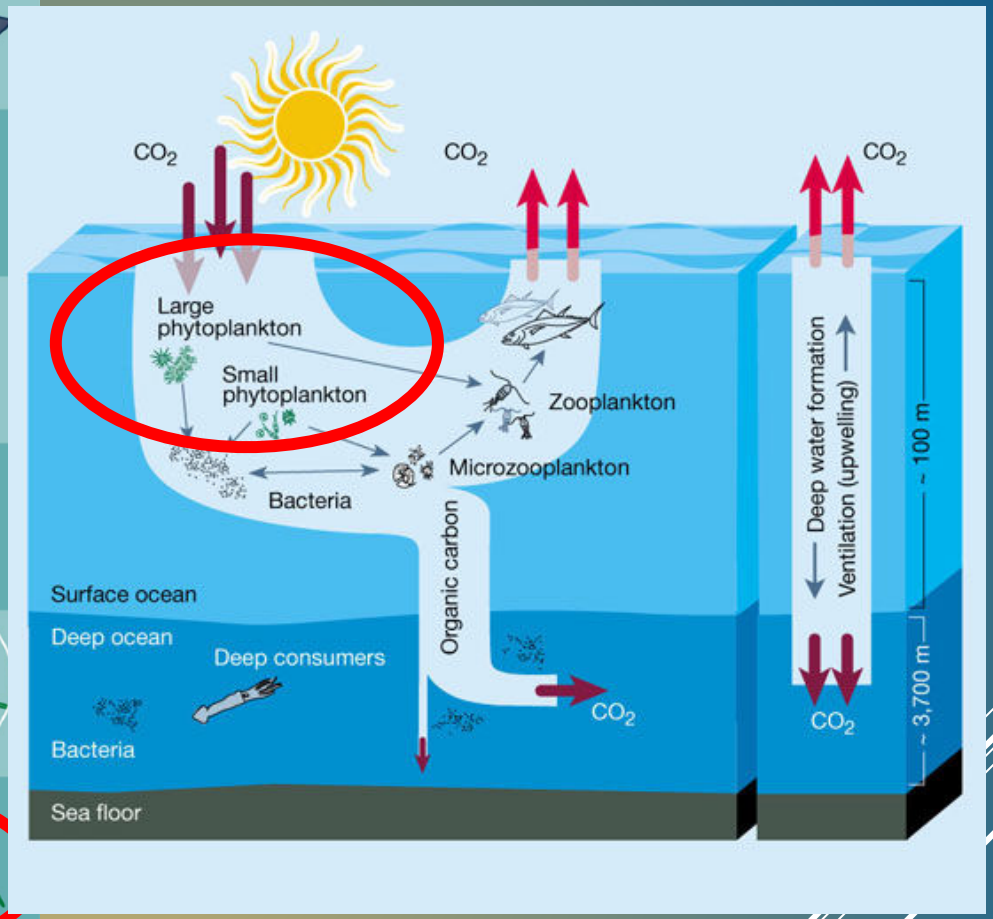




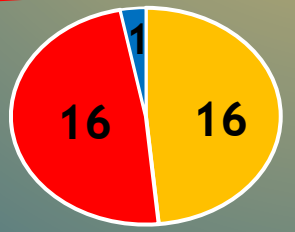
Chisholm 2000 ; http://worldoceanreview.com

Y. Del Amo – Coast Bordeaux 2017



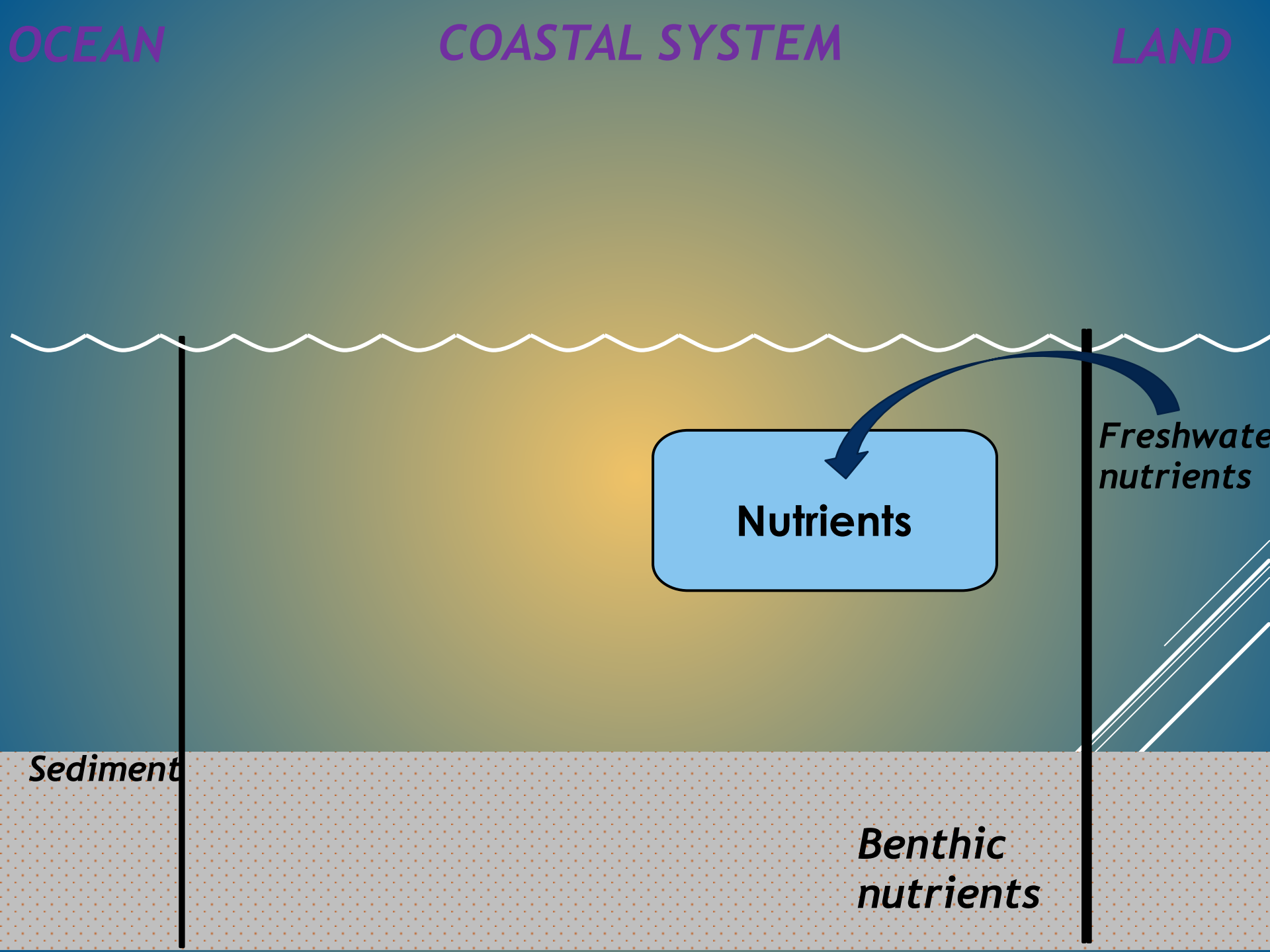


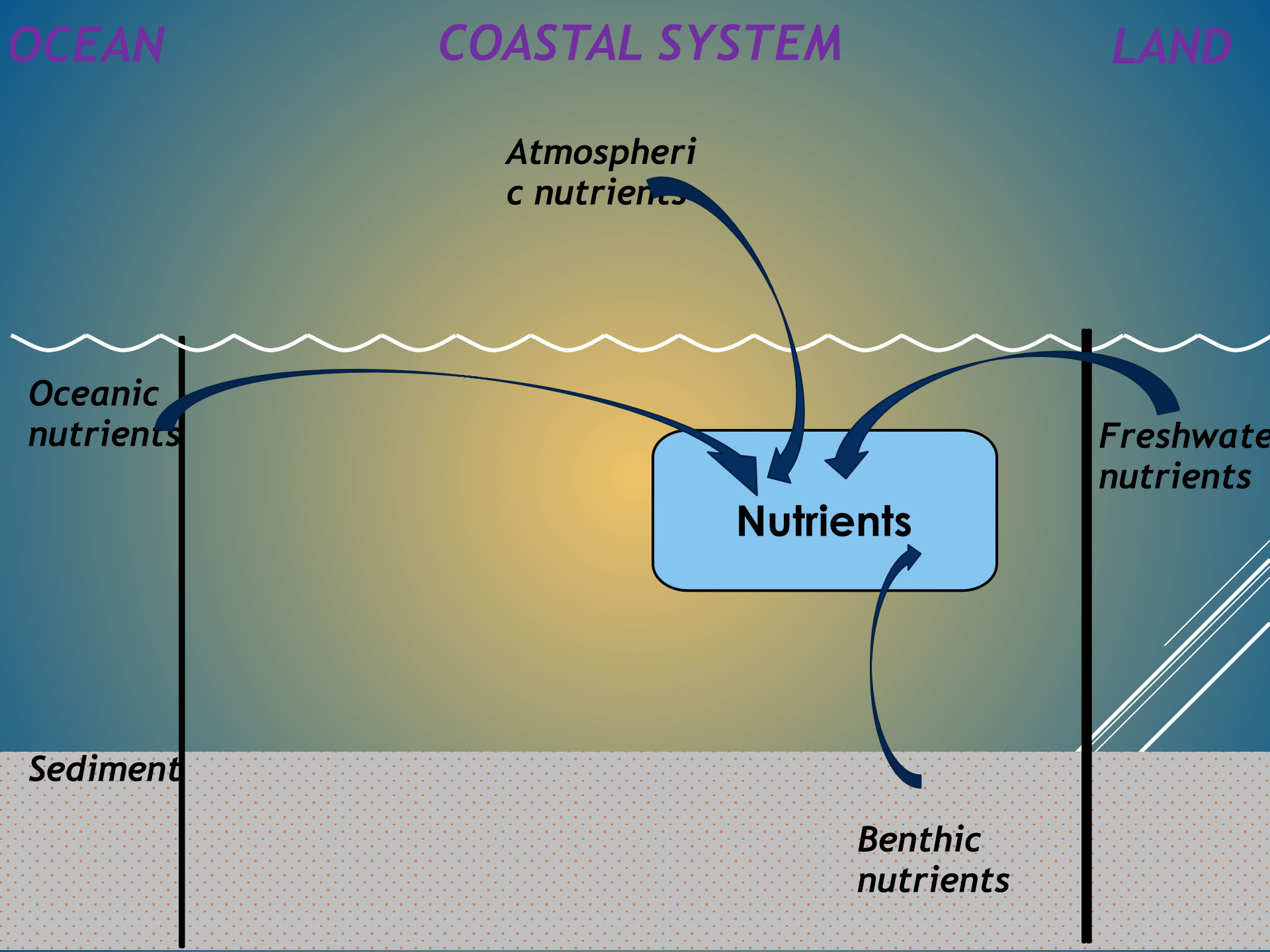
Nutrients
NO_3^-, NO_2^-
PO_4
$Si(OH)_4$

