STAtion of Reference and rEsearch on Change of local and global Anthropogenic Pressures on Mediterranean Ecosystems Drifts: The STARECAPMED project

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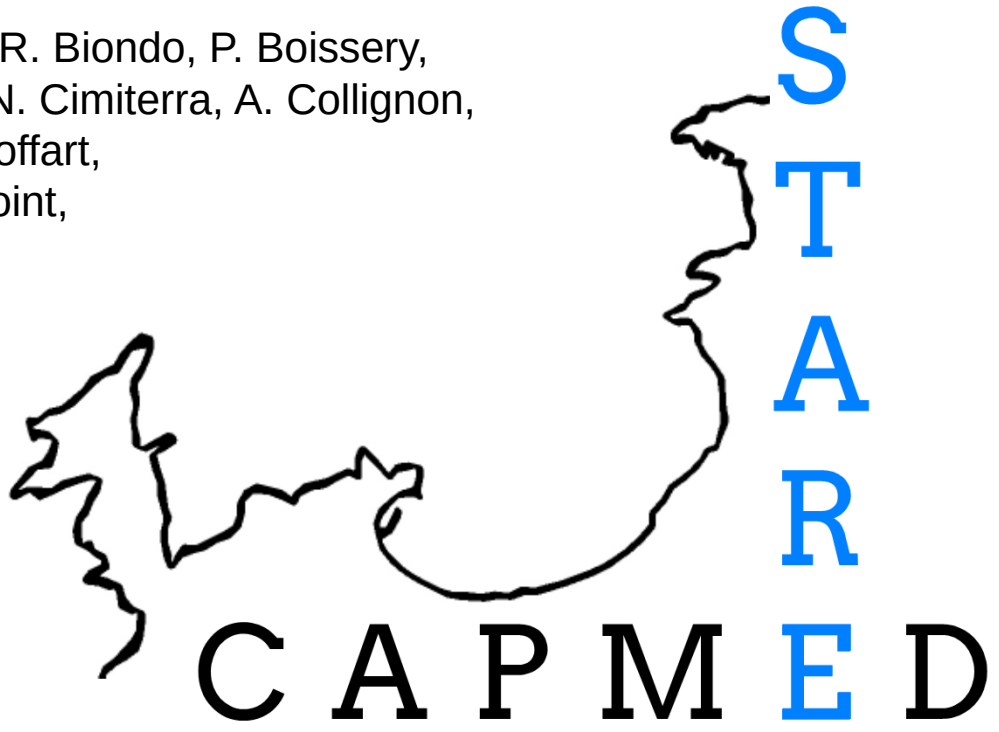
Qingdao,
11-08-15



INTRODUCTION

STARECAPMED - Context

The scientific information on marine ecosystems must answer 3 objective issues:

(i) what is the state ?

(ii) what are the changes ?

(iii) what are the mechanisms and processes involved ?

and a more prospective issue:

(iv) what can we expect and how can we act ?

STARECAPMED

INTRODUCTION

STARECAPMED - Objectives

STAtion of Reference and rEsearch on Change of local and global Anthropogenic Pressures on Mediterranean Ecosystems Drifts

► To understand how human activities can interact with the fundamental processes that govern the functioning of the different coastal ecosystems of a Mediterranean bay.

The understanding of these interactions involves:

(i) the identification of the anthropogenic pressures;

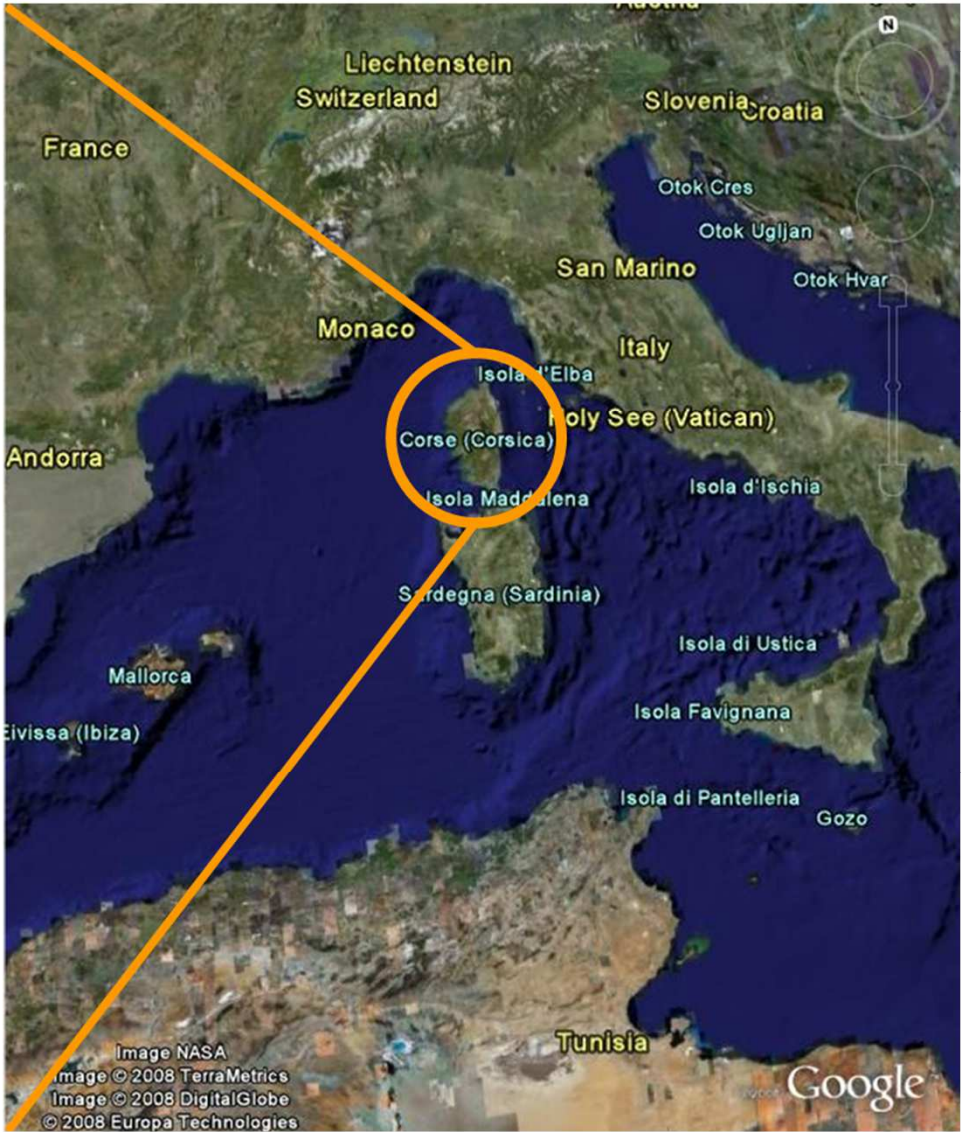
(ii) the quantification of their impacts on the ecosystems;

(iii) the prioritization of these impacts.

► To confirm the relevance of the use of the Calvi Bay as a reference in the study of local and global pressures and the changes they may cause on the structure and the functioning of Mediterranean coastal ecosytems.

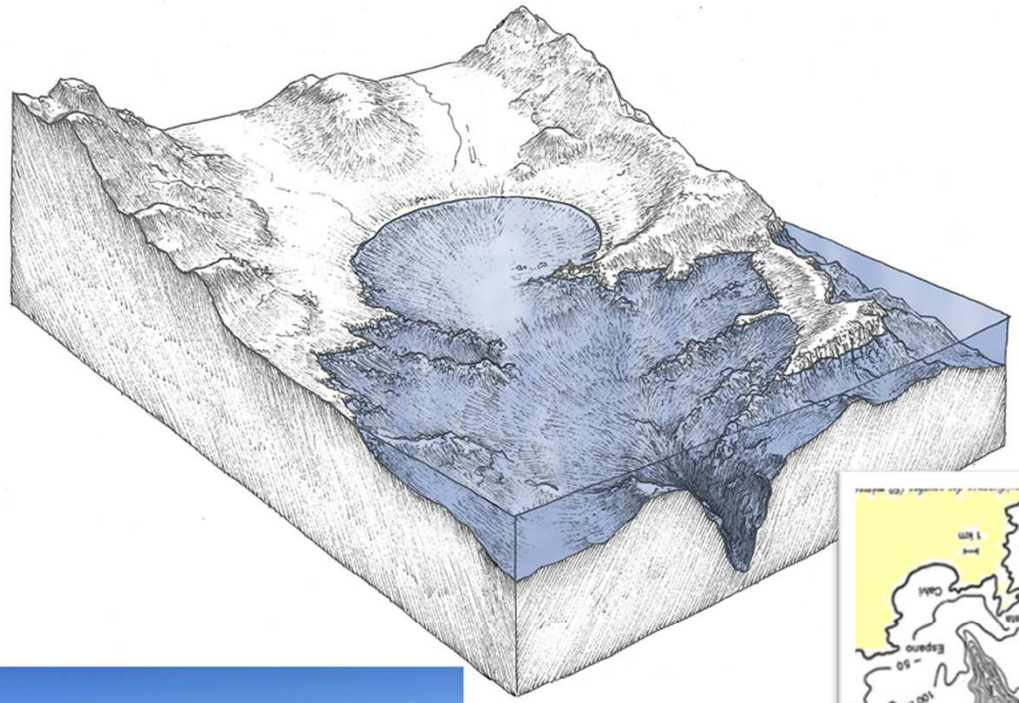
INTRODUCTION

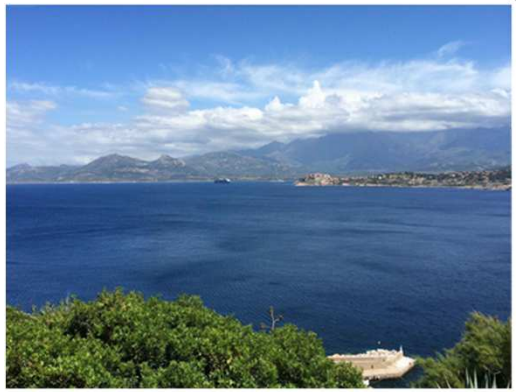
STARECAPMED - The bay of Calvi

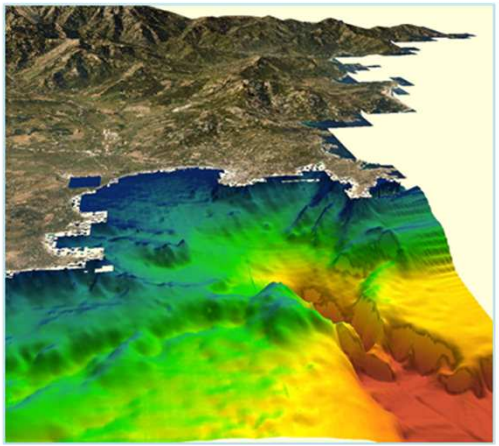


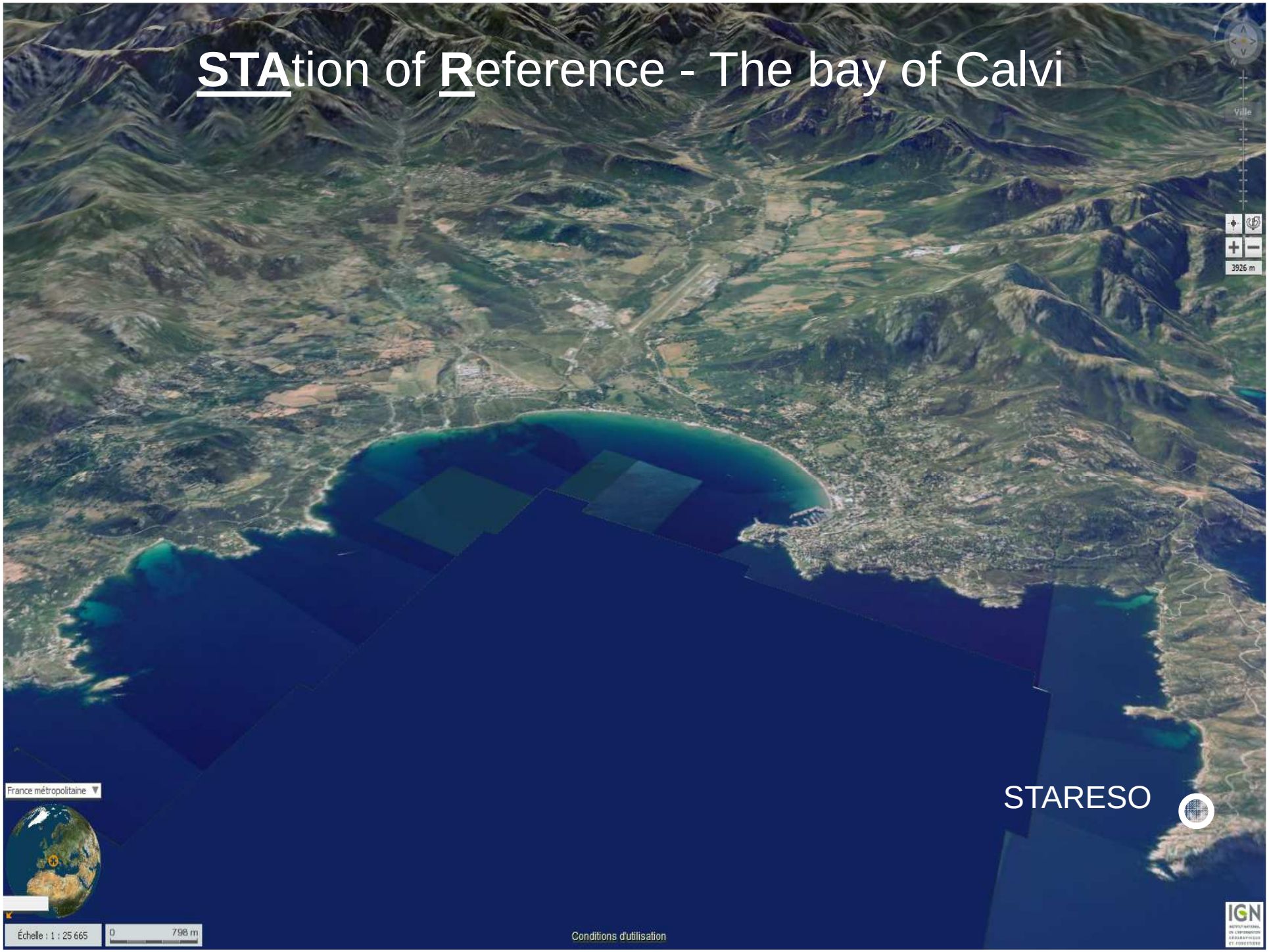
INTRODUCTION

STARECAPMED - The bay of Calvi







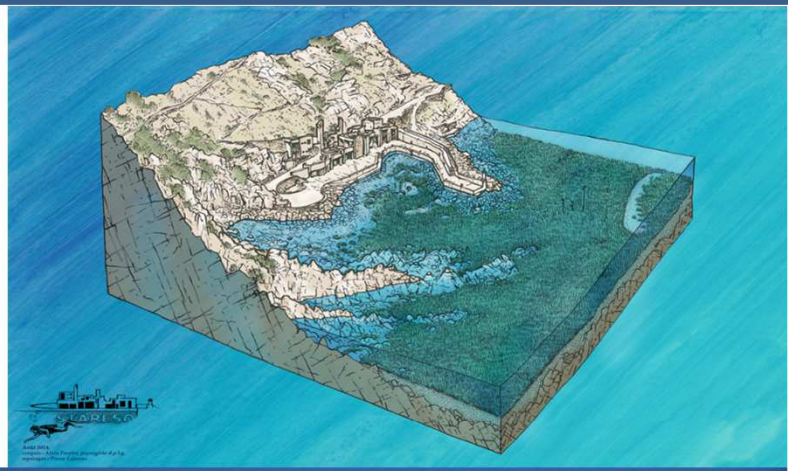

STATion of Reference - The bay of Calvi
STARESO
France métropolitaine
Échelle : 1 : 25 665
0
798 m
Conditions d'utilisation
3926 m
Ville

INTRODUCTION

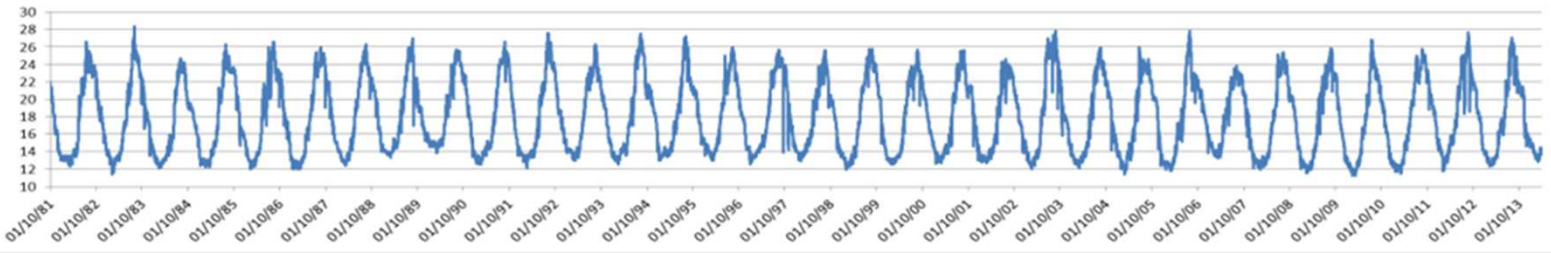
STARECAPMED - STARESO

► The Station STARESO is a unique tool in a preserved natural site.

