

# Effets anthropiques sur les écosystèmes marins

Sixième journée thématique :  
Modélisation – Simulation

28/01/2016

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Ecologie numérique des Milieux aquatiques

# Ecophysiologie marine

- Etude en récifs coralliens artificiels et en chemostats



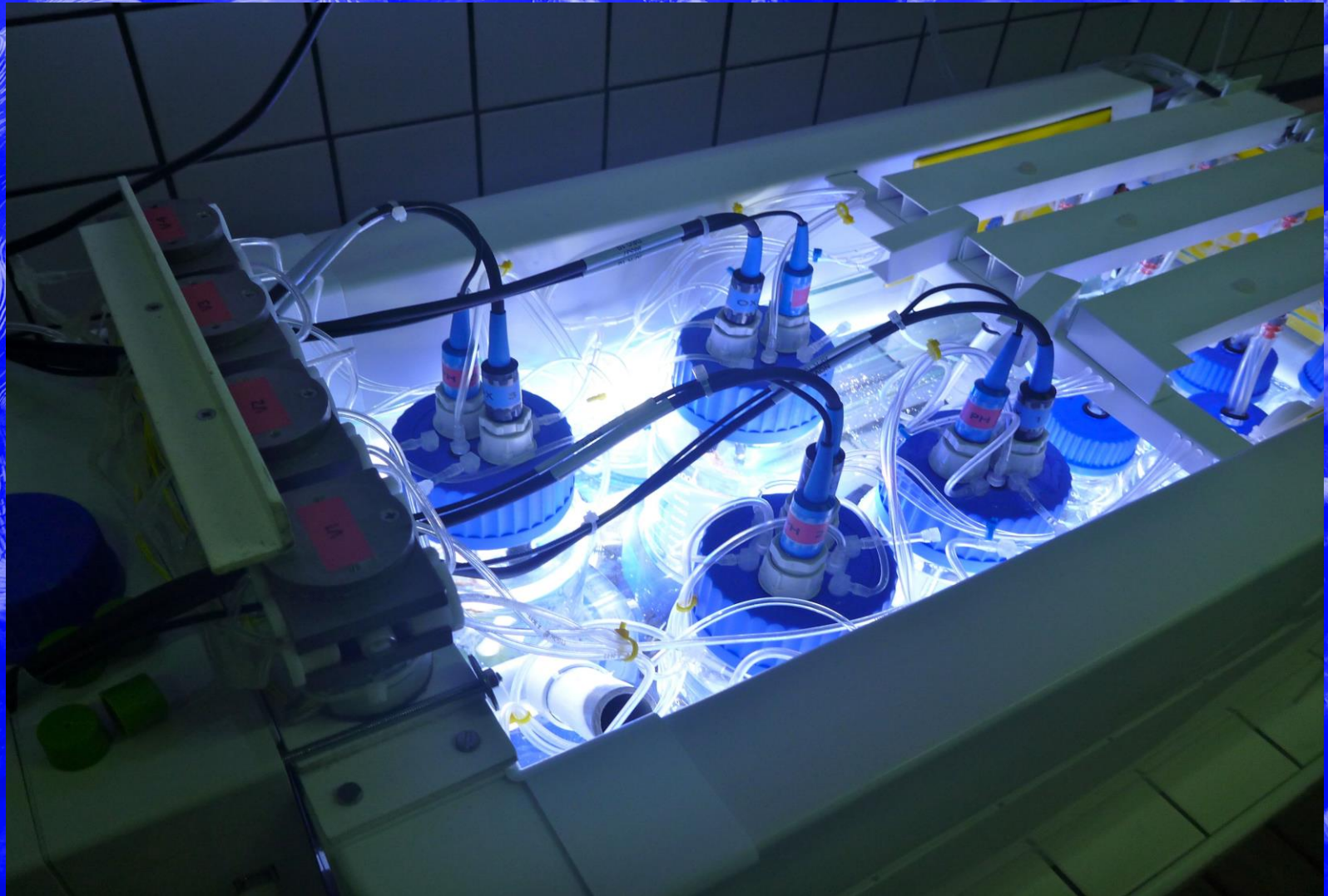


# Mésocosmes récifaux artificiels



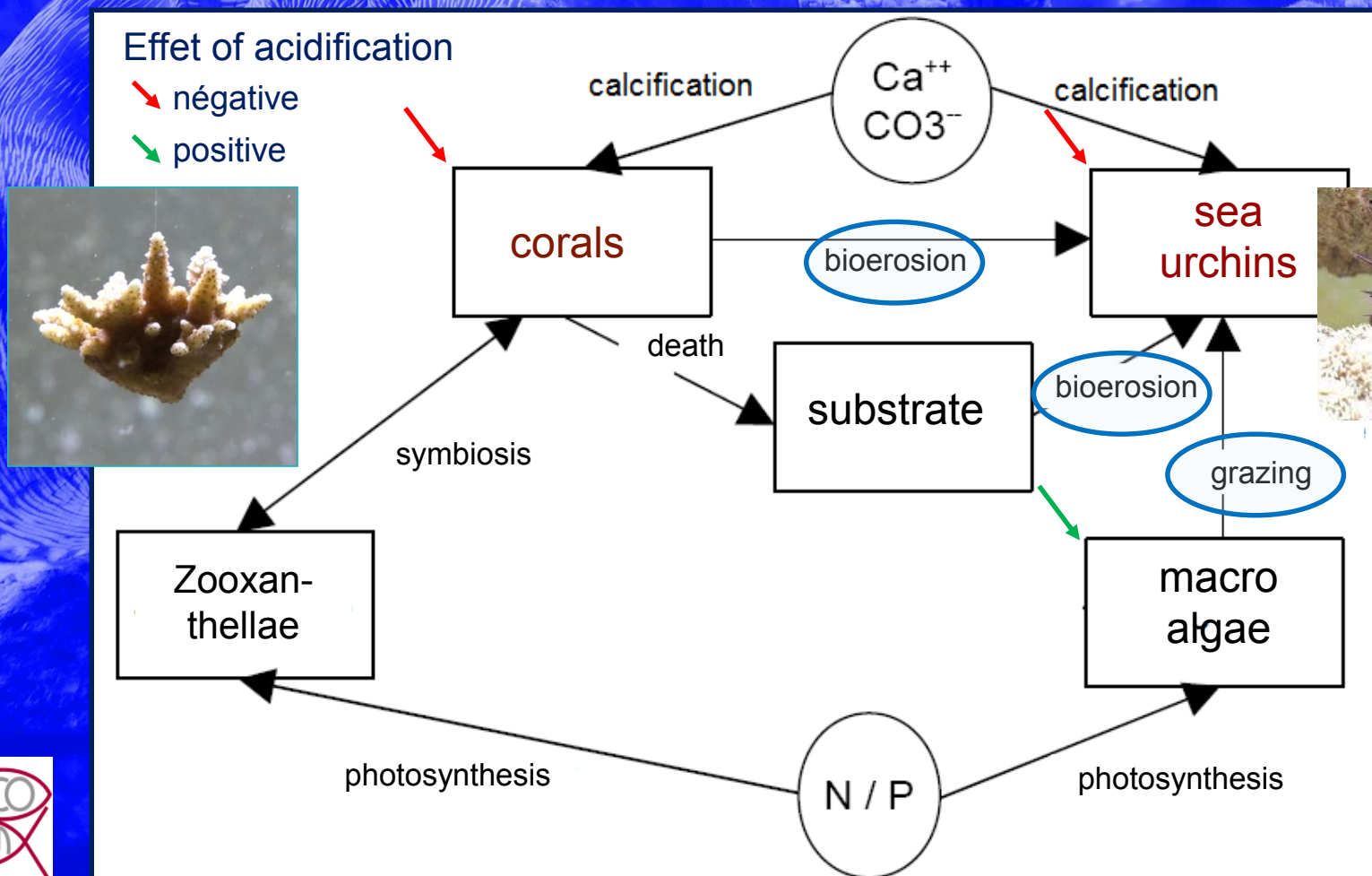
# Mesures de flux en chemostat

- Système original et breveté



# Modélisation : interactions corail-oursin sur le récif

- Effet de l'acidification des océans sur les interactions dans l'écosystème