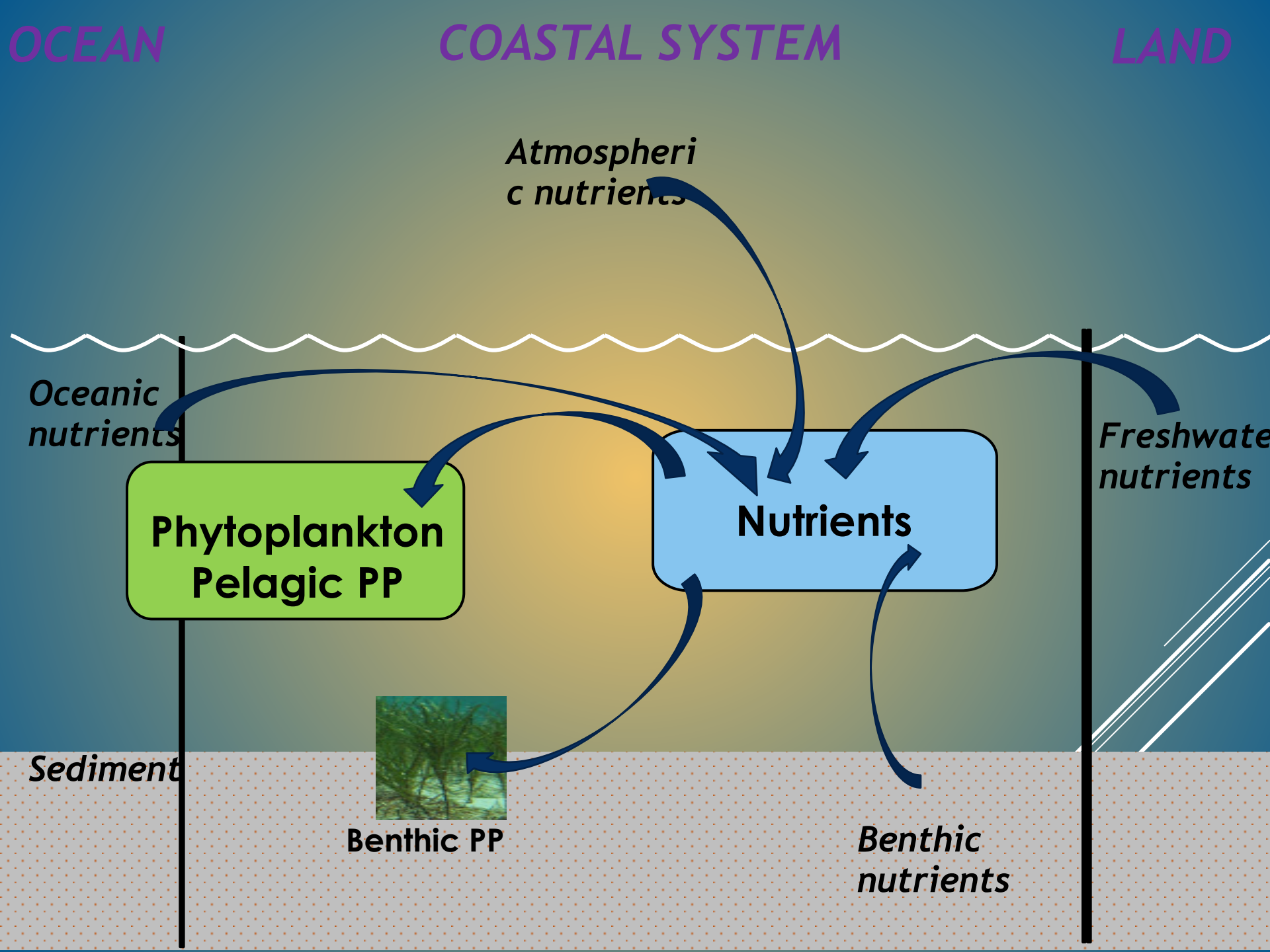


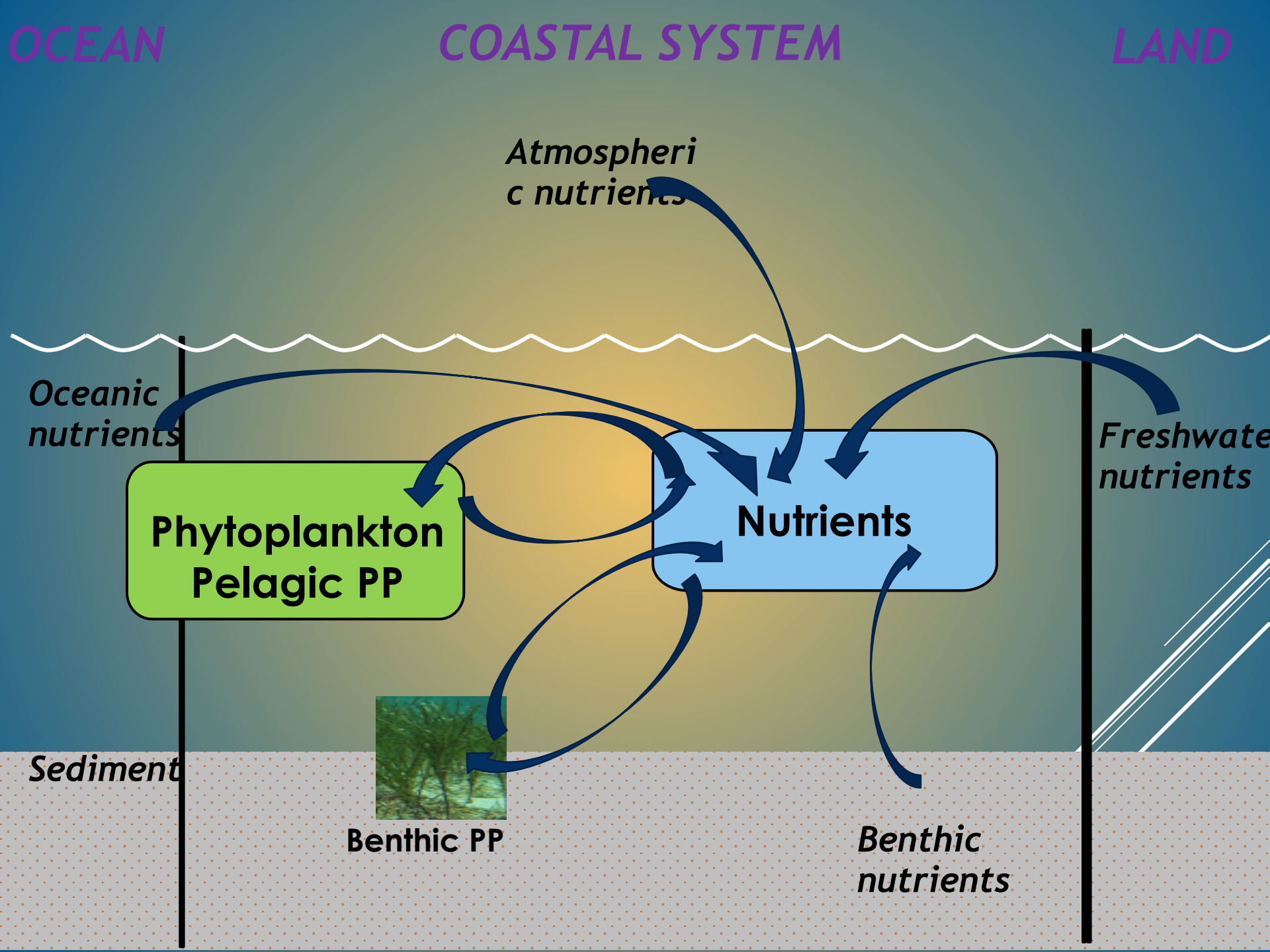
Limitation & Phytoplankton biomass & community structure

Y. Del Amo – Coast Bordeaux 2017

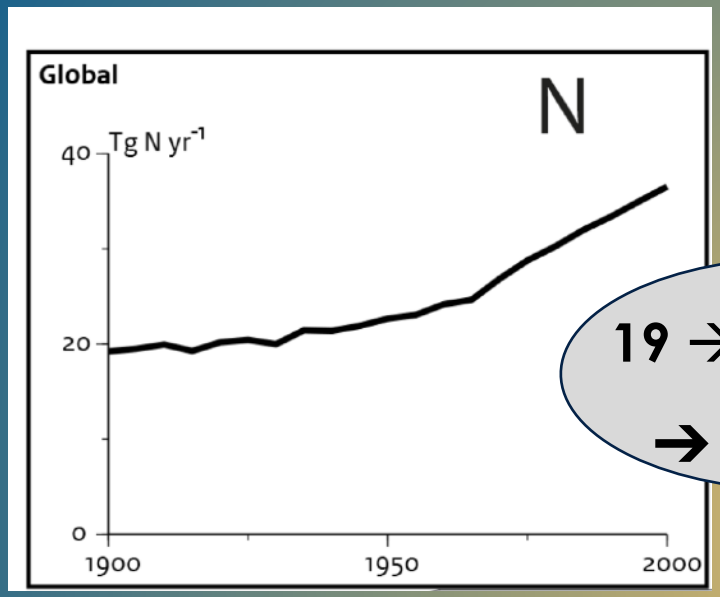

OCEAN
COASTAL SYSTEM
LAND
Nutrients
Freshwate
nutrients
Sediment
Benthic
nutrients


OCEAN
COASTAL SYSTEM
LAND
Atmospheri
c nutrients
Oceanic
nutrients
Freshwate
nutrients
Nutrients
Sediment
Benthic
nutrients


OCEAN
COASTAL SYSTEM
LAND
Atmospheri
c nutrients
Oceanic
nutrients
Freshwate
nutrients
Phytoplankton
Pelagic PP
Nutrients
Sediment
Benthic PP
Benthic
nutrients