► The Station has archived environmental data for decades.

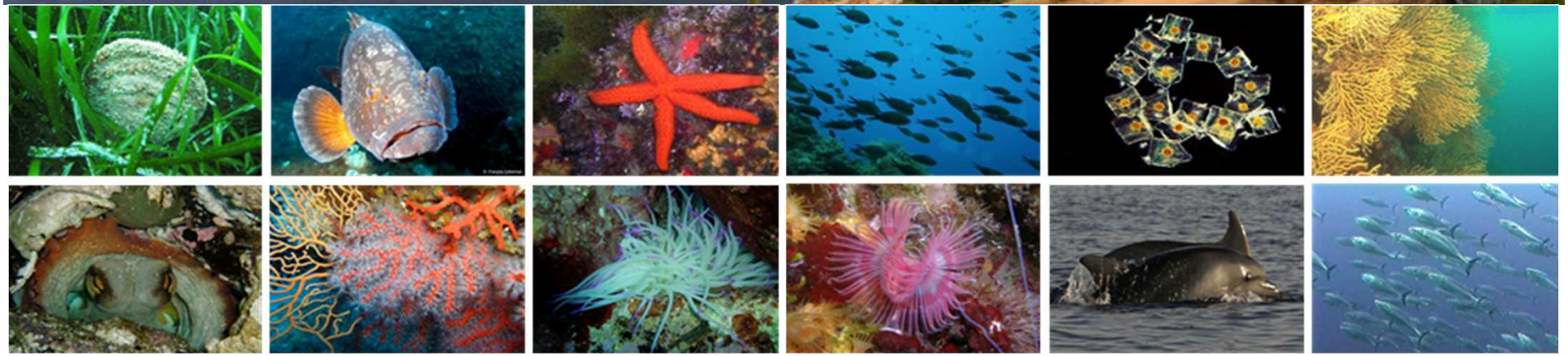


Water temperature in STARESO (°C) from October 1981 to March 2014



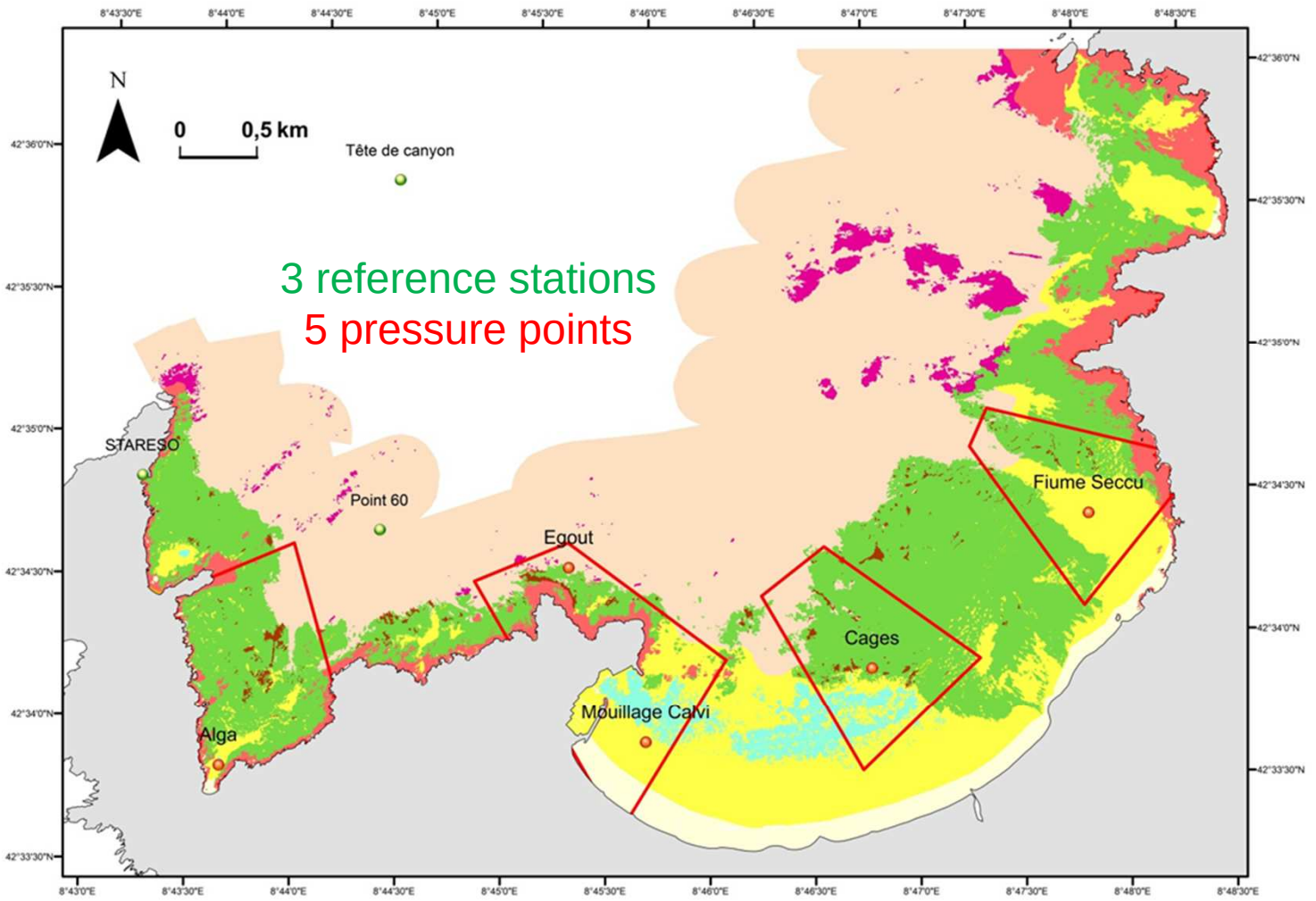
STAtion of **R**eference - The bay of Calvi

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



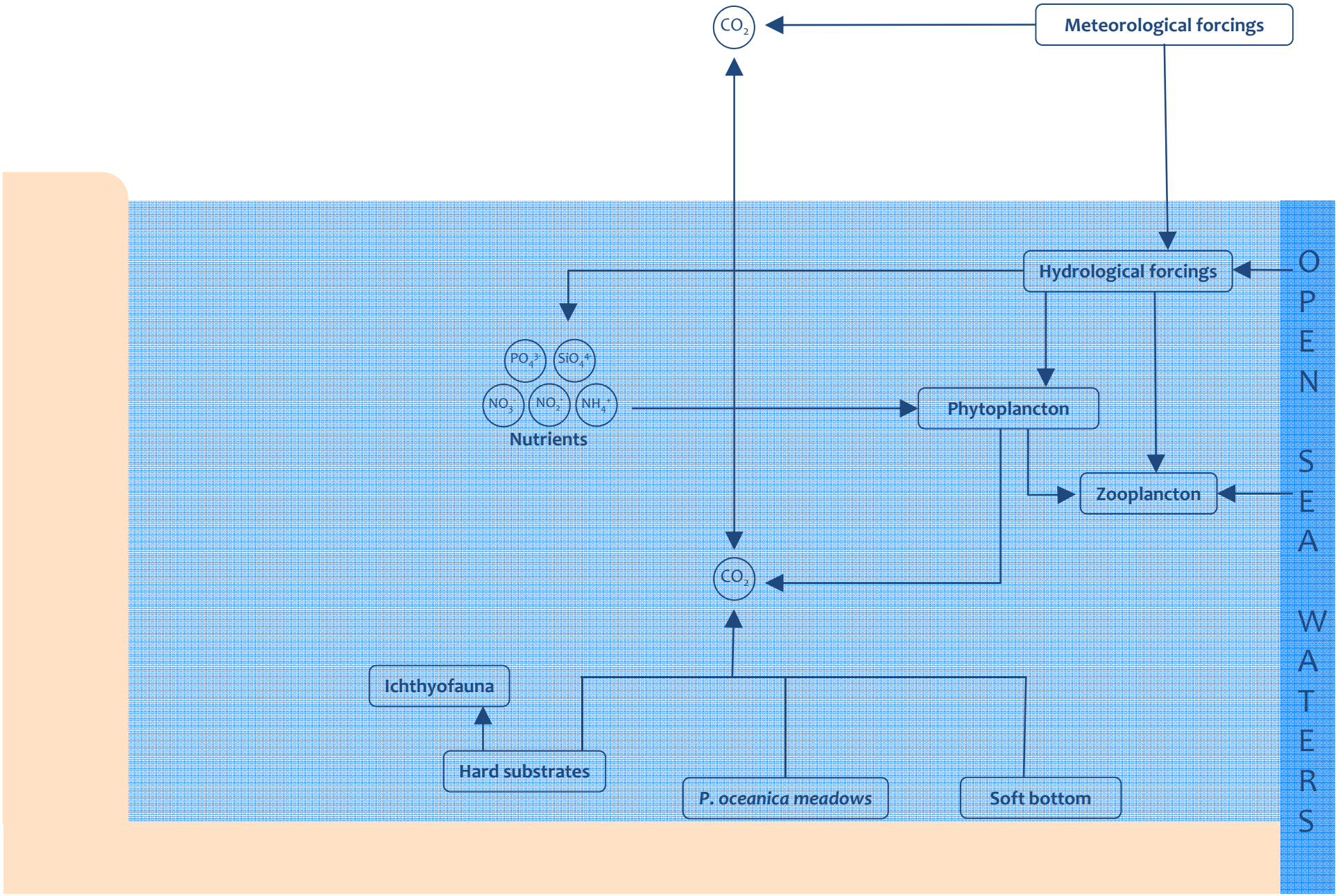
INTRODUCTION

STARECAPMED - The bay of Calvi



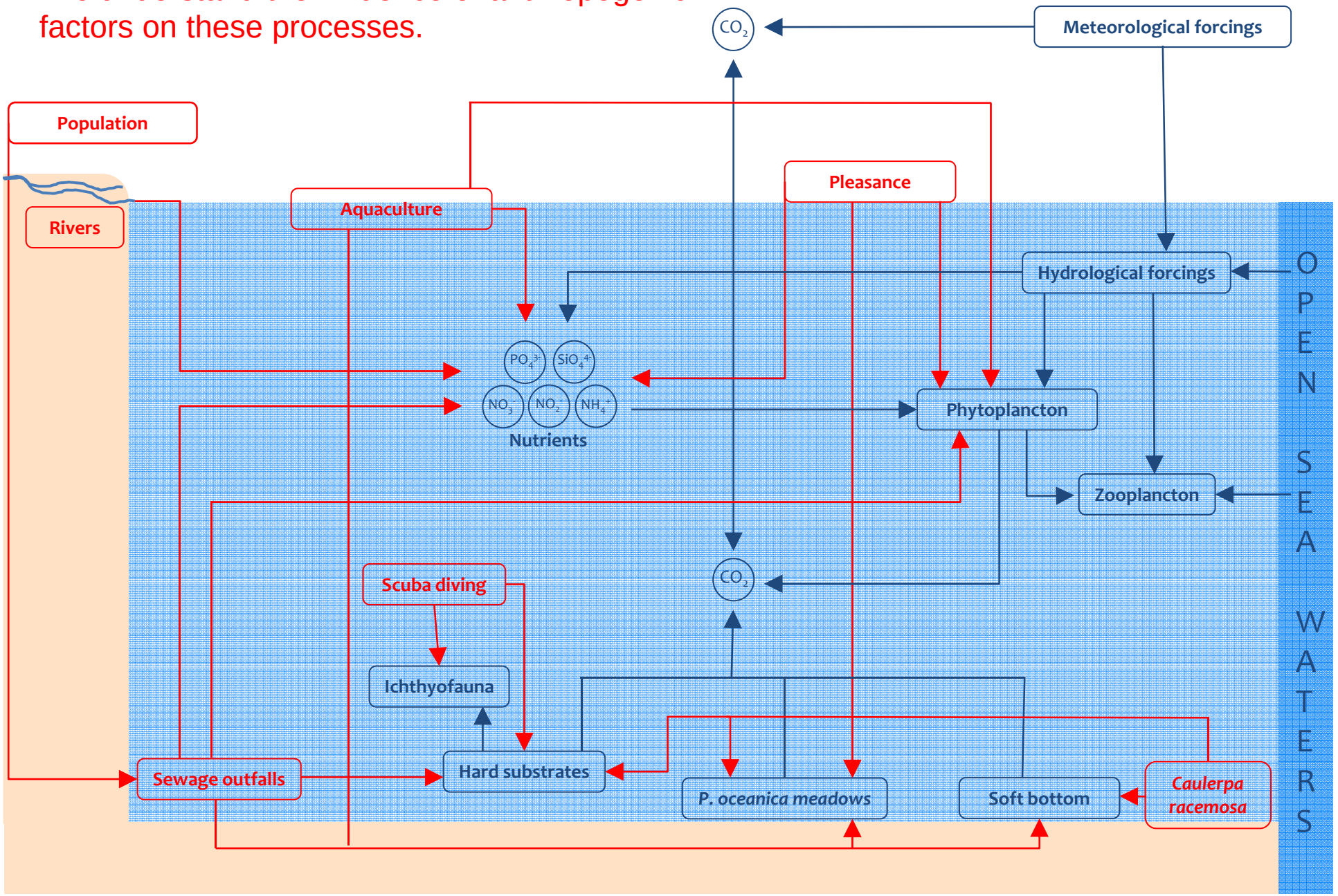
- *Posidonia oceanica* meadows
- *Posidonia oceanica* dead matte
- *Cymodocea nodosa* meadows
- Sandy bottom
- Supralittoral rocks
- Infralittoral rocks with photophile algae
- Coralligenous
- Soft muddy bottom