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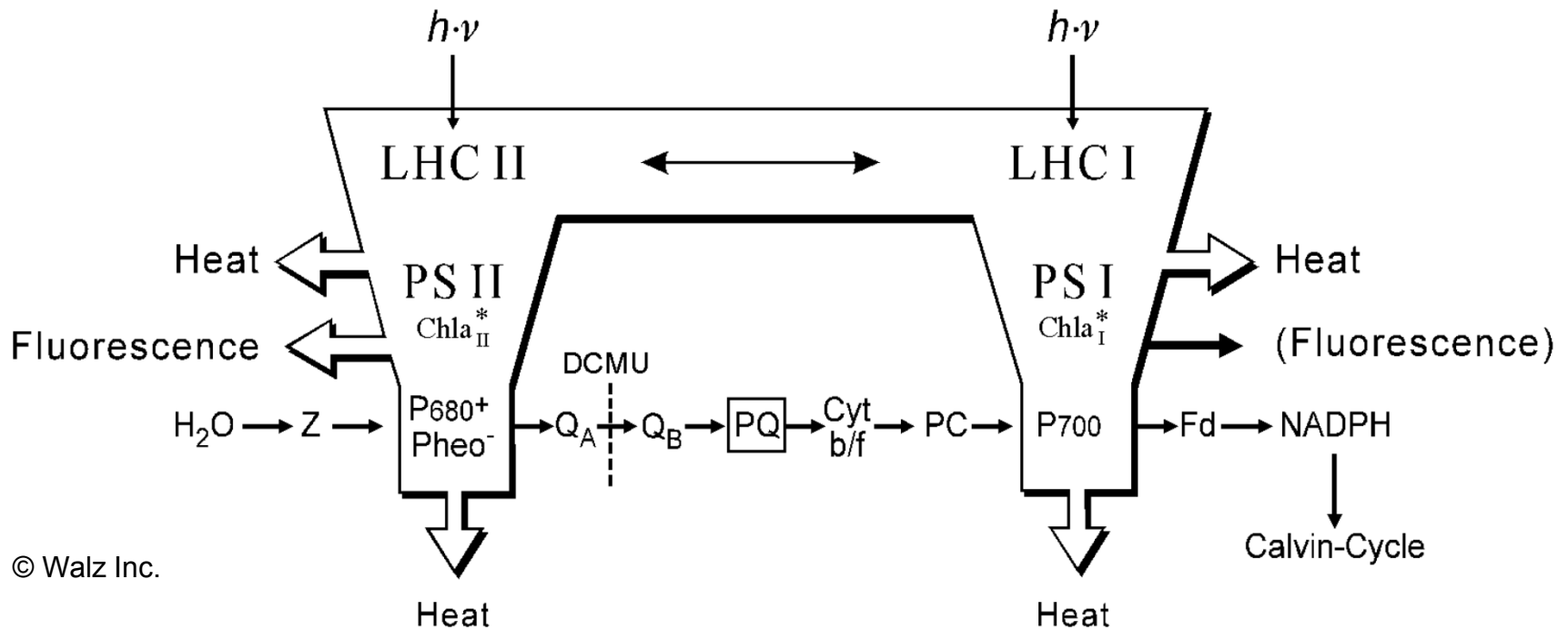
### Photosynthèse : indicateur précoce

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# Fluorescence emission

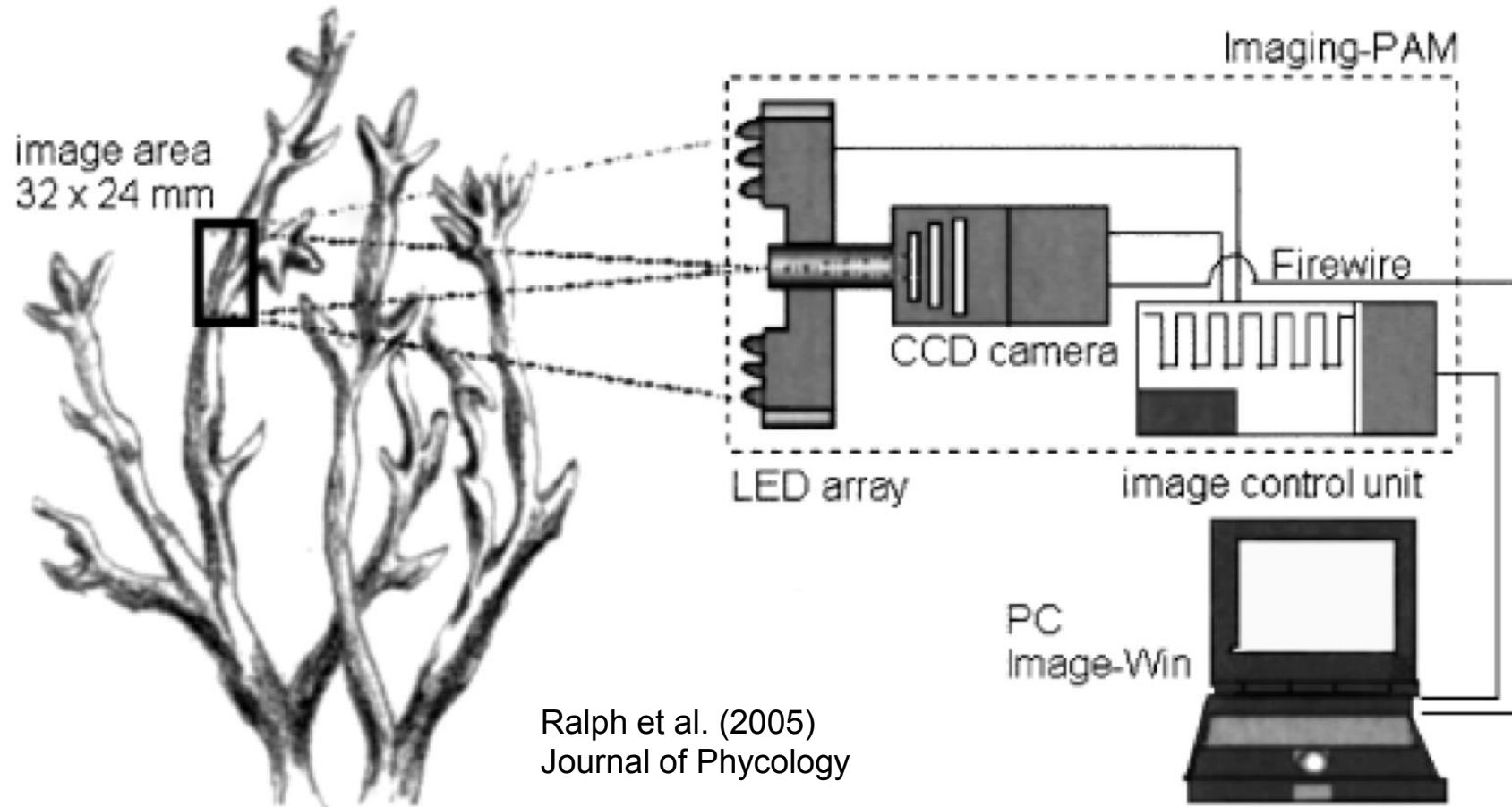


Fluorescence emission is complementary to the alternative pathways of de-excitation, which are photochemistry and heat dissipation.



# Imaging-PAM - high-resolution imaging fluorometer

- ❖ To map the spatial heterogeneity of photosynthesis;
- ❖ Optimized to determine of the effective quantum yield of photosynthetic energy conversion,  $\Delta F/F_m'$ .



