

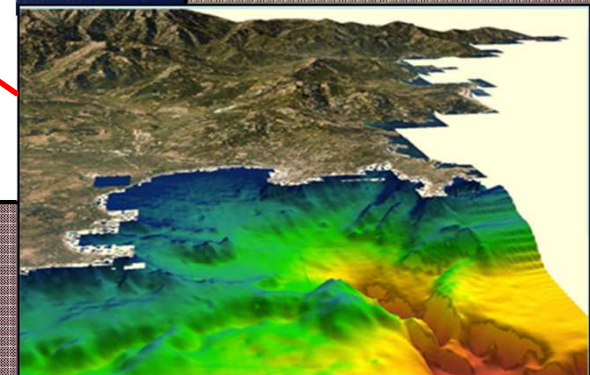
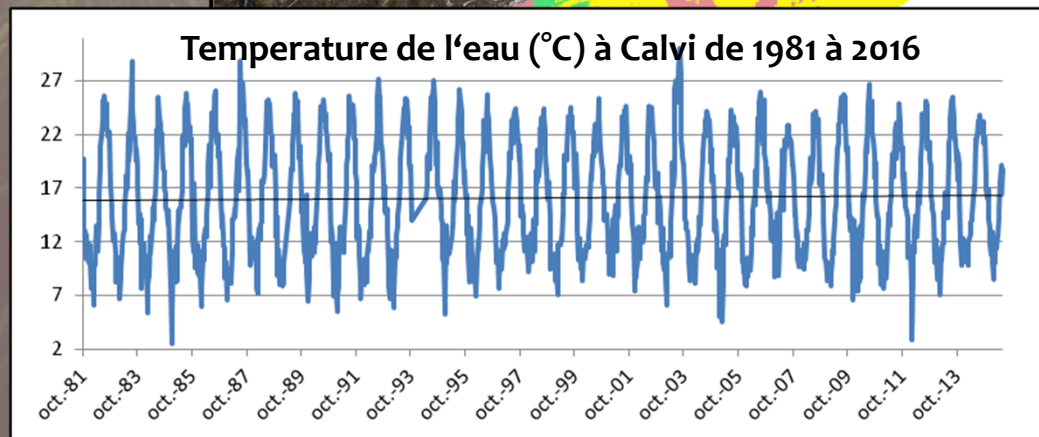
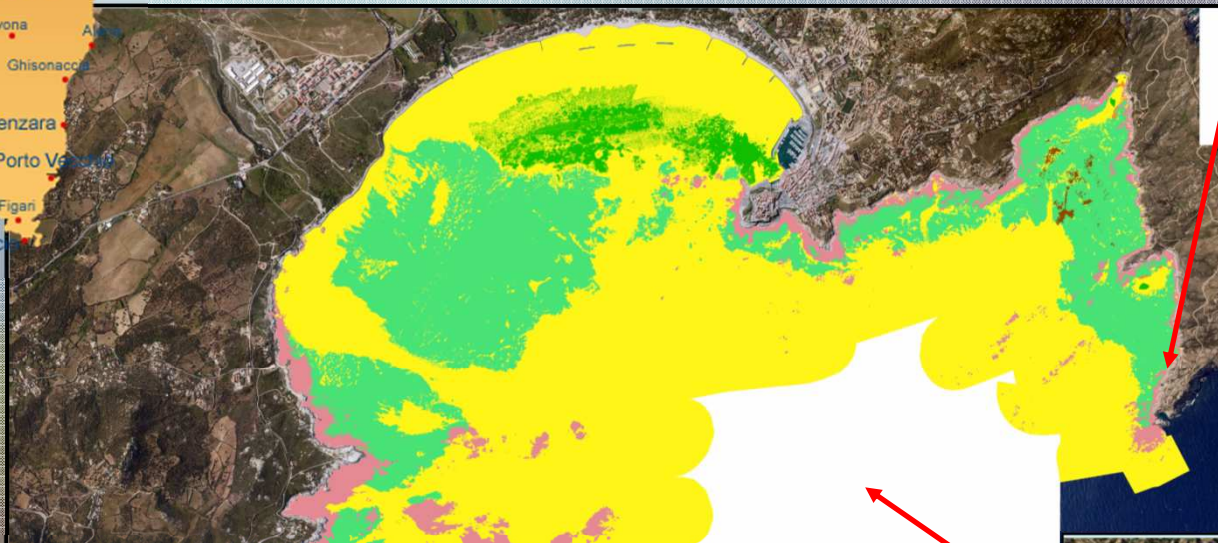
STARECAPMED, des indices pour la Méditerranée

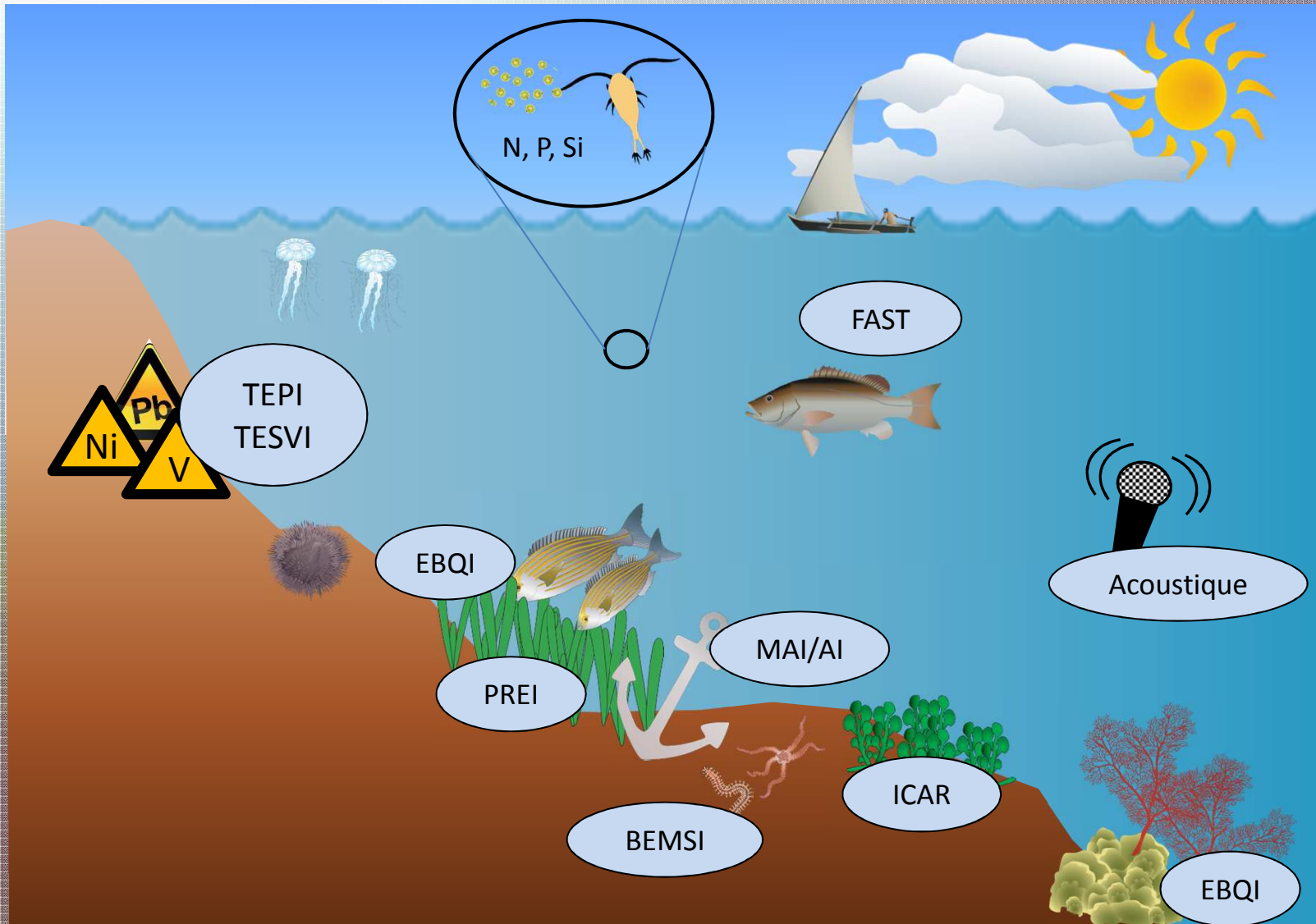
M. Leduc, A. Abadie, A. Donnay, C. Pelaprat, C. Gervaise,
S. Ruitton, E. Parmentier, J. Richir, P. Lejeune, S. Gobert

CARAMB'AR, 16 mars 2017



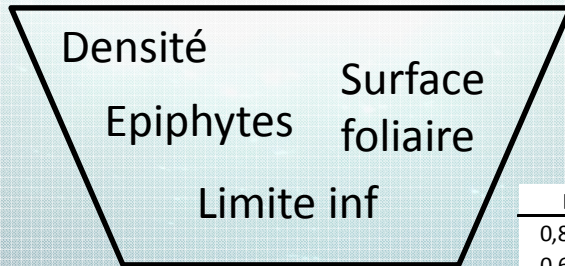
STATION of Reference and rEsearch on Change of local and global Anthropogenic Pressures on Mediterranean Ecosystems Drifts