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



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

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

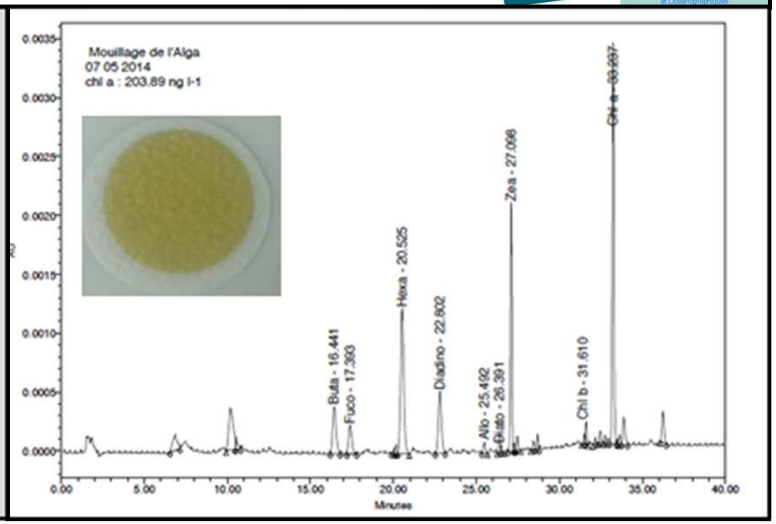


STARECAPMED - Examples

PHYTOPLANCTON	MACROBENTHOS OF SOFT BOTTOM	PROFESSIONAL FISHERIES
ZOOPLANCTON	BLUE CARBON WELL	*PALINURUS ELEPHAS* RECRUITMENT
HARD SUBSTRATES	ECOTOXICOLOGY	RESERVE EFFECT
MACROALGAE	ANCHORING	DATABASE RACE

PHYTOPLANCTON

STARECAPMED - Phytoplancton

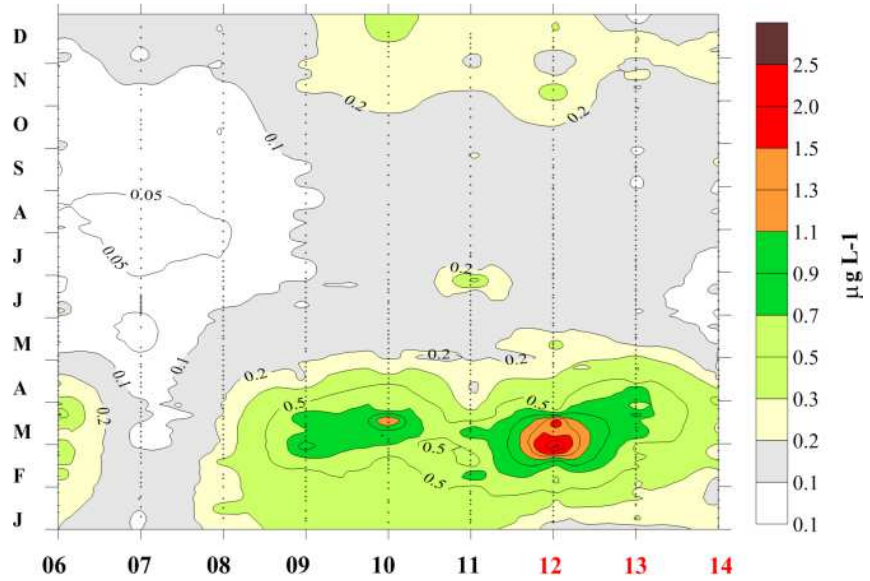


The Index $I_{C\ Medit}$:
uses the pigment signature of the phytoplancton measured by HPLC as quick determination method of the floristic composition.