Ralph et al. (2005)  
Journal of Phycology

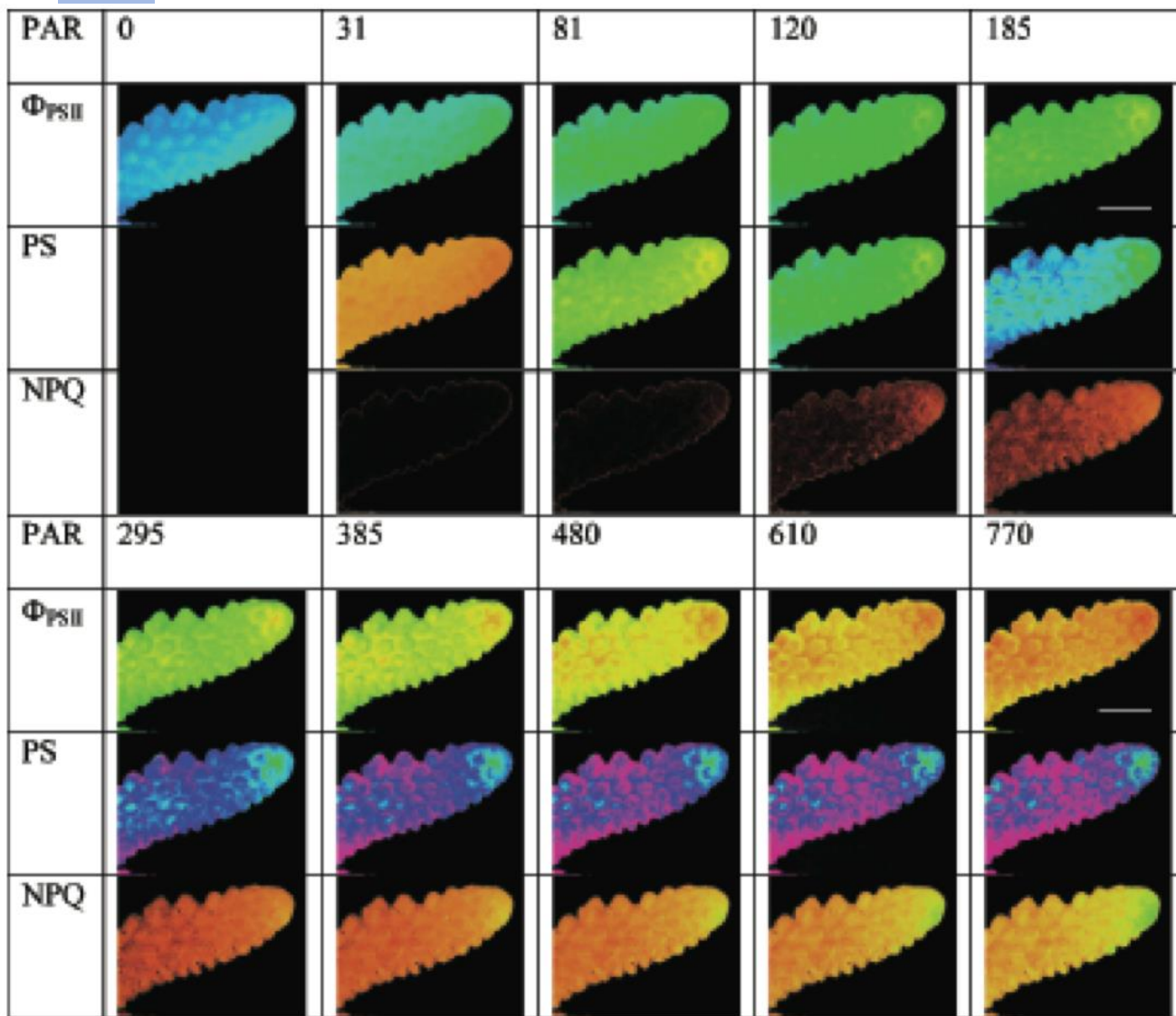


# Imaging-PAM



*Acropora nobilis*

Chl a fluorescence images of *Acropora nobilis* (sun-adapted) collected during a RLC with 10-s illumination steps.  $\Phi_{PSII}$  : effective quantum yield, PS : relative photosynthesis rate, NPQ: non-photochemical quenching coefficient.



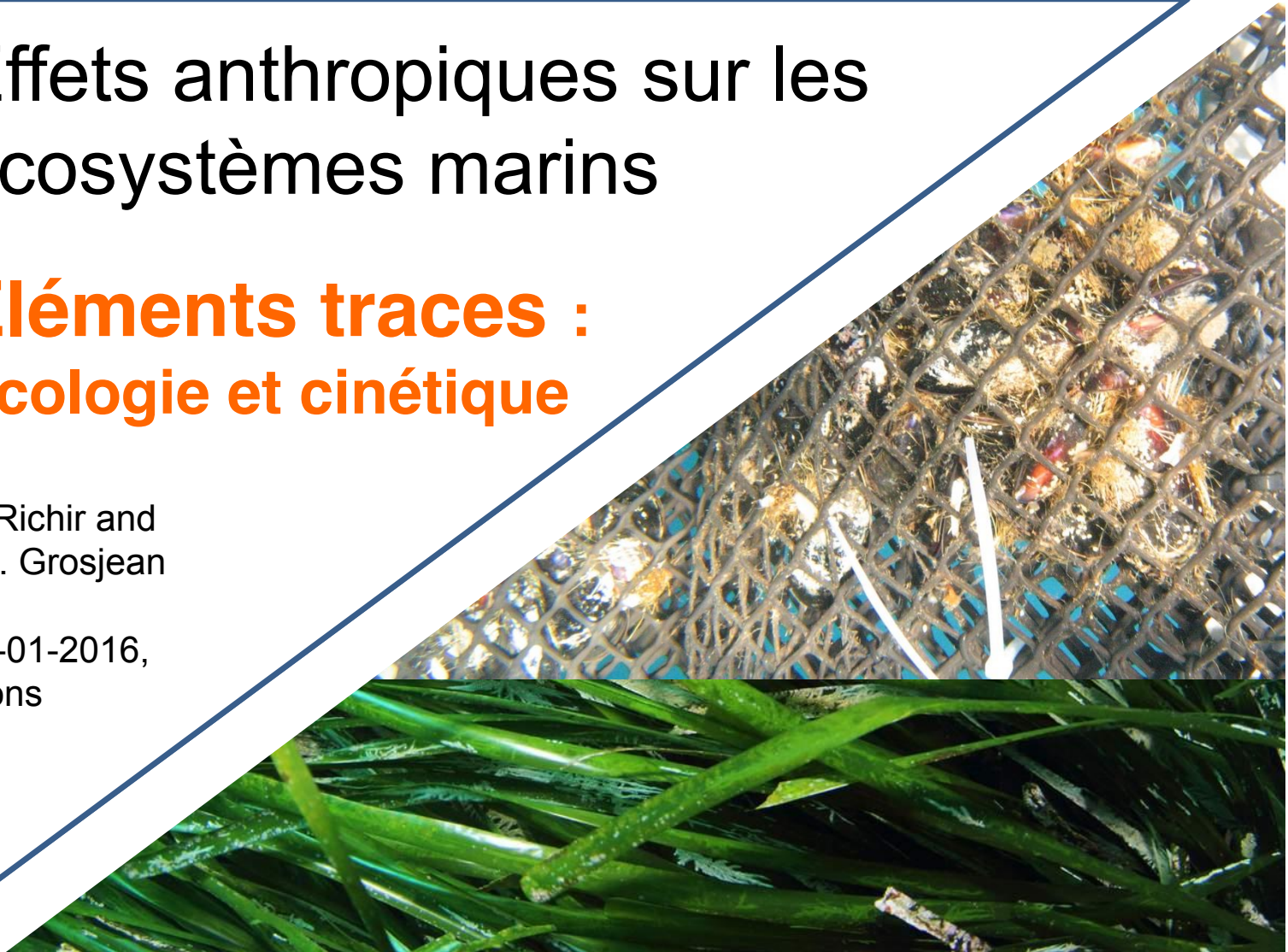
Ralph et al. (2005)  
Journal of Phycology

