

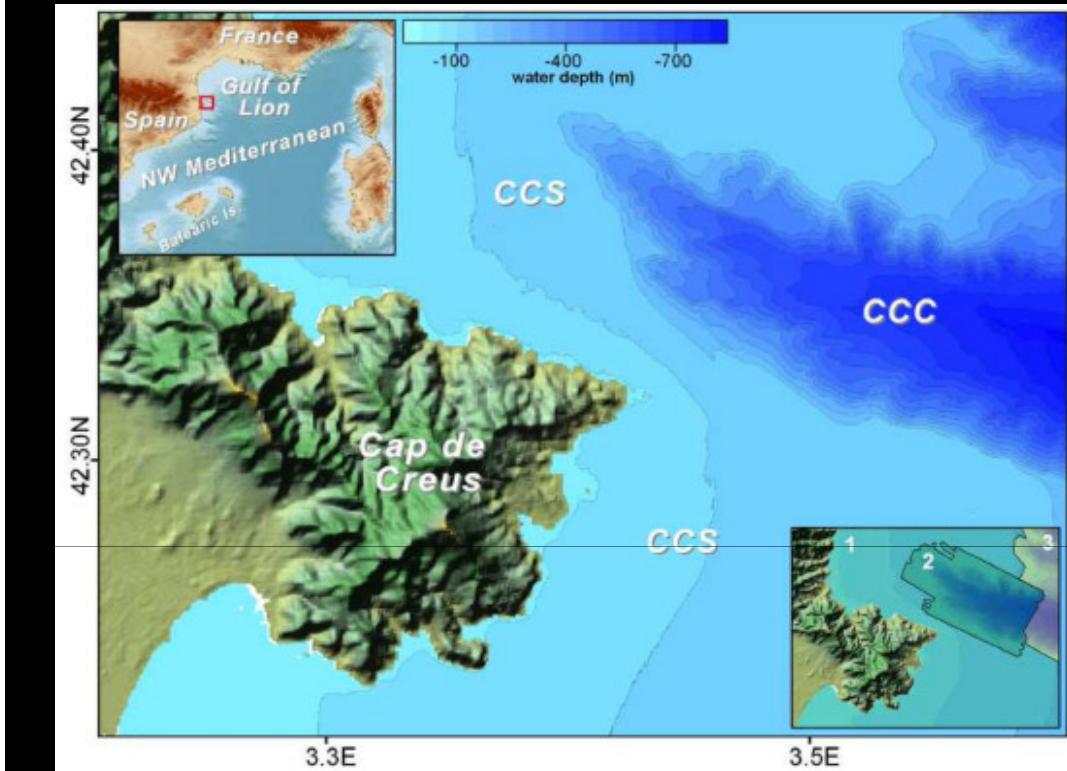


Cold-water coral ecology in the Cap de Creus submarine canyon (Northwestern Mediterranean): 7 years of multidisciplinary research

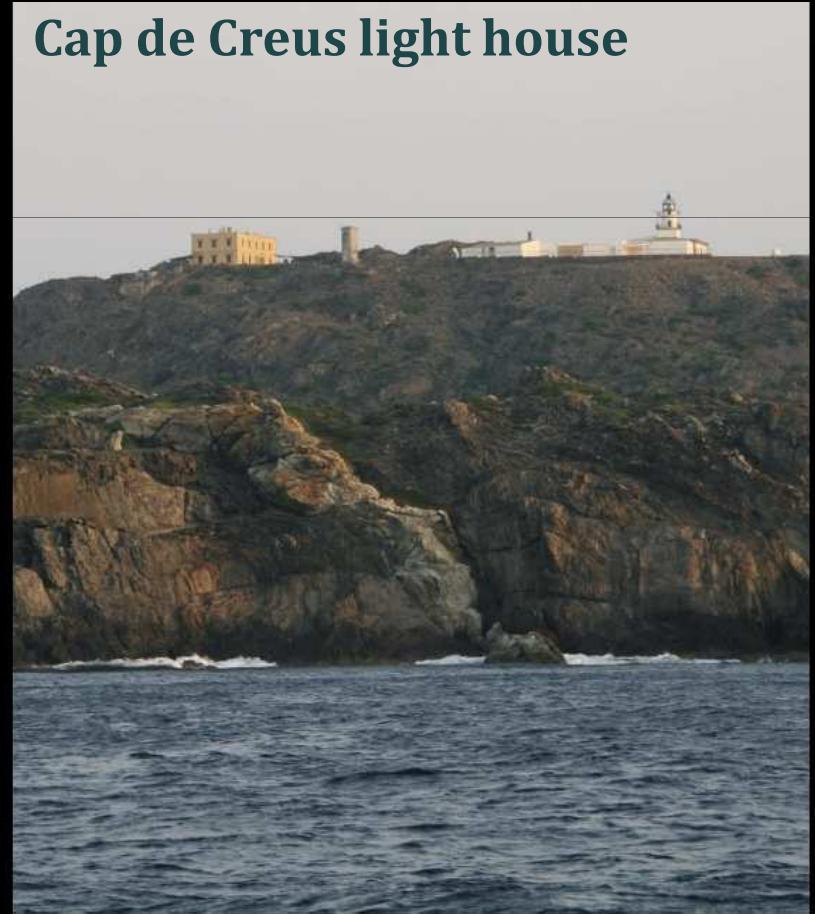
C Orejas, A Gori, C Ferrier-Pagès, C Lo Iacono, P Puig, MS Naumann,
J Movilla, G Tsounis, S Reynaud, A Olariaga, T Madurell & JM Gili



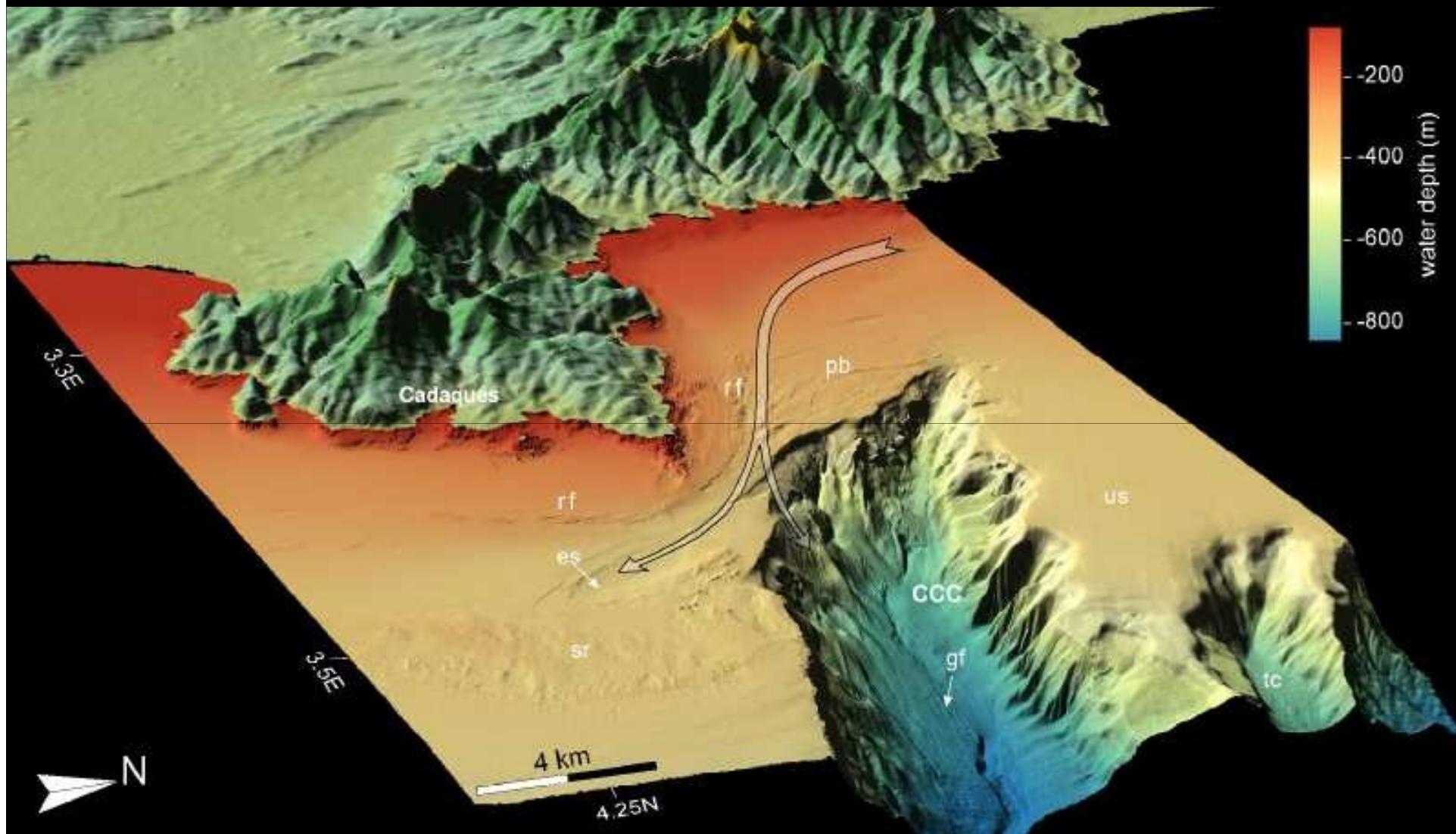
The Cap de Creus: the eastern most point of the Iberian peninsula