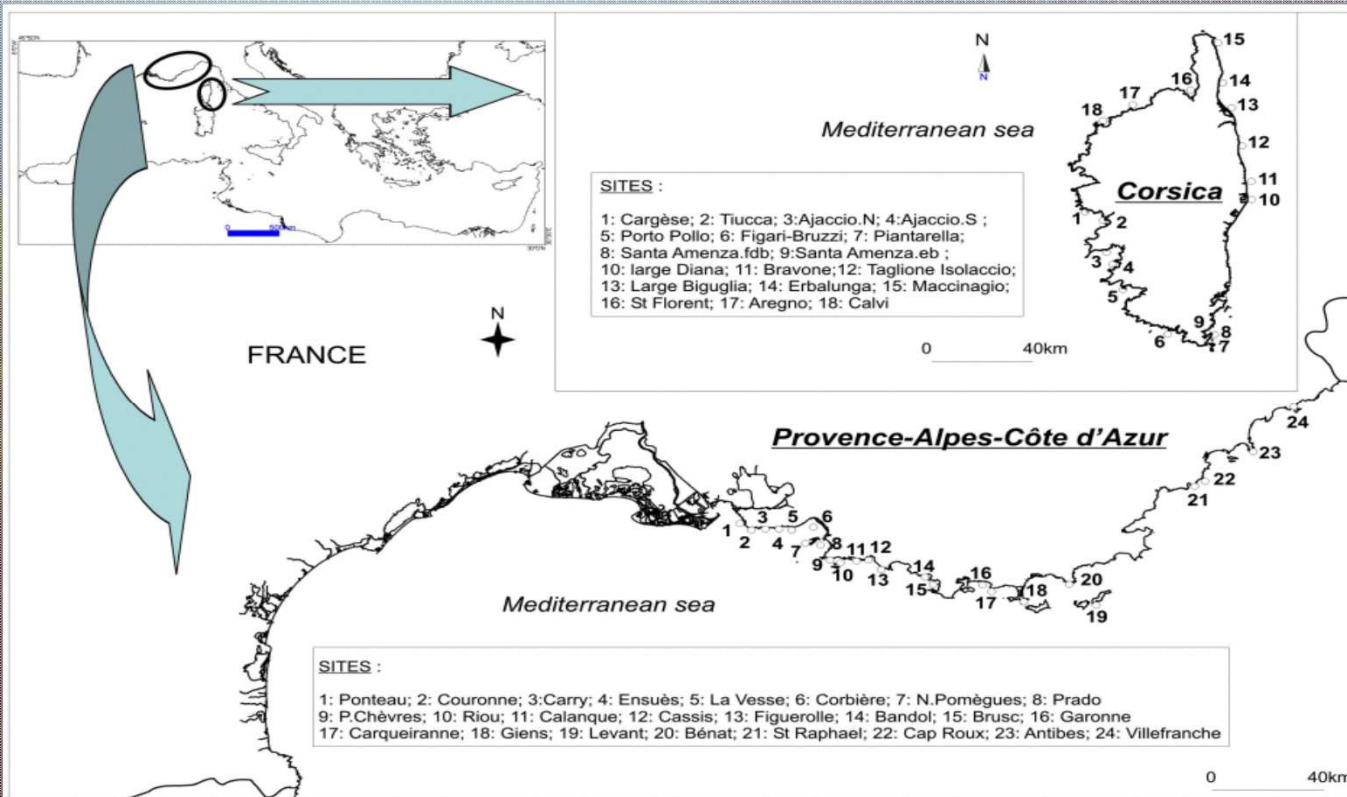
Indice de qualification des milieux

PREI: Posidonia Rapid Easy Index



PREI (EQR)

EQR	Statut écologique
0,8 - 1,00	Très bon
0,6 - 0,79	Bon
0,4 - 0,59	Moyen
0,2 - 0,39	Médiocre
0 - 0,19	Mauvais



GOBERT S., SARTORETTO S.,
RICO-RAIMONDINO V., ANDRAL
B., CHERY A., LEJEUNE P. &
BOISSERY P.
(2009) : Assesment of the
ecological status of
Mediterranean French coastal
waters as required by the Water
Framework Directive using the
Posidonia oceanica Rapid Easy
Index : PREI.
Marine Pollution Bulletin 58 :
1727-1733.

Indice de qualification des milieux

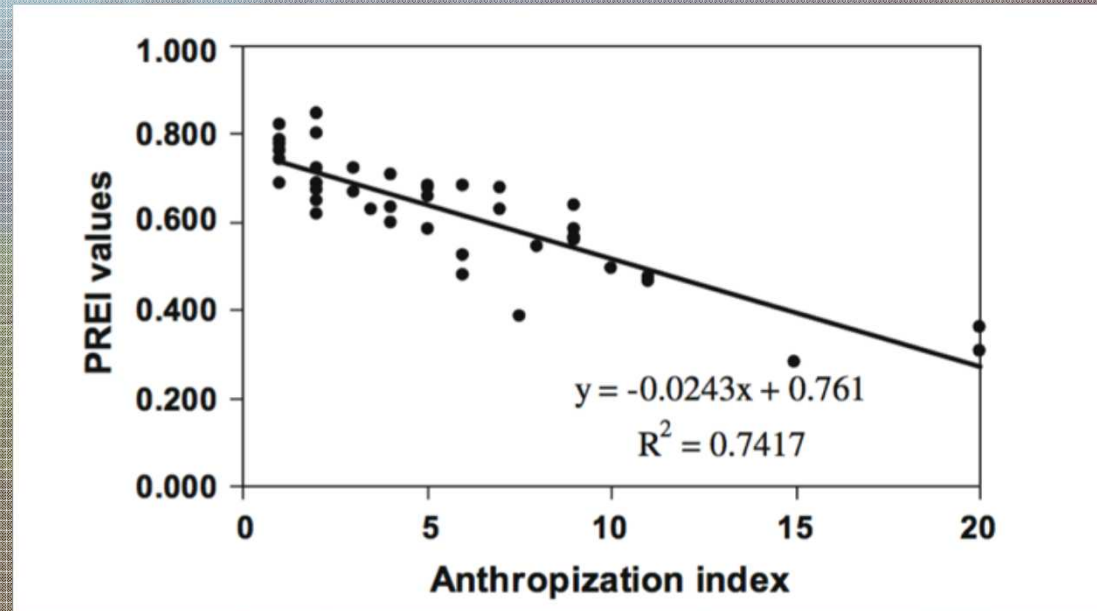
CORSICA		PACA	
STATION	PREI	STATION	PREI
Cargèse	0.668	Ponteau	0.360
Tiucca	0.630	Couronne	0.525
Ajaccio nord	0.564	Carry	0.680
Ajaccio sud	0.495	Ensuès	0.686
Porto Pollo	0.386	La Vesse	0.465
Figari-Bruzzi	0.619	Corbière	0.305
Piantarella	0.597	Nord Pomègues	0.628
Sant'Amanza fdb	0.542	Prado	0.636
Sant'Amanza eb	0.671	P. Chèvres	0.477
Large Diana	0.689	Riou	0.677
Bravone	0.779	Calanque	0.584
Taglio Isolaccio	0.690	Cassis	0.563
Large Biguglia	0.721	Figuerolle	0.660
Erbalunga	0.741	Bandol	0.682
Maccinagio	0.650	Brusc	0.634
St Florent	0.478	Carqueiranne	0.708
Aregno	0.789	Garonne	0.583
Calvi	0.724	Levant	0.802
		Giens	0.819
		Bénat	0.764
		St Raphael	0.690
		Cap Roux	0.847
		Antibes	0.560
		Villefranche	0.280

2007

Etat écologique->

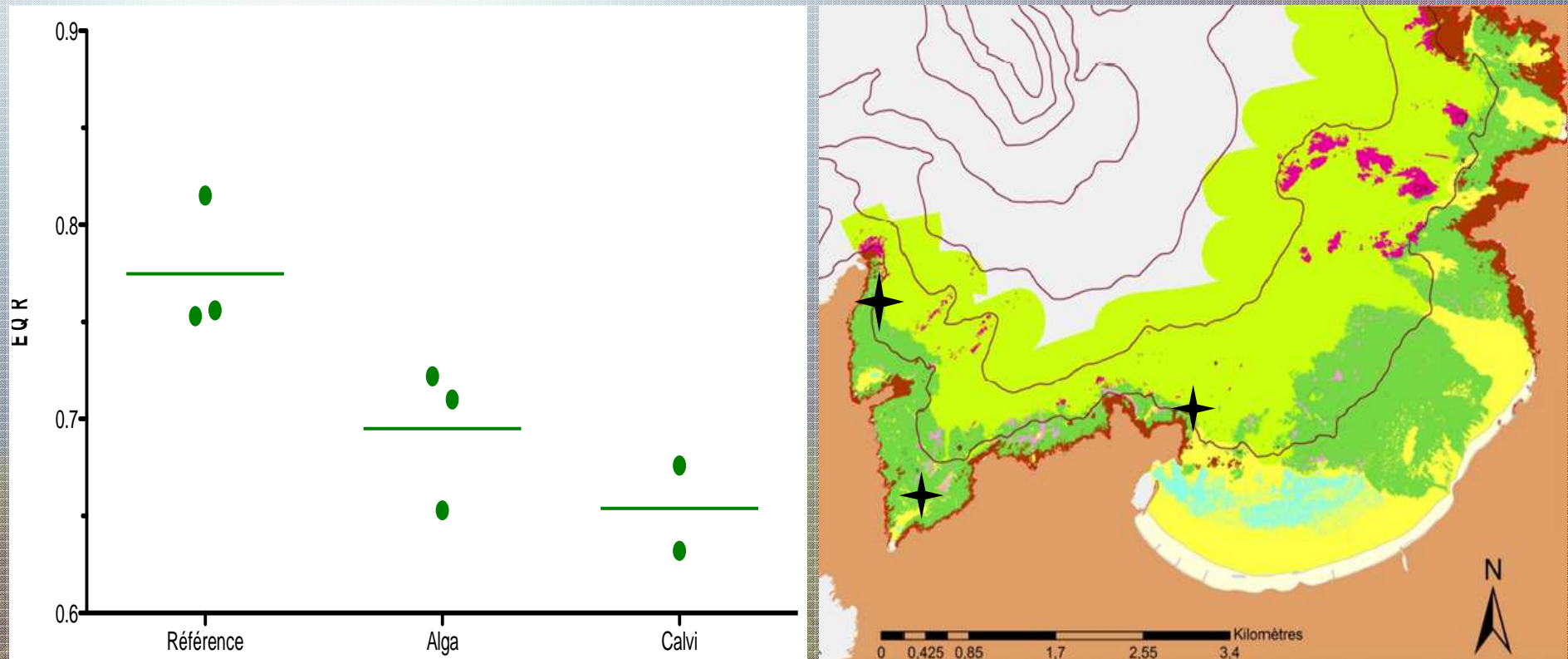
Anthropisme? remédiation?