## Effets anthropiques sur les écosystèmes marins

### **Eléments traces : Écologie et cinétique**

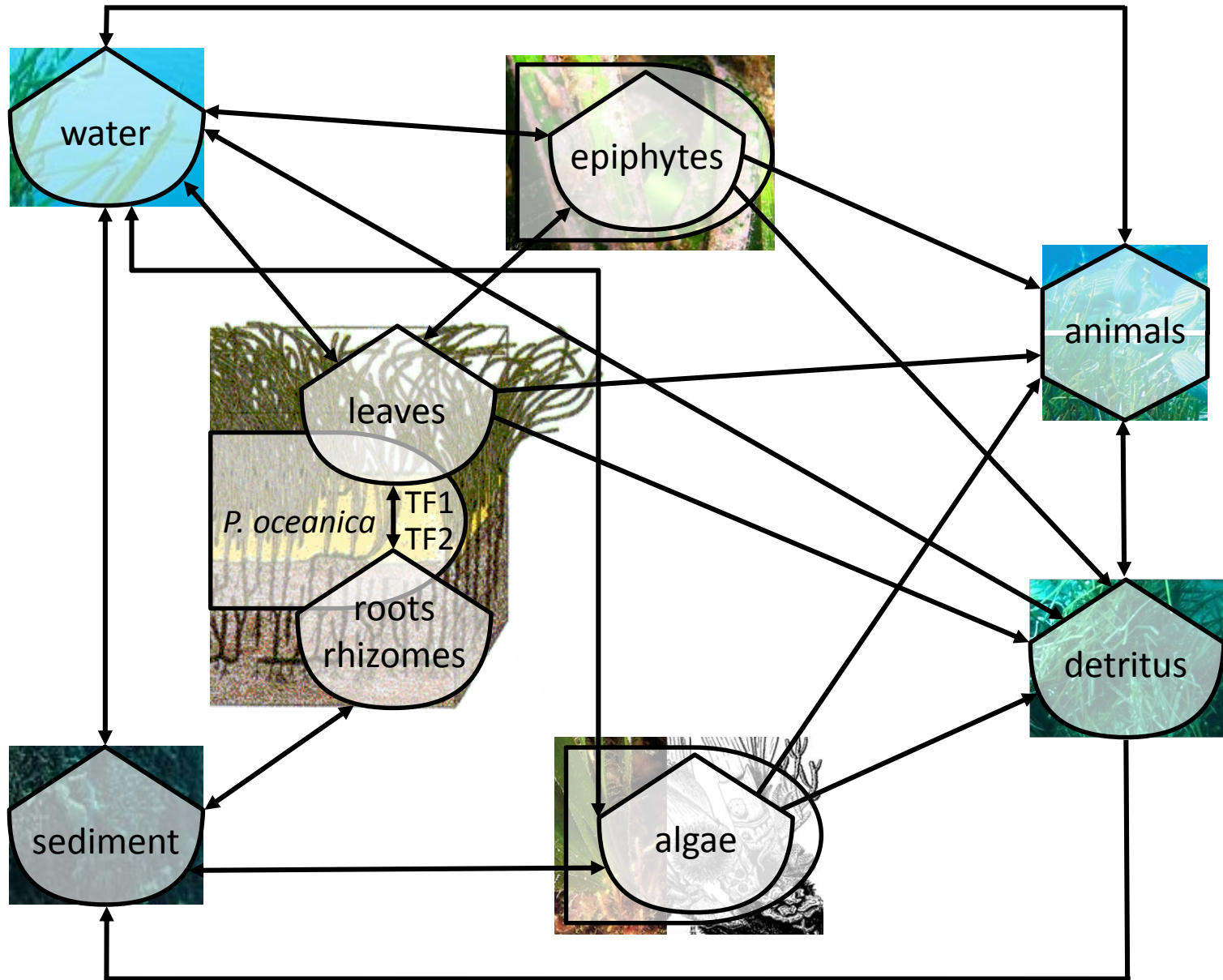
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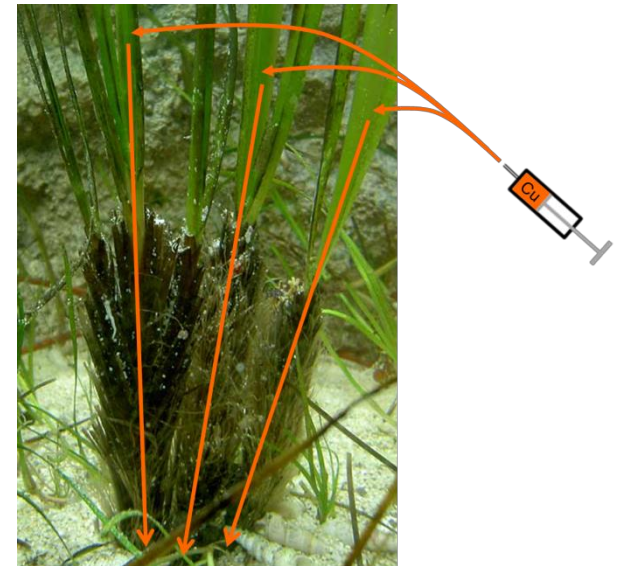
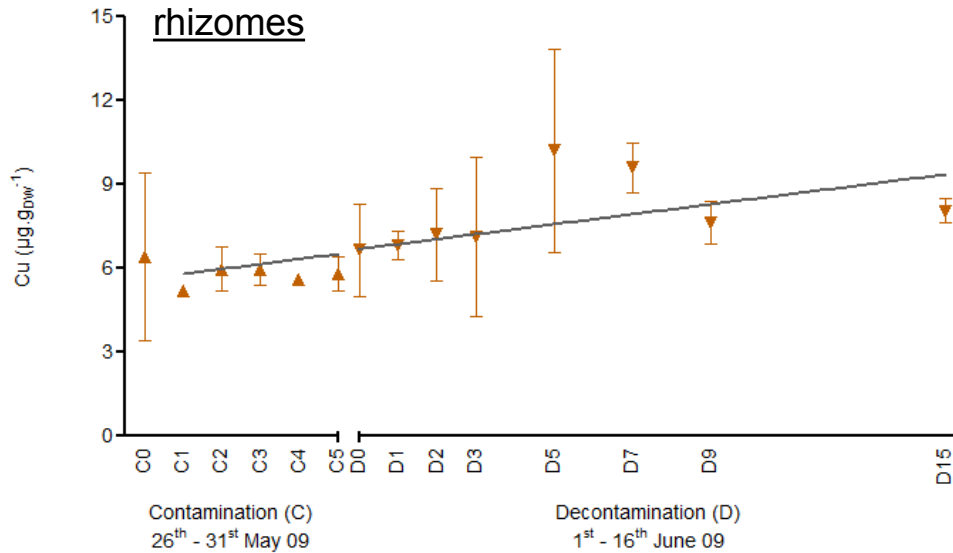
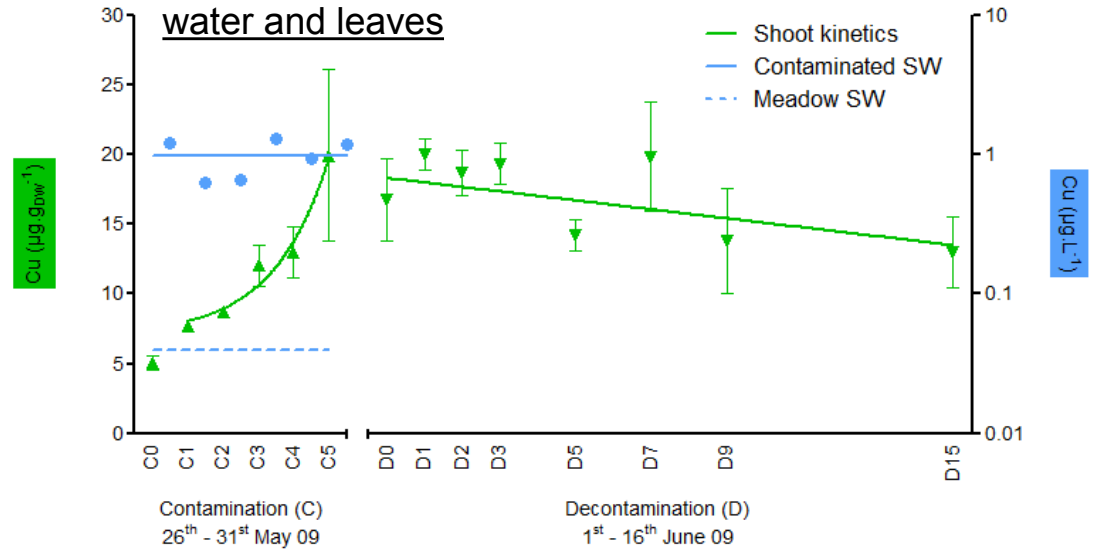
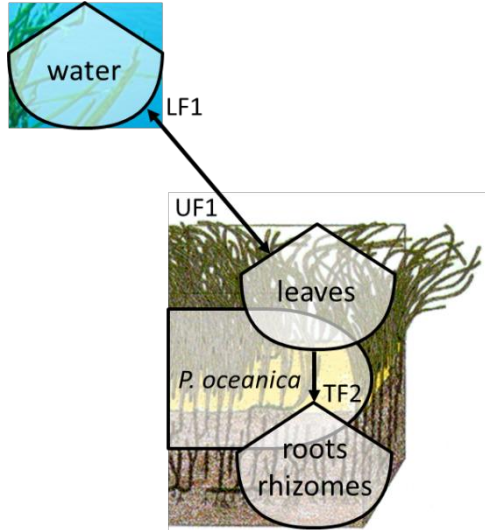