PHYTOPLANCTON

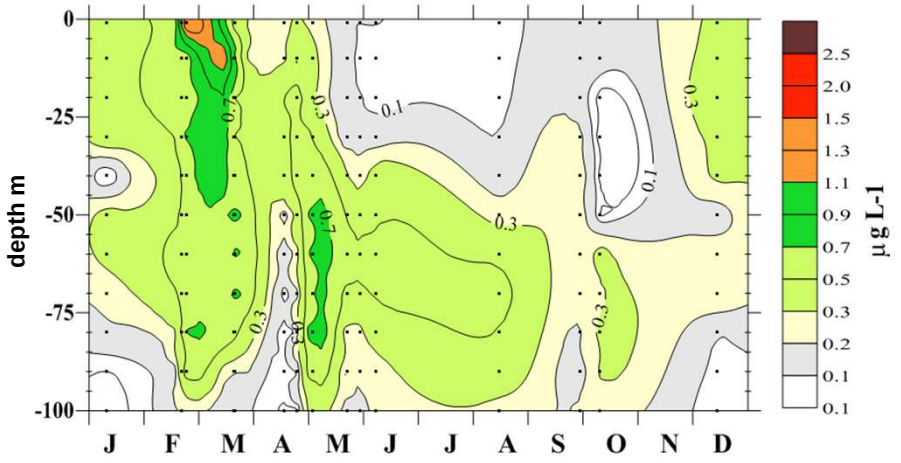
STARECAPMED - Phytoplancton

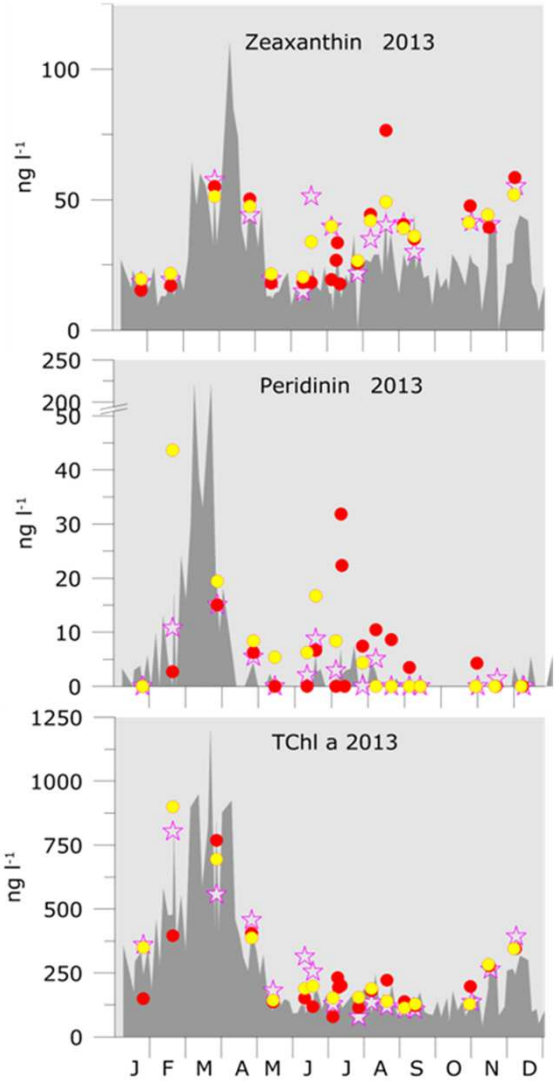
Calvi bay, TChl a, 2006-2014, surface



DCE and other projects **DCE and other projects**

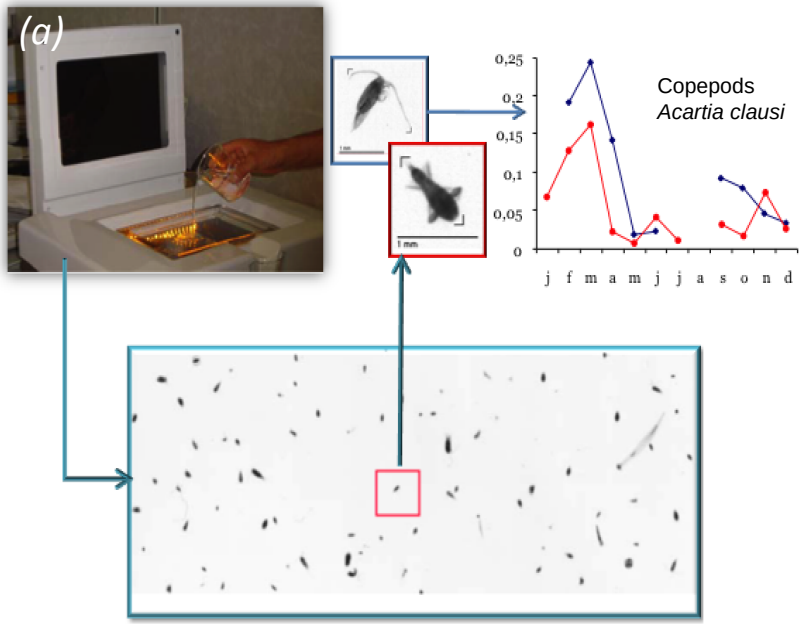
Tête de canyon, 2012-2014

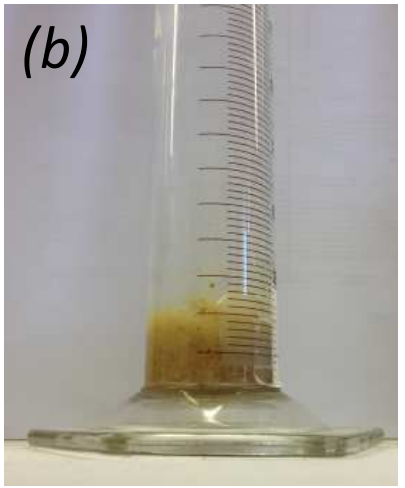


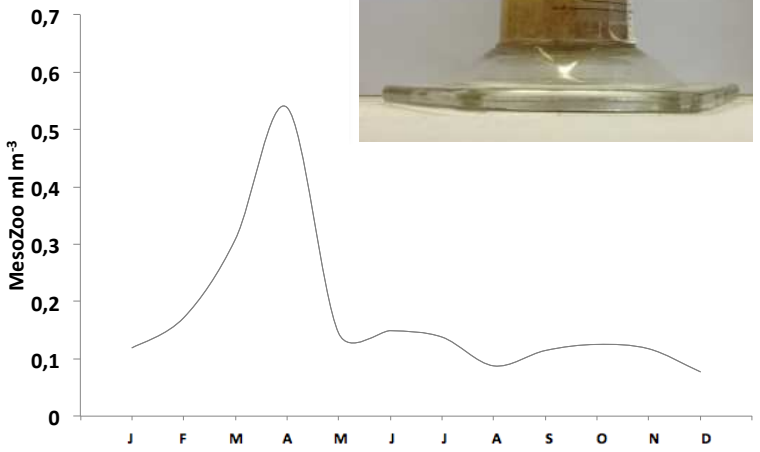


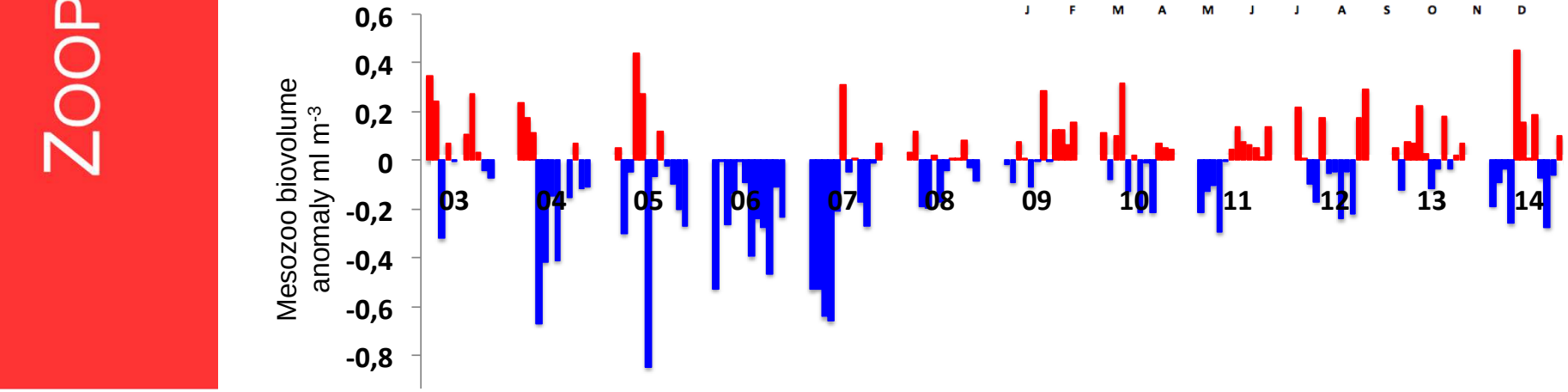
ZOOPLANCTON

STARECAPMED - Zooplancton



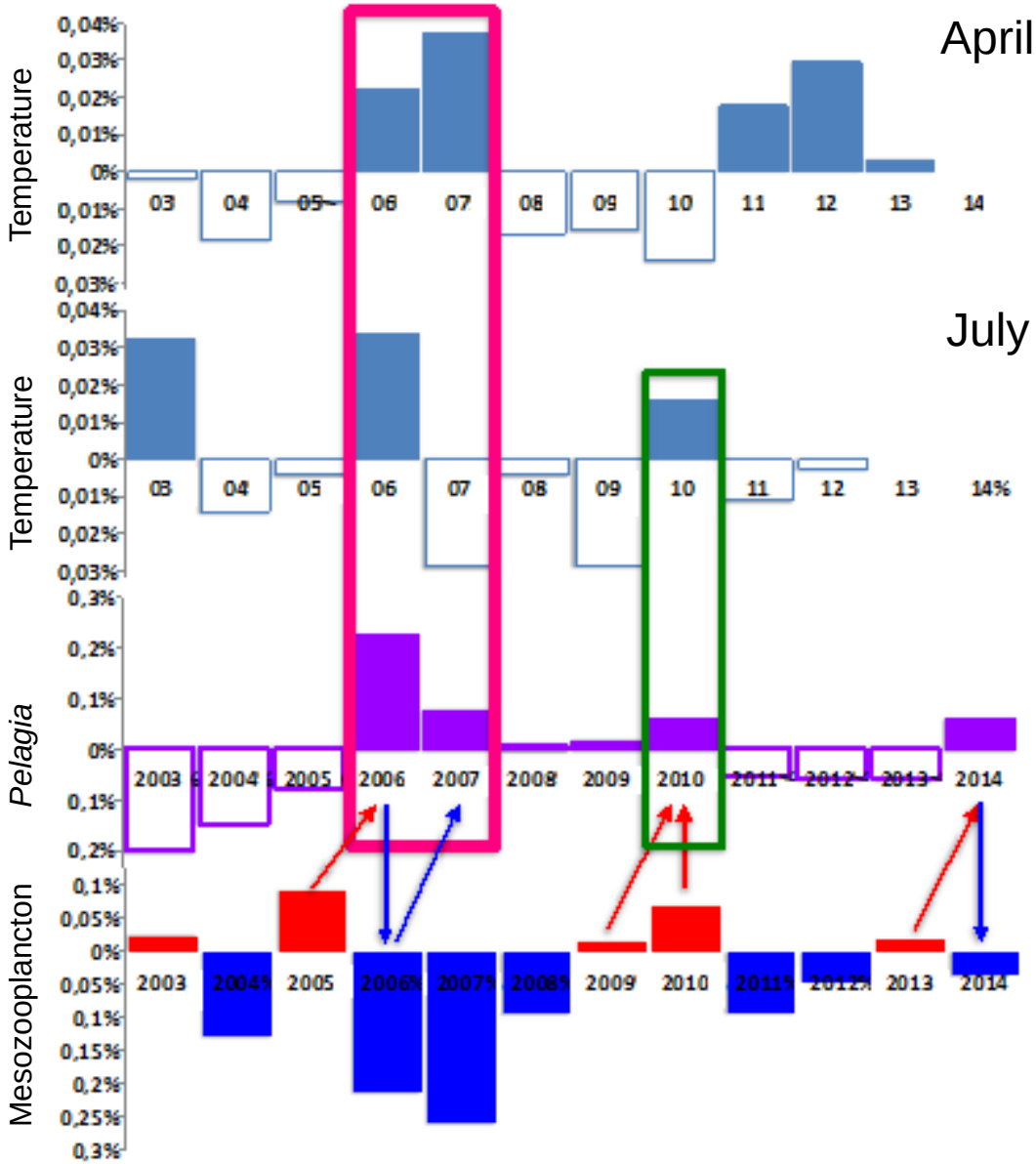


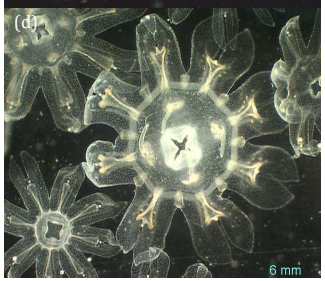




ZOOPLANCTON

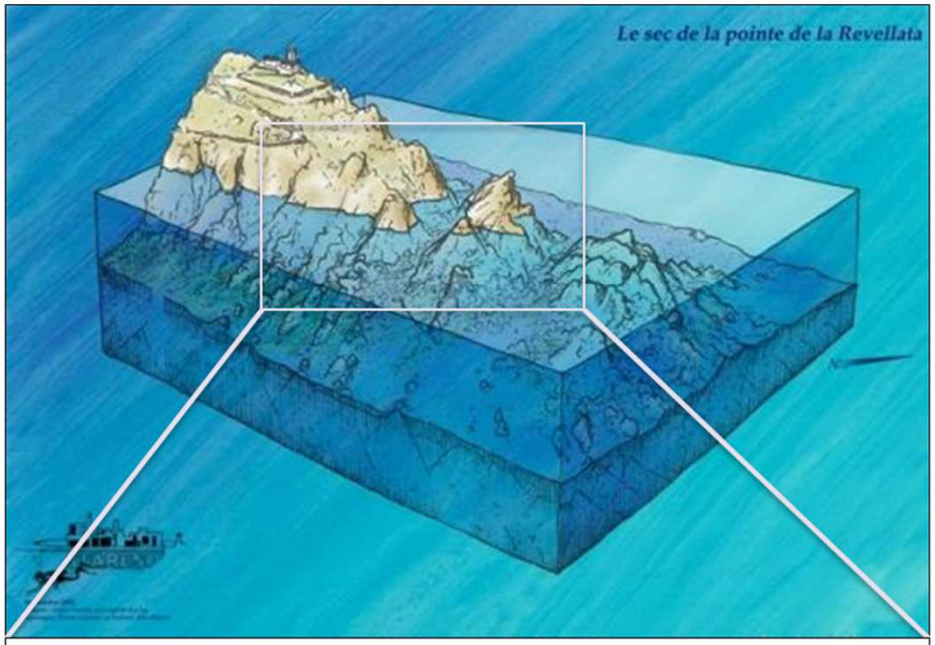
STARECAPMED - *Pelagia noctiluca*

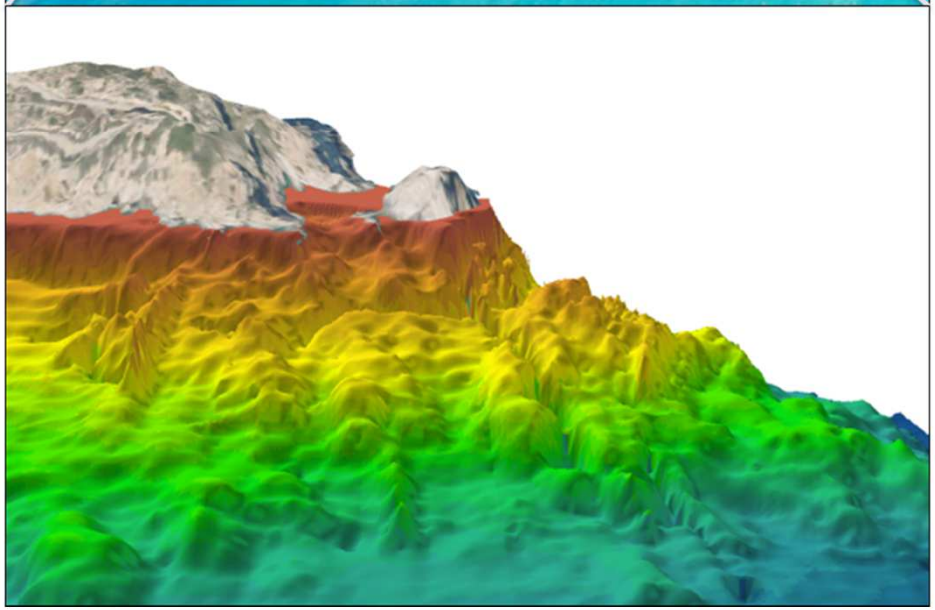




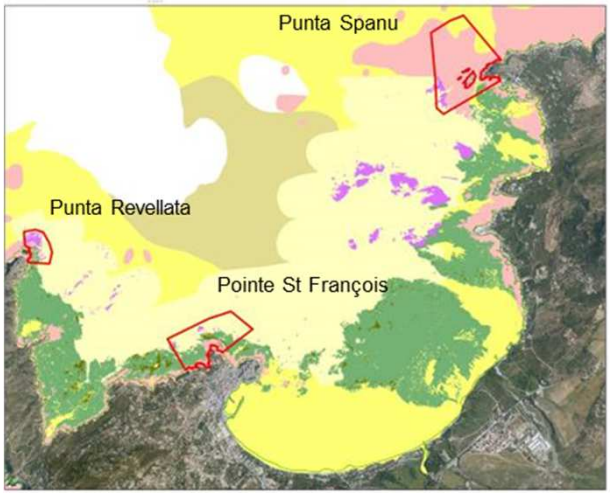
STARECAPMED - Hard substrates

HARD SUBSTRATES





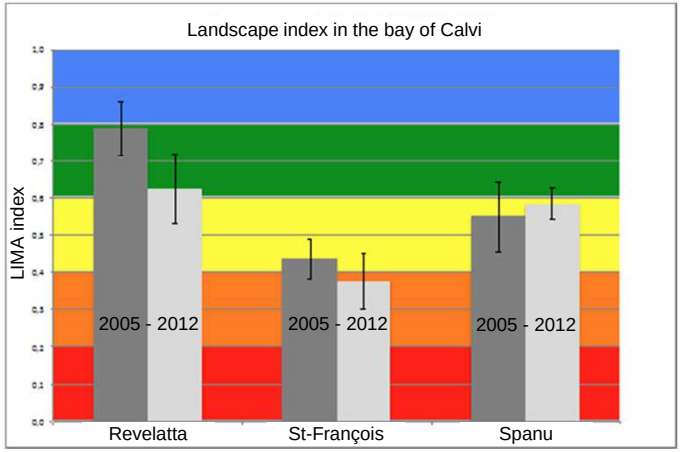
Indices: LIMA, FAST

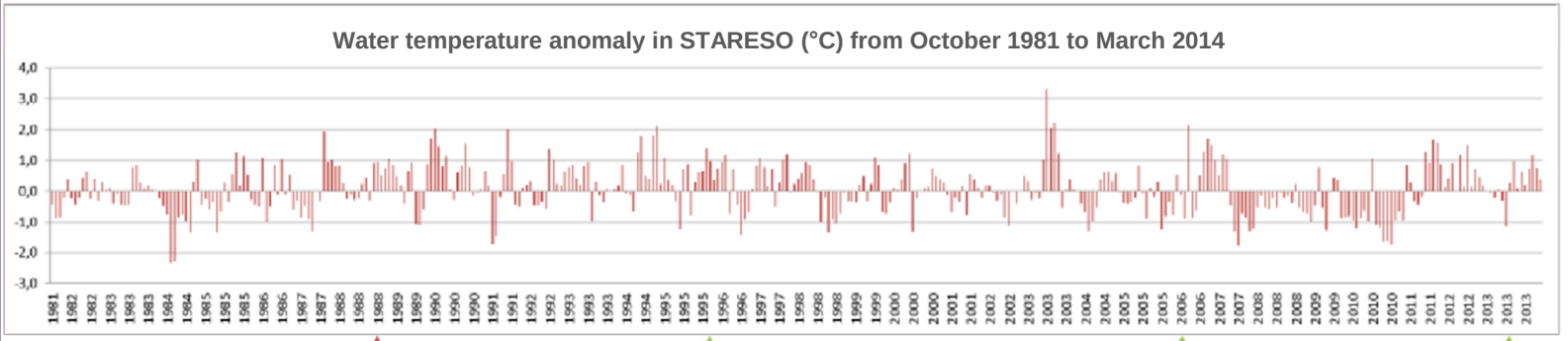


HARD SUBSTRATES

STARECAPMED - Hard substrates

► The LIMA (Littoral Marin) index developped by STARESO is a rapid and easy method to evaluate the landscape attractiveness and the patrimonial richness of a Mediterranean marine site between 0 and 40m depth.





Tourism growth

Thalassoma pavo apparition

Wastewater treatment plan creation

Lobster recruitment events

Cystocera population restauration

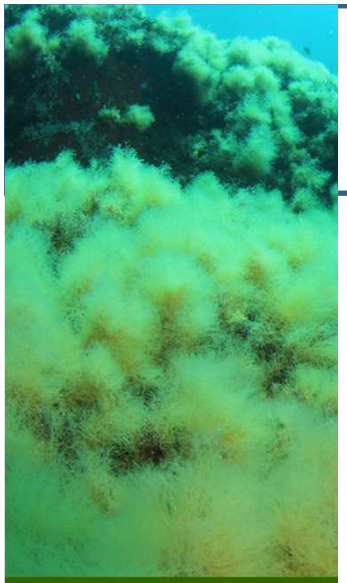
Cystosera population decline

Filamentous algae bloom, high Gorgonia mortality

Caulerpa racemosa development





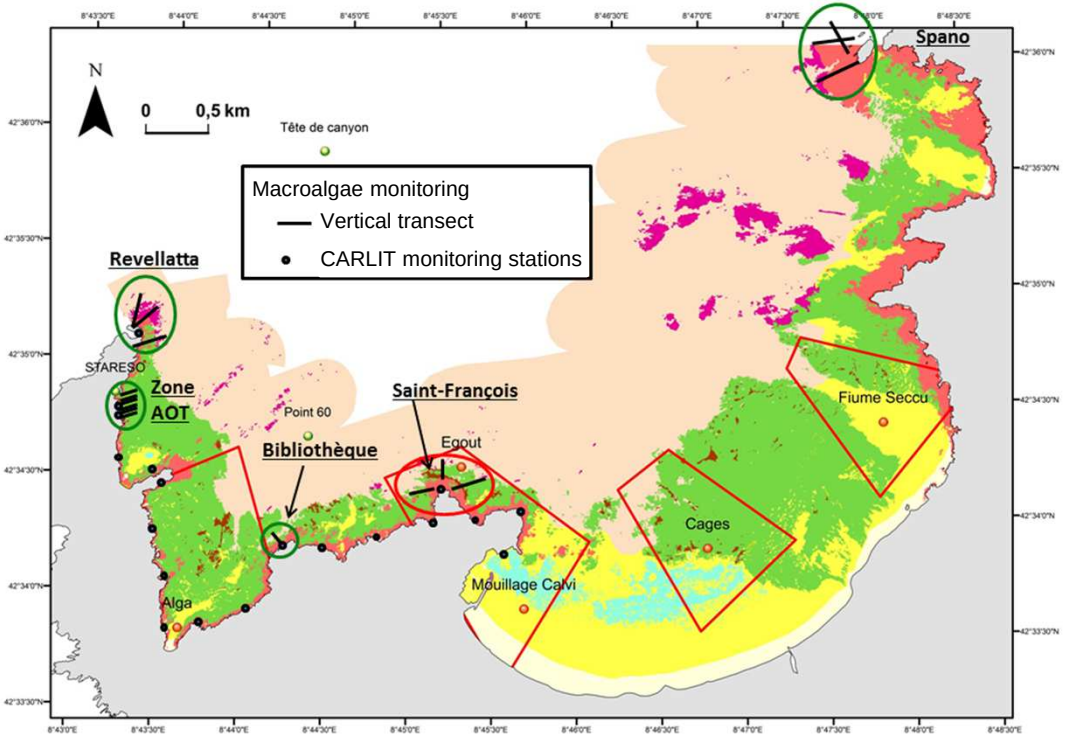



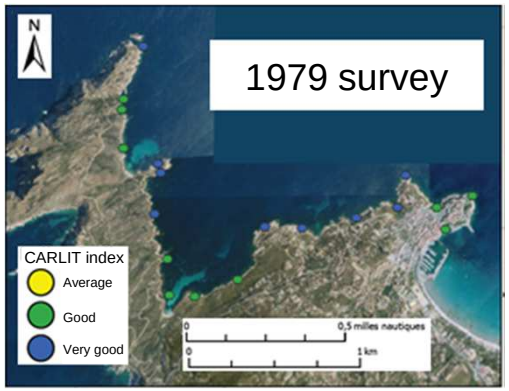
MACROALGAE

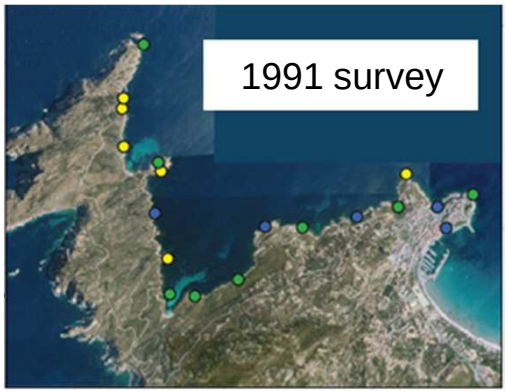
STARECAPMED - Macroalgae

CARLIT index: CARtography of the LITtoral

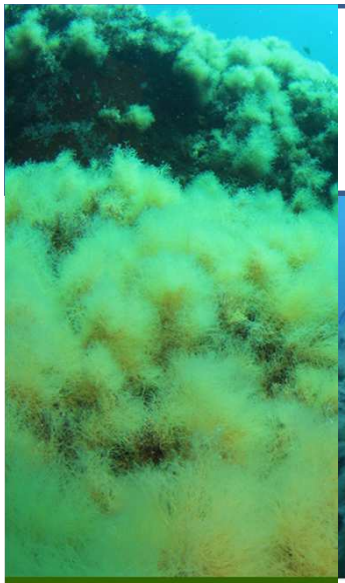
1979	1991	2014
0,75	0,65	0,81

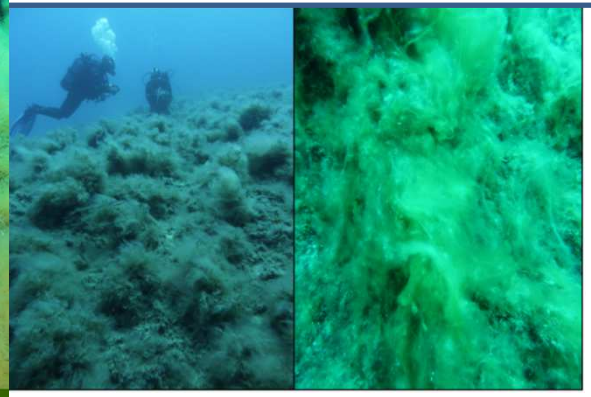






STARECAPMED - Macroalgae





MACROALGAE

Habitat

- Infralittoral pebbles
- Infralittoral rocks
- Supralittoral rocks
- *Posidonia oceanica* meadow
- Calibrated fine sand
- Coarse sand and fine gravels
- Vertical transects
- North oriented horizontal transects
- South oriented horizontal transects
- Horizontal transects at the back of creeks
- Horizontal transects at points

CARLIT
Index values: 15
of 18 transects have a
good to very good status.