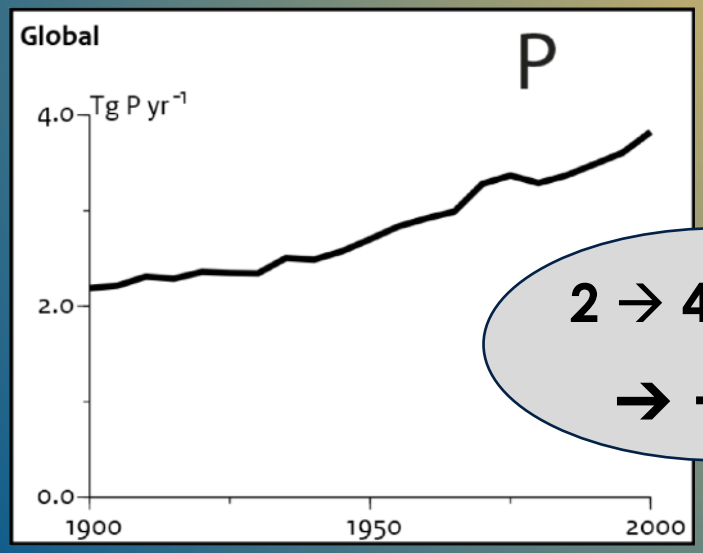

OCEAN
COASTAL SYSTEM
LAND
Atmospheri
c nutrients
Oceanic
nutrients
Freshwate
nutrients
Phytoplankton
Pelagic PP
Nutrients
Sediment
Benthic PP
Benthic
nutrients

Global Rivers



19 → 37 Tg.yr^{-1}

→ + 90%

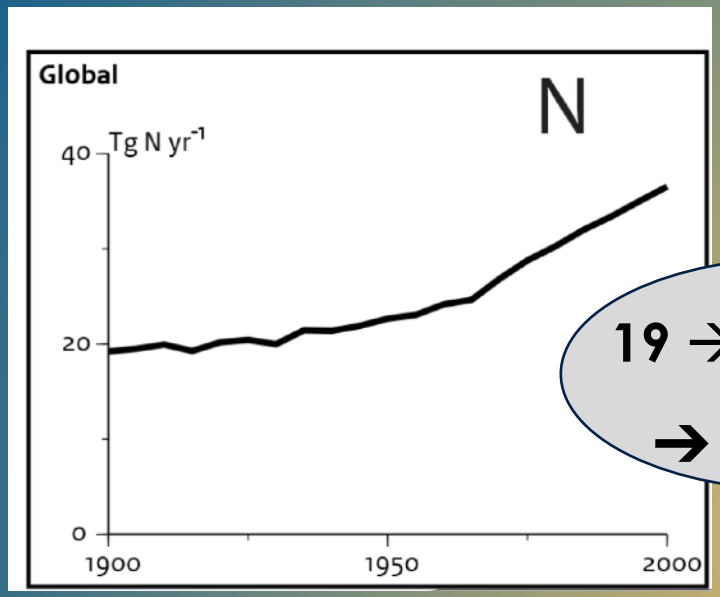


2 → 4 Tg.yr^{-1}

→ + 75%

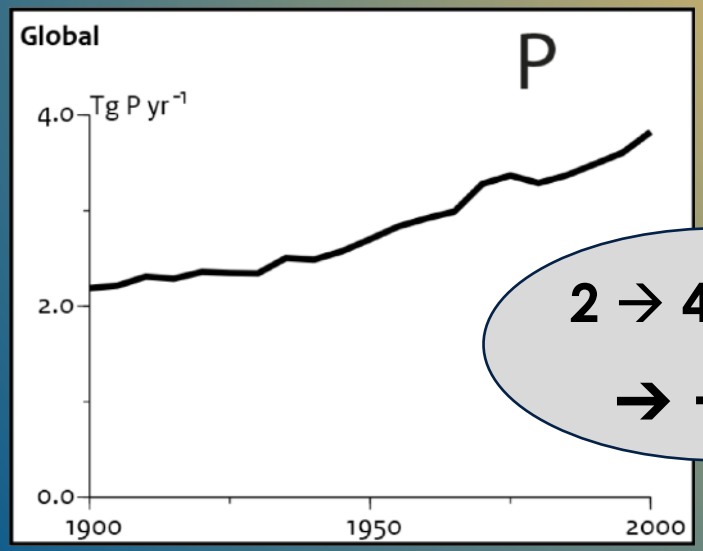
From Beusen et al,. 2016

Global Rivers



19 → 37 Tg.yr-1

→ + 90%

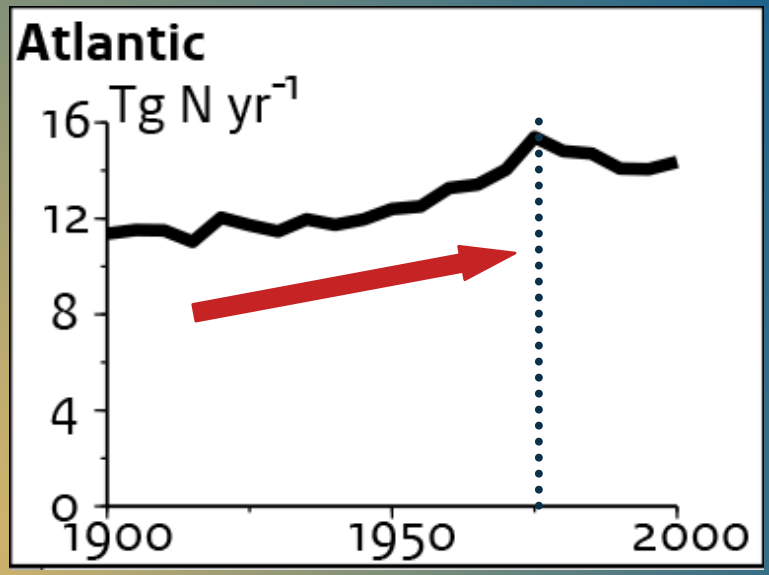


2 → 4 Tg.yr-1

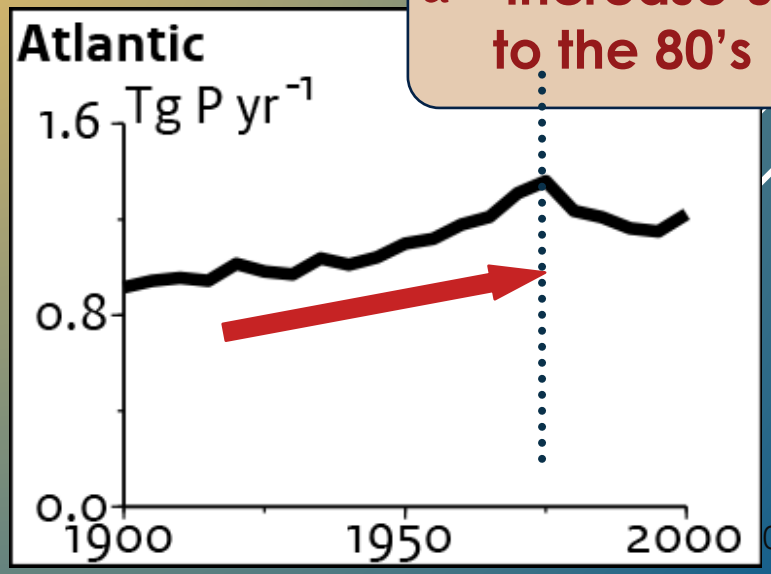
→ + 75%

From Beusen et al,. 2016

Atlantic Ocean

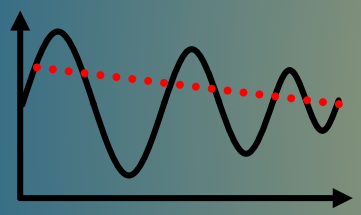


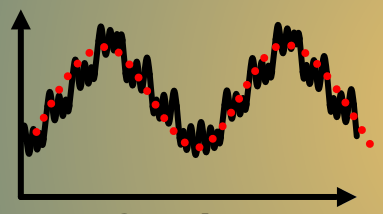
à increase up to the 80's

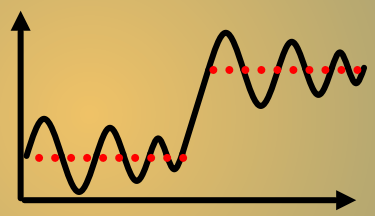


MAIN OBJECTIVES

- Long-term evolution of NUTRIENTS





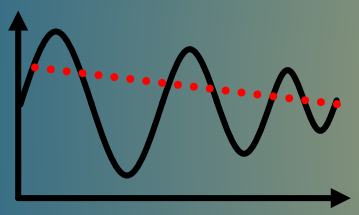


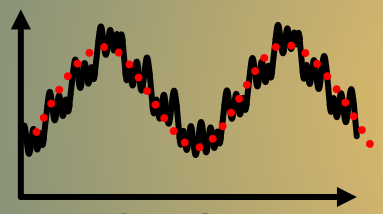
concentrations
&
ratios N:P:Si

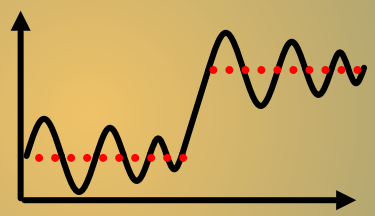
MAIN OBJECTIVES

- **DRIVERS**

- **Long-term evolution of NUTRIENTS**







concentrations
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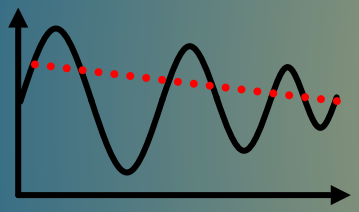
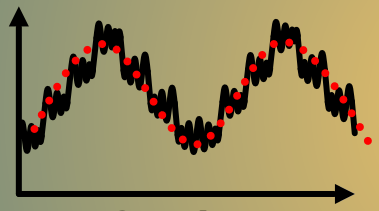
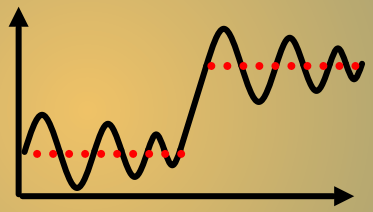
MAIN OBJECTIVES