Cap de Creus light house



The Cap de Creus: from the shallow to the deep

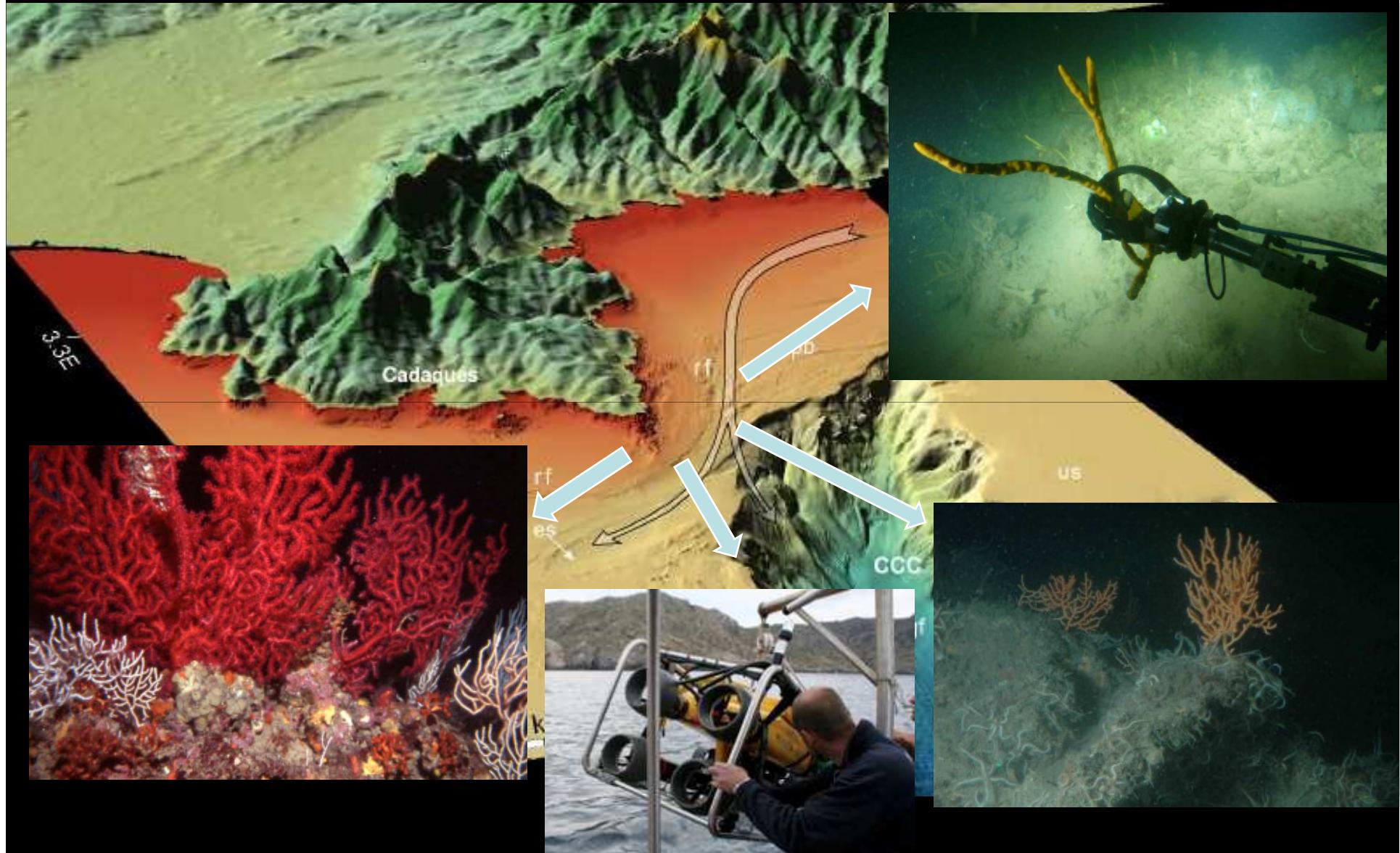


The Cap de Creus: from the shallow to the deep



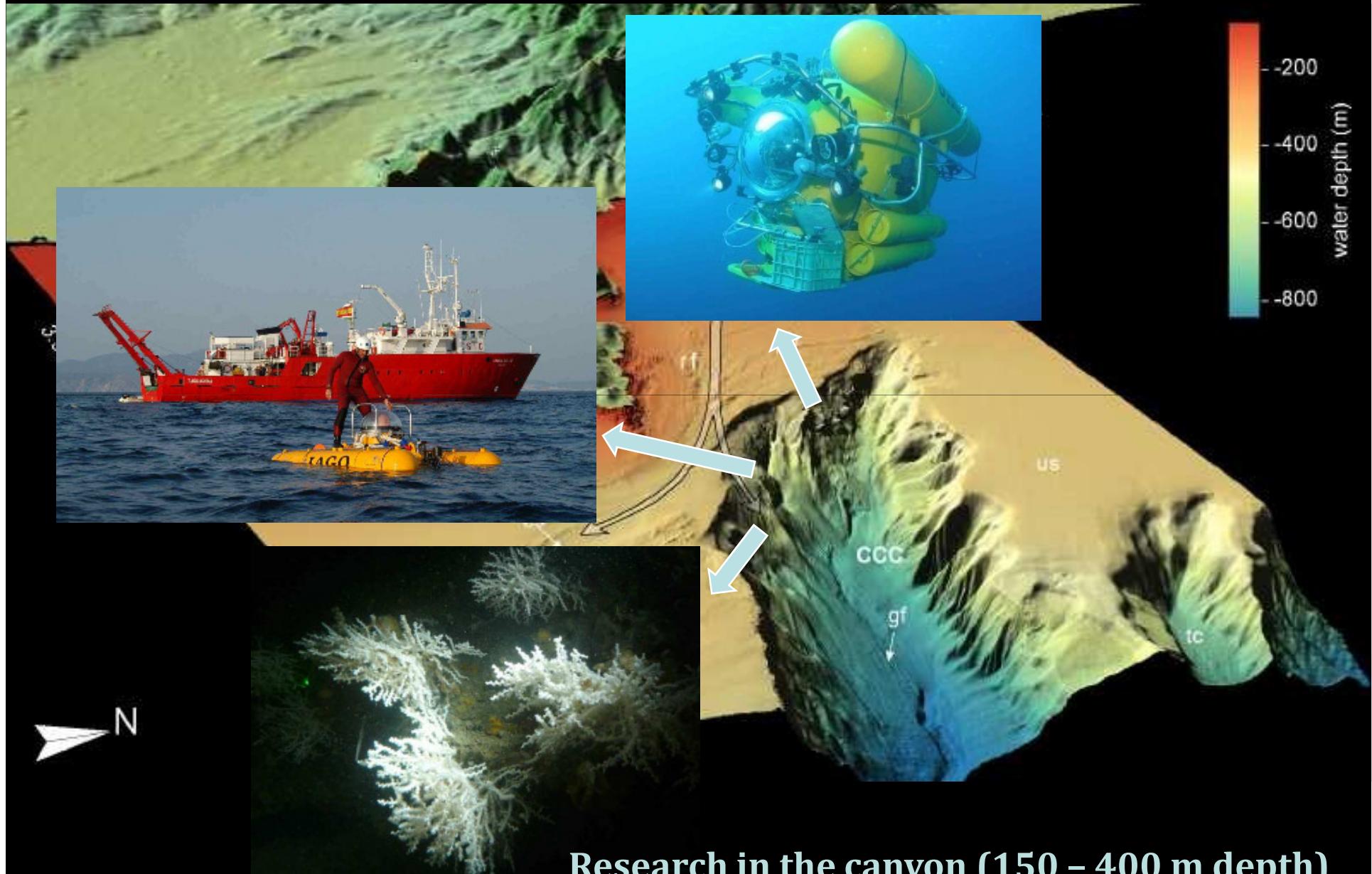
Research in shallow waters (0 - 40 m depth)

The Cap de Creus: from the shallow to the deep



Research at intermediate depths (40 – 150 m depth)

The Cap de Creus: from the shallow to the deep



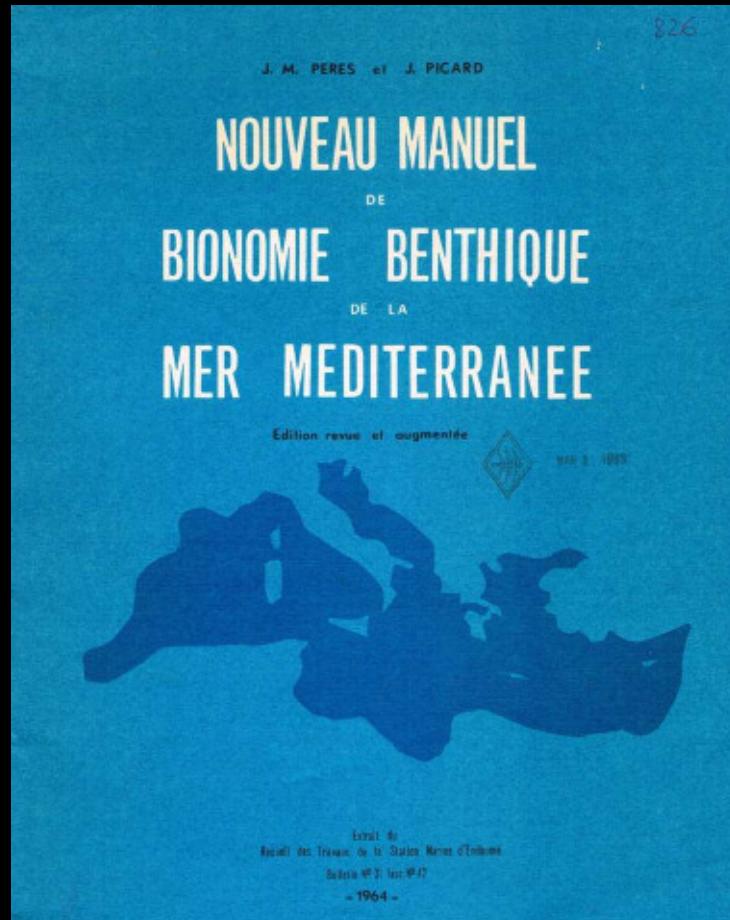
We have not been the first ones ...