# Diagram in energy circuit language



# Flows : uptake and translocation processes



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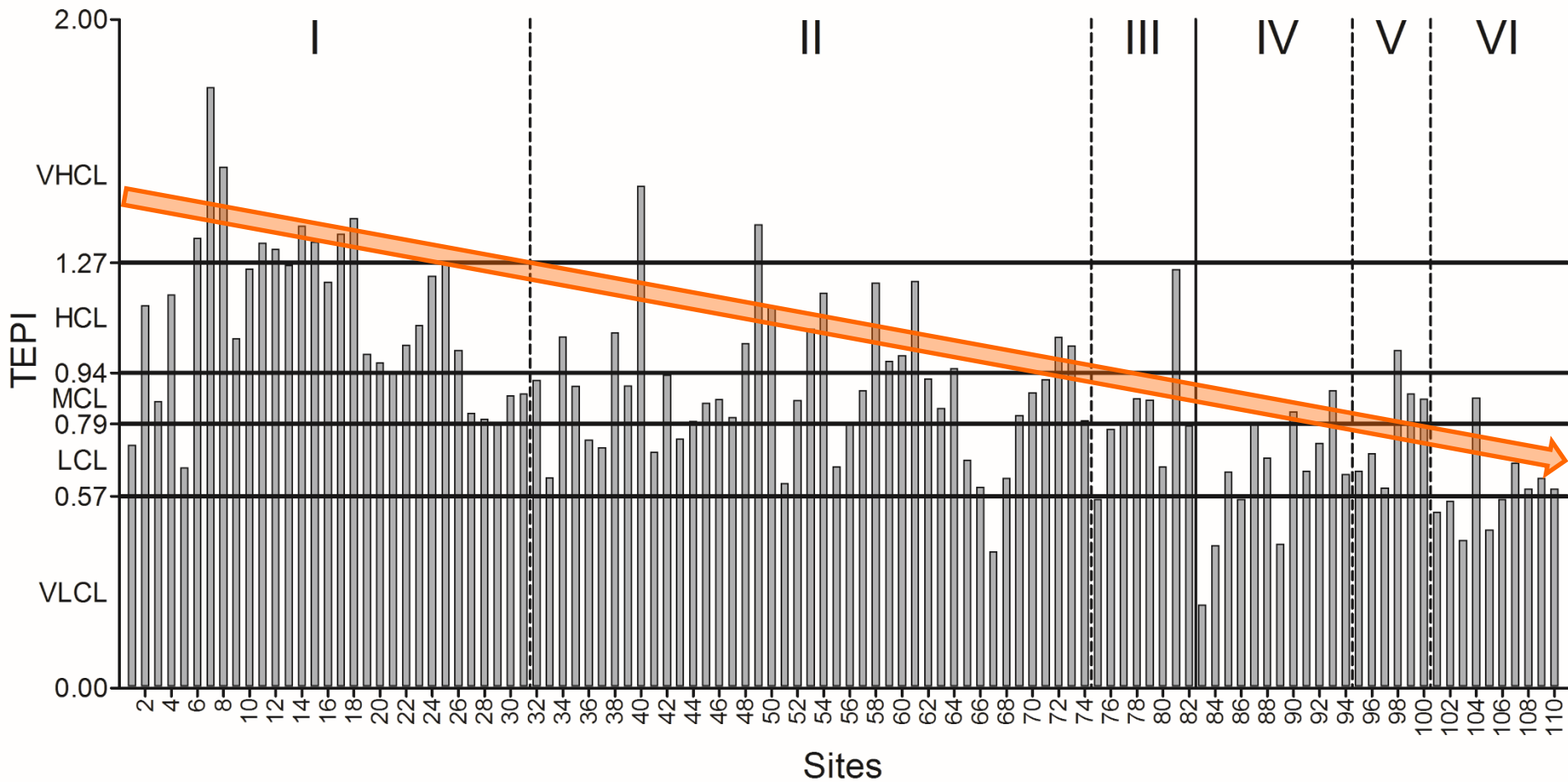
### Elément traces : monitoring