- **DRIVERS**

- **Long-term evolution of NUTRIENTS**





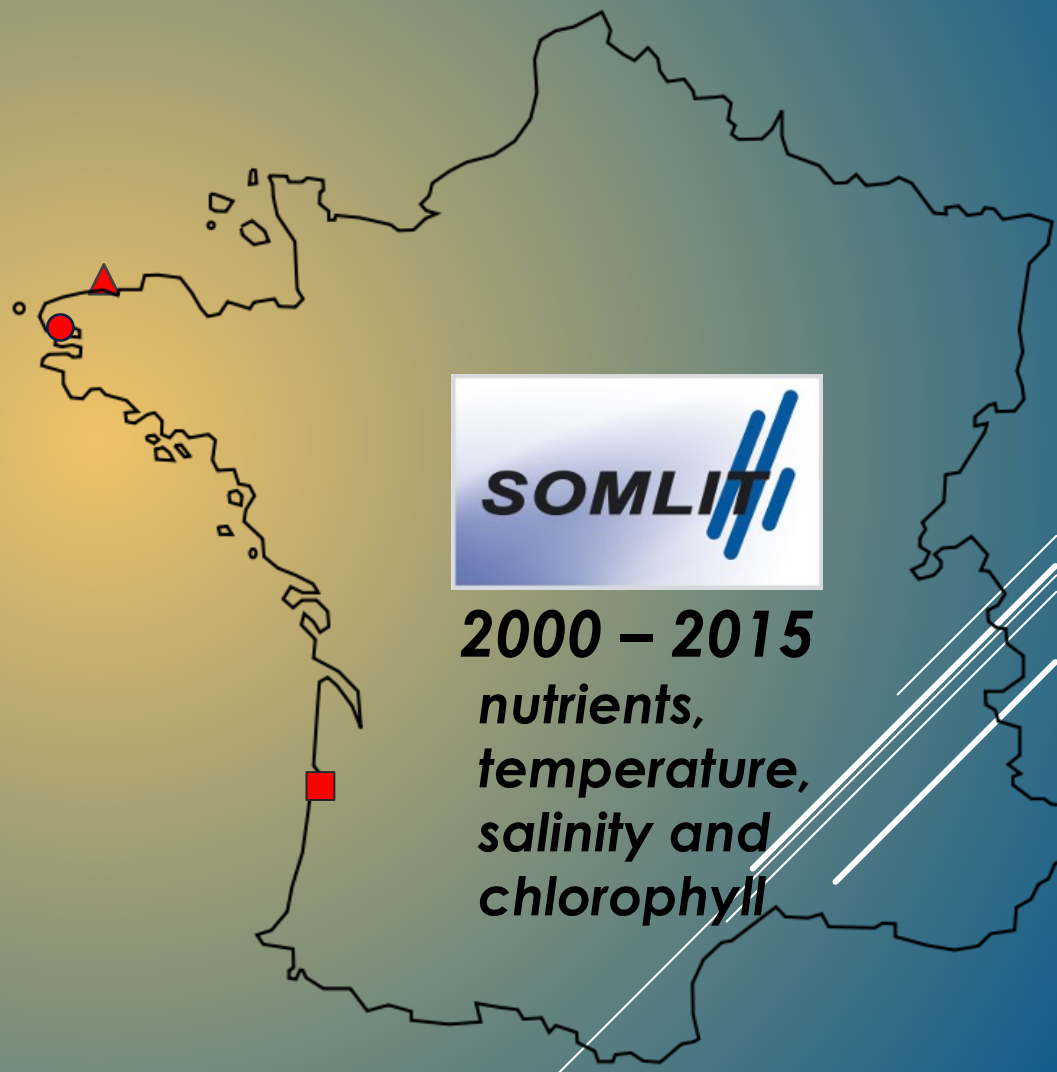


concentrations
&
ratios N:P:Si

- **Consequences on PHYTOPLANKTON biomass**

chlorophyll
biomass

STUDY LOCATIONS



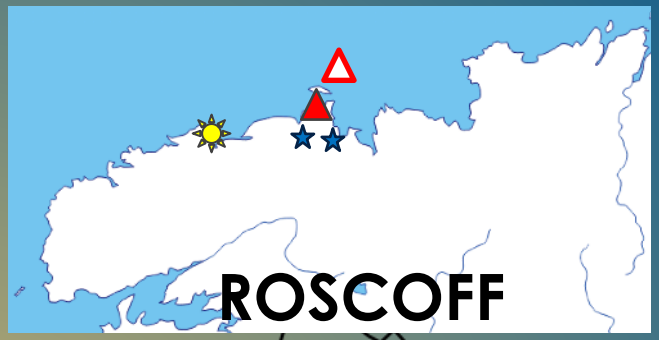
2000 – 2015

nutrients, temperature, salinity and chlorophyll

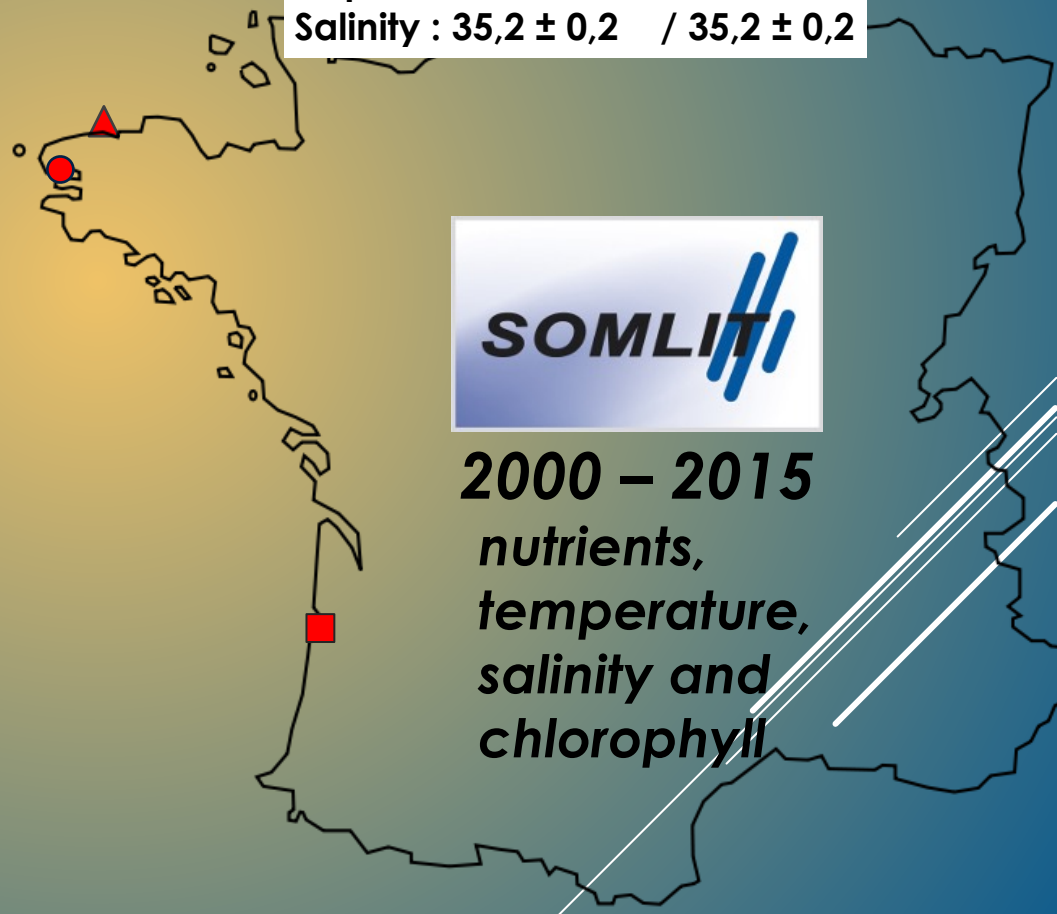
Meteorology (Météo-France)

Hydrology (ECOFLUX, Agences de l'eau, Banque Hydro)

STUDY LOCATIONS



RIVERS ★: Penzé & Guilhec
Depth : △ 60m / ▲ 3m
Salinity : 35,2 ± 0,2 / 35,2 ± 0,2



SOMLIT

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nutrients, temperature, salinity and chlorophyll

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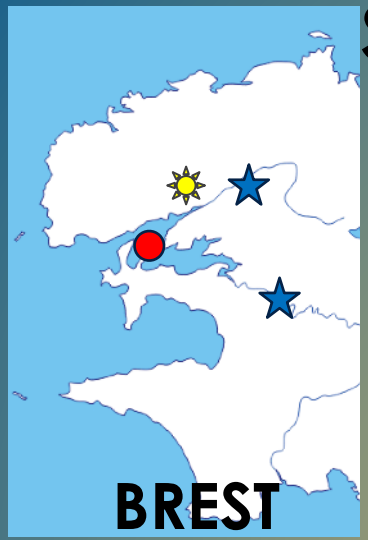
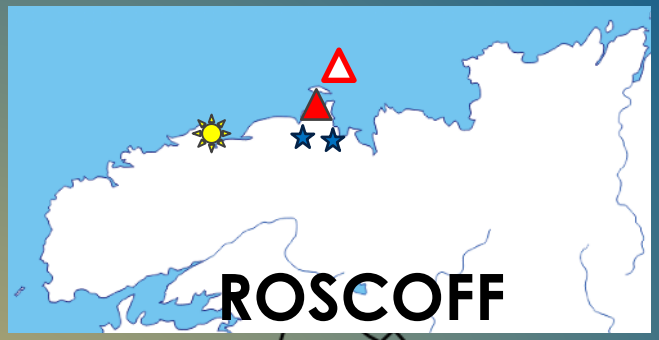
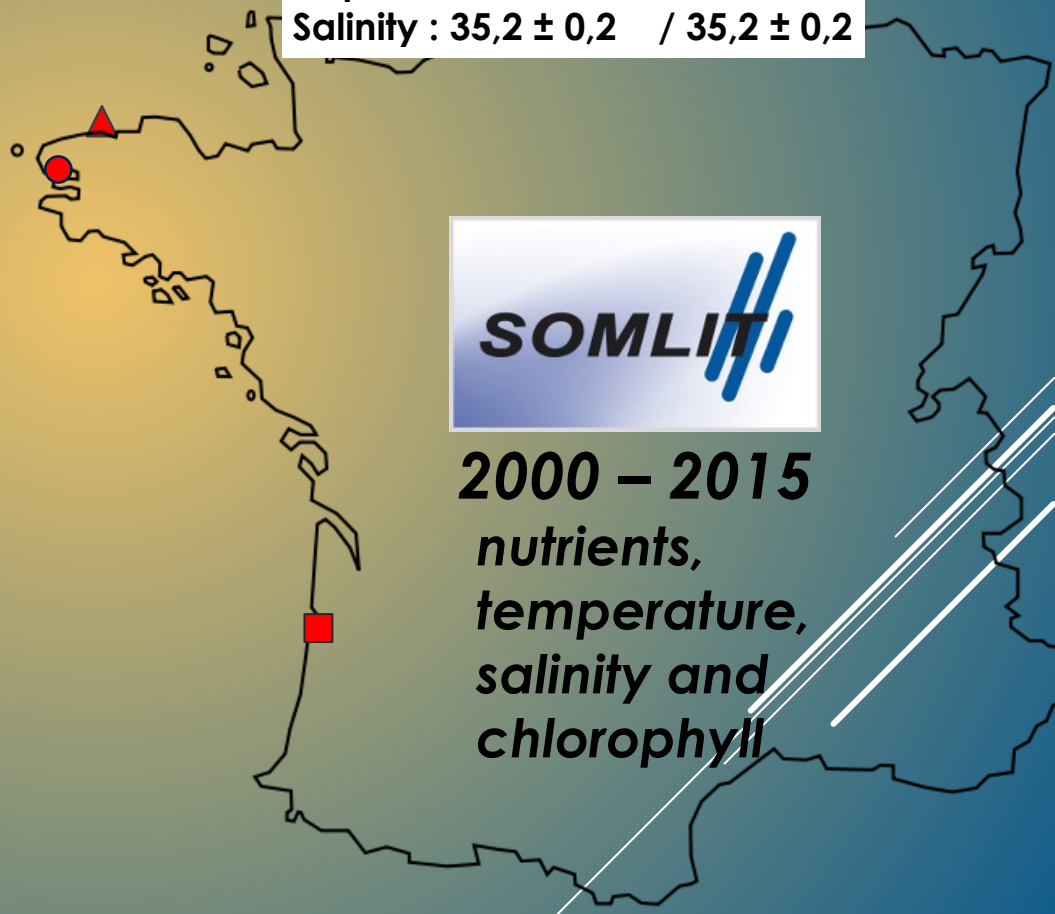
STUDY LOCATIONS