Jacques Piccard
(1922-2008)

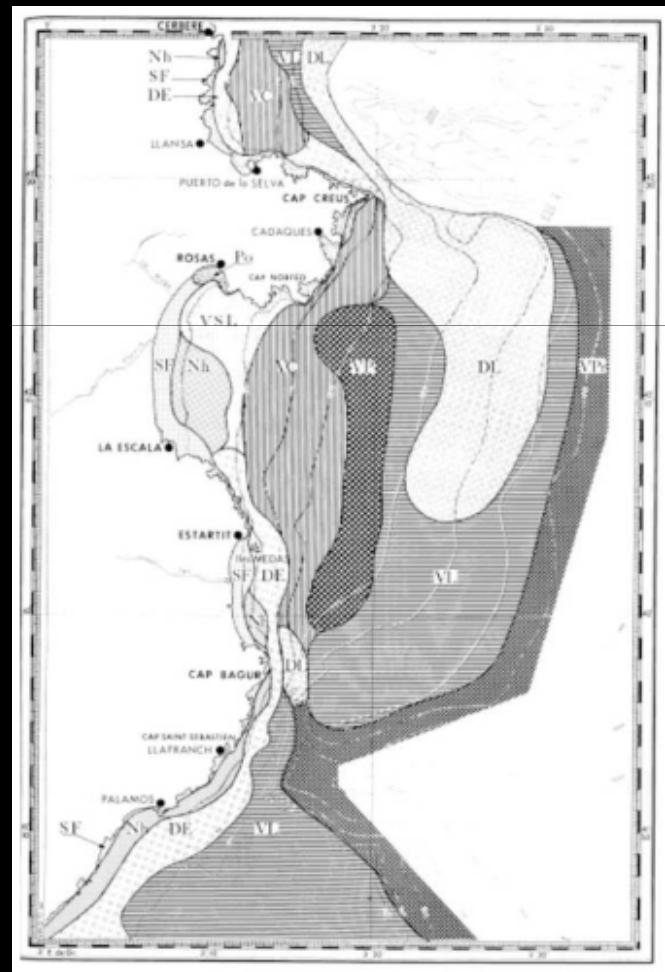


Jean Marie
Pérès
(1915 - 1988)



We have not been the first ones ...

Bionomie benthique du plateau continental de la côte catalane espagnole



Desbruyères et al. 1972-73

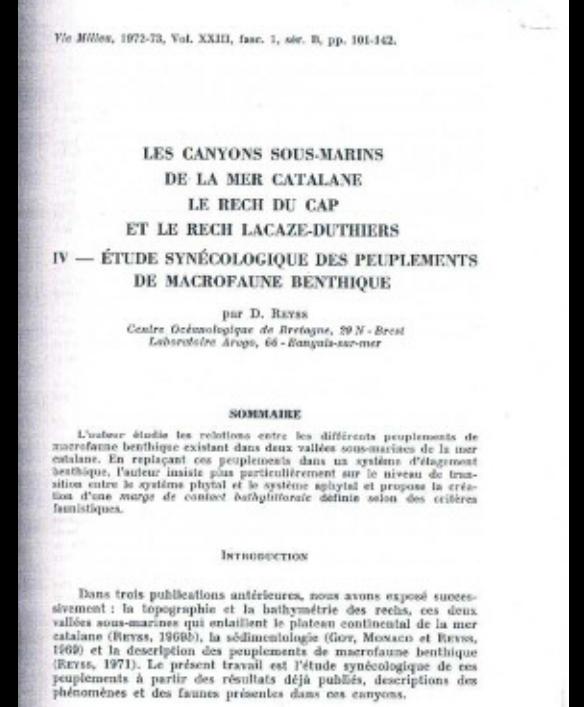


Daniel
Desbruyères

Daniel
Reyss

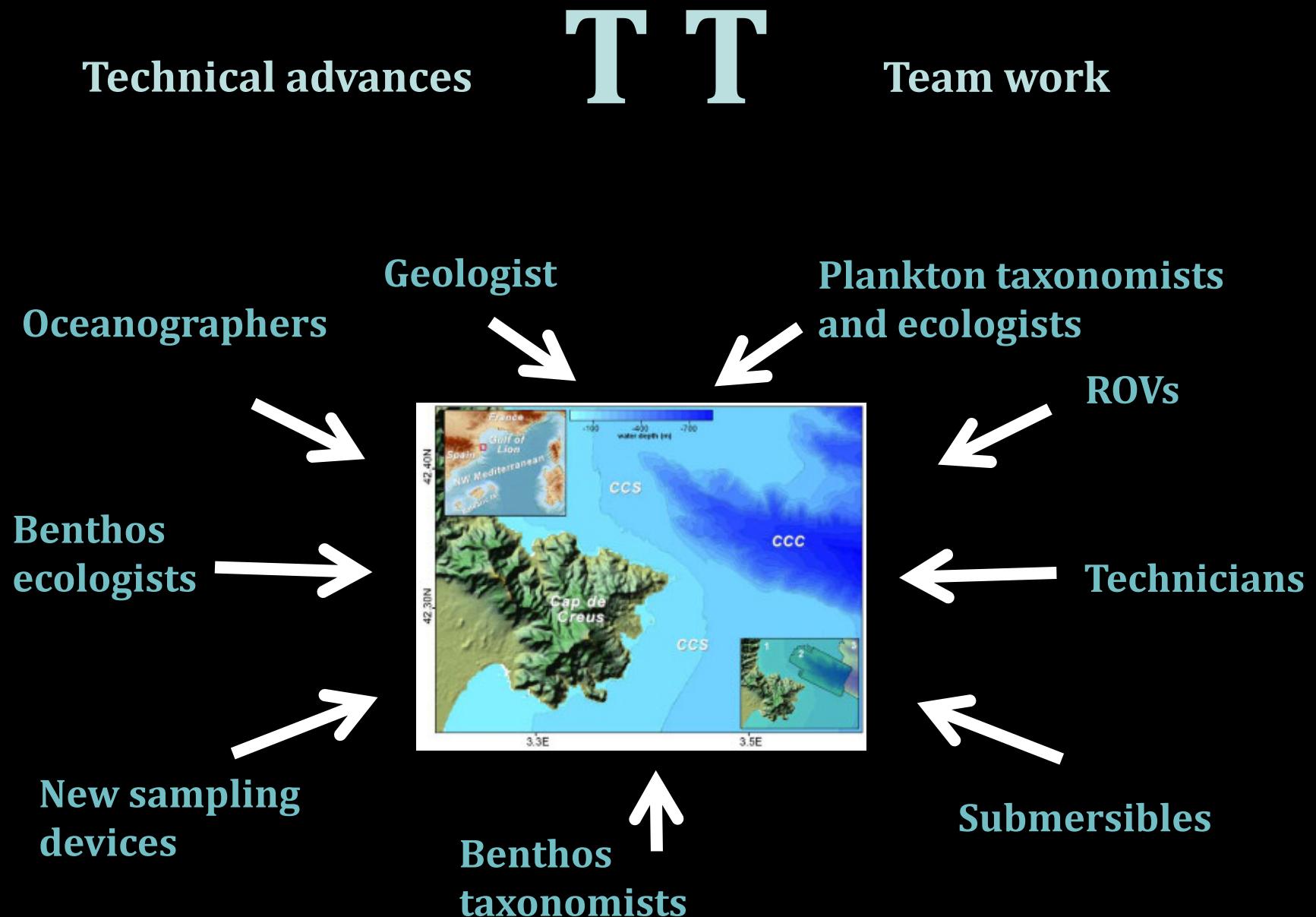


Reyss 1972-73

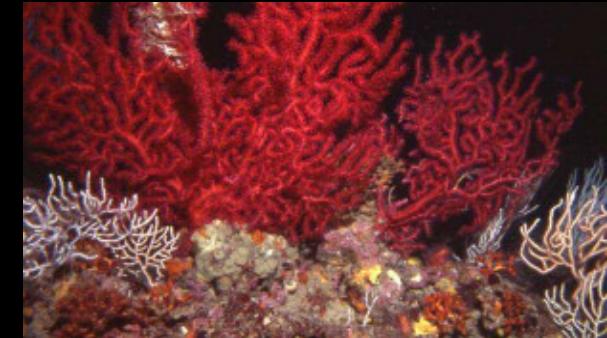


Les cayons sous-marins de la mer catalane. Le rech du Cap et le rech Lacaze-Duthiers