Suivi au court du temps



Indice de qualification des milieux

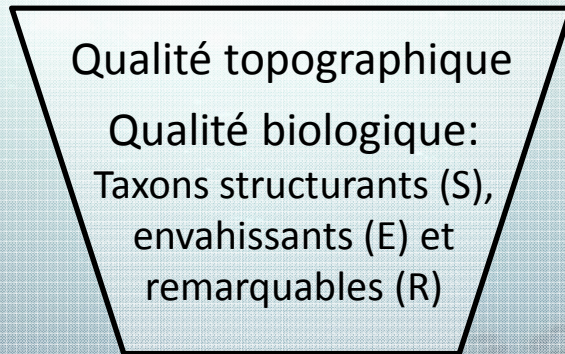
PREI: Posidonia Rapid Easy Index



Effet de l'anthropisation

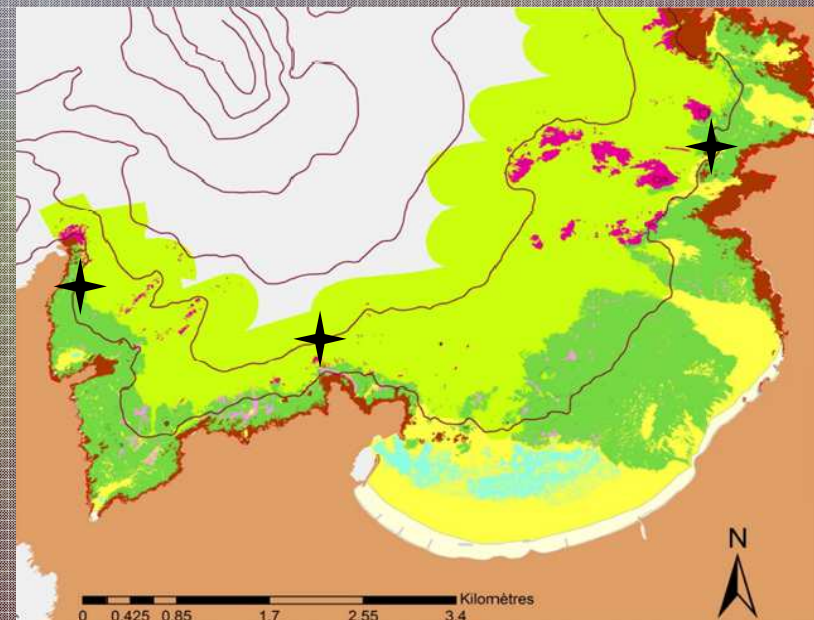
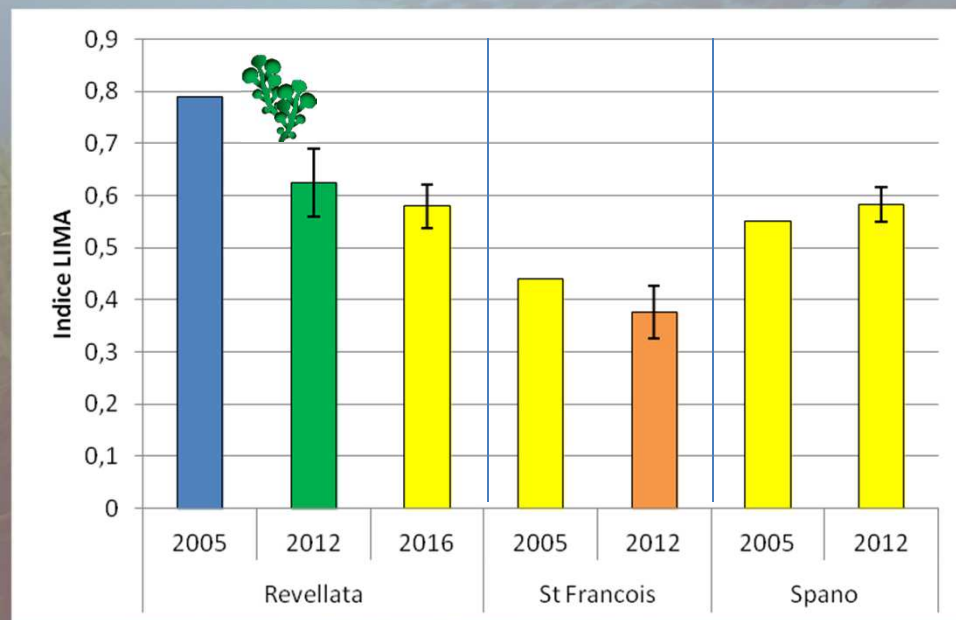
Indice de qualification des milieux

LIMA: Littoral MARin



LIMA	Statut du site
0,8 - 1,00	Richesse patrimoniale et site exceptionnels
0,6 - 0,79	Richesse patrimoniale élevée, site riche
0,4 - 0,59	Richesse patrimoniale moyenne, site attrayant
0,2 - 0,39	Faible richesse patrimoniale, site peu attrayant
0 - 0,19	Pauvre en espèces patrimoniales, site non attrayant

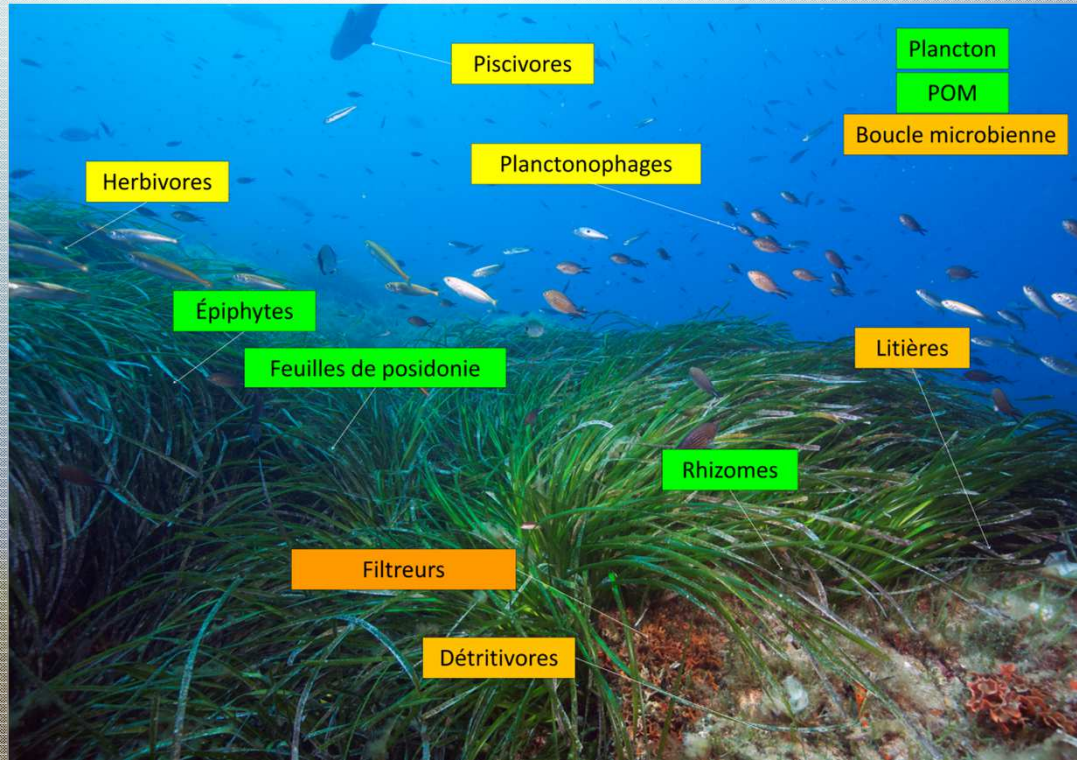
l'attrait paysager et la richesse patrimoniale du benthos méditerranéen pour des profondeurs allant de 0 à 40 m



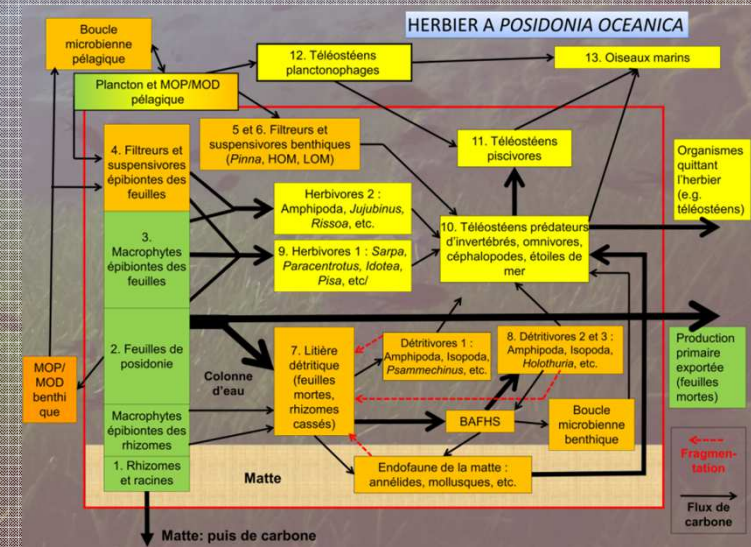
GOBERT S., CHERY A., VOLPON A., PELAPRAT C. & LEJEUNE P. (2014) : The Seascapes as an Indicator of Environmental Interest and Quality of the Mediterranean Benthos: The in Situ Development of a Description Index: The LIMA. Underwater Seascapes : 273-287.