RIVERS ★: Aulne & Elorn
Depth : ●10m
Salinity : 34,6 ± 0,6



RIVERS ★: Penzé & Guilhec
Depth : △60m / ▲ 3m
Salinity : 35,2 ± 0,2 / 35,2 ± 0,2



SOMLIT

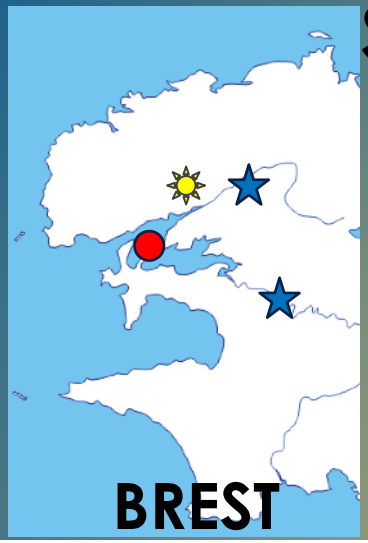
2000 – 2015

nutrients, temperature, salinity and chlorophyll

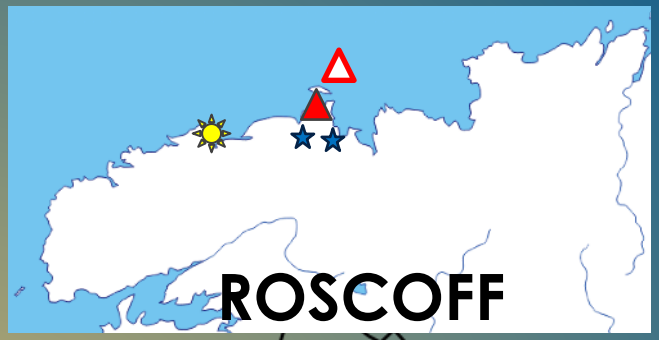
☀ ***Meteorology (Météo-France)***

★ ***Hydrology (ECOFLUX, Agences de l'eau, Banque Hydro)***

STUDY LOCATIONS



RIVERS ★: Aulne & Elorn
Depth : ●10m
Salinity : 34,6 ± 0,6



RIVERS ★: Penzé & Guilhec
Depth : △60m / ▲3m
Salinity : 35,2 ± 0,2 / 35,2 ± 0,2

RIVER ★: Leyre
Depth : □25m / ■8m / ■6m
Salinity : 34,4 ± 0,8 / 32,6 ± 1,8/ 31,4 ± 2,6

SOMLIT

2000 – 2015

nutrients, temperature, salinity and chlorophyll

☀ *Meteorology (Météo-France)*

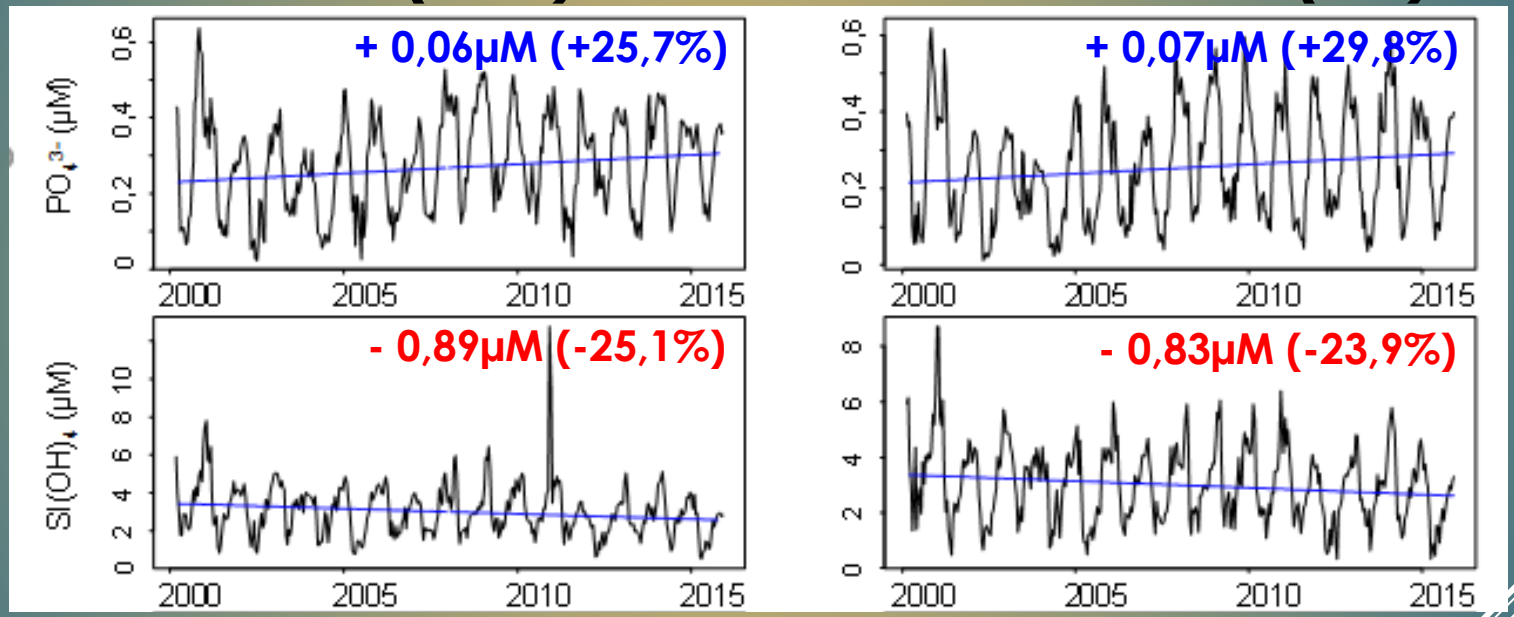
★ *Hydrology (ECOFLUX, Agences de l'eau, Banque Hydro)*

ROSCOFF

ASTAN (60m) | ESTACADE (3m)