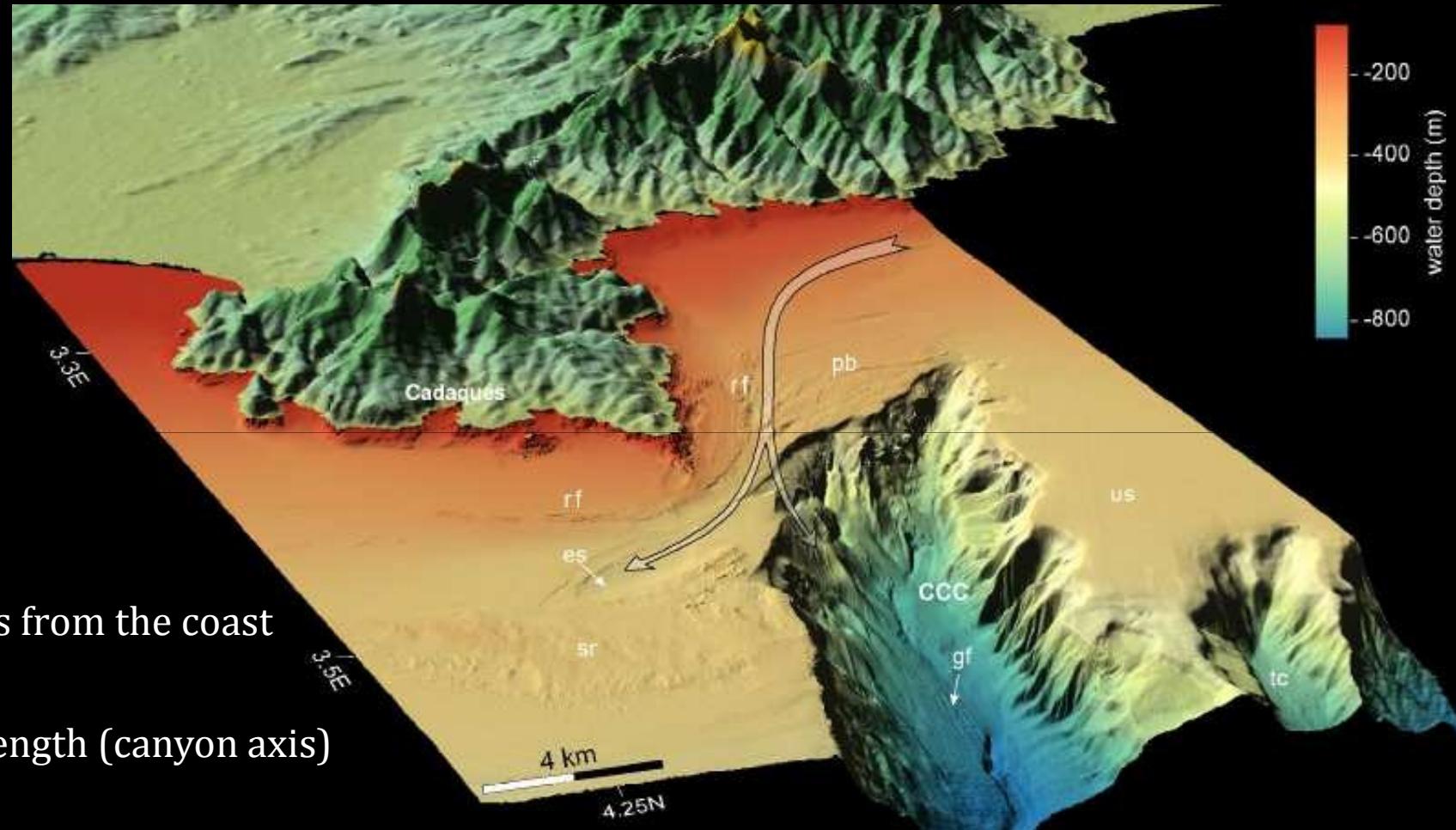
Our 7 years research in the Cap de Creus canyon



First observations of Cold-Water corals in the shelf edge



The Cap de creus submarine canyon : main current direction and features



Max Depth: 2150 m

Oceanography

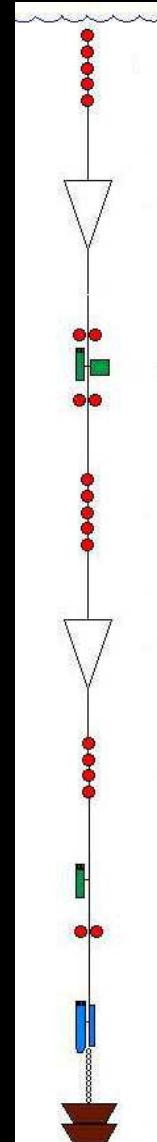
Mooring deployment in Cap de Creus canyon



Sediment traps

Temperature

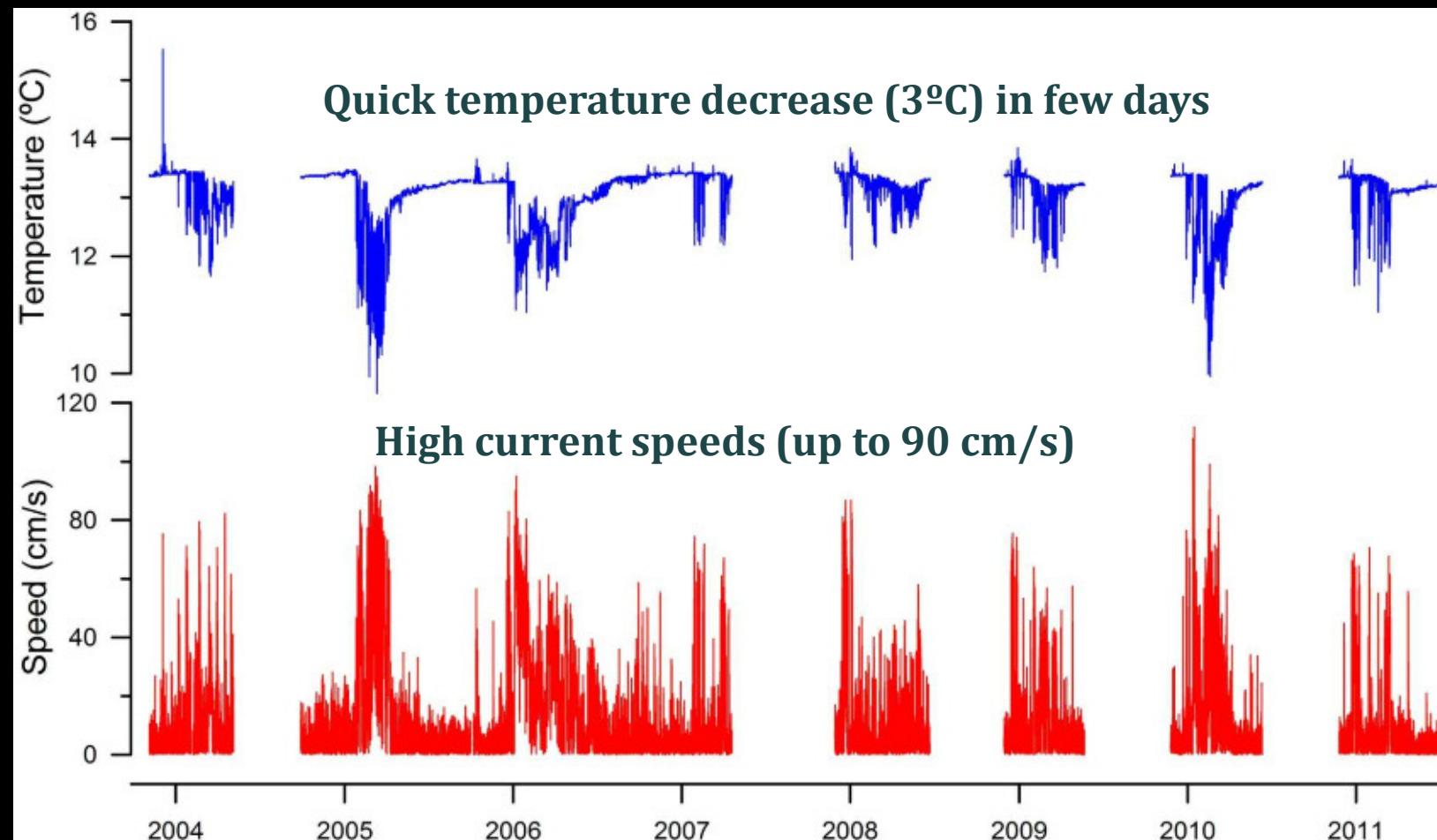
Current meters



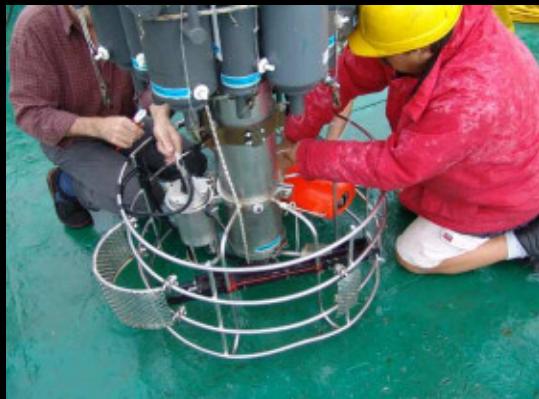
EuroSTRATAFORM, HERMES, HERMIONE

Palanques et al. 2006 I Canals et al. 2006 I Puig et al. 2008 I Ribó et al. 2011

Cascading episodes in Cap de Creus canyon registered from 2004 to 2011

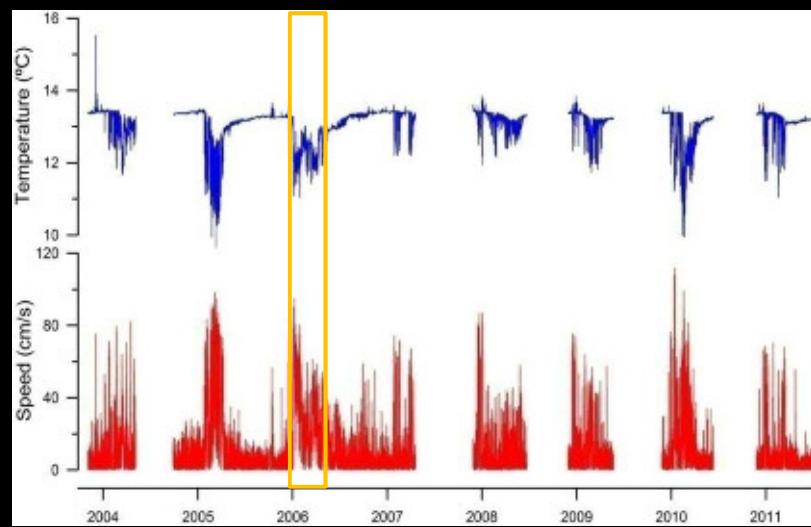


Water column analyses

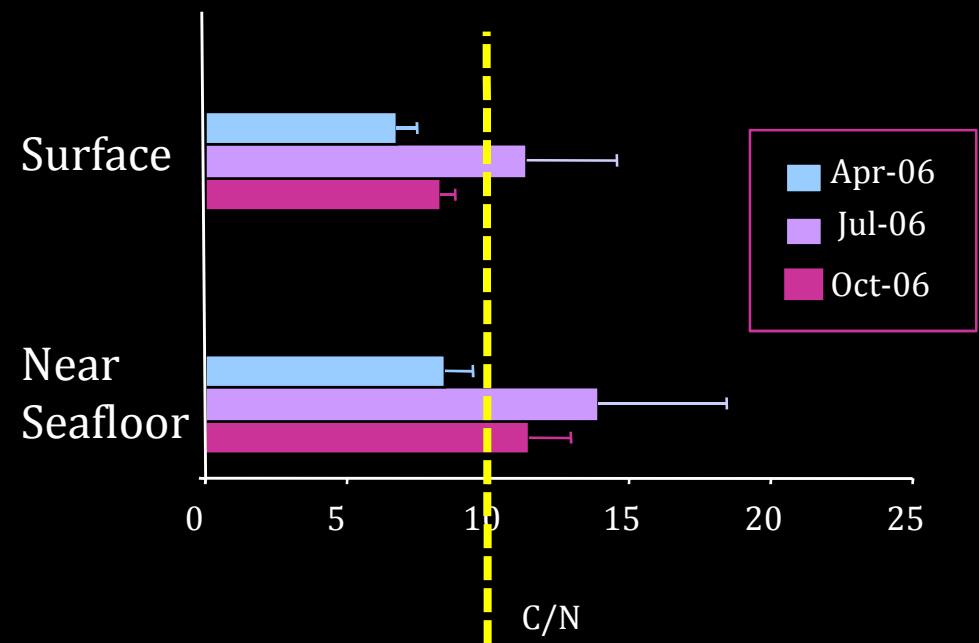


Water column characterization:
nutrients, POC, PON,
temperature, salinity,
Chla ...