Adaptation des Indices de qualification des milieux

EBQI: Approche écosystémique



EBQI	Statut écologique
>7,5	Très bon
6 - 7,5	Bon
4,5 - 6	Moyen
3,5 - 4,5	Médiocre
< 3,5	Mauvais

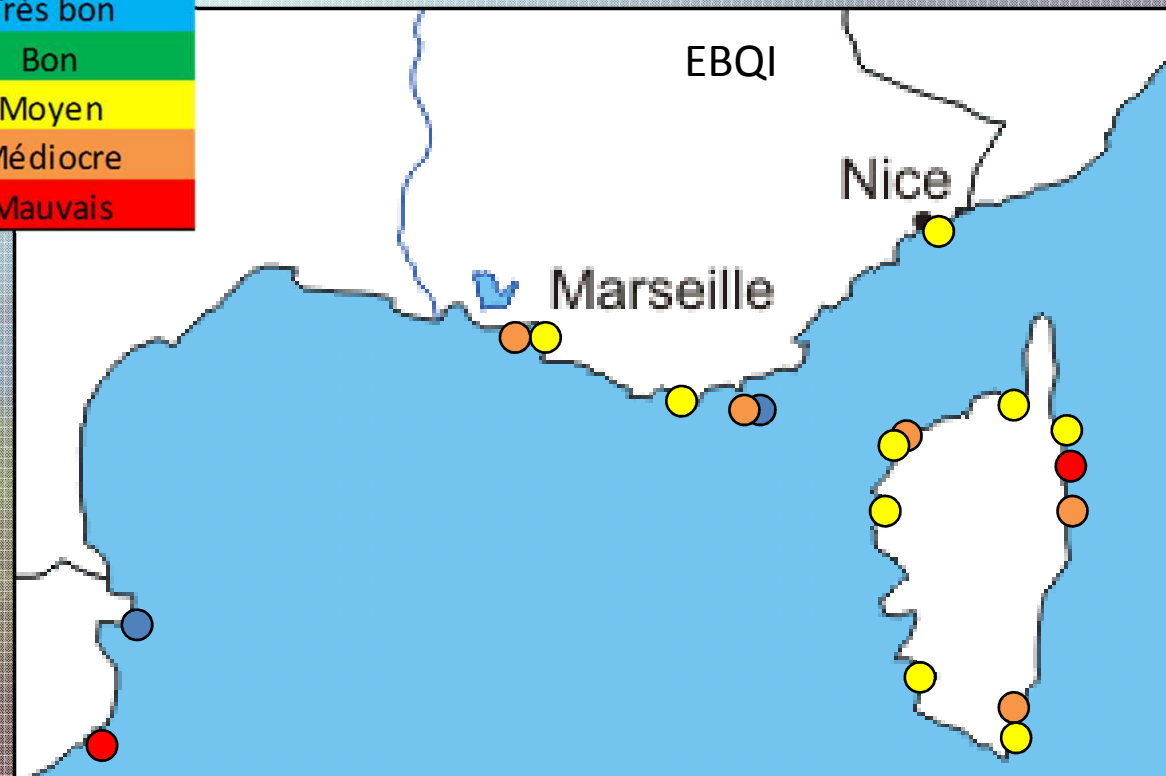


PERSONNIC S, BOUDOURESQUE C, ASTRUCH P, BALLESTEROS E, BLOUET S et al. (2014) : An Ecosystem-Based Approach to Assess the Status of a Mediterranean Ecosystem, the Posidonia oceanica Seagrass Meadow. Plos One 9(6): e98994. doi:10.1371/journal.pone.0098994.

Adaptation des Indices de qualification des milieux

EBQI:

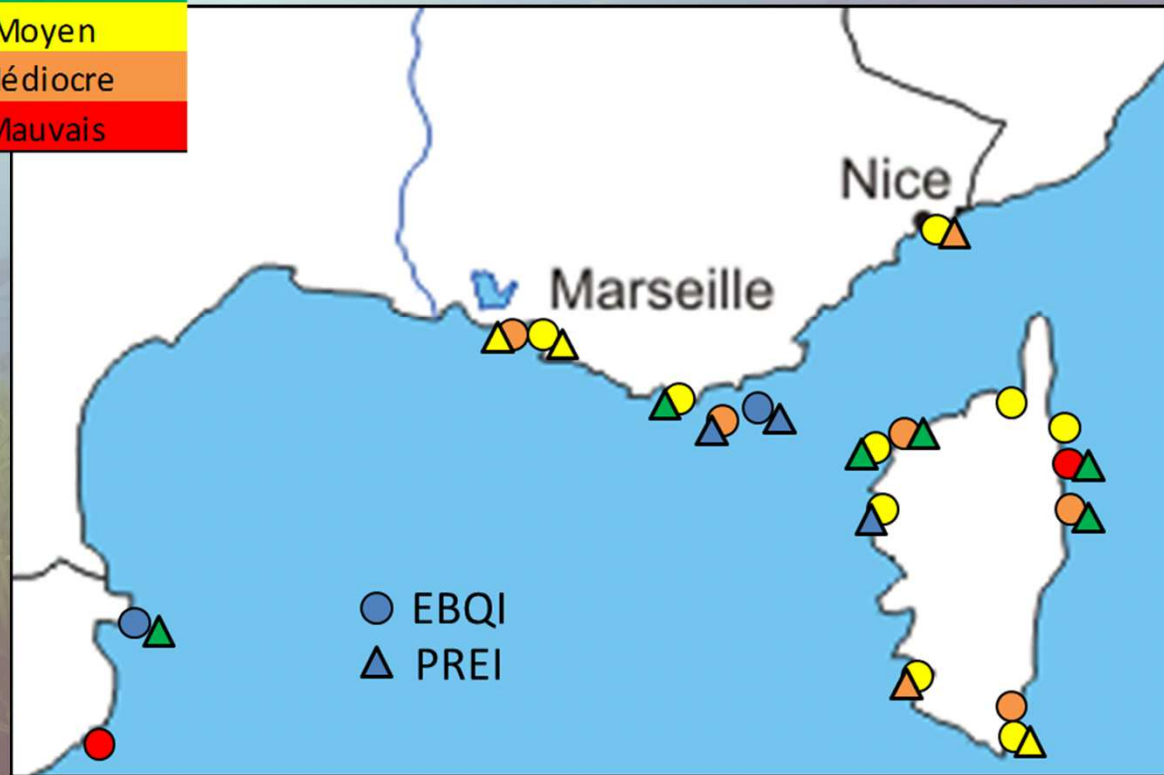
EBQI	Statut écologique
>7,5	Très bon
6 - 7,5	Bon
4,5 - 6	Moyen
3,5 - 4,5	Médiocre
<3,5	Mauvais



Adaptation des Indices de qualification des milieux

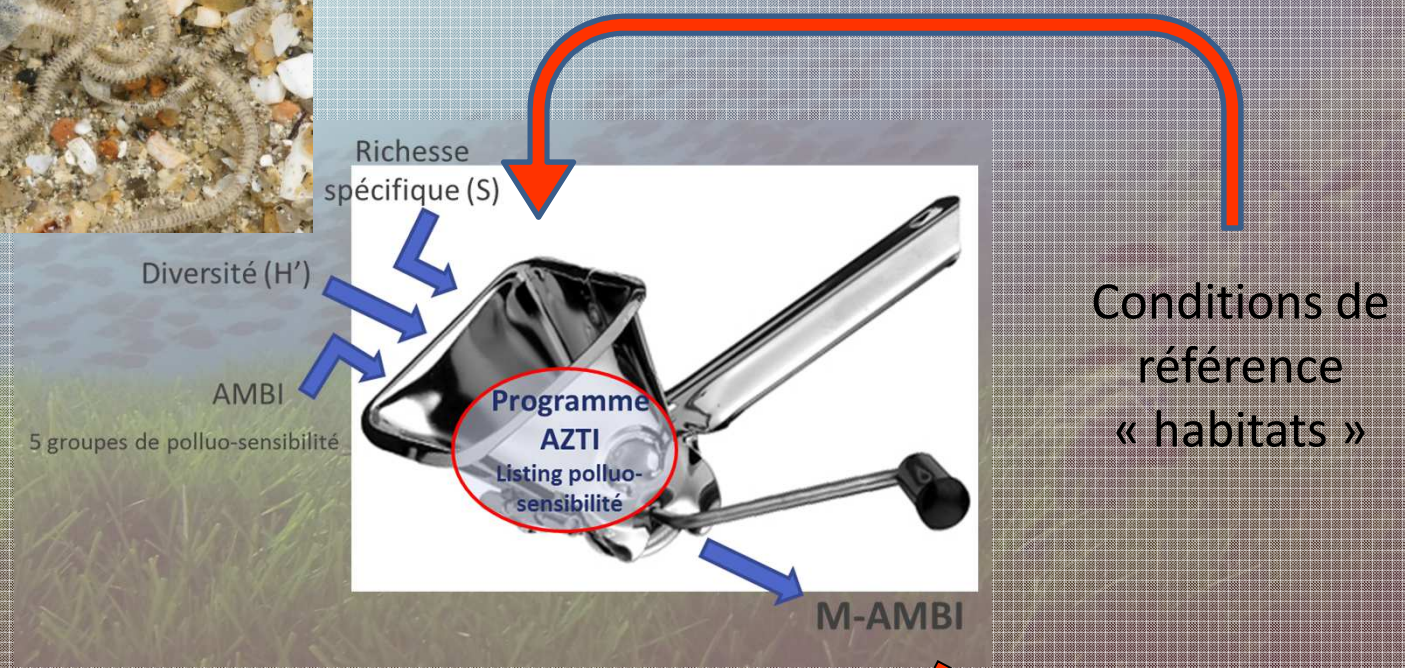
EBQI: Incohérence -> Adaptation des indices