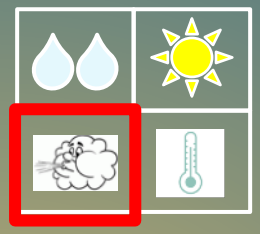
P_{mar}

Si_{mar}



ROSCOFF

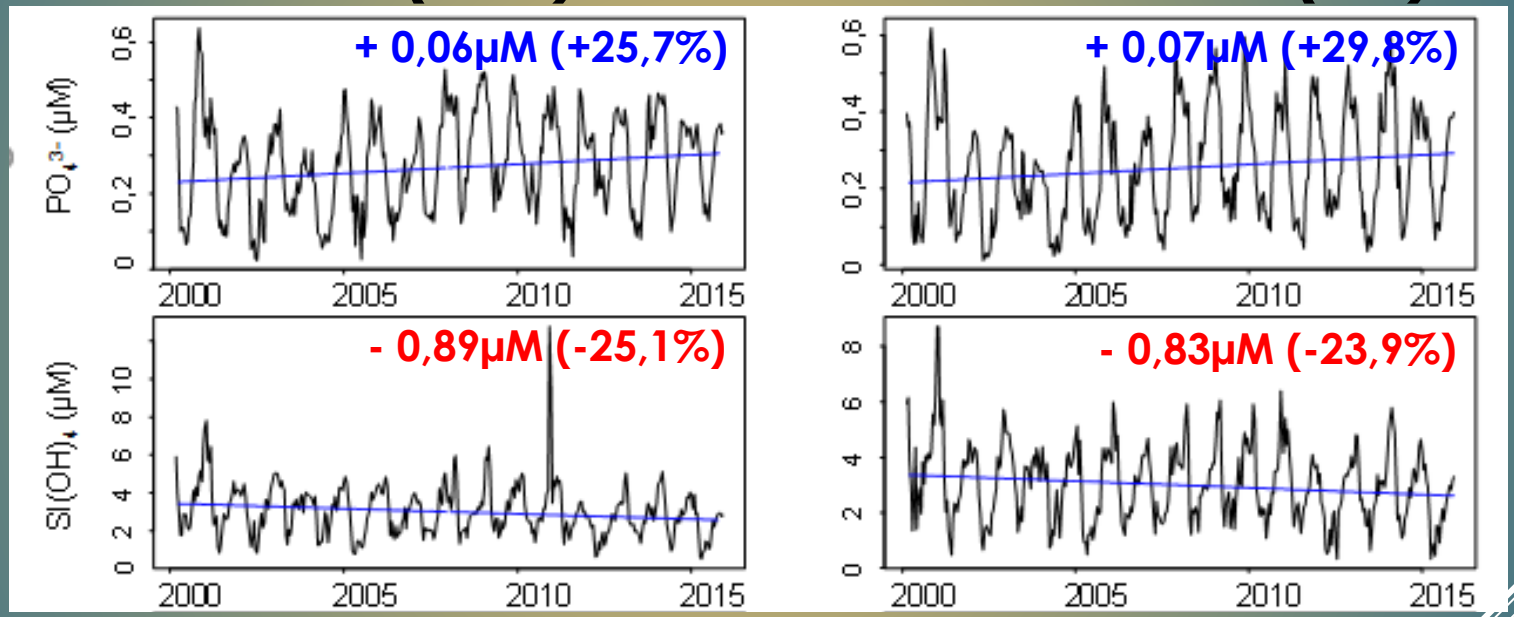
N_{riv} and P_{riv}



ASTAN (60m) *ESTACADE (3m)*

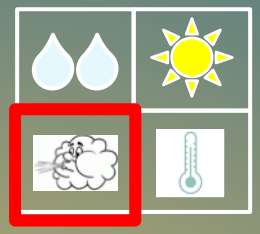
P_{mar}

Si_{mar}



ROSCOFF

N_{riv} and P_{riv}

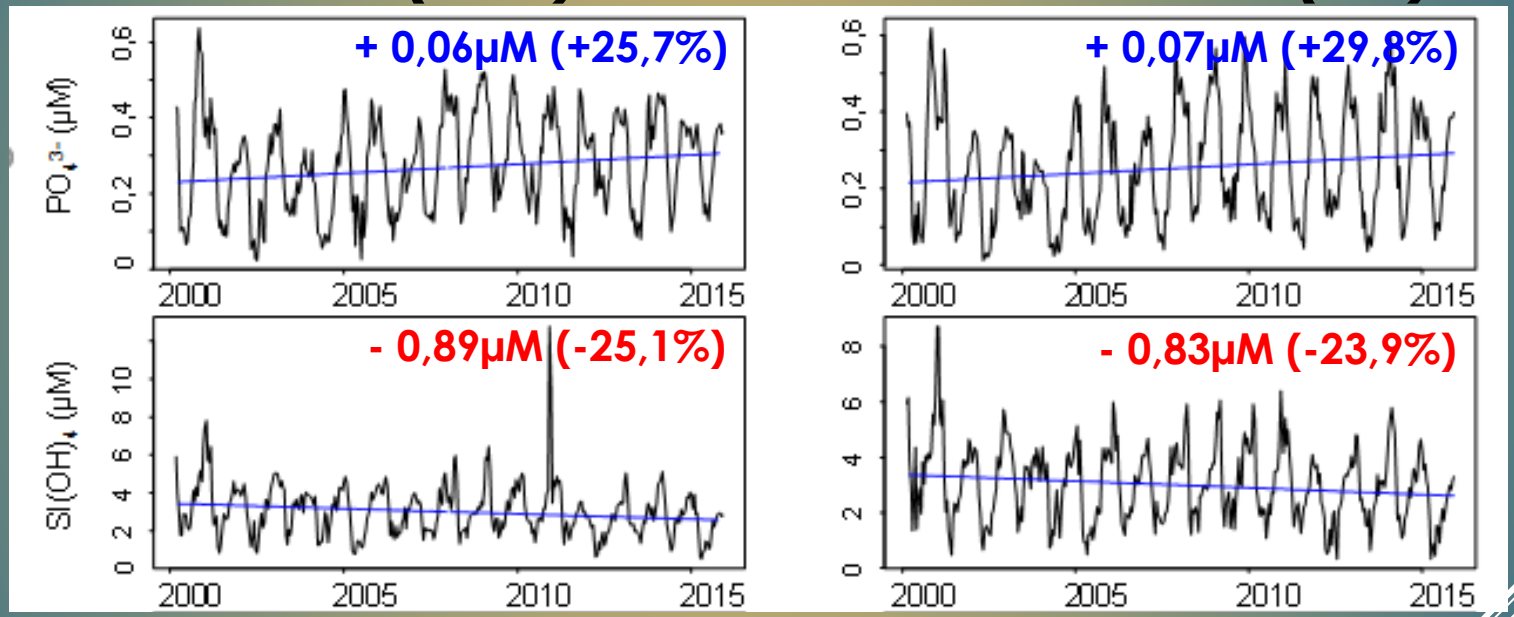


ASTAN (60m)

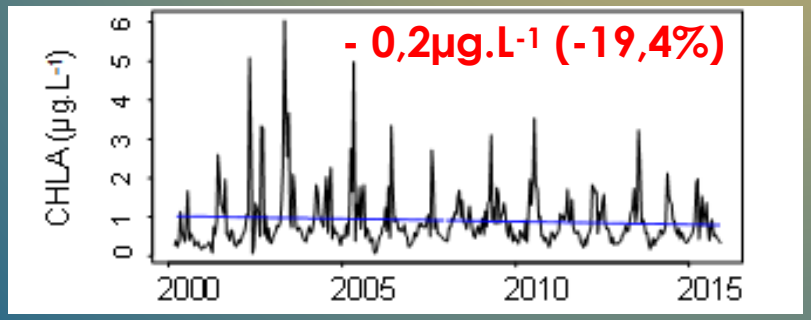
ESTACADE (3m)

P_{mar}

Si_{mar}

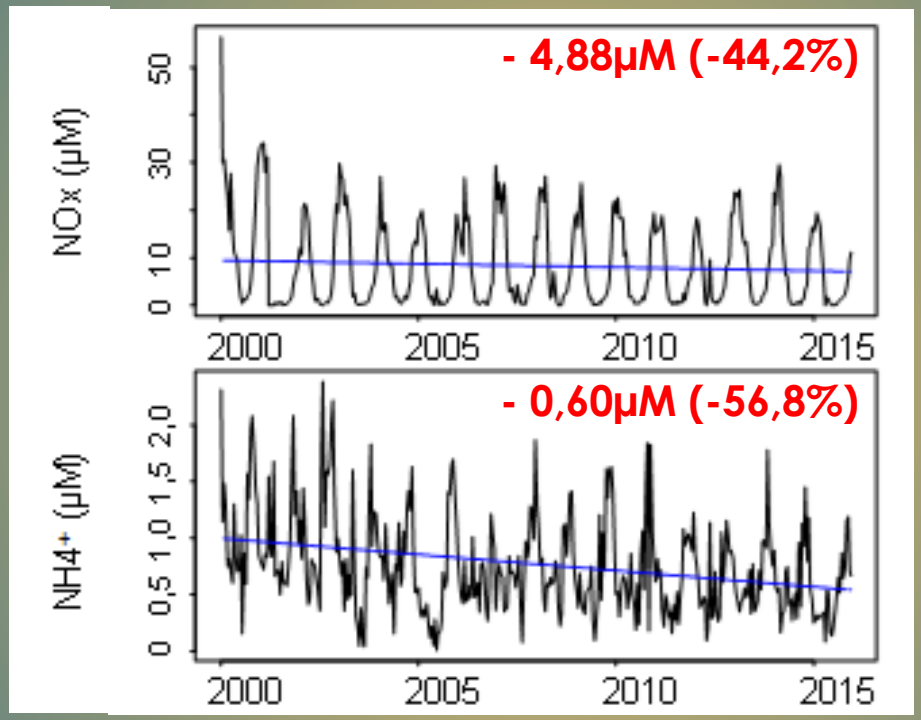


phyto



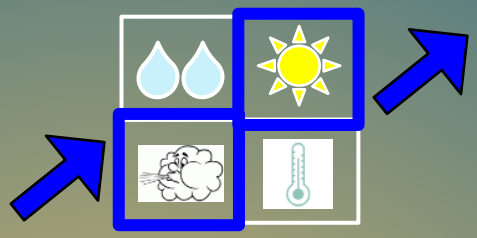
BREST

N_{mar}

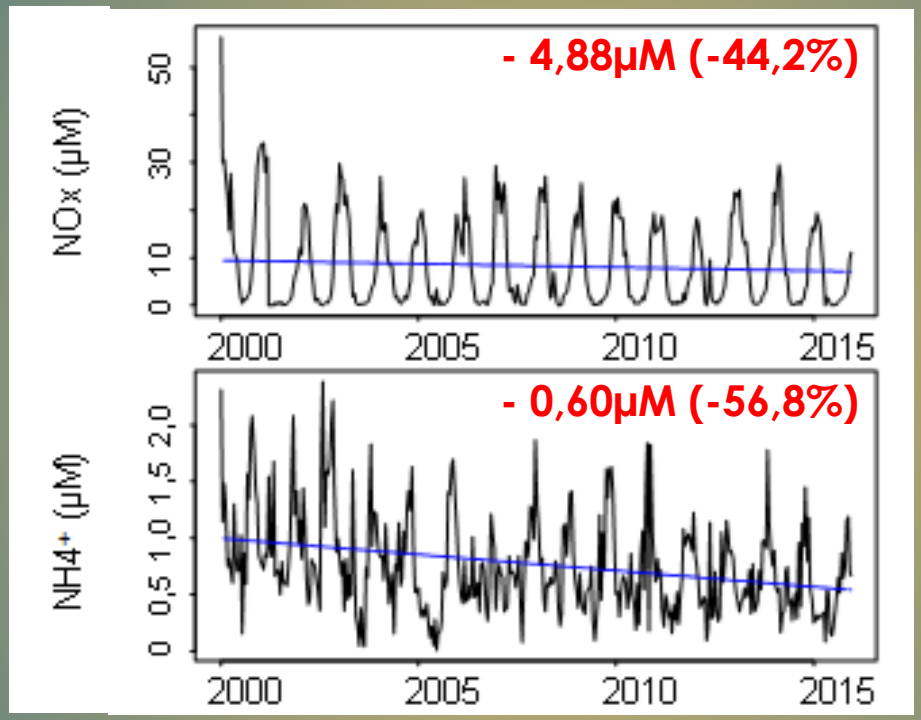

- 4,88µM (-44,2%)
NOx (µM)
0
10
30
50
2000
2005
2010
2015
- 0,60µM (-56,8%)
NH4+ (µM)
0
0,5
1,0
1,5
2,0
2000
2005
2010
2015

BREST

N_{riv} and P_{riv}



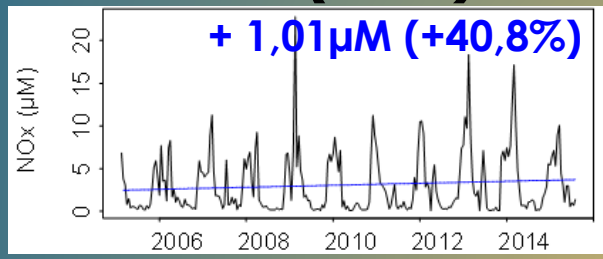
N_{mar}



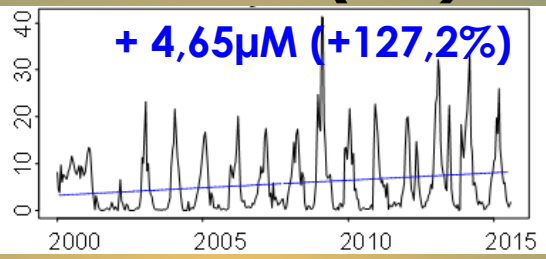
phyto

ARCACHON

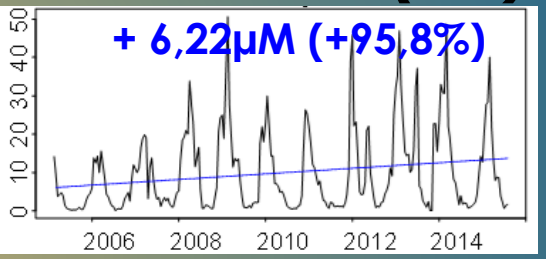
B13 (25m)*



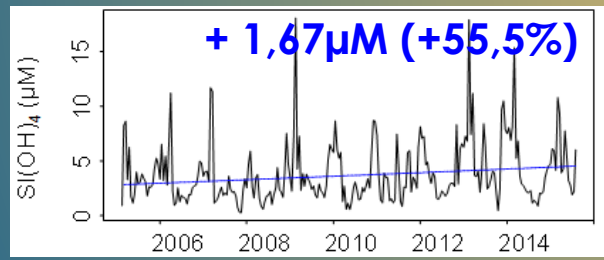
EYRAC (8m)