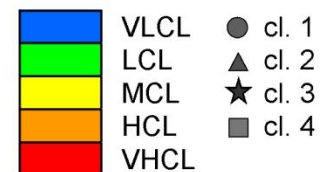
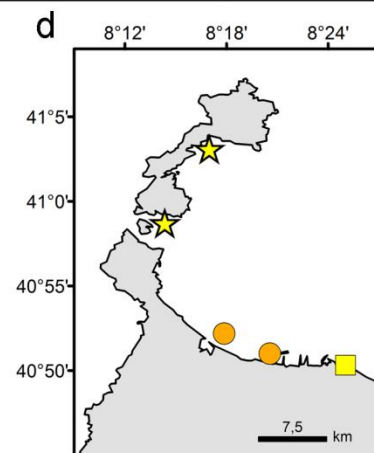
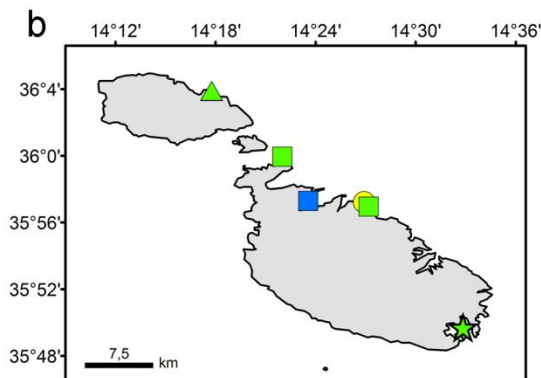
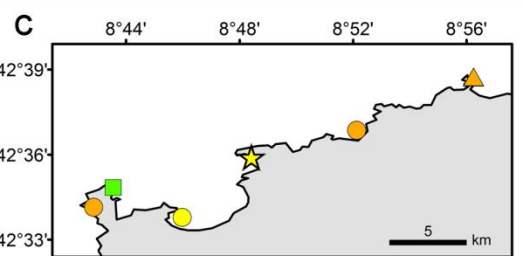
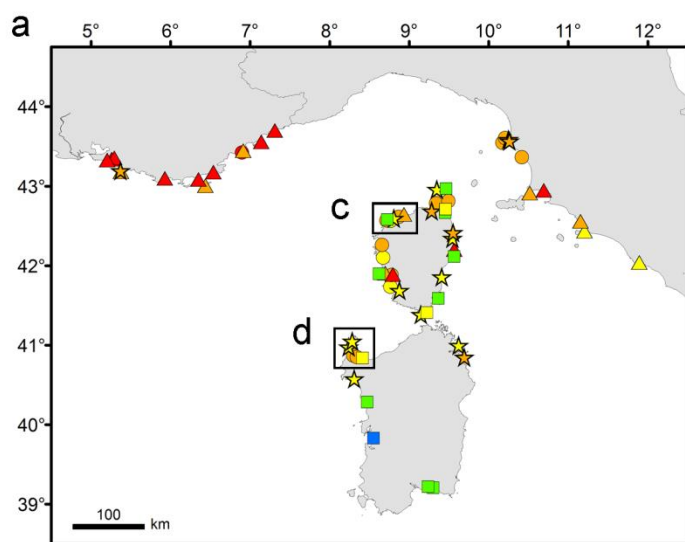
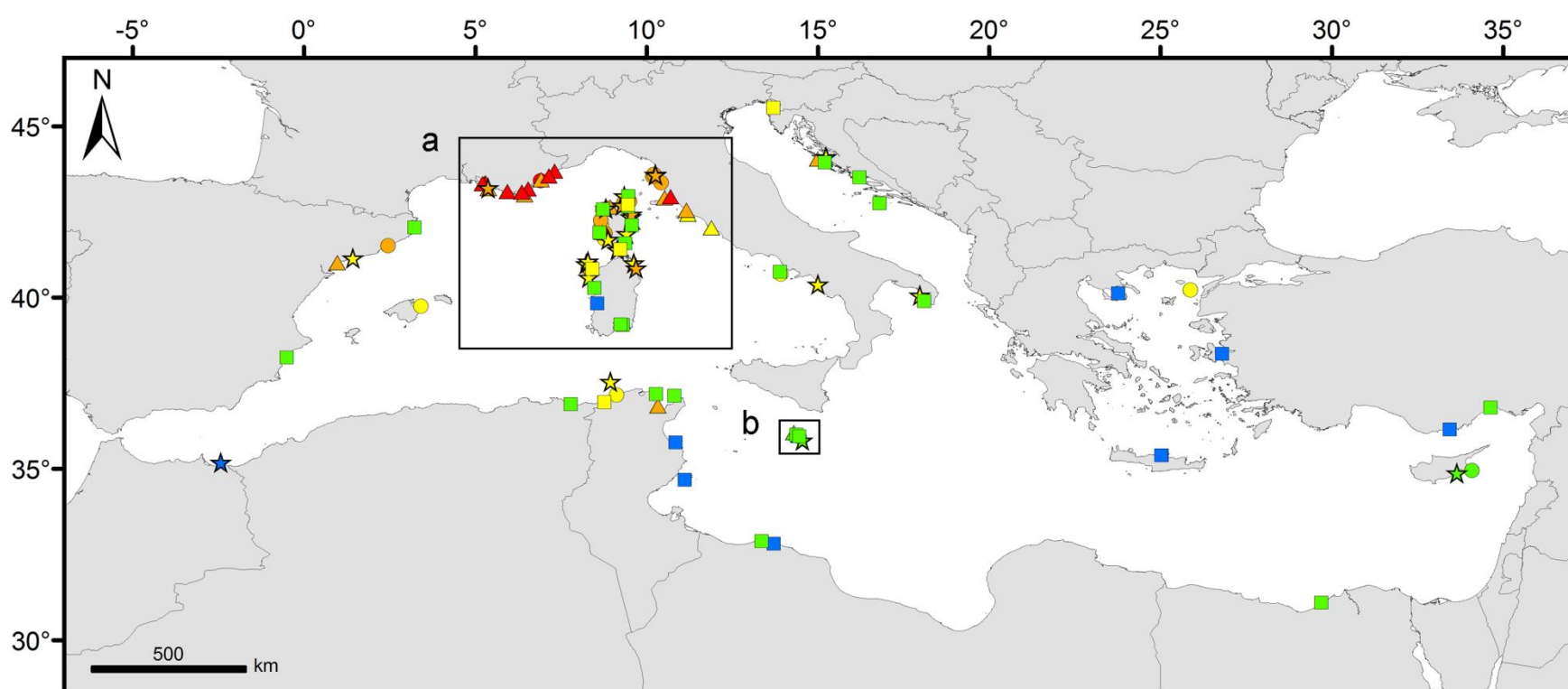
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# Global contamination

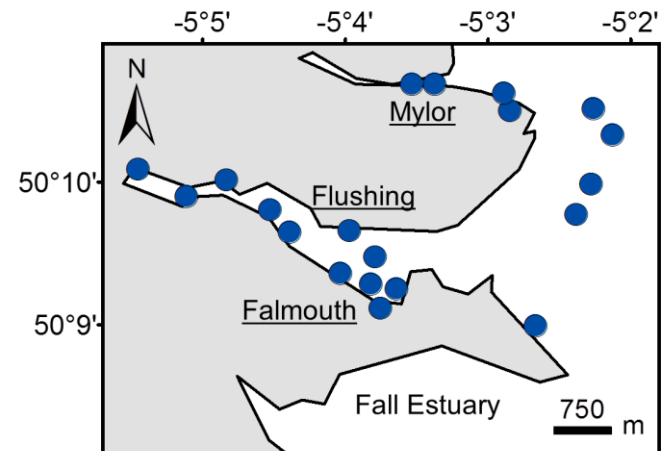
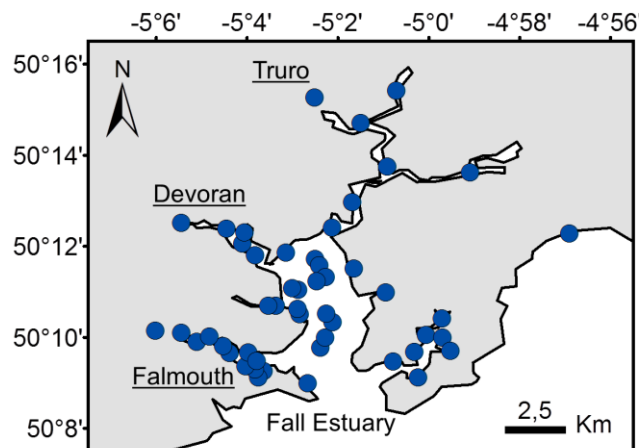
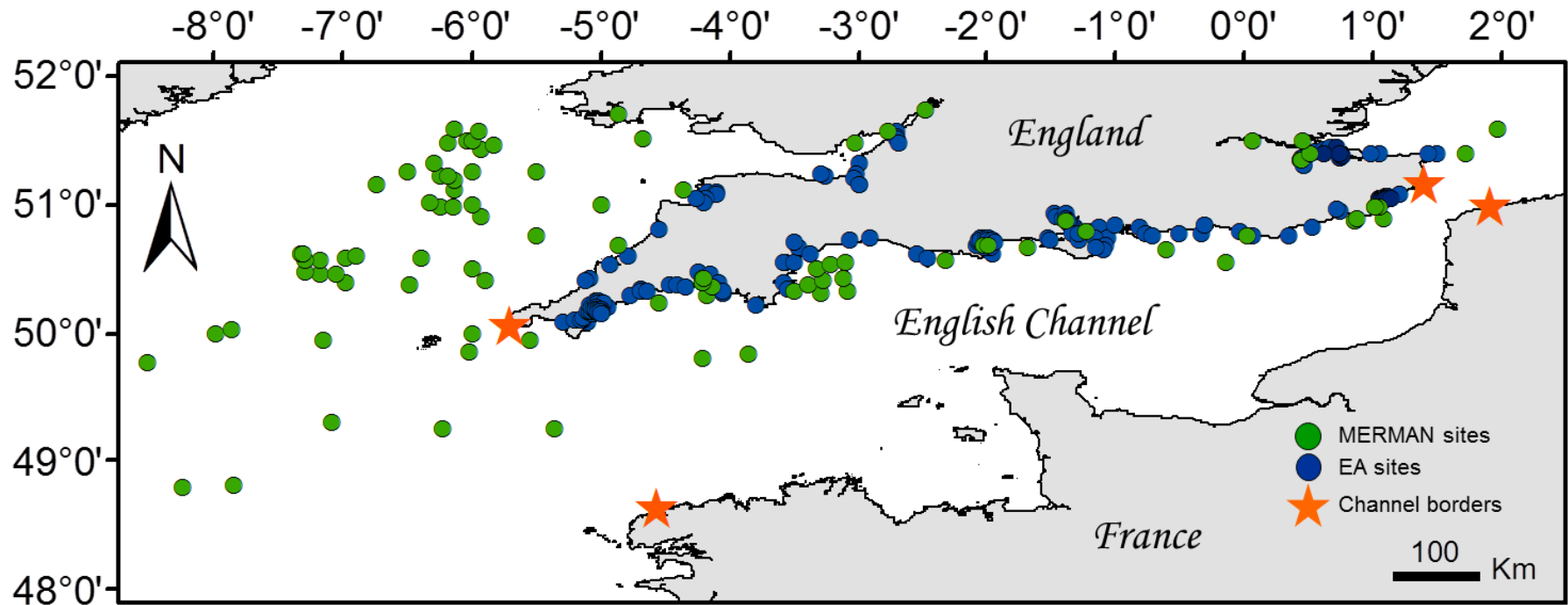