STARECAPMED - Macrobenthos

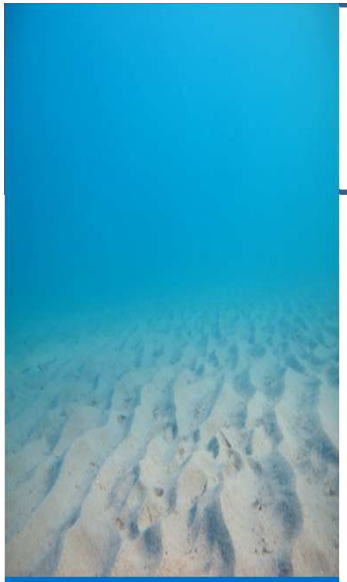
MACROBENTHOS OF SOFT BOTTOM

Development of a method of coloration-decoloration (eosin) for sample with seagrass fibers.

J'MAMBI: ponderation of the M-AMBI by the equitability value, the Pielou index (J'), calculated for each assemblage

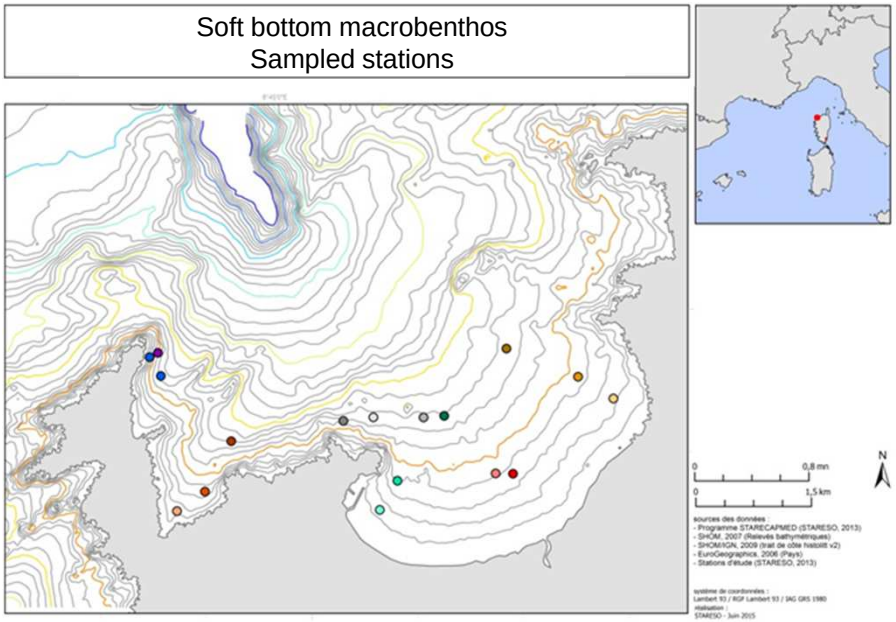
	Habitat	AMBI	Diversity	Richness	M-AMBI	Statut M-AMBI	Pielou (J')	J'MAMBI	Statut J'MAMBI
Abestos mine	SF>=35m	1,467	4,35	75	0,73	Good	0,70	0,51	Medium
Calvi	SF>=35m	1,351	5,62	93	0,86	Good	0,86	0,74	Good

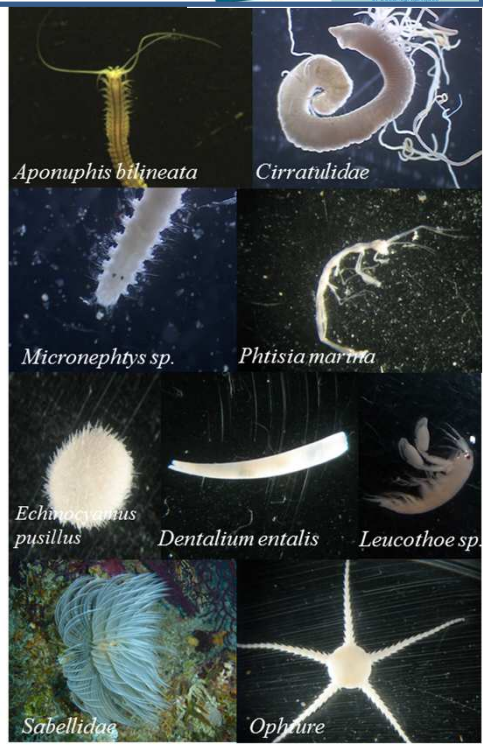
STARECAPMED - Macrobenthos



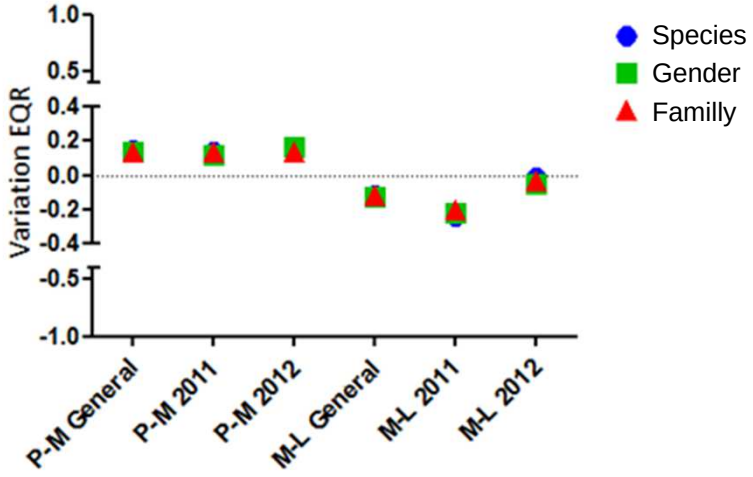
MACROBENTHOS OF SOFT BOTTOM

Soft bottom macrobenthos
Sampled stations

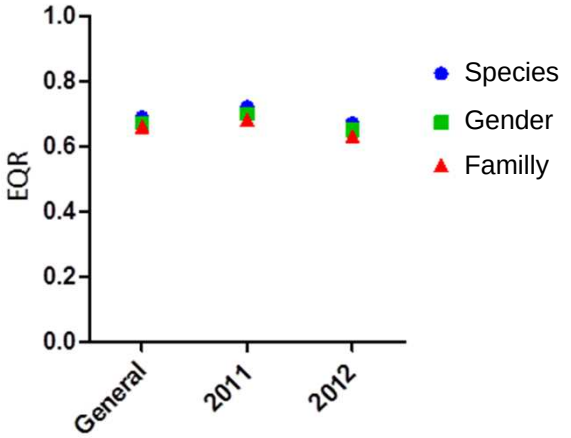




Summer organized mooring site EQR



Calvi bay mean EQR

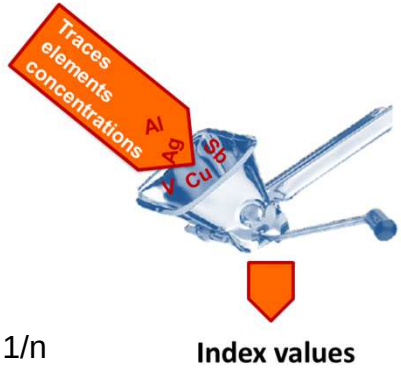


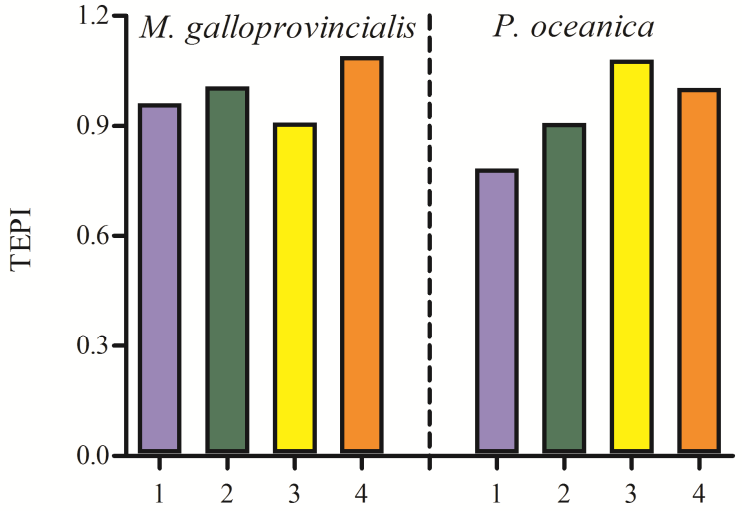
STARECAPMED - Ecotoxicology

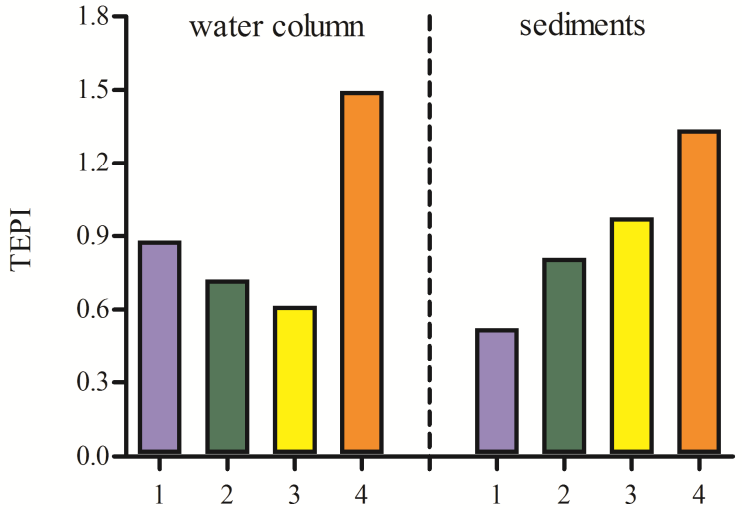
ECOTOXICOLOGY

Trace Element Pollution Index:

$TEPI = (Cf_1 * Cf_2 \ldots Cf_n)^{1/n}$



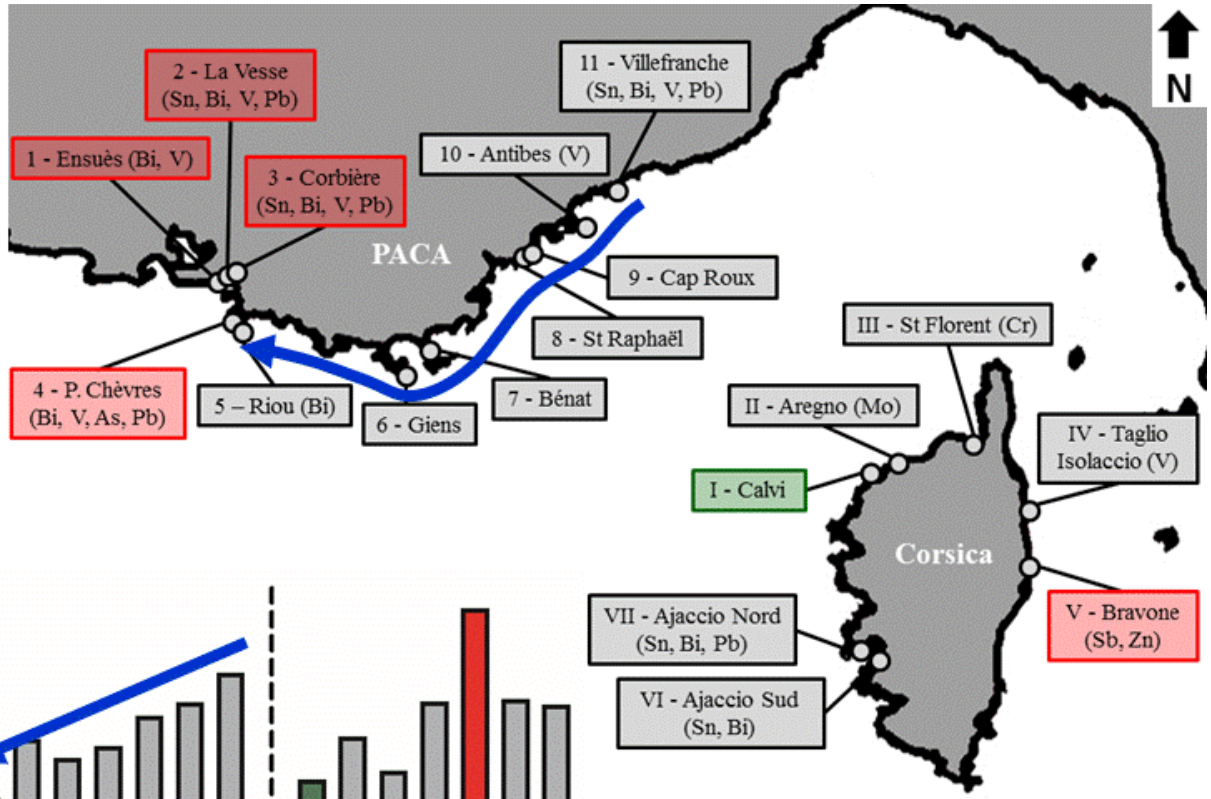


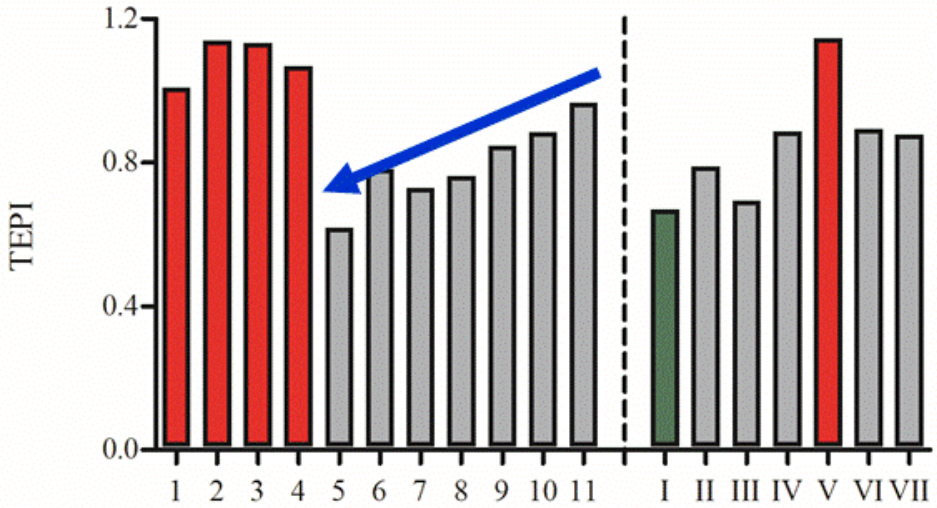


ECOTOXICOLOGY

STARECAPMED - Ecotoxicology

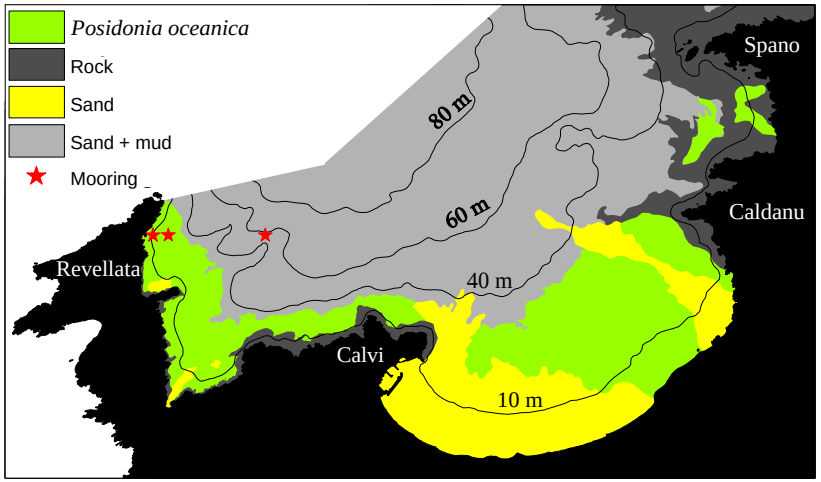
Posidonia oceanica

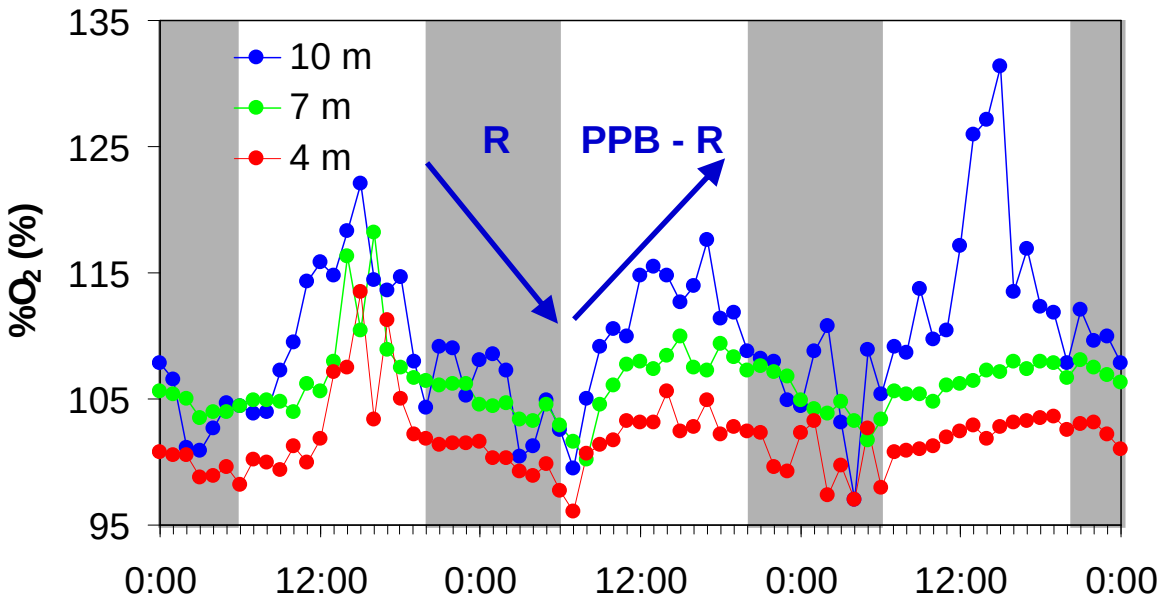




BLUE CARBON WELL

STARECAPMED - Blue carbon well





BLUE CARBON WELL

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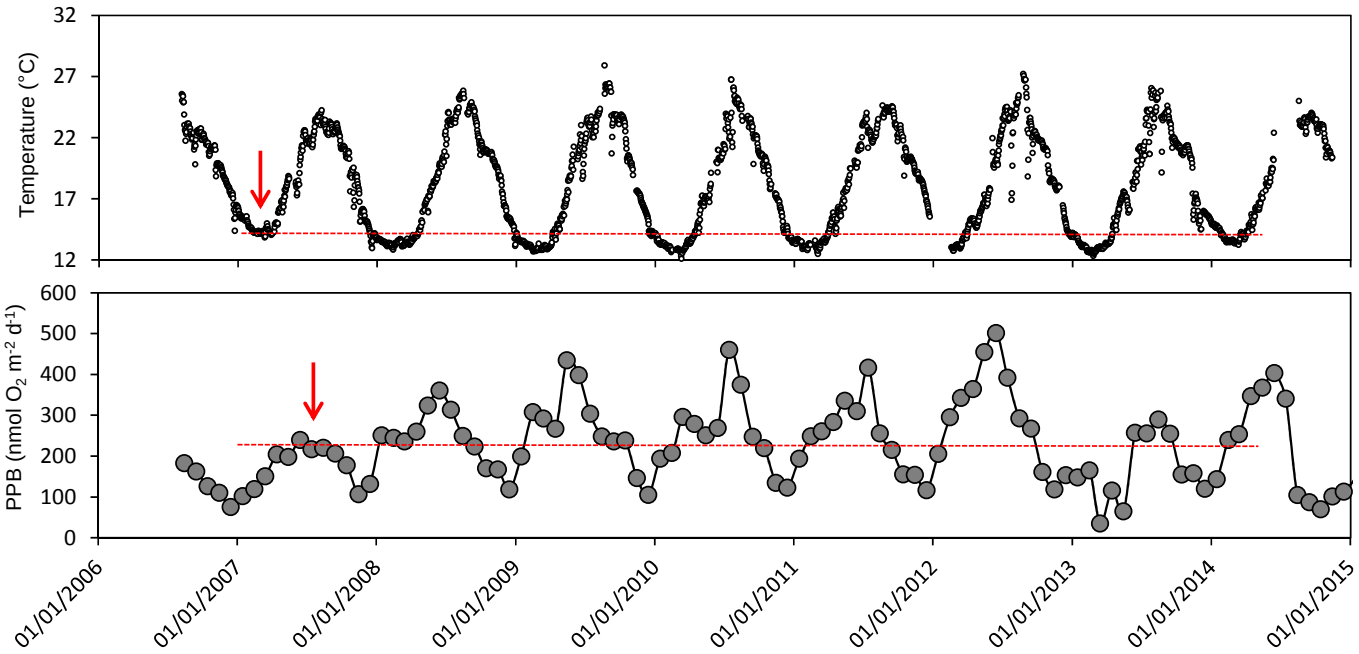
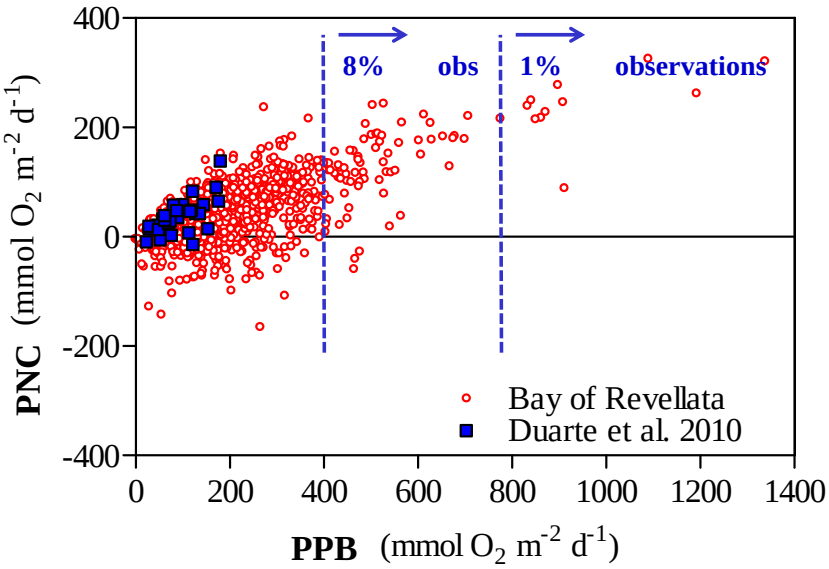
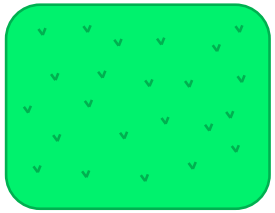




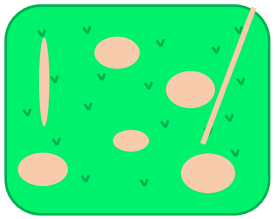
ANCHORING

STARECAPMED - Anchoring

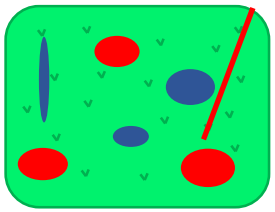
Continuous meadow (matrix)



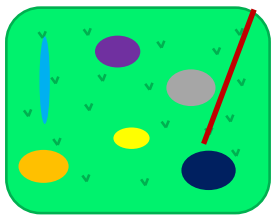
Heterogeneous meadow (patches)



Patches of different origins

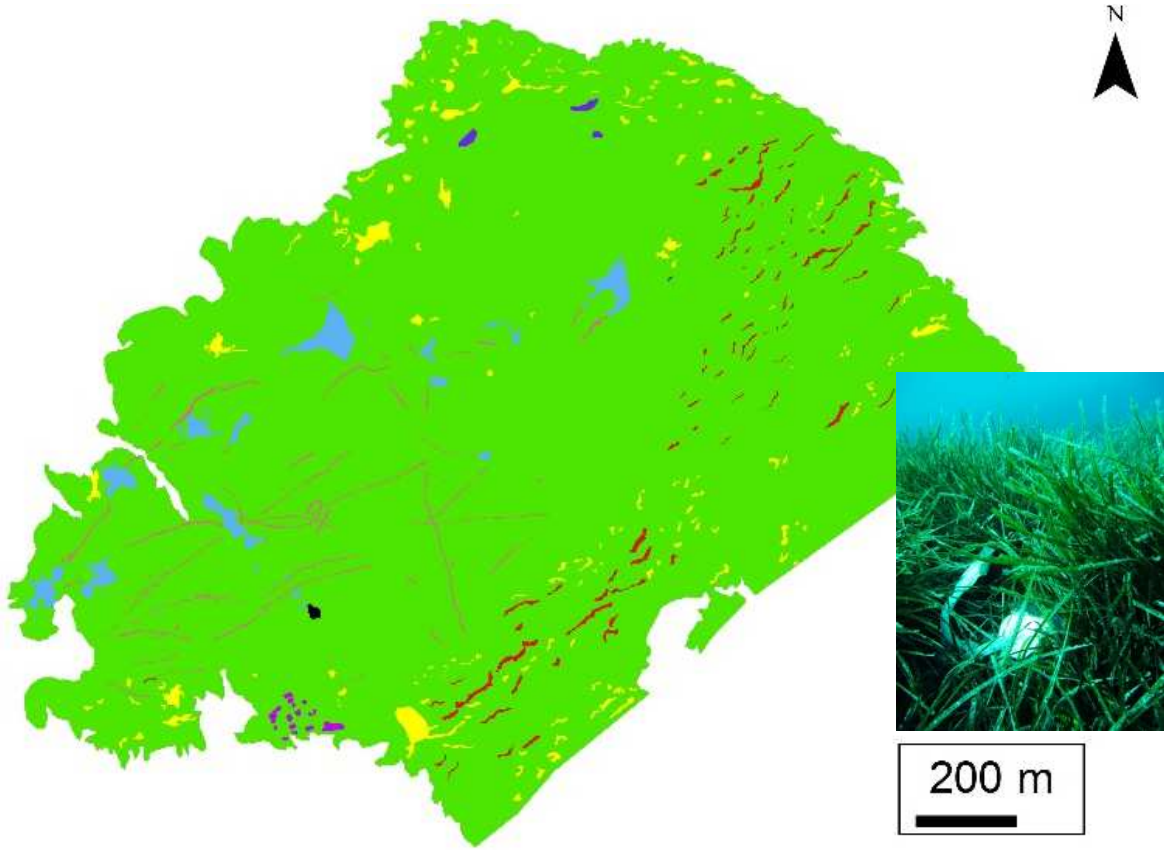


Patches of different types



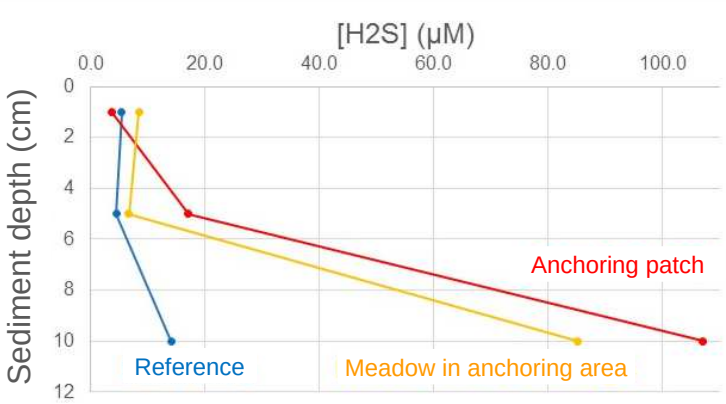
Patchiness Source Index (PaSI): to assess the origin (natural or induced by human activities) of the patches in *P. oceanica* meadows, identified with the use of side scan sonar and from the resulting mapping.

PaSI value	Color code
0.801 - 1	Blue
0.601 - 0.800	Green
0.401 - 0.600	Yellow
0.201 - 0.400	Orange
0 - 0.200	Red



STARECAPMED - Anchoring

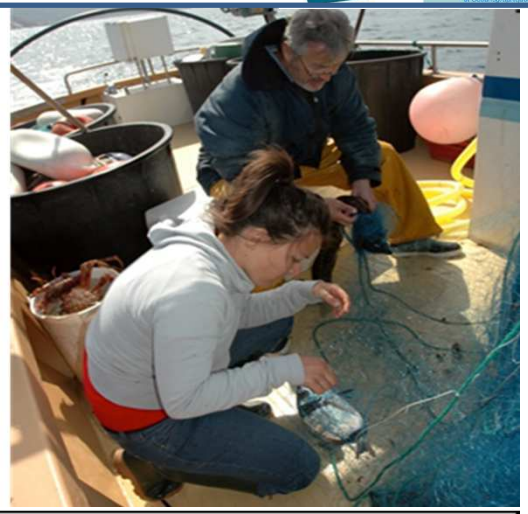
ANCHORING

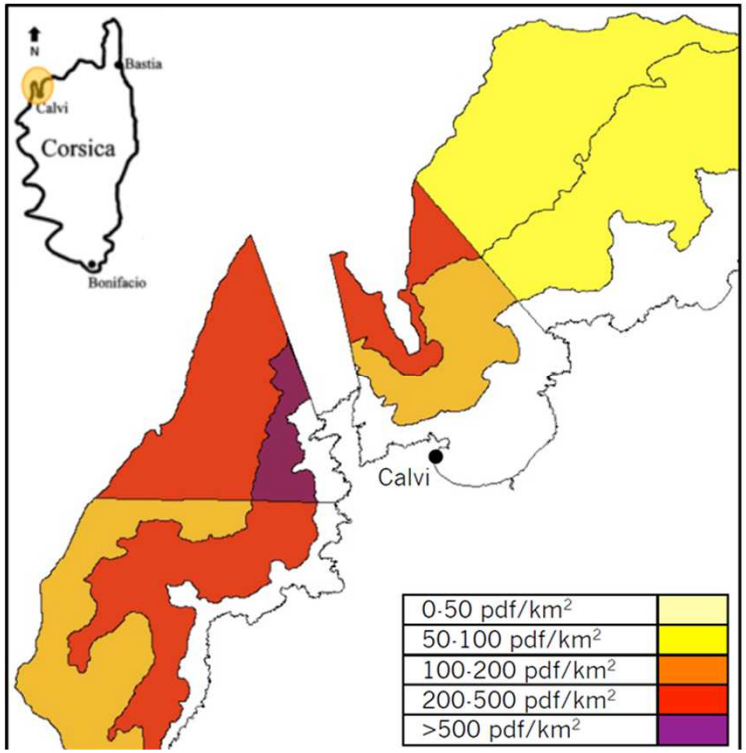


GPS localisation of boats in the Alga bay (yellow: < 10m; orange: 10-20m; red: > 20m). Data are for a two days frequentation period during the summer season.