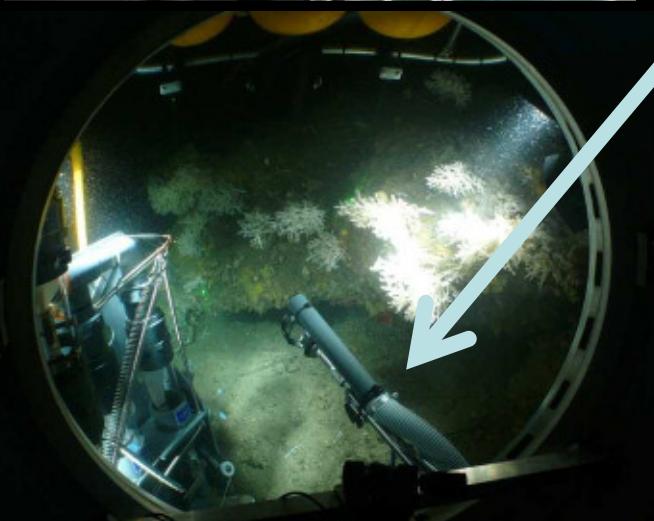
C/N ratio as indicative of
the “quality” of the suspended
matter



C/N <10 → “Fresh material”

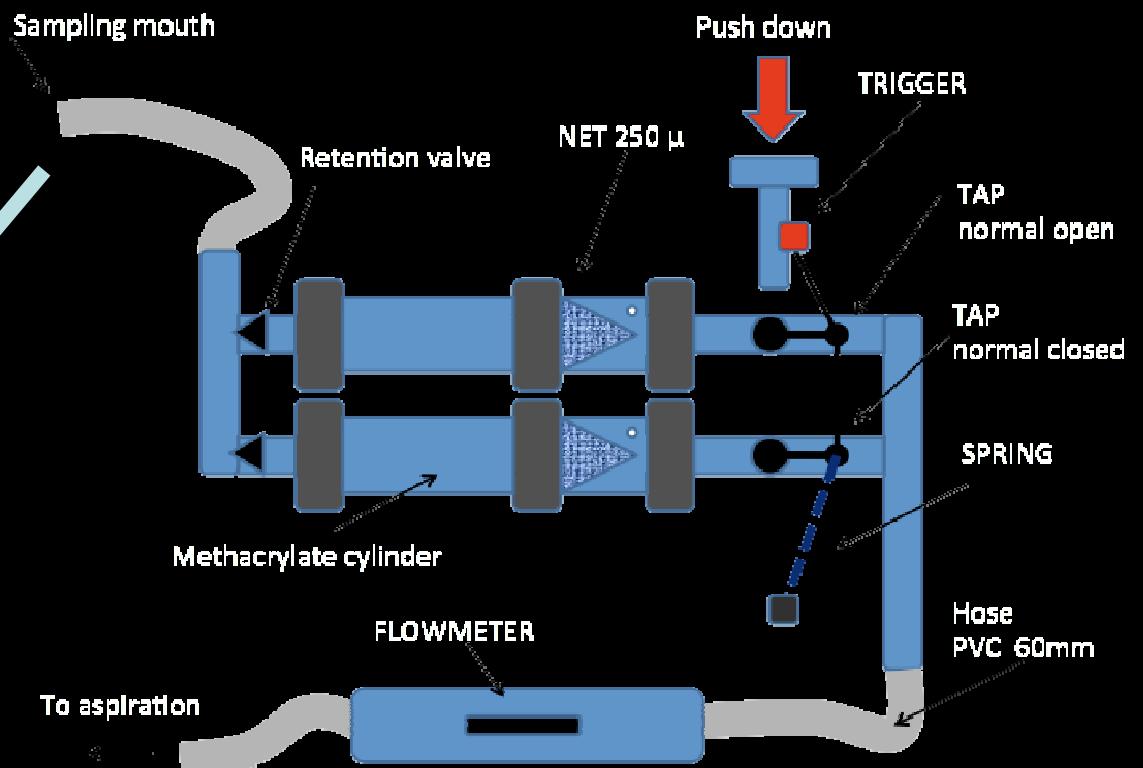


Plankton community near the sea floor



Plankton near the sea floor,
community composition

Submarine Associated Multi Filtration Pump (SAMFP)



Video surveys (ROVs and JAGO)



Benthic communities:
occurrence, composition,
abundances...

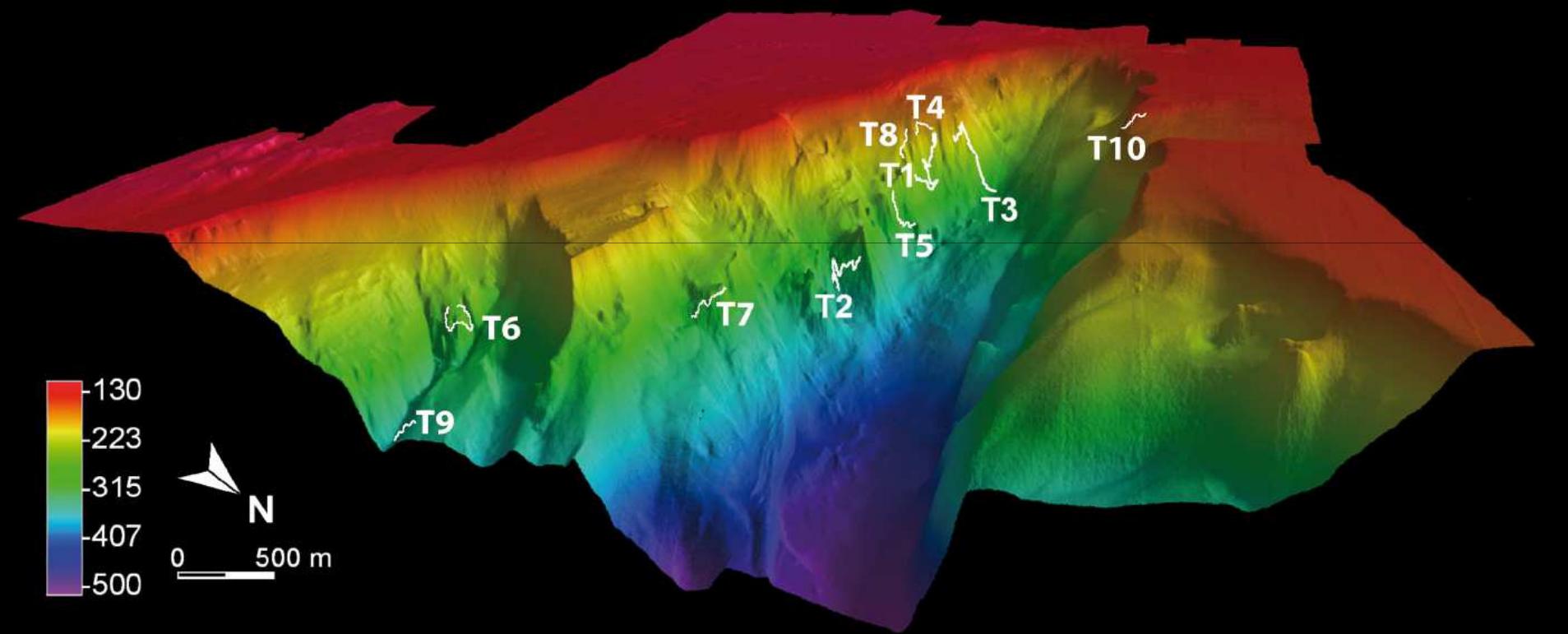
Focus on Cold-Water coral
communities

...the never ending possibilities of underwater video images



Coral occurrence, distribution and abundance

HERMES, DEEP CORAL (2005 - 2007)