TEPI vs. clustering

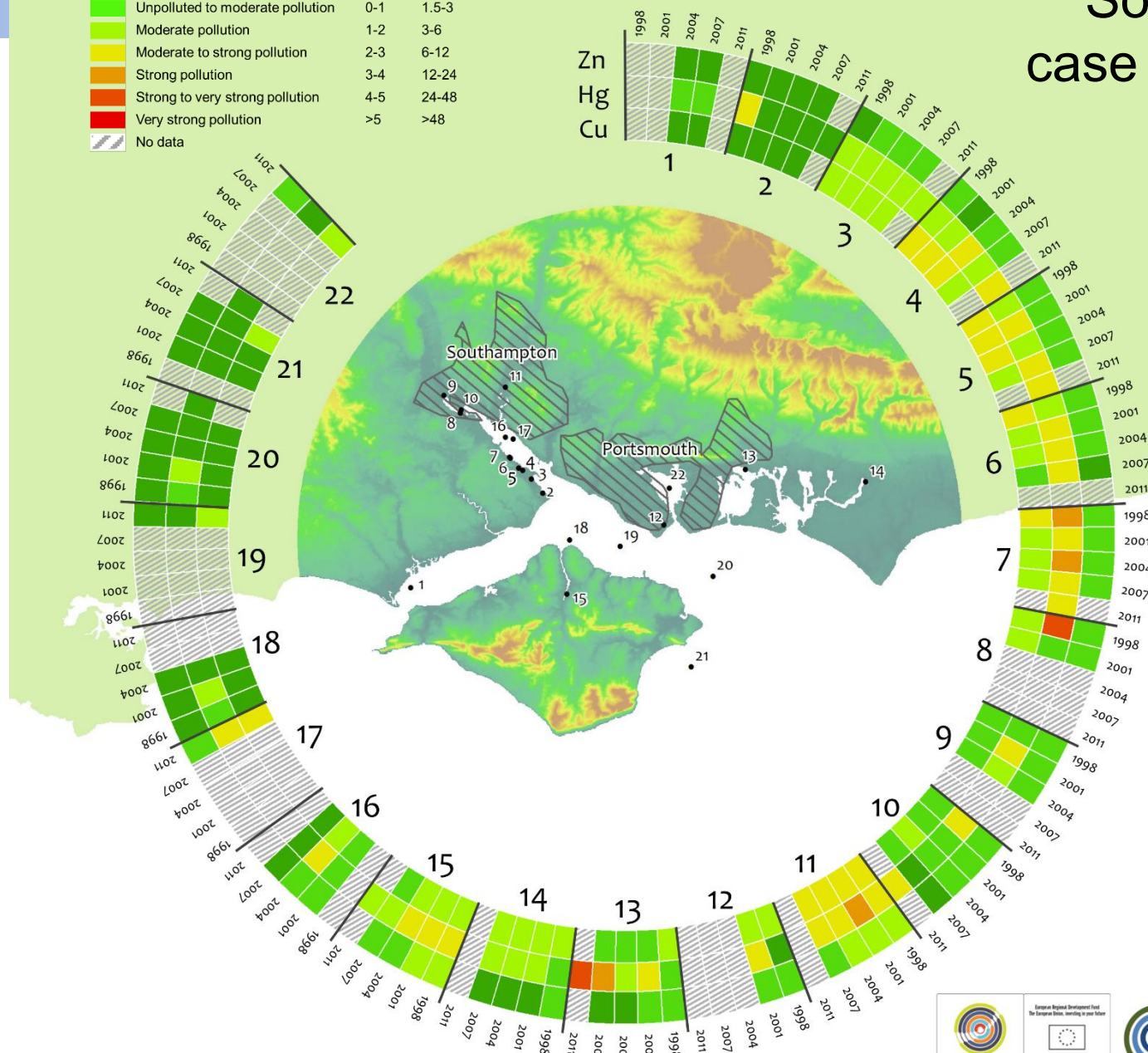


# Sediments = environmental archives



# Solent : case study

Pollution level	Igeo	EF
Unpolluted	0	<1.5
Unpolluted to moderate pollution	0-1	1.5-3
Moderate pollution	1-2	3-6
Moderate to strong pollution	2-3	6-12
Strong pollution	3-4	12-24
Strong to very strong pollution	4-5	24-48
Very strong pollution	>5	>48
No data		



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### Baie de Calvi : Site Atelier

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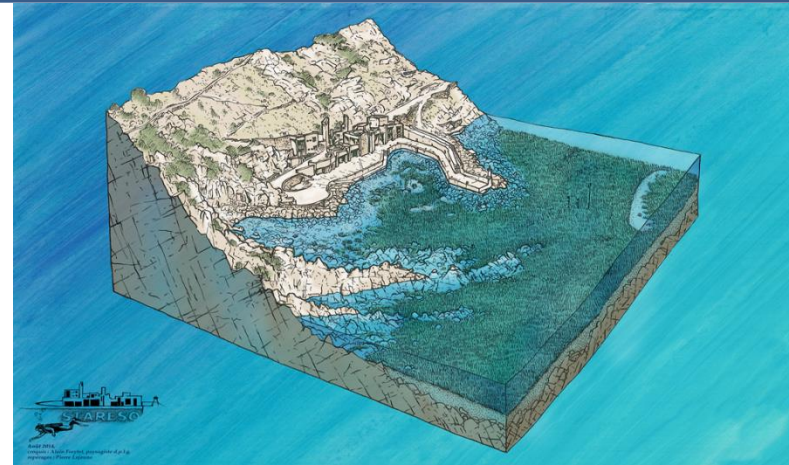
# STation of Reference - The bay of Calvi

The bay of Calvi includes all the characteristic ecosystems of the Mediterranean littoral.



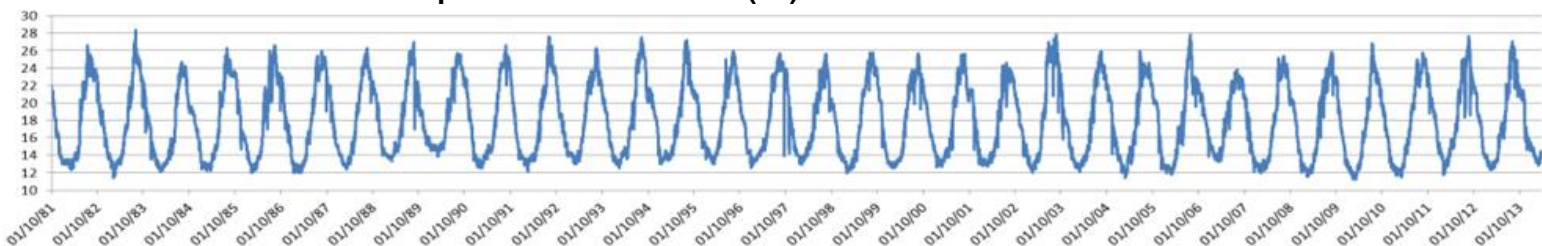
# STARECAPMED - STARESO

- ▶ The Station STARESO is a unique tool in a preserved natural site.
- ▶ The Station has archived environmental data for decades.