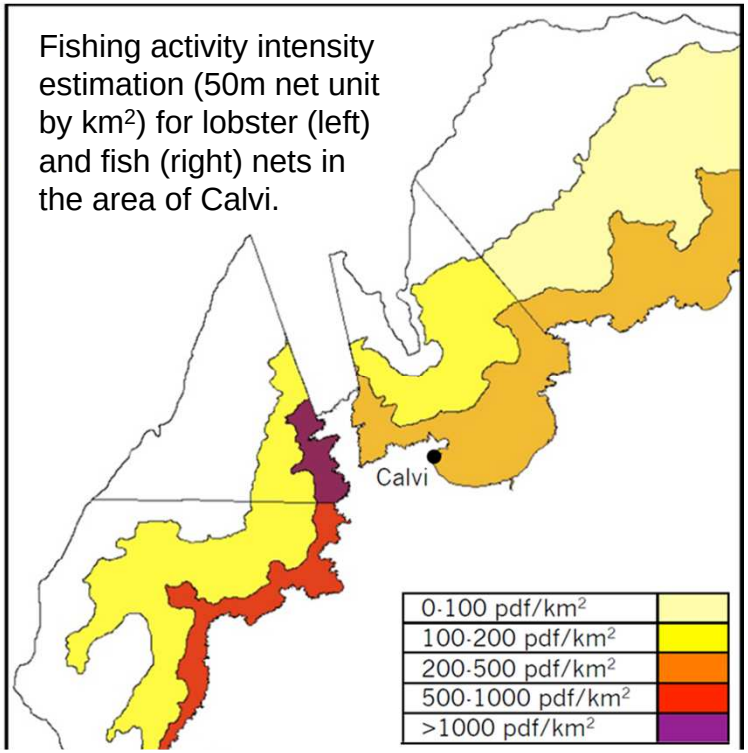
STARECAPMED - Fisheries

PROFESSIONAL FICHERIES



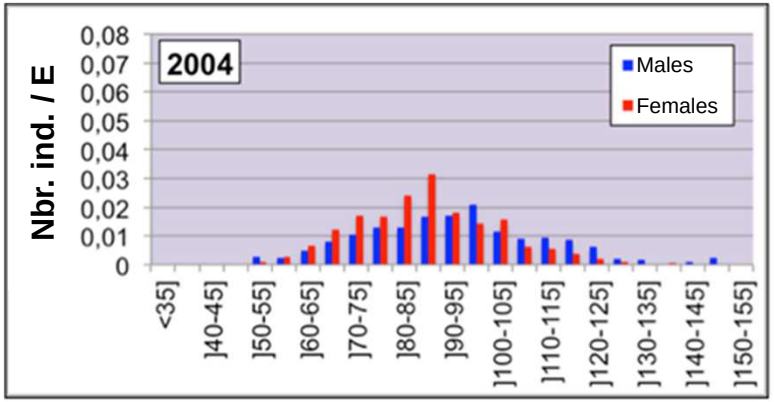


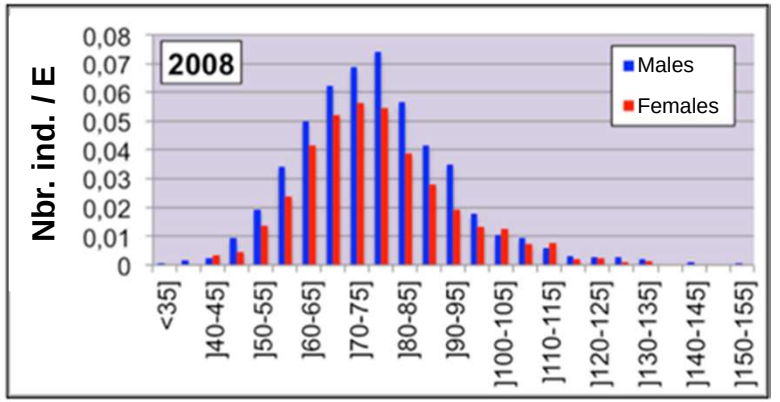
Fishing activity intensity estimation (50m net unit by km²) for lobster (left) and fish (right) nets in the area of Calvi.

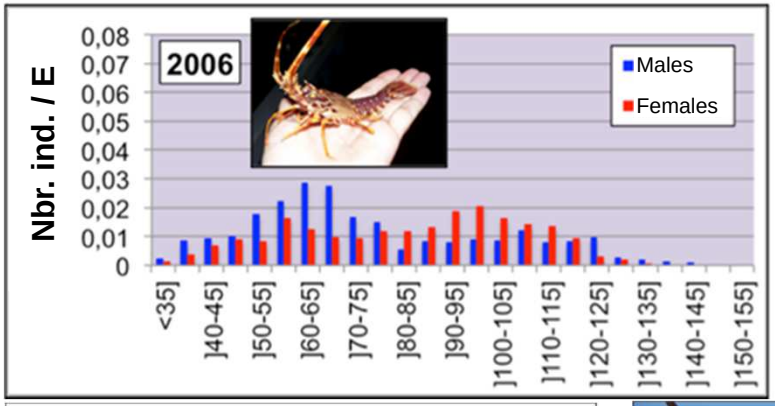


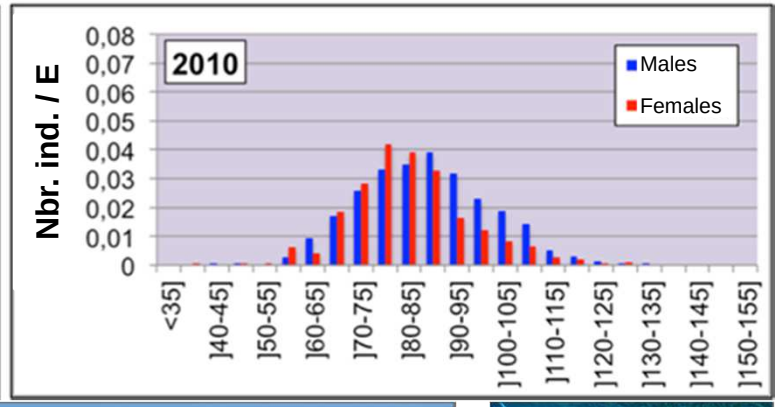
STARECAPMED - Fisheries

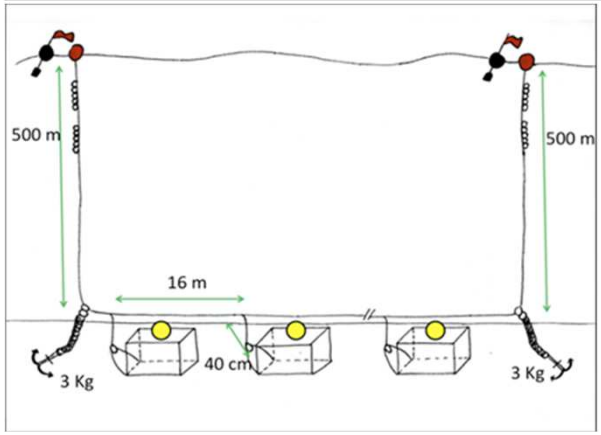
PROFESSIONAL FICHERIES

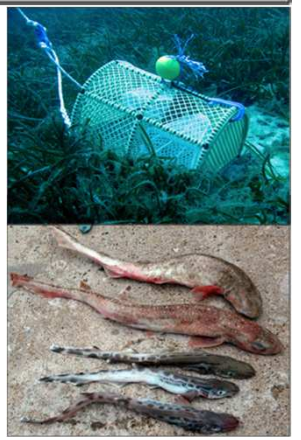












STARECAPMED - Recruitment

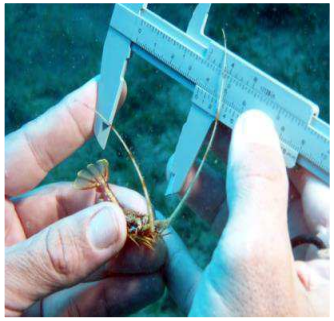
PALINURUS ELEPHAS

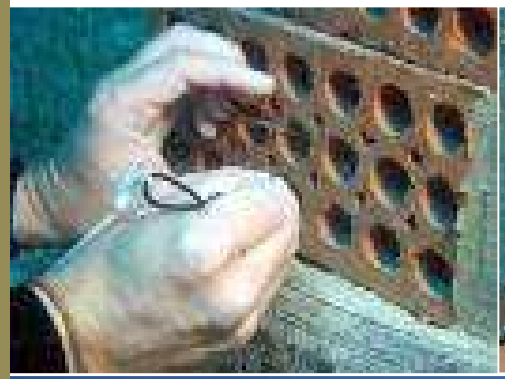
RECRUITMENT

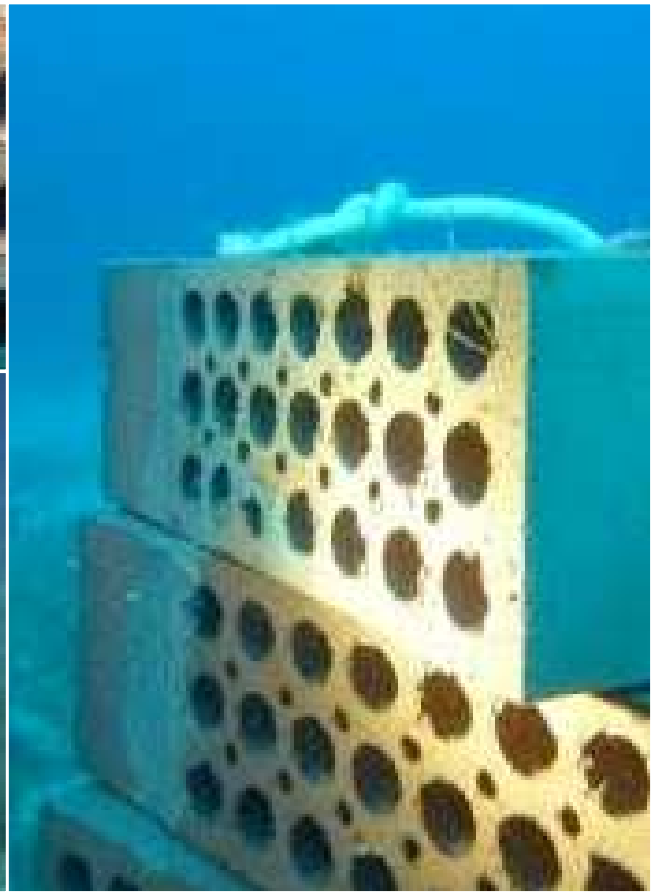
PALINURUS ELEPHAS

RECRUITMENT

STARECAPMED - Recruitment

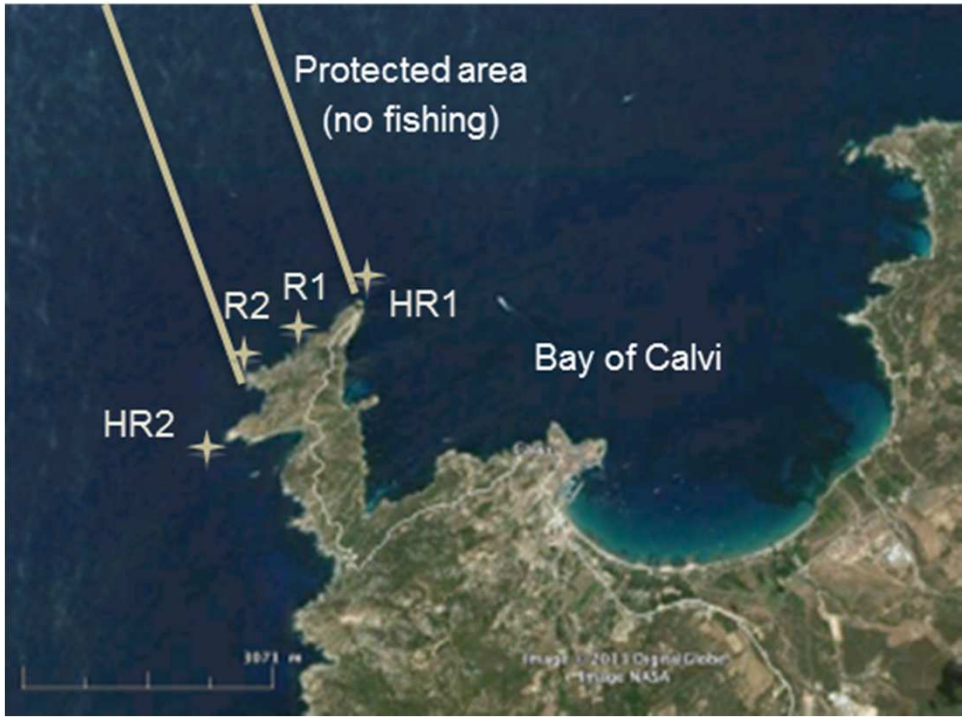




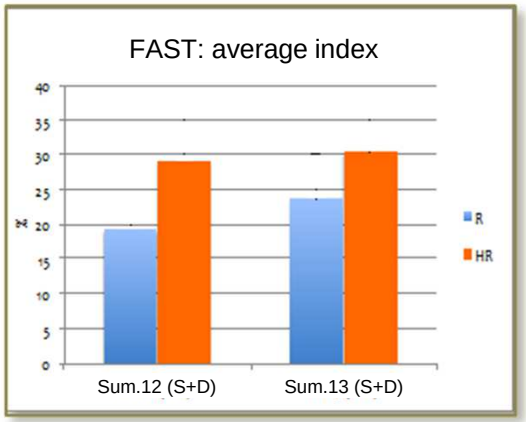


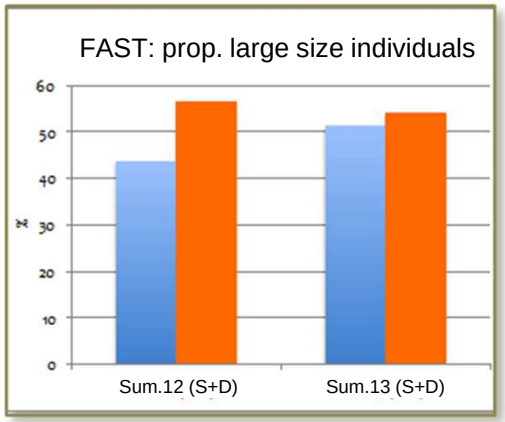
RESERVE EFFECT

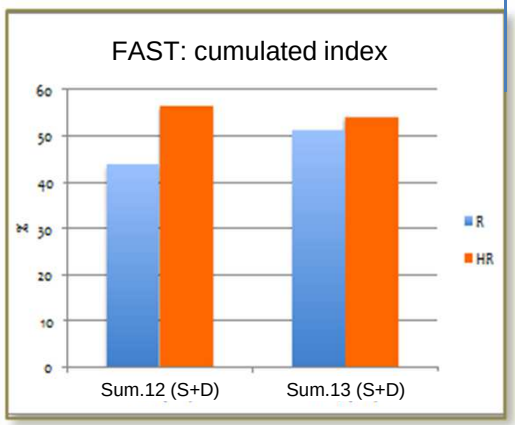
STARECAPMED - Reserve



Permanent transects vs. FAST index: modifications of the FAST index are under study to adapt it to situations with low reserve effect.