Coral occurrence, distribution and abundance

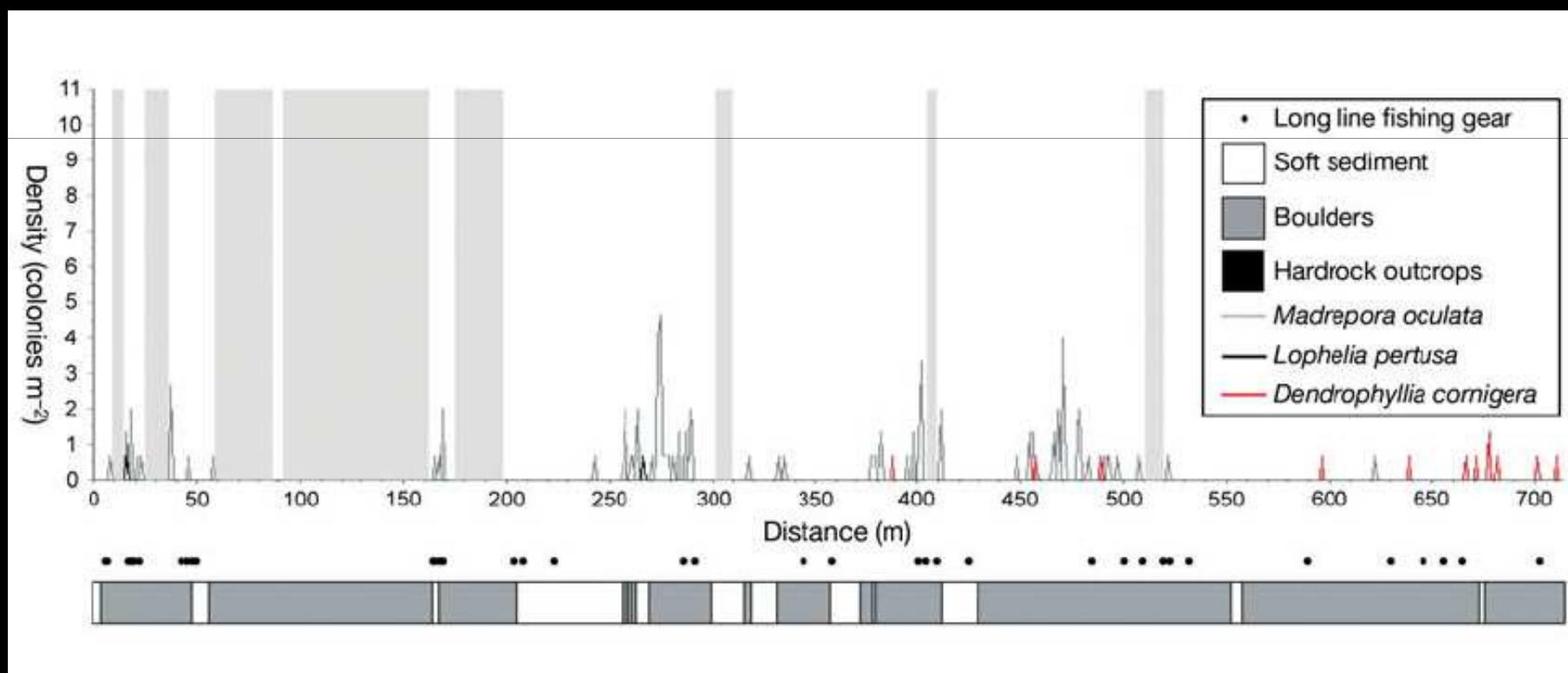
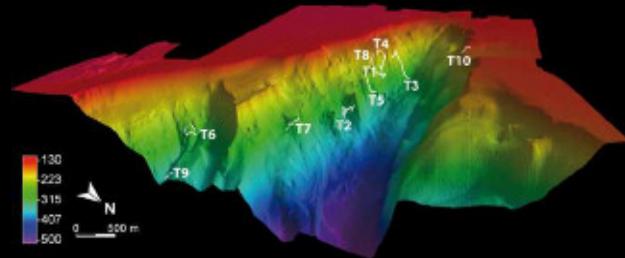
HERMES, DEEP CORAL (2005 - 2007)

Where?

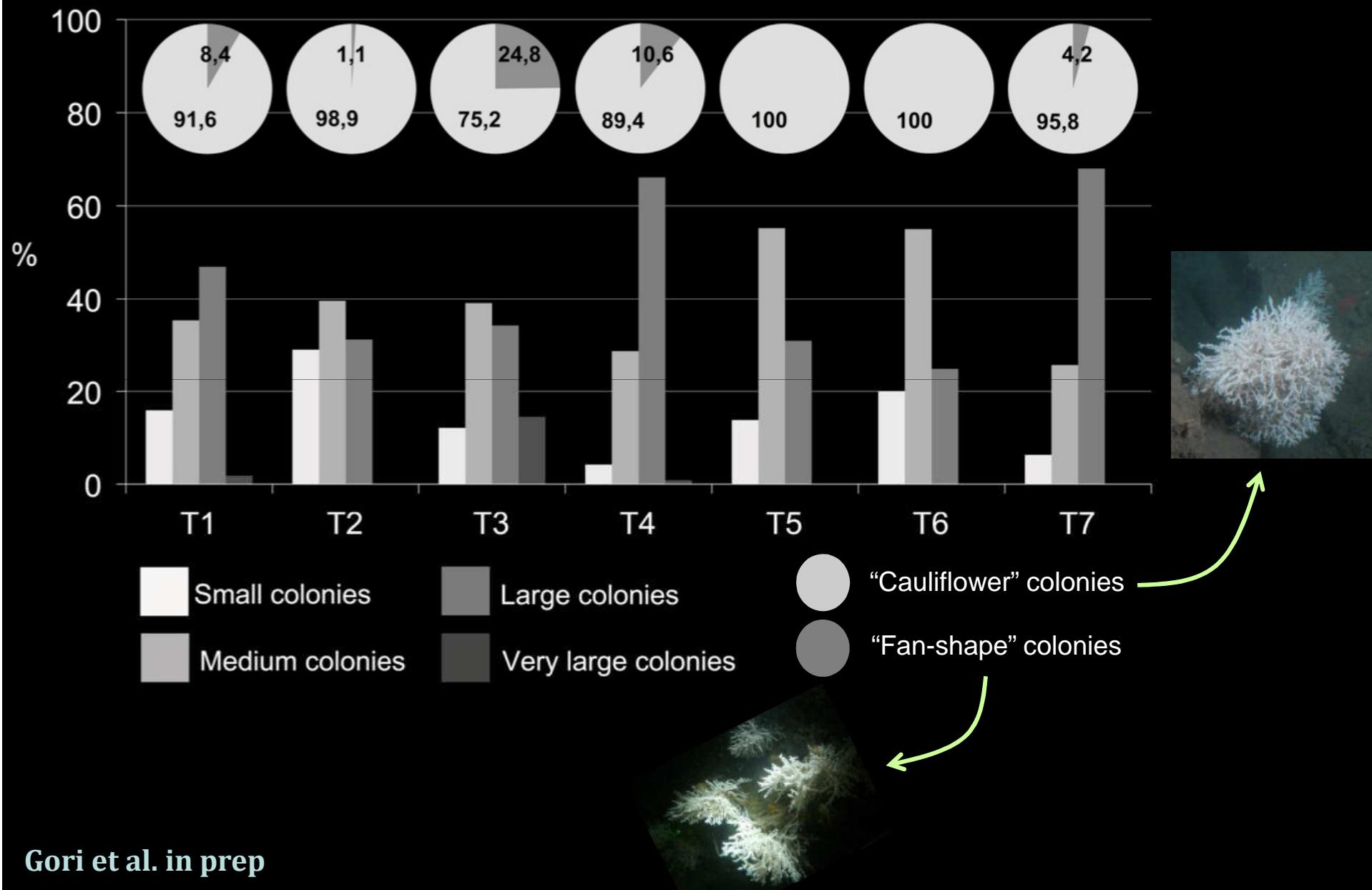
How many?

Distribution pattern?

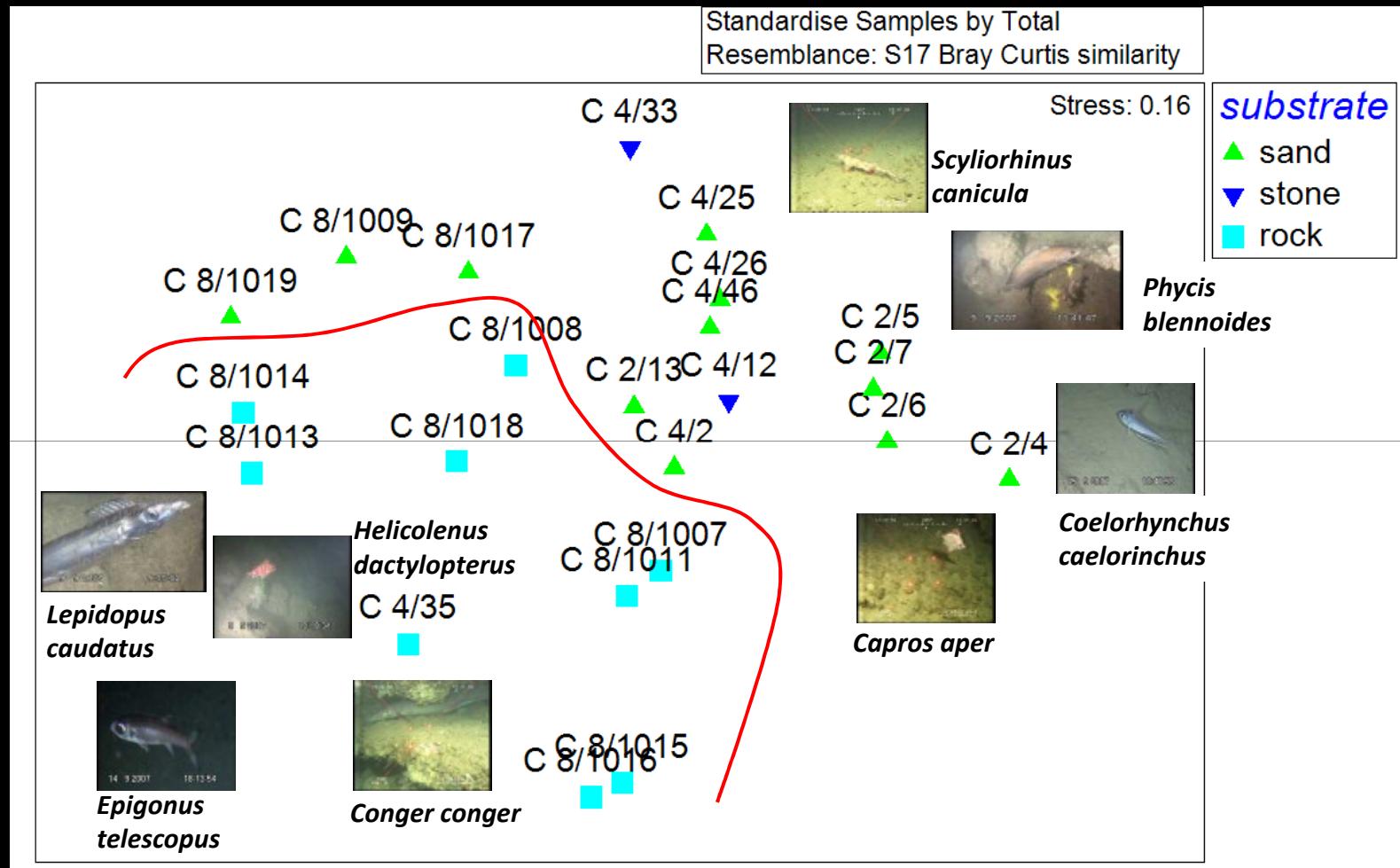
Substrate?