EBQI	Statut écologique
>7,5	Très bon
6 - 7,5	Bon
4,5 - 6	Moyen
3,5 - 4,5	Médiocre
< 3,5	Mauvais

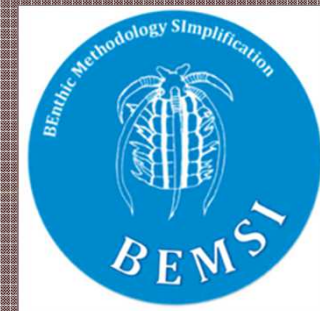


Adaptation des Indices de qualification des milieux

BEMSI: Macrobenthos benthique



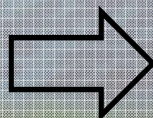
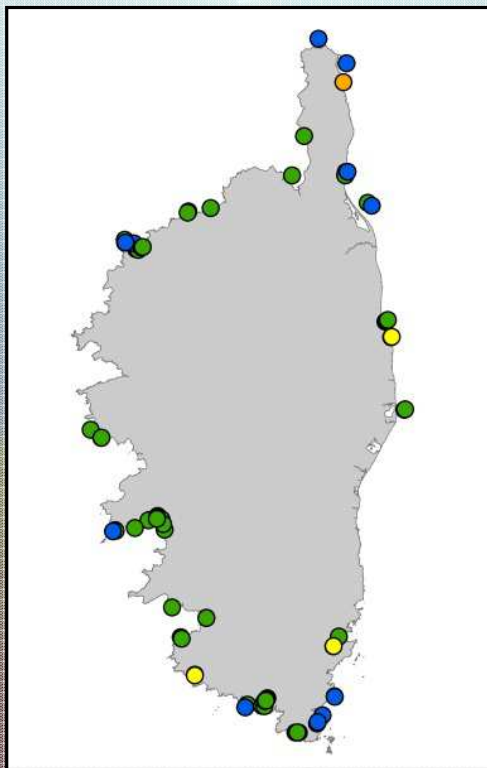
DONNAY, A, Thèse ULG/STARESO soutenue en 2016



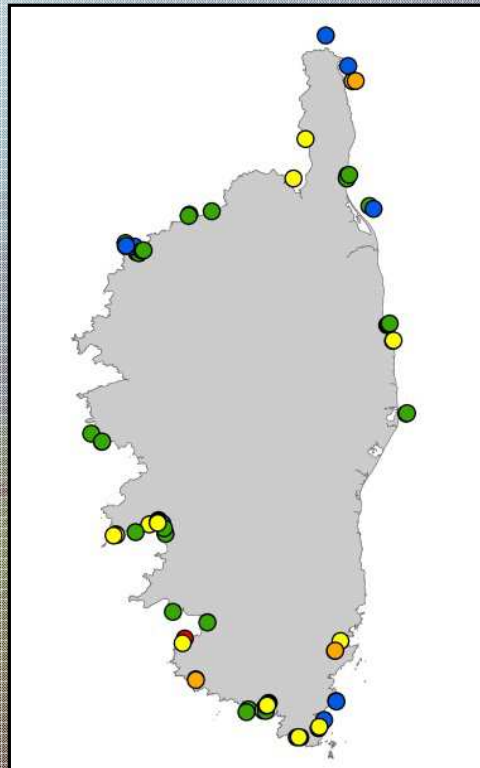
Adaptation des Indices de qualification des milieux

BEMSI:

M-AMBI



BeMSI



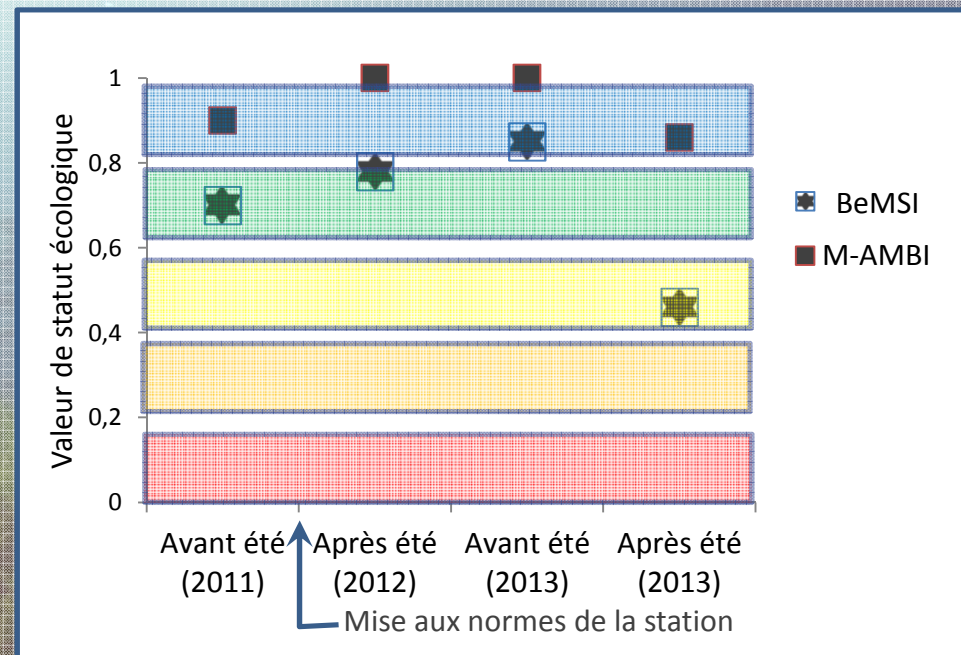
Statut

- Elevé
- Bon
- Moyen
- Pauvre
- Mauvais

Adaptation des Indices de qualification des milieux

BEMSI:

Cas de l'émissaire de Calvi



Indices spécifiques à une perturbation

ICAR:

Site	Profondeur (m)	Indice ICar
Pte de La Revellata	15	RA-S2-C2-P2
	20	RA-S2-C2-P2
	42	RA-S3-C4-P2
B17	15	2011 Sa-S3-C3-P2
		2012 Sa-S3-C4-P2

La colonisation vient des zones profondes

La colonisation s'amplifie chaque année

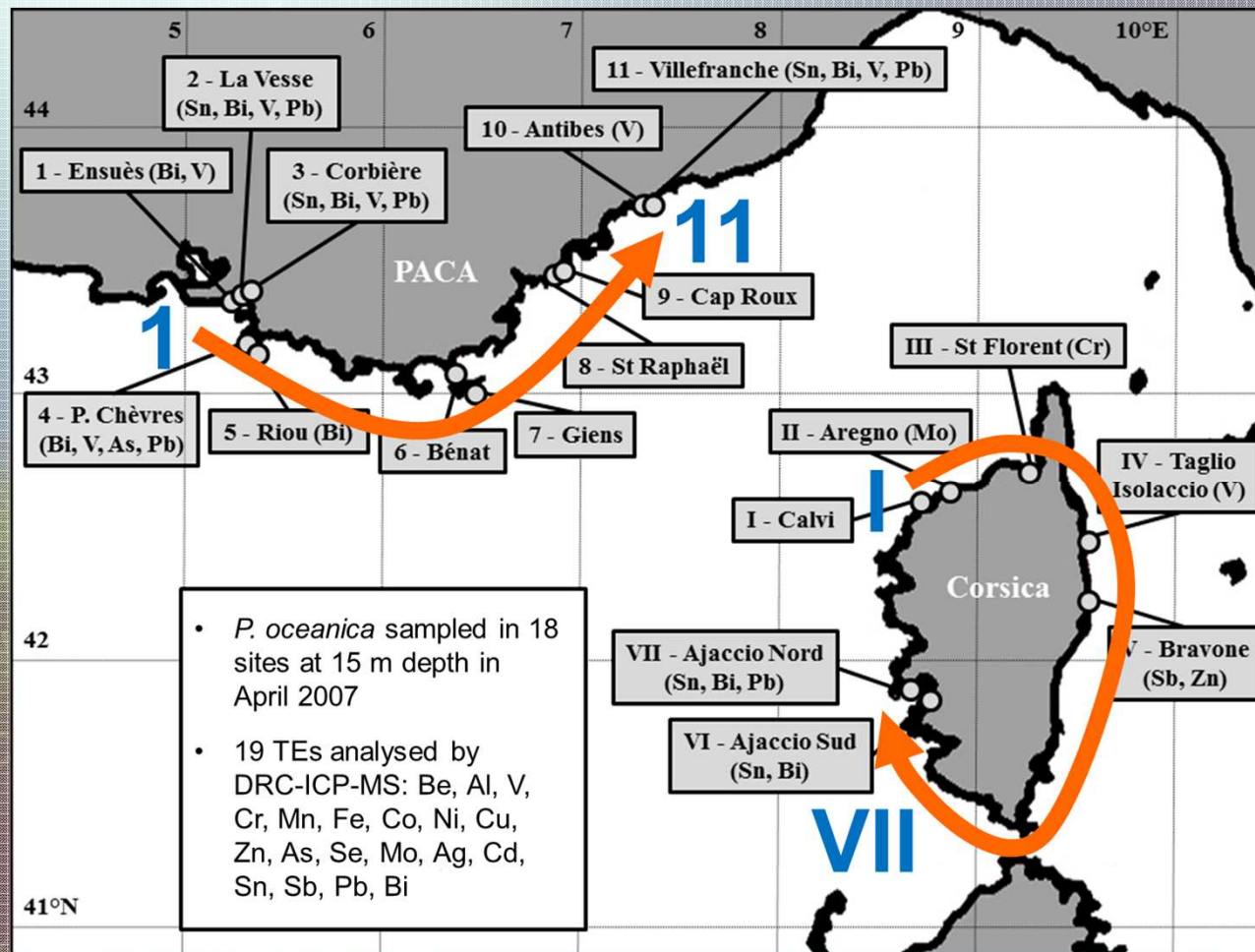
Caractérisation des habitats et communautés benthiques en baie de Calvi (Corse) : évaluation du potentiel de l'imagerie ROV. D. SIRJACOBS



Cariou N., Chery A., Jousseau M., Richir J., Lejeune P., Gobert S., 2013. L'indice paysager *Caulerpa racemosa* « Icar ». Colloque CARHAMB'AR, Brest.