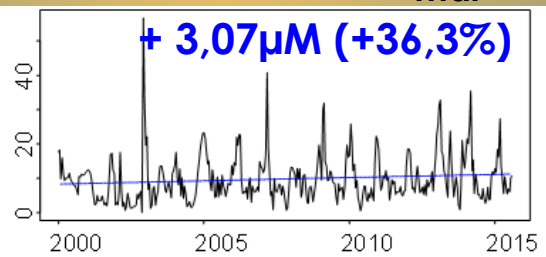
COMPRIAN (6m)*

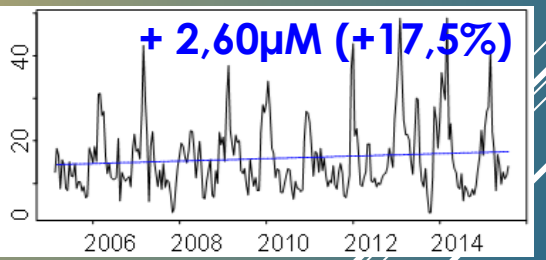


Si_{mar} & N_{mar}



$Temp_{mar}$ (+0,88°C & +0,78°C)

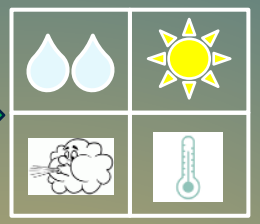




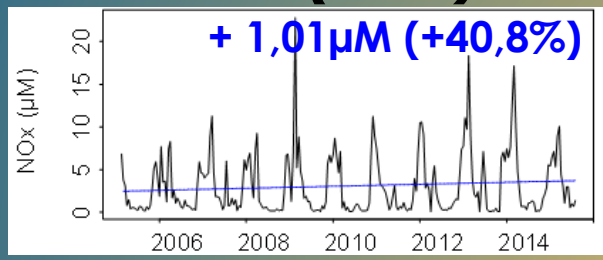
* [2005 – 2015]

ARCACHON

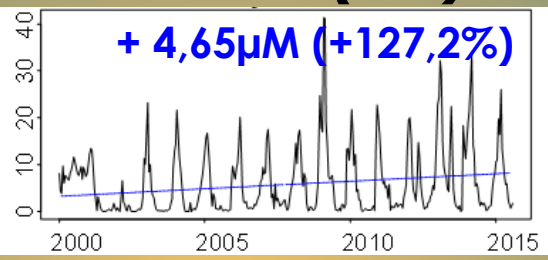
N, P & S_{riv}



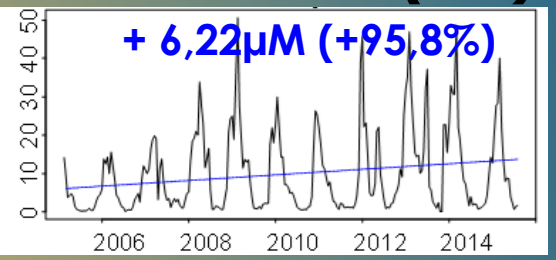
B13* (25m)



EYRAC (8m)

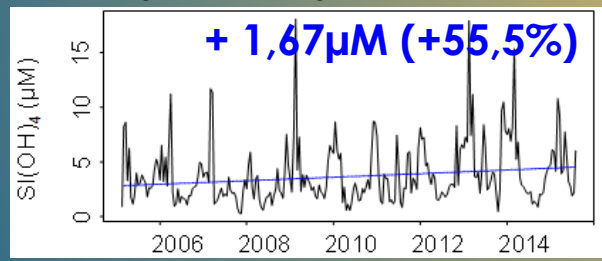


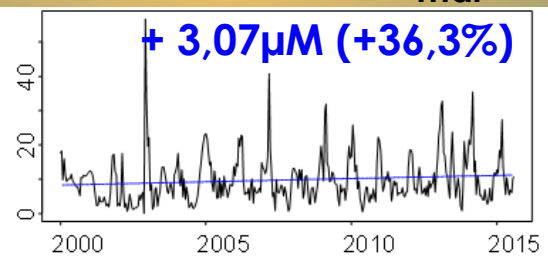
COMPRIAN* (6m)

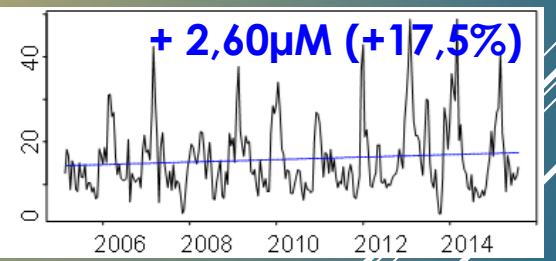


Si_{mar} & N_{mar}

$Temp_{mar}$



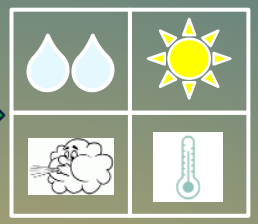




* [2005 – 2015]

ARCACHON

N, P & S_{riv}



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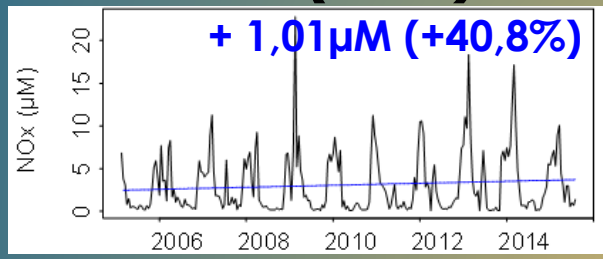

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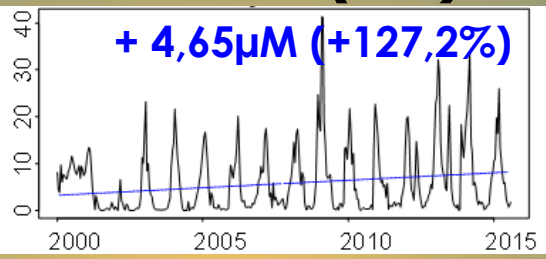

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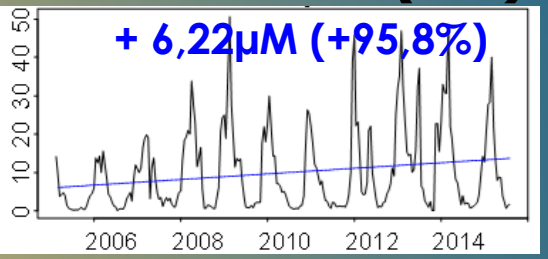
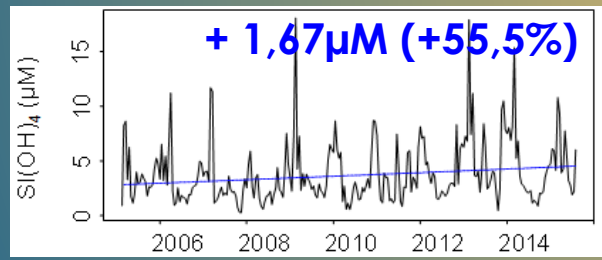
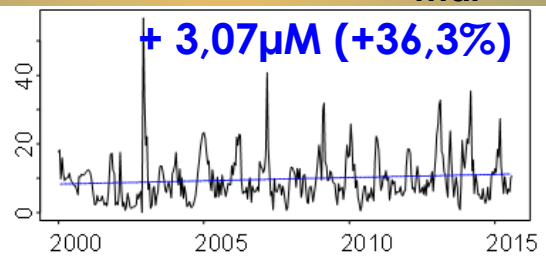
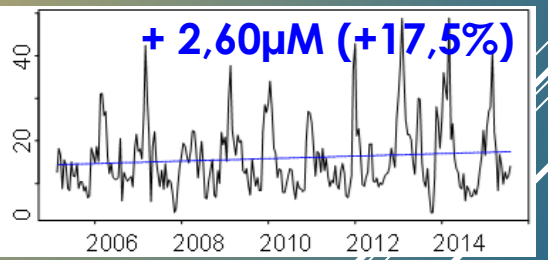


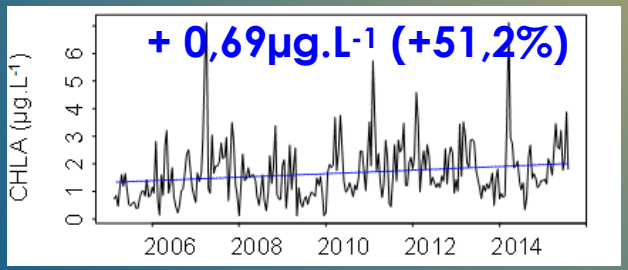
Si_{mar} & N_{mar}

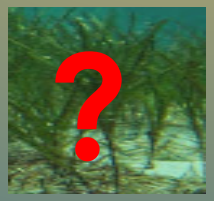
$Temp_{mar}$





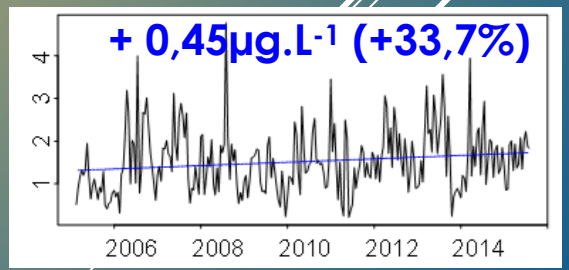






Zostera spp.