Coral size structure and morphology

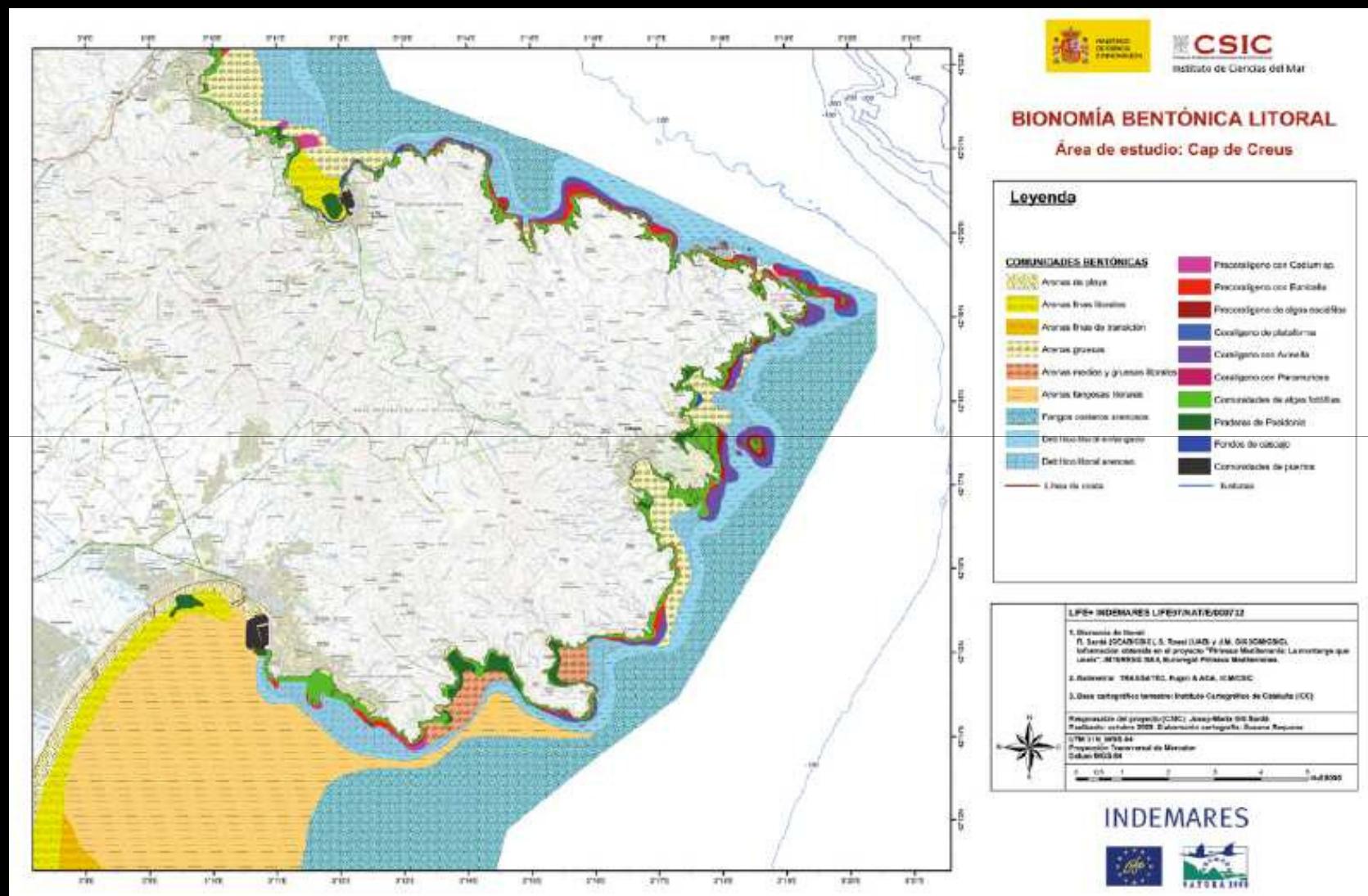


Fish community associated to CWCs



Different fish community in rocky and sandy substrates in the canyon

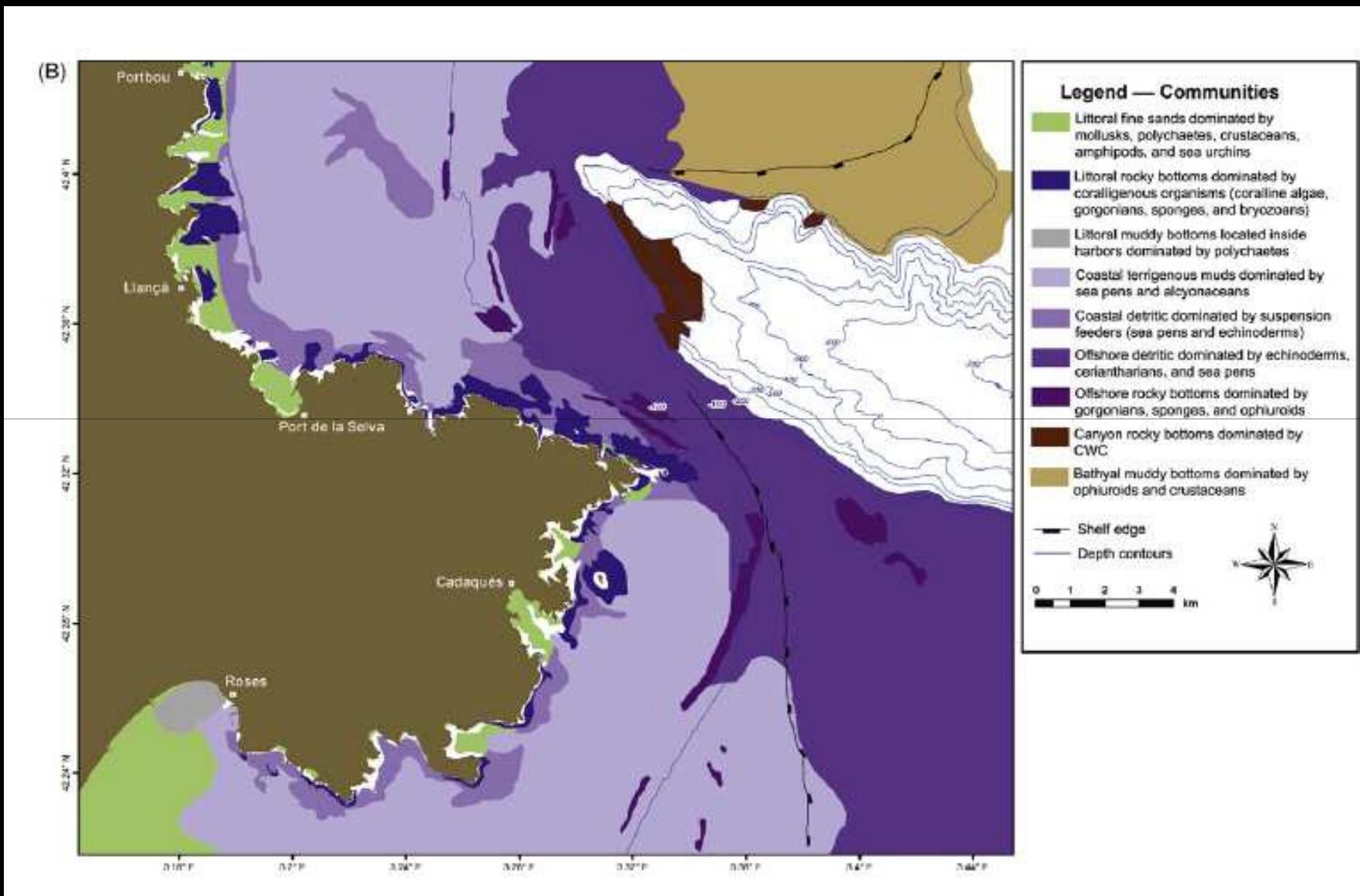
Habitat mapping (shallow benthic habitats)



Litoral benthic bionomie for the 0-60 m zone in Cap de Creus

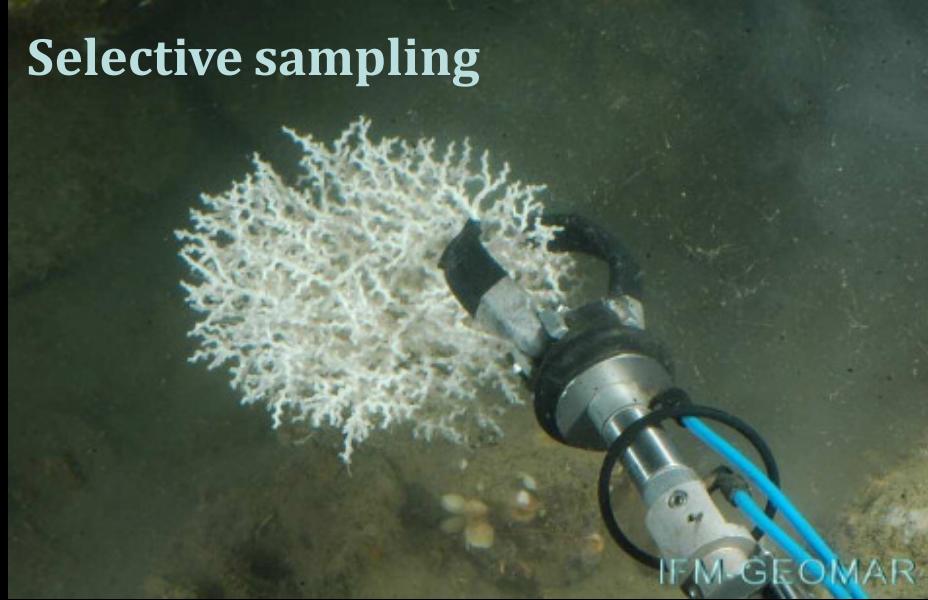
Sardá et al. 2012

Habitat mapping (continental shelf)



Cold-Water Coral sampling and maintenance

Selective sampling



Lophelia pertusa, Madrepora oculata, Dendrophyllia cornigera and Desmophyllum dianthus in aquaria since 2006!