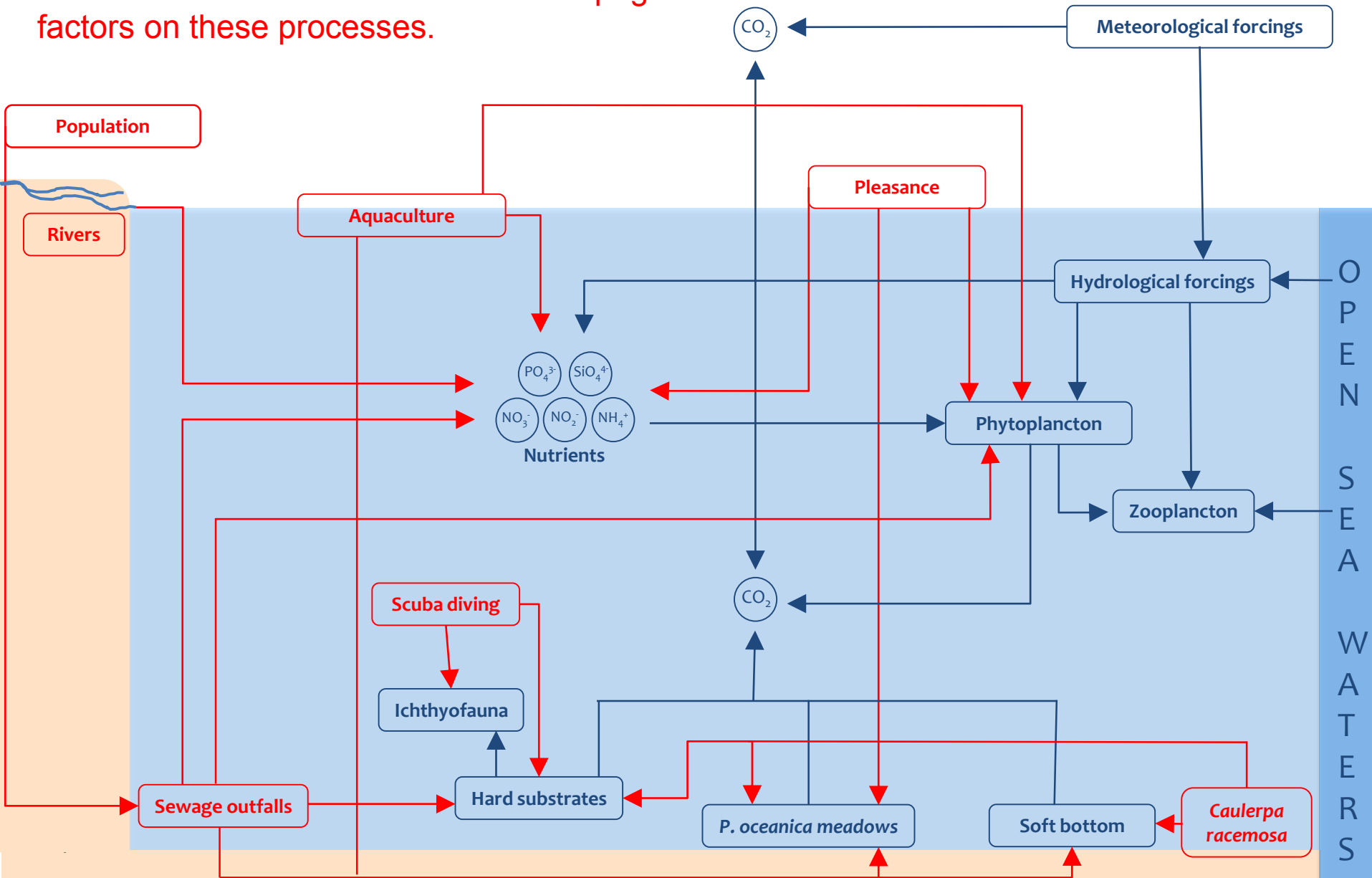
INTRODUCTION

Water temperature in STARESO (°C) from October 1981 to March 2014

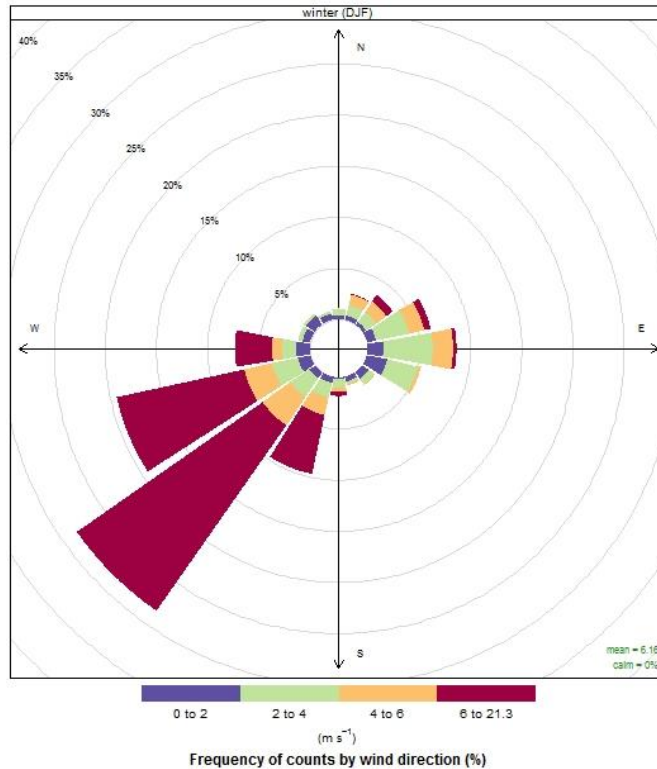


- To study the fundamental processes operating in bay of Calvi.

- To understand the influence of anthropogenic factors on these processes.



# DATABASE RACE



Query - race\_db\_v2 sur race@10.16.8.17 : 5432 \*

Fichier Édition Requête Favoris Macros Affichage Aide

Éditeur SQL Constructeur graphique de requêtes

Requêtes précédentes

```

8 from
9 (SELECT
10   data_an.daytime,
11   timeseries.tssta_codesta,
12   timeseries.depth,
13   data_an.datavalue as speed,
14   cast(NULL as real) as direction /* cela reste vide */
15 FROM
16   public.data_an,
17   public.timeseries

```

Panneau sortie

Sortie de données Expliquer (Explain) Messages Historique

	my_ye	my_1	my_1	tssta_c	depth	max_sp	min_sp	avg_spe	nb_vale	max	min	avg_dir	nb_valeu
	double	doub	doub	charac	real	real	real	numeric	bigint	real	real	numeric	bigint
1	1996	10	10	AN004	21	16.21	3.42	12.814	49	331	274	296.334	49
2	1996	10	11	AN004	21	9.53	1.1	4.343	144	315	14	302.962	144
3	1996	10	12	AN004	21	9.53	1.1	4.409	144	359	1	298.663	144
4	1996	10	13	AN004	21	9.53	1.1	5.441	144	307	191	248.982	144
5	1996	10	14	AN004	21	7.78	1.1	4.180	144	295	2	100.893	144
6	1996	10	15	AN004	21	11.27	1.1	4.271	144	355	2	327.843	144
7	1996	10	16	AN004	21	23.19	3.72	14.592	144	306	228	249.180	144
8	1996	10	17	AN004	21	19.7	1.1	10.708	144	356	128	261.703	144
9	1996	10	18	AN004	21	9.82	1.1	3.558	144	346	2	228.530	144
10	1996	10	19	AN004	21	10.98	1.39	5.769	144	225	94	144.188	144
11	1996	10	20	AN004	21	11.85	1.1	4.414	144	176	30	114.391	144

OK. Unix Ligne 2, Col 1, Caract. 8 234 lignes. 1047 ms

QGIS 2.4.0-Chugiak - calvi\_exemple\_view

Projet Éditer Vue Couche Préférences Extension Vecteur Raster Base de donnée Internet Traitements Aide

Parcourir

- MSSQL
- Oracle
- PostGIS
- Spatialite
- ows

Couches

- carto\_ext
- s012915\_viewmaster\_number ...
- s012915\_viewmaster\_number\_...

Chemin le plus court

Départ

DATABASE RACE