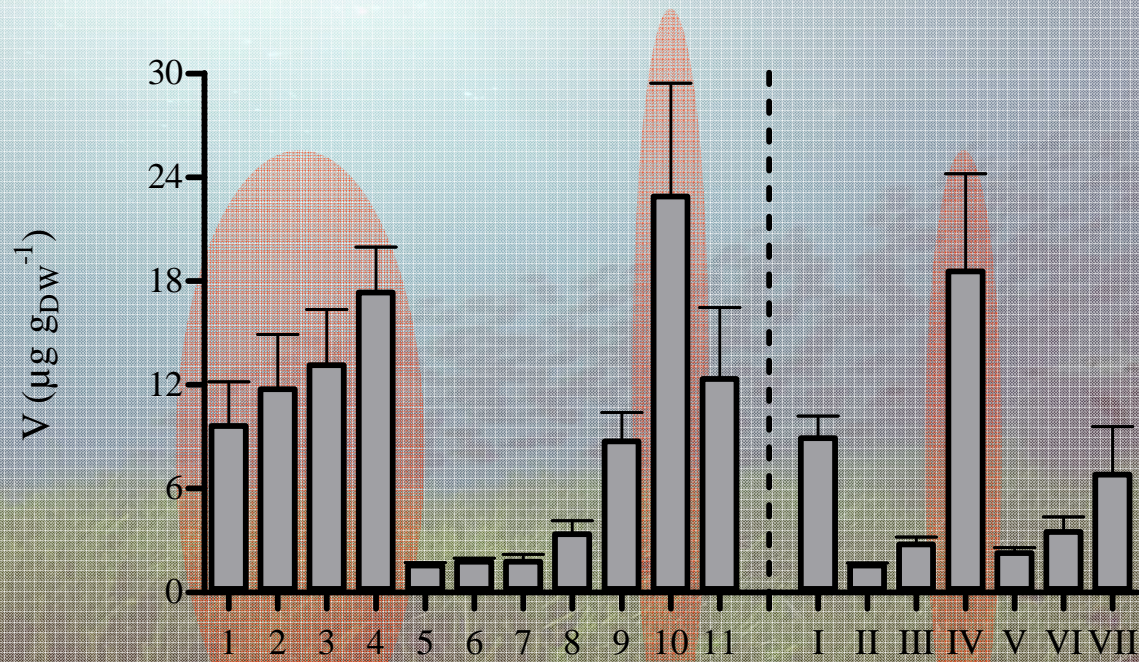
Indices spécifiques aux pollutions

TEPI/TESVI:



Indices spécifiques aux pollutions

TEPI/TESVI:



Marseille
oil refinery

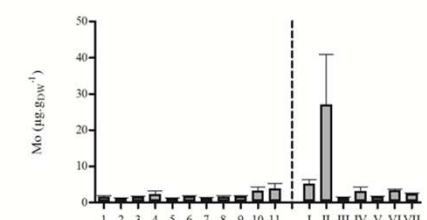
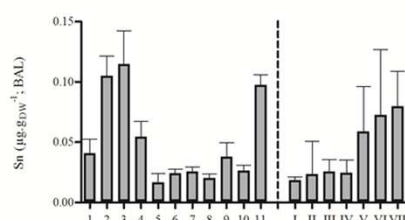
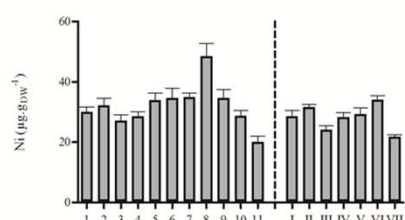
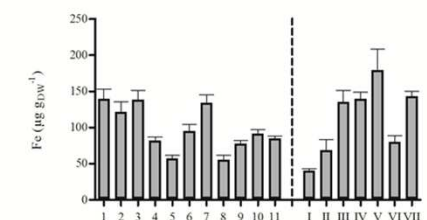
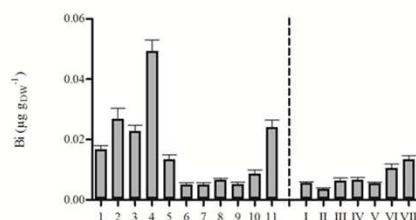
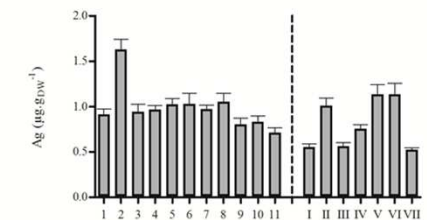
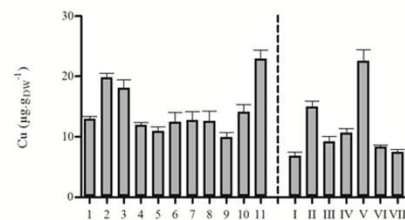
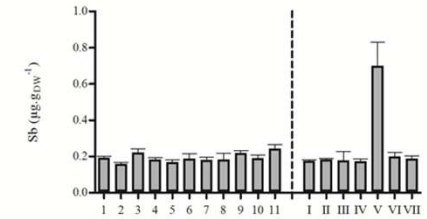
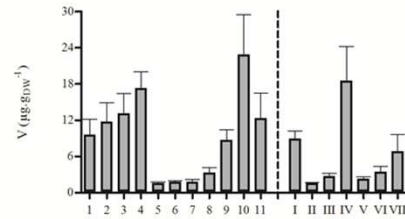
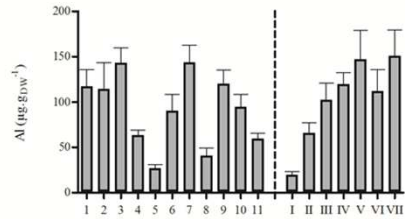
Antibes oil-
exporting harbour

Taglio-Isolaccio
petroleum depot



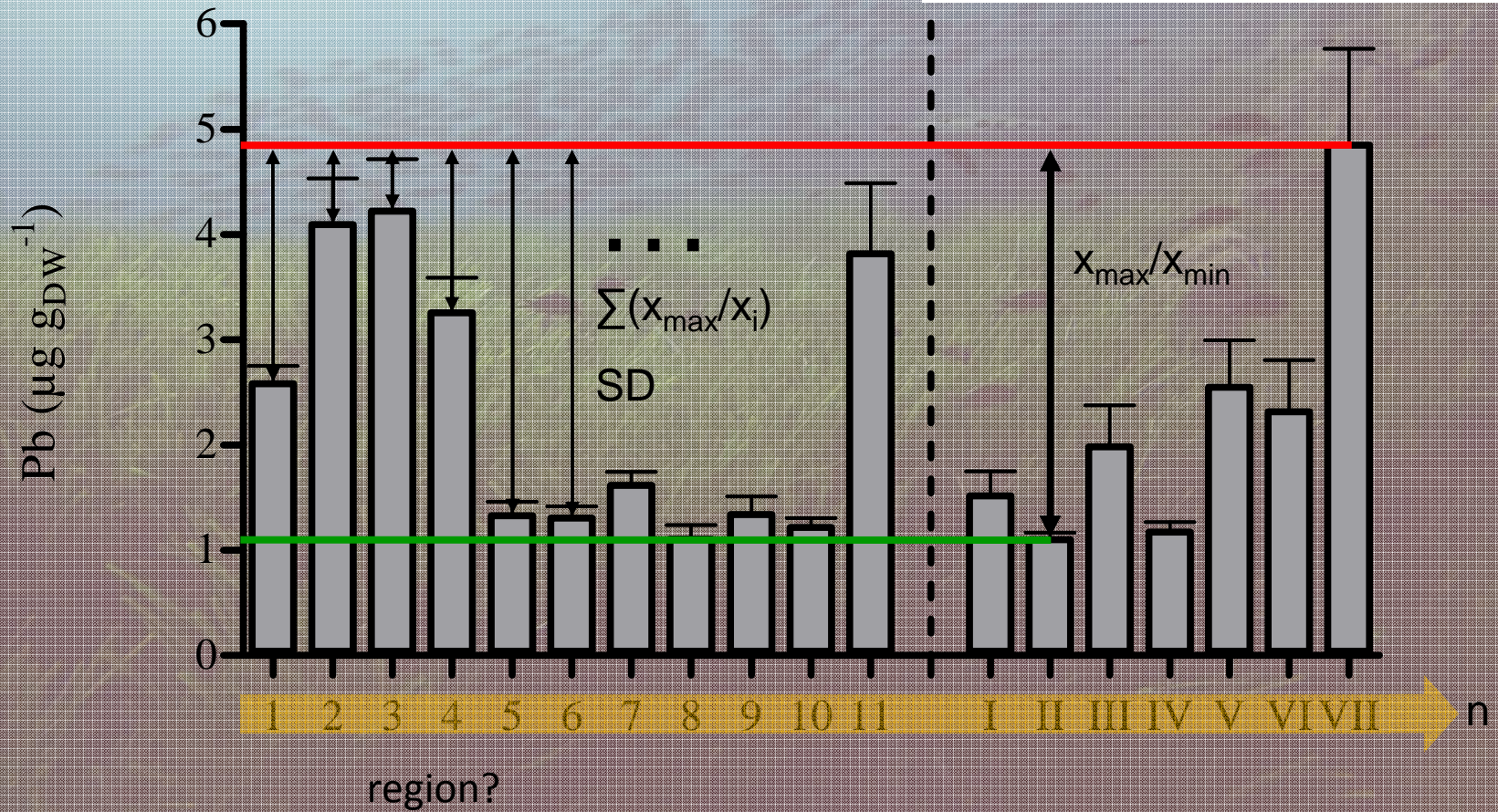
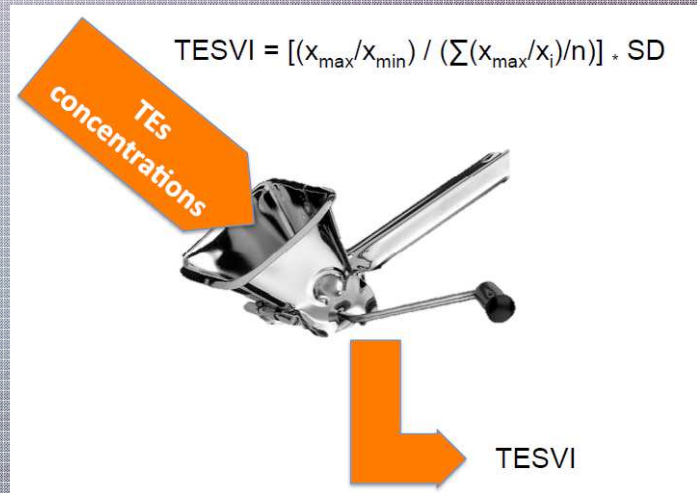
Indices spécifiques aux pollutions