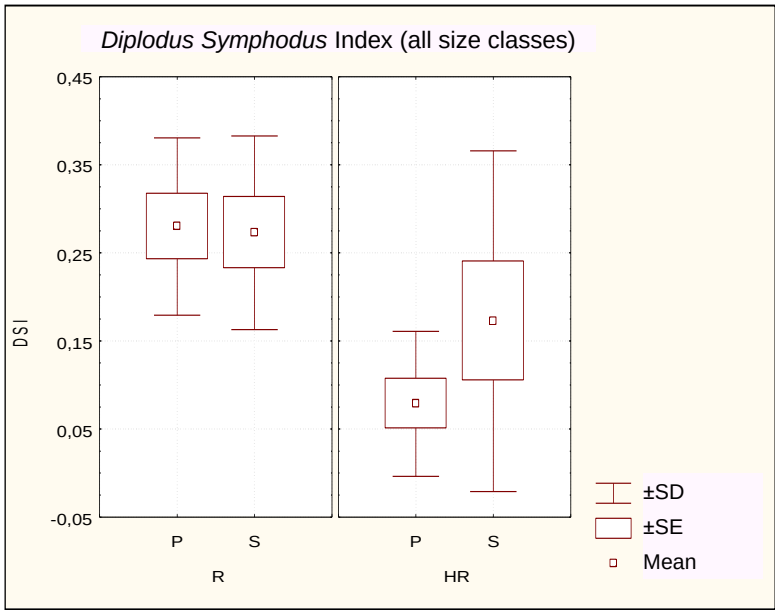


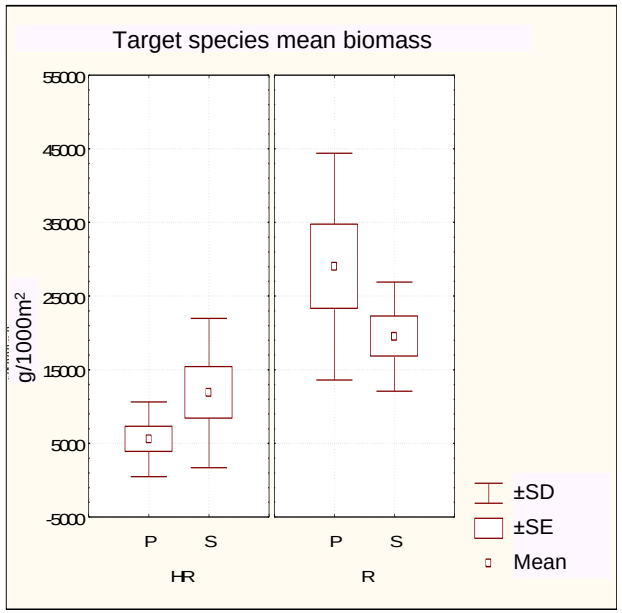




RESERVE EFFECT

STARECAPMED - Reserve





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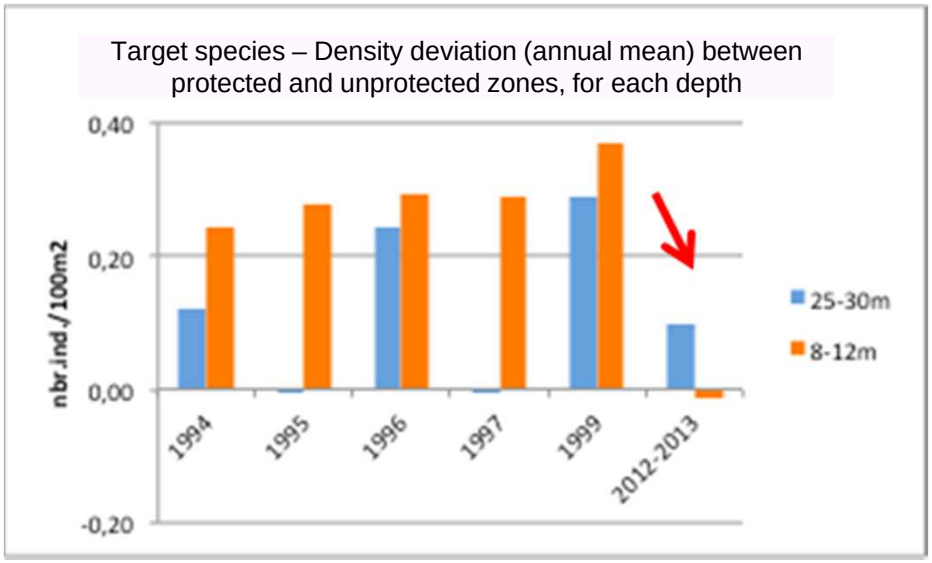

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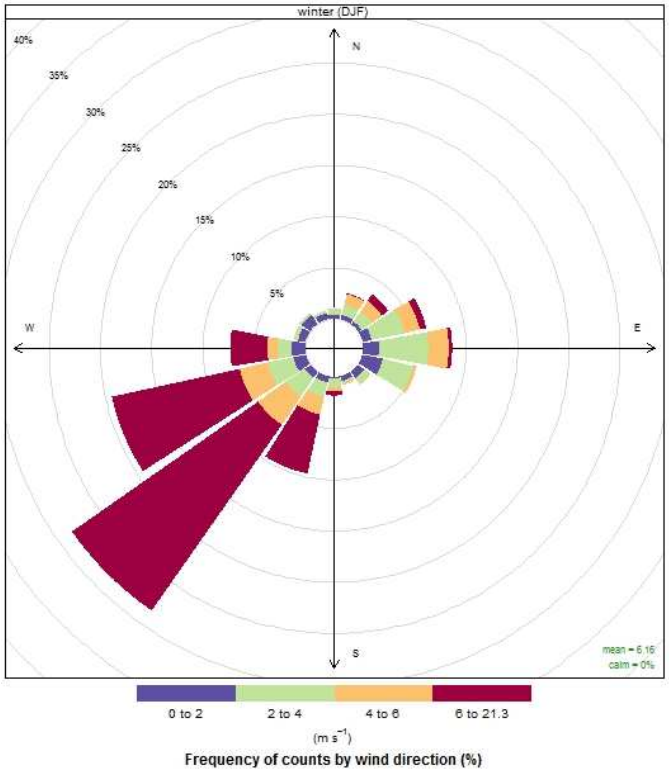
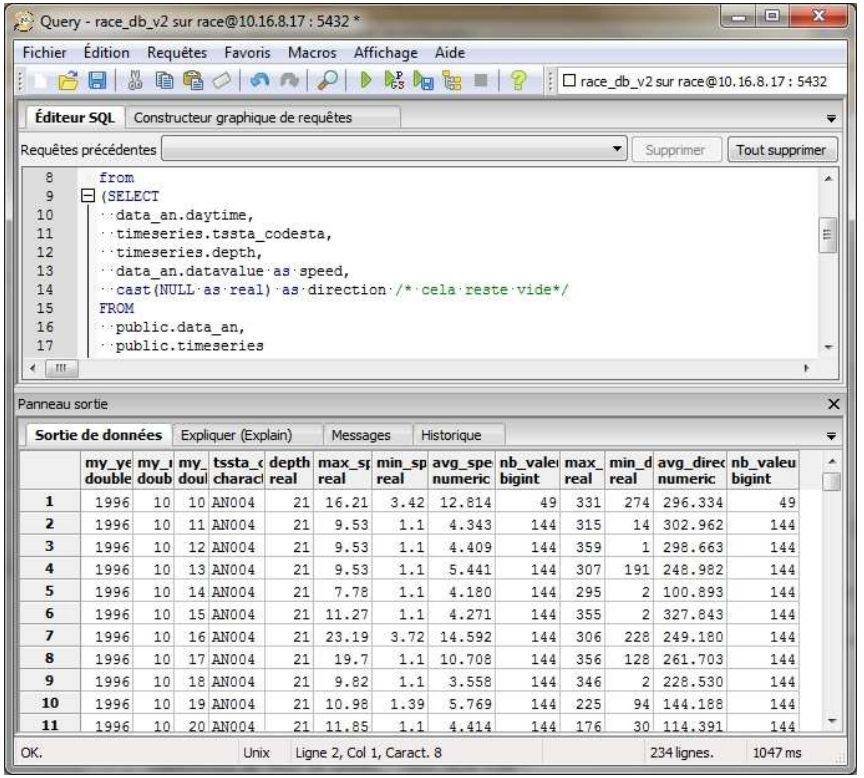
DATABASE RACE

DATABASE RACE

pgAdmin
PostgreSQL Tools





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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
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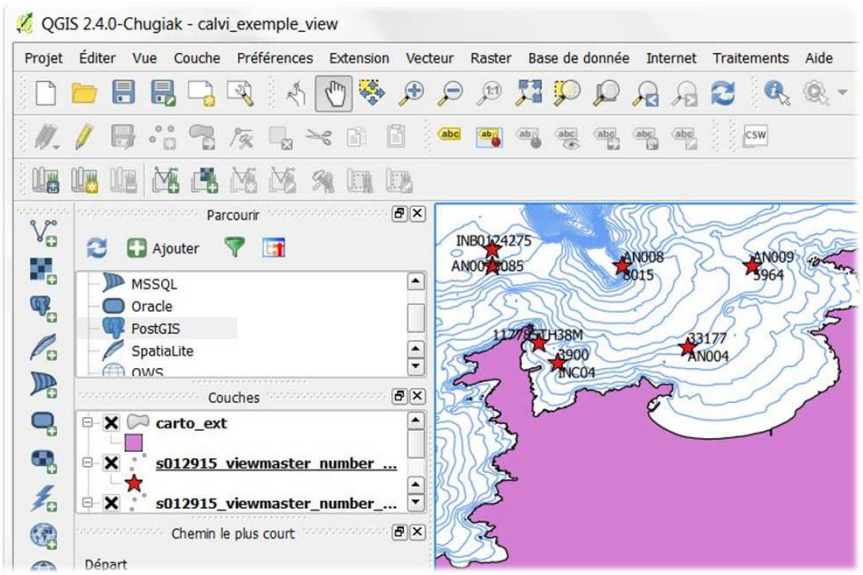
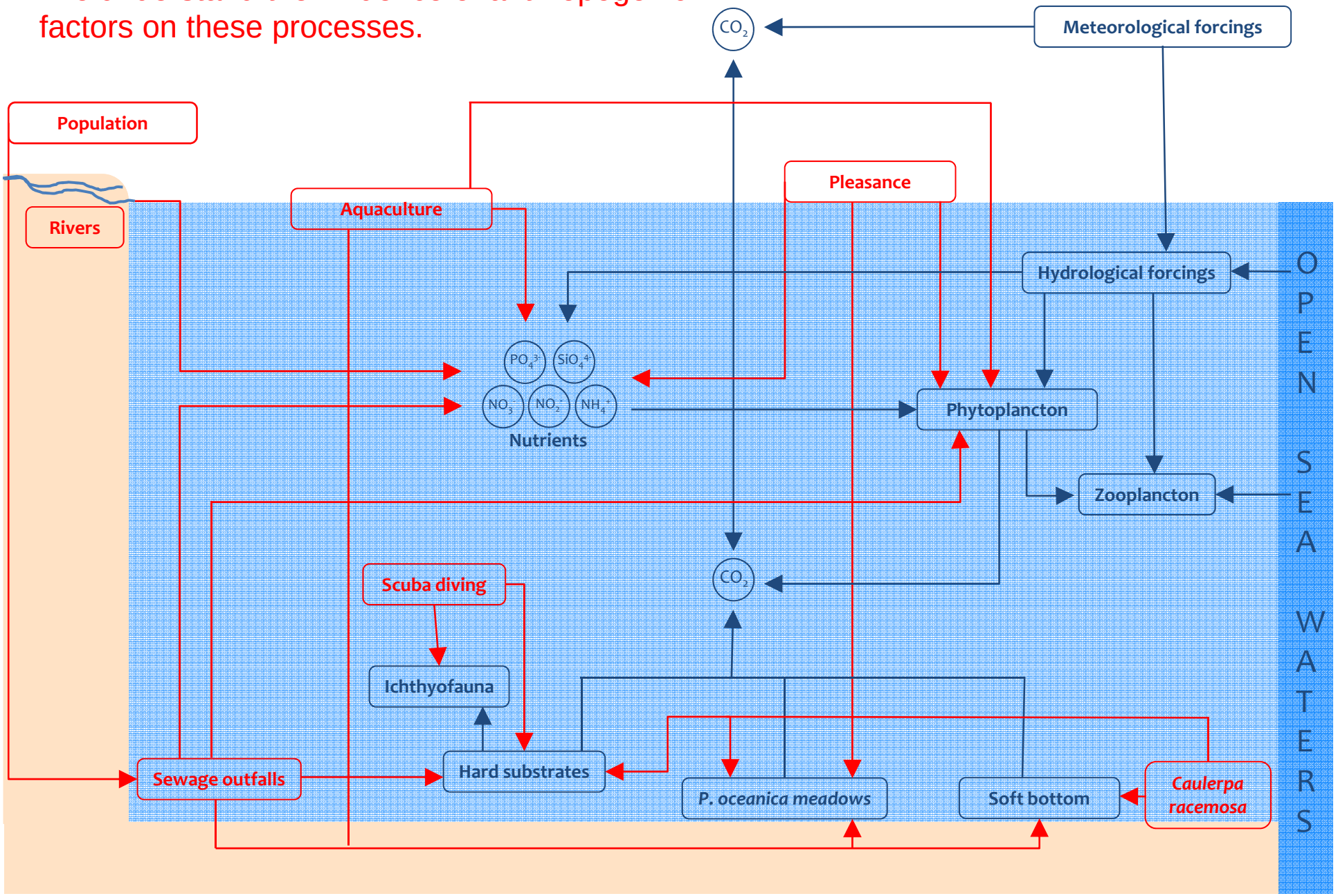


STARECAPMED - Examples

PHYTOPLANCTON	MACROBENTHOS OF SOFT BOTTOM	PROFESSIONAL FISHERIES
ZOOPLANCTON	BLUE CARBON WELL	*PALINURUS ELEPHAS* RECRUITMENT
HARD SUBSTRATES	ECOTOXICOLOGY	RESERVE EFFECT
MACROALGAE	ANCHORING	DATABASE RACE

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

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



anchoring - *P. oceanica* - *C. racemosa* - landscape - fish recruitment and fisheries - macroalgae - macrobenthos - ecotoxicology - blue carbon well

PHYTOPLANCTON	MACROBENTHOS OF SOFT BOTTOM	PROFESSIONAL FISHERIES
ZOOPLANCTON	BLUE CARBON WELL	*PALINURUS ELEPHAS* RECRUITMENT
HARD SUBSTRATES	ECOTOXICOLOGY	RESERVE EFFECT
MACROALGAE	ANCHORING	DATABASE RACE

➔ Essential to apply an integrative approach such as the one developed in the framework of STARECAPMED

Many thanks for your attention

J. Richir, A. Abadie, M. Binard, R. Biondo, P. Boissery, A.V. Borges, W. Champenois, N. Cimiterra, A. Collignon, A. Donnay, C. Fréjefond, A. Goffart, J.-H. Hecq, P. Lejeune, G. Lepoint, L. Michel, C. Pelaprat, A. Pere, D. Sirjacobs, J.-P. Thomé, A. Volpon and S. Gobert

Qingdao,
11-08-15