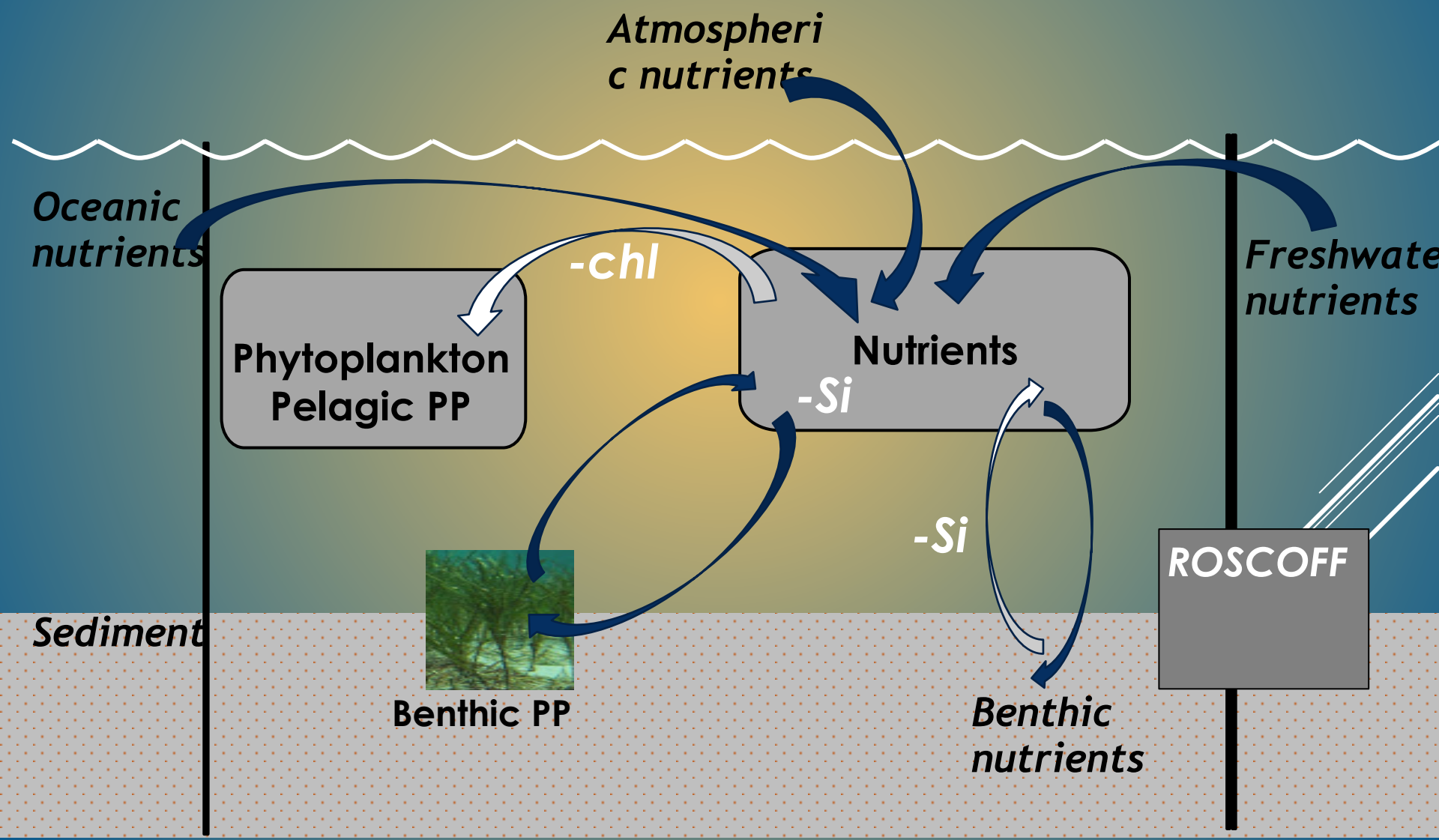
phyto



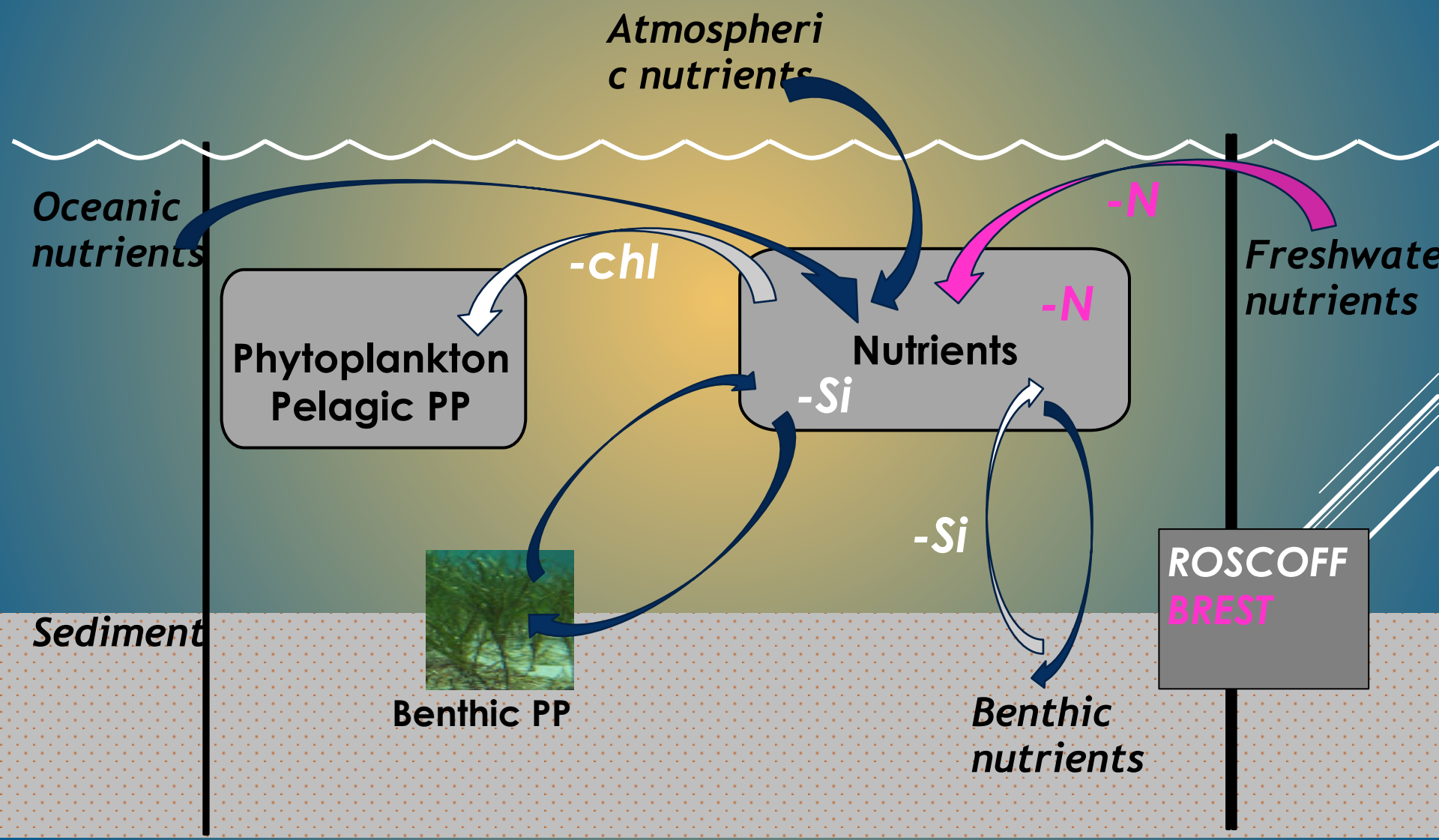
* [2005 – 2015]

Y. Del Amo – Coast Bordeaux 2017

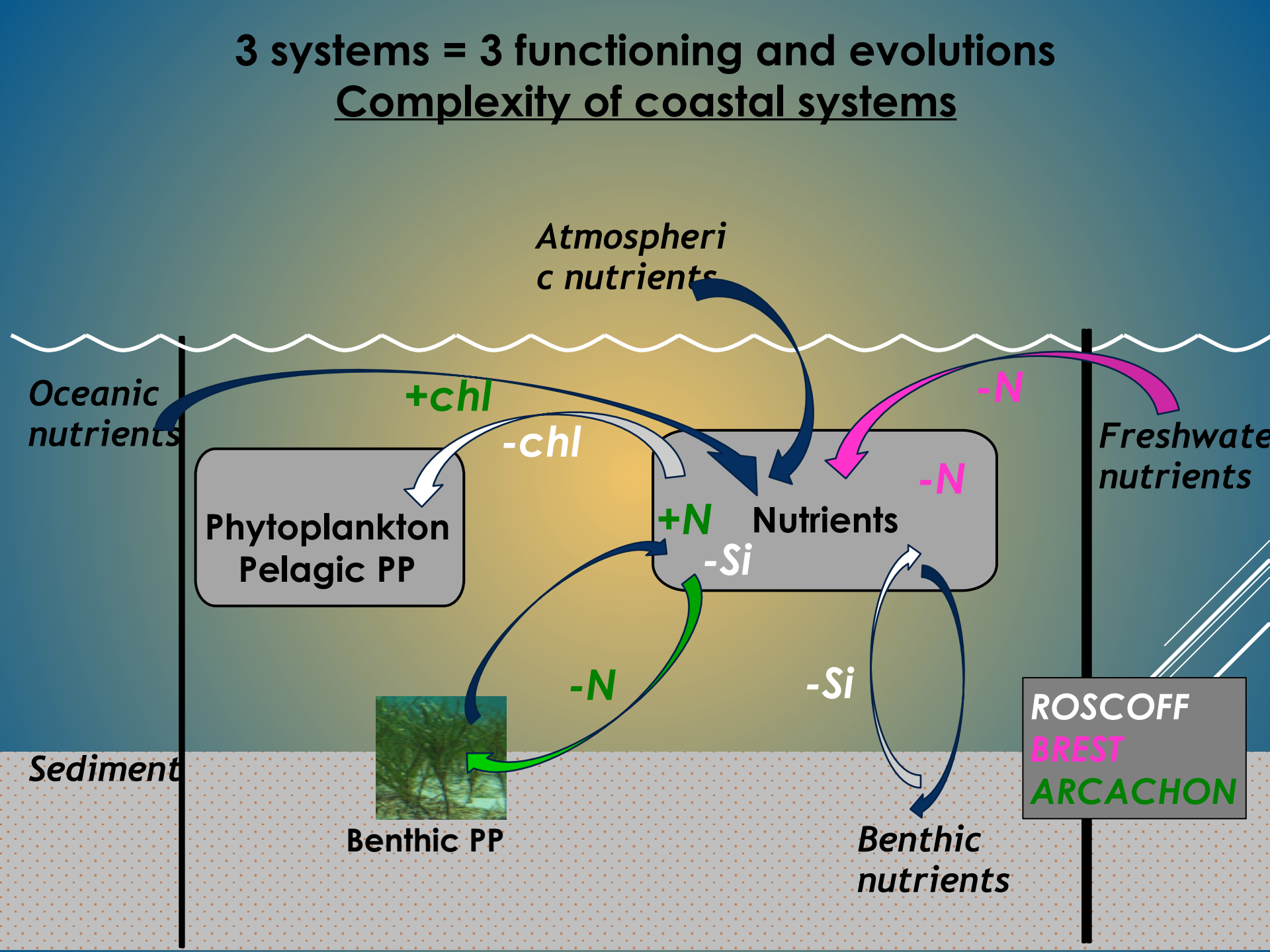
3 systems = 3 functioning and evolutions



3 systems = 3 functioning and evolutions



3 systems = 3 functioning and evolutions
Complexity of coastal systems



Données brutes

Régularisation des données

↓

Moyenne Mobile

↓

Test **Mann-Kendall** modifié