TEPI/TESVI:



Indices spécifiques aux pollutions

TESVI: Trace Element Spatial Variation Index



Indices spécifiques aux pollutions

TESVI: Trace Element Spatial Variation Index

A. TEs broadly monitored with *P. oceanica*

	x_{\max}/x_{\min}	$\sum(x_{\max}/x_i)/18 \pm \text{SD}$	TESVI	Site x_{\max}
Cr	6.0	3.6 ± 1.3	2.2	St Florent
Fe	4.4	2.0 ± 0.9	1.9	Bravone
Ni	2.4	1.6 ± 0.3	0.5	St Raphaël
Cu	3.4	1.9 ± 0.7	1.2	Villefranche
Zn	19.6	13.3 ± 4.4	6.5	Bravone
Cd	3.9	1.9 ± 0.7	1.4	St Raphaël
Pb	4.4	2.7 ± 1.2	2.0	Ajaccio N.

B. TEs little monitored with *P. oceanica*

	x_{\max}/x_{\min}	$\sum(x_{\max}/x_i)/18 \pm \text{SD}$	TESVI	Site x_{\max}
Be	3.1	1.6 ± 0.6	1.0	Ajaccio N.
Al	7.5	2.2 ± 1.8	6.1	Ajaccio N.
V	14.5	5.9 ± 5.0	12.3	Antibes
Mn	2.2	1.6 ± 0.4	0.5	St Raphaël
Co	2.9	1.8 ± 0.5	0.7	St Raphaël
As	10.6	5.9 ± 2.7	4.9	P. des Chèvres
Se	1.7	1.3 ± 0.2	0.3	Calvi
Mo	22.8	13.6 ± 6.2	10.5	Aregno
Ag	3.1	1.9 ± 0.6	0.9	La Vesse
Sn (BAL)	6.9	3.5 ± 1.9	3.8	Corbière
Sb	4.4	3.6 ± 0.7	0.9	Bravone
Bi	13.6	6.1 ± 3.5	7.9	P. des Chèvres

TESVI values were listed in ascending order :

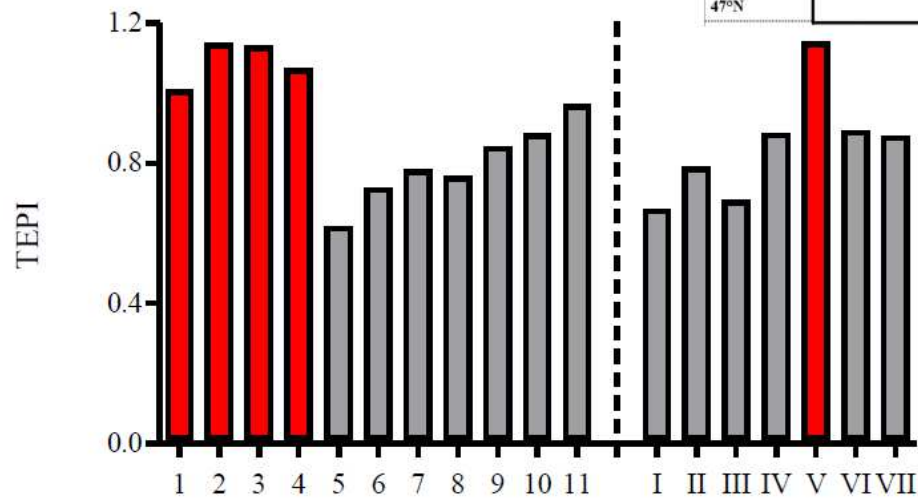
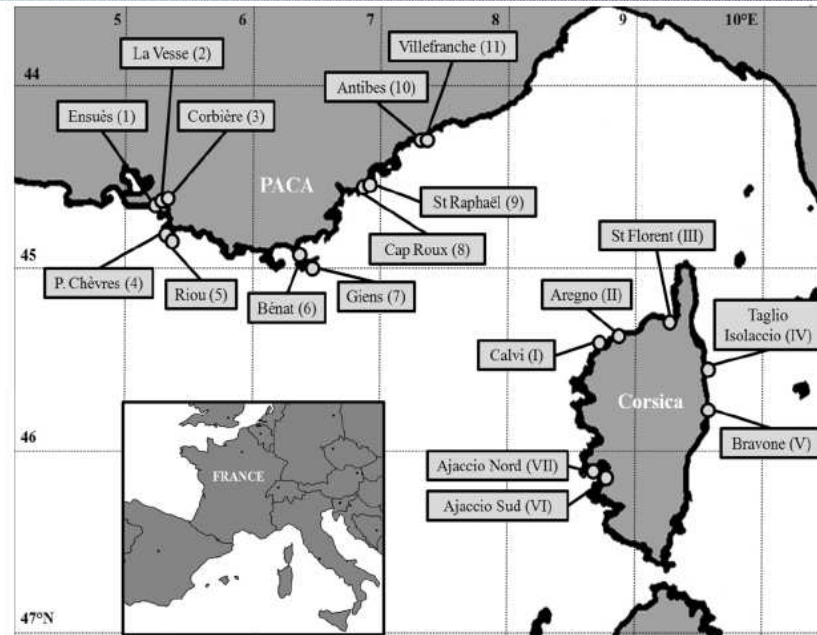
Se, **Ni**, Mn, Co, Sb, Ag, Be, Cu, Cd, Fe, **Pb**, Cr, Sn, As, **Al**, Zn, Bi, Mo, **V**

Indices spécifiques aux pollutions

TEPI: Trace Element Pollution Index

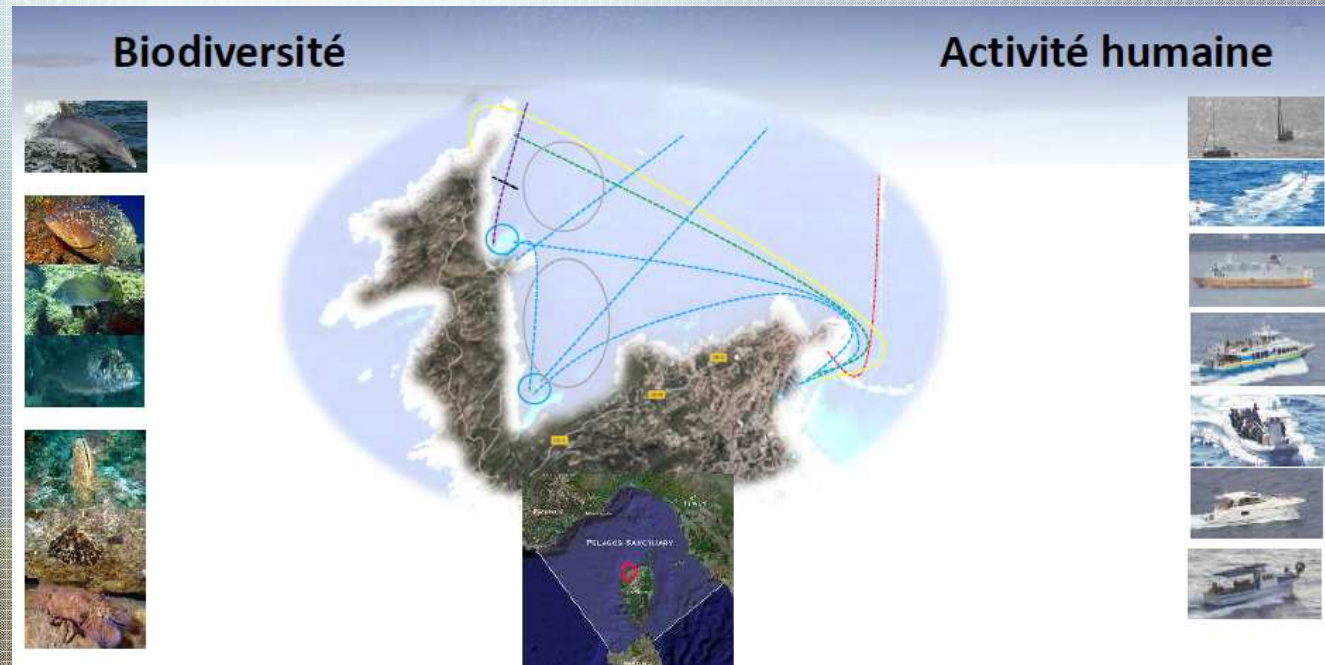


P. oceanica

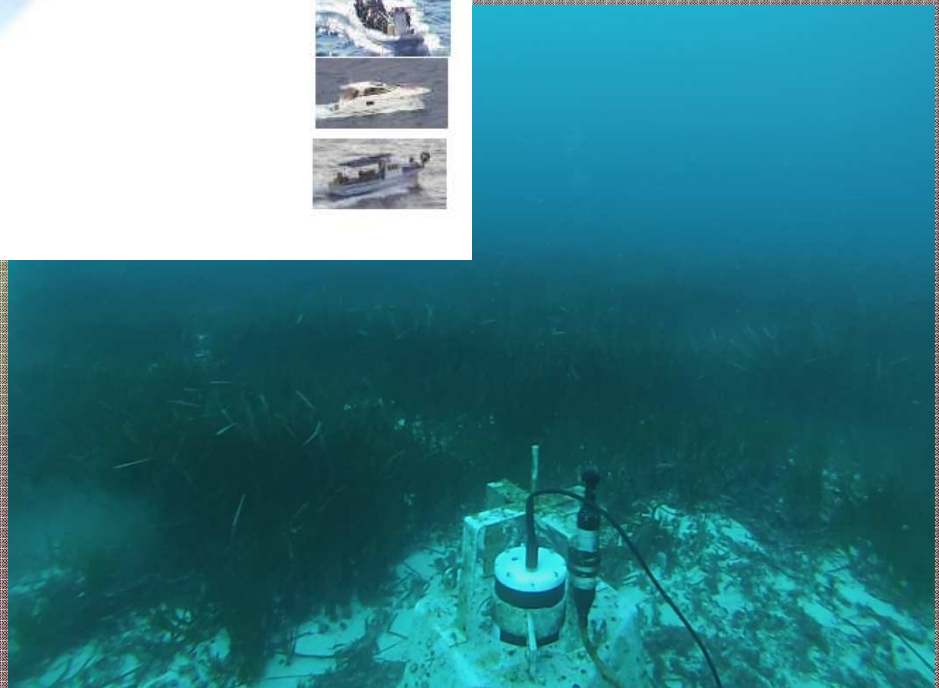


Nouveaux Indices

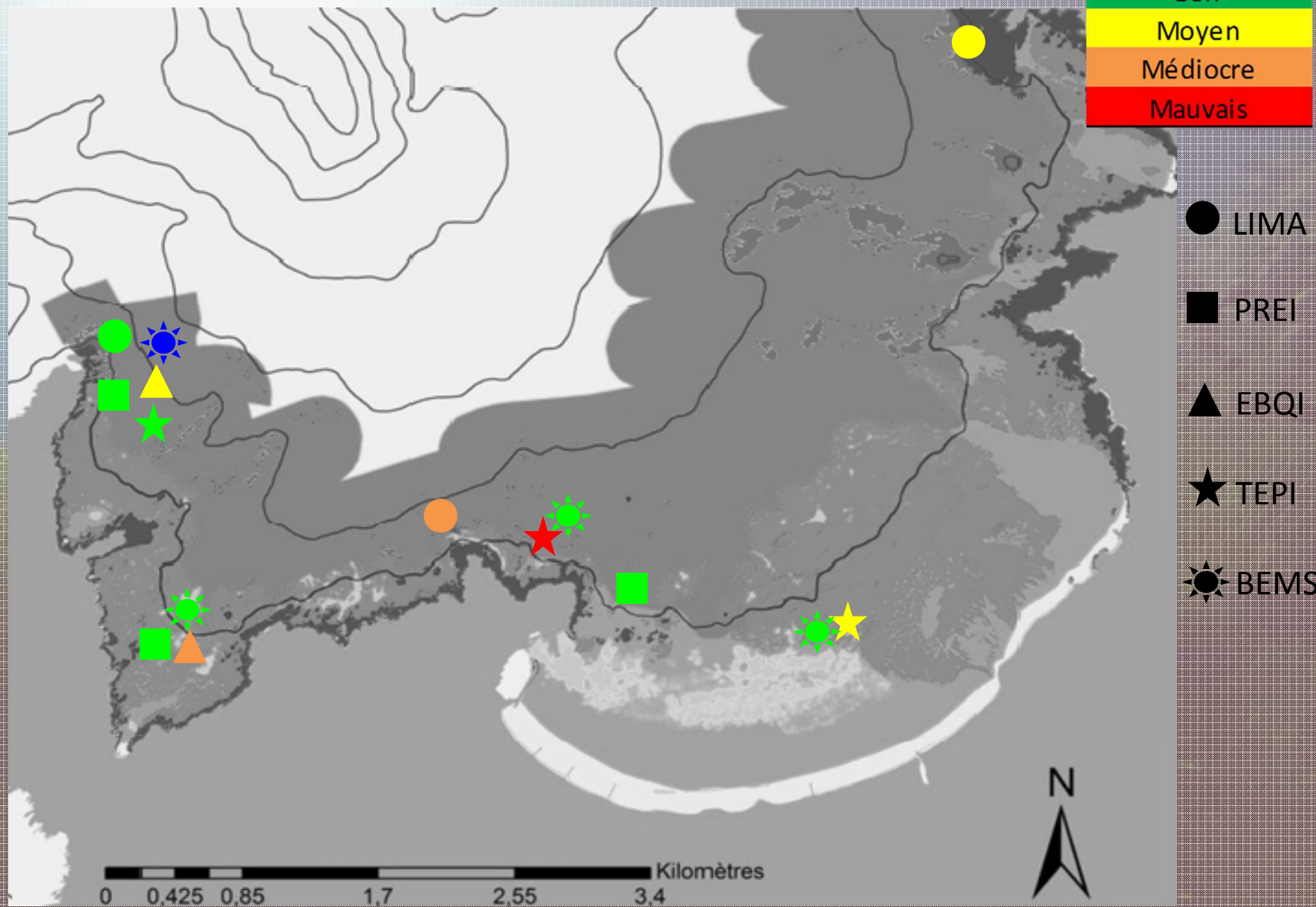
Paysage acoustique

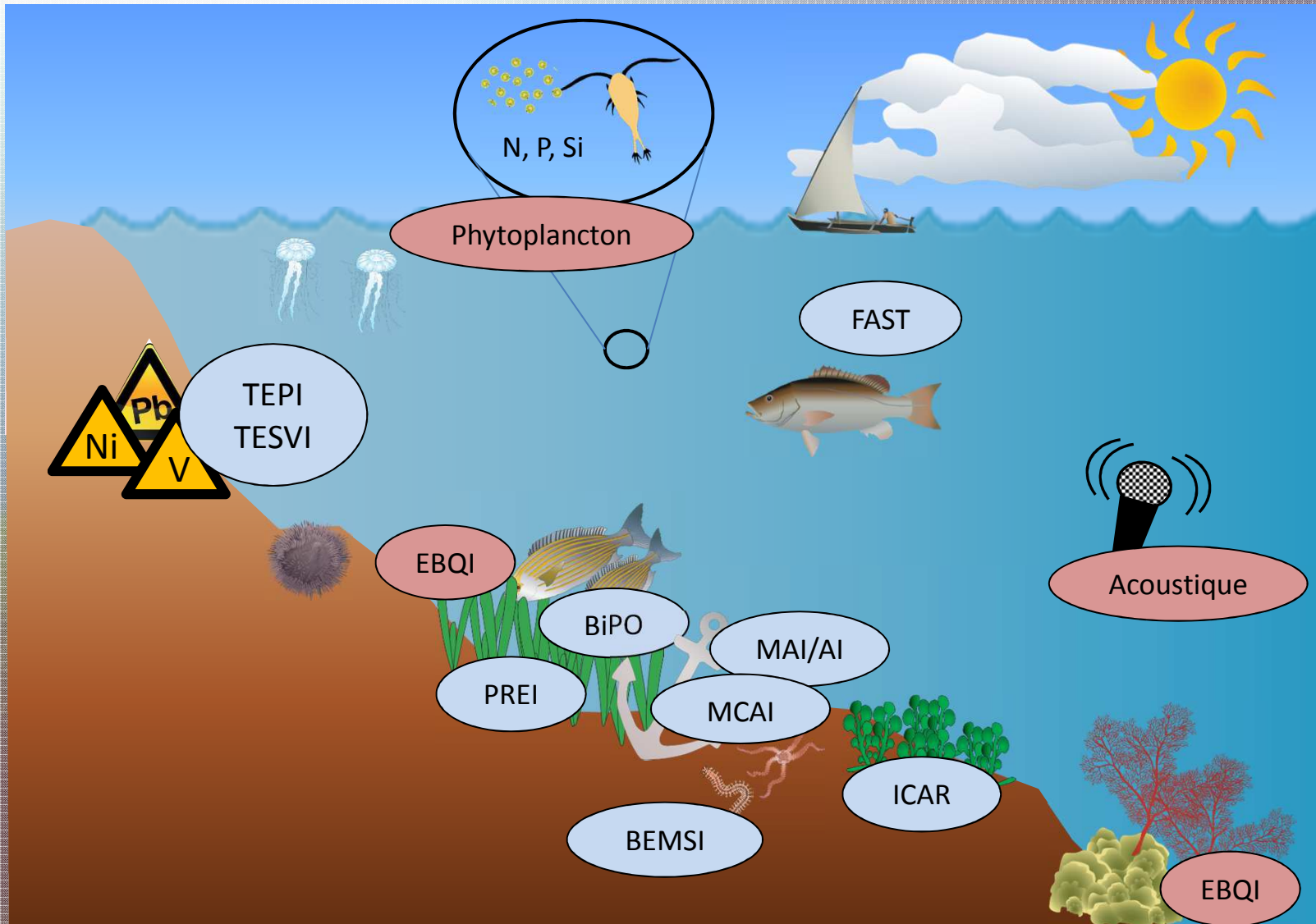


www.chorusacoustics.com



Conclusion







Merci pour votre attention