Olarriaga et al. 2009



Cold-Water Coral ecophysiology

HERMES, DEEP CORAL , HERMIONE (2005 - 2012)

*Madrepora
oculata*



*Lophelia
pertusa*

*Desmophyllum
dianthus*



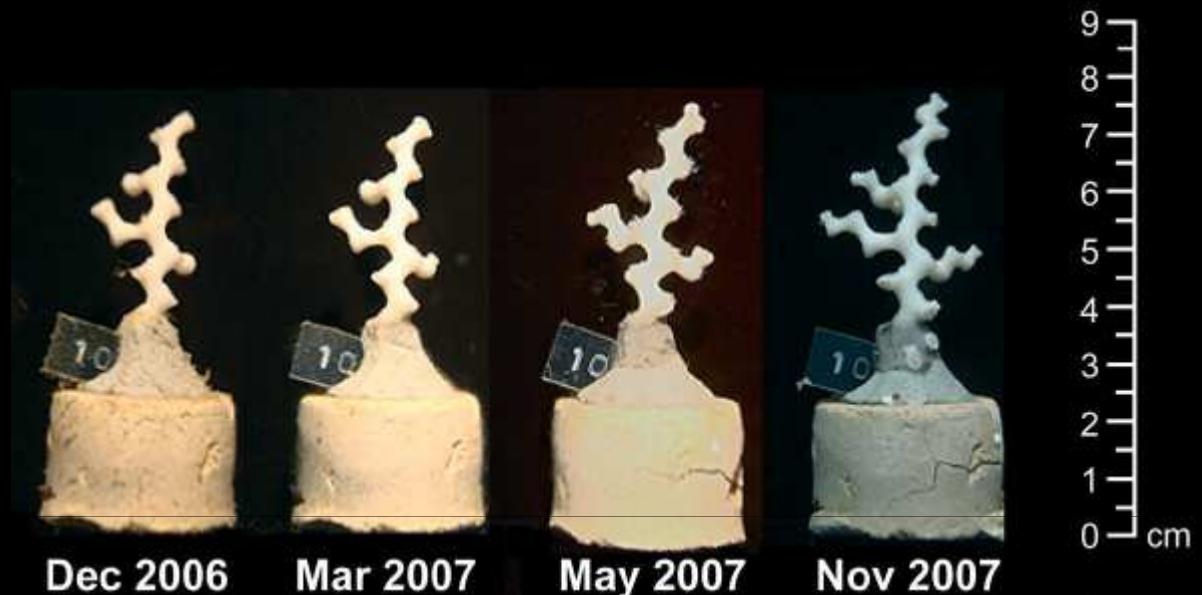
*Dendrophyllia
cornigera*

Cold-Water Coral ecophysiology

(growth)

M. oculata (n= 17)

$0.014 \pm 0.007 \text{ mm d}^{-1}$



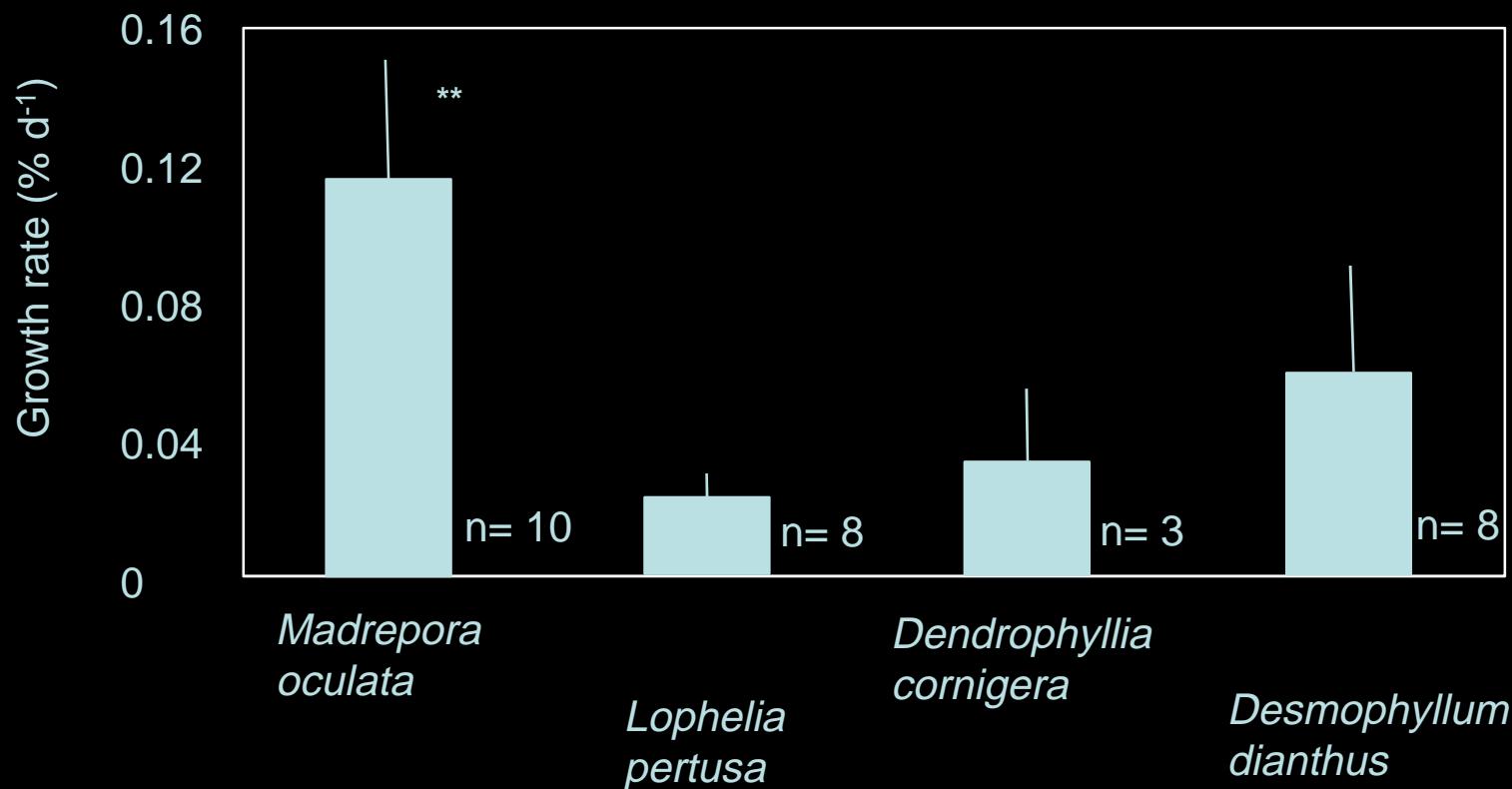
L. pertusa (n=10)

$0.024 \pm 0.018 \text{ mm d}^{-1}$



Cold-Water Coral ecophysiology

(growth)

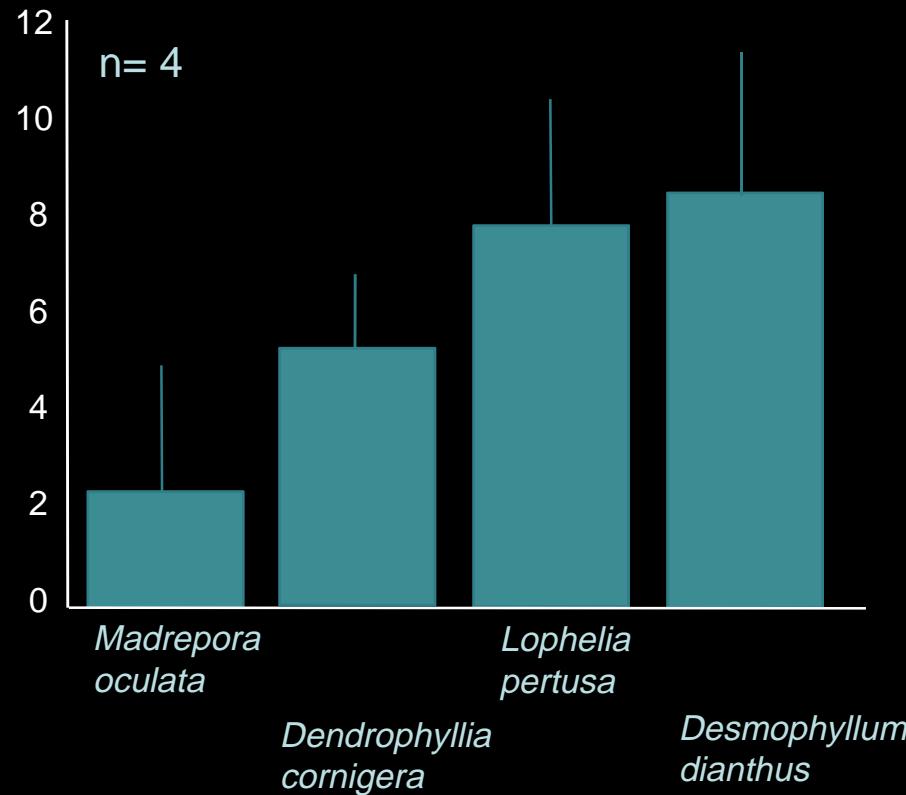


***M. oculata* growth rate significantly higher than for the other 3 CWC species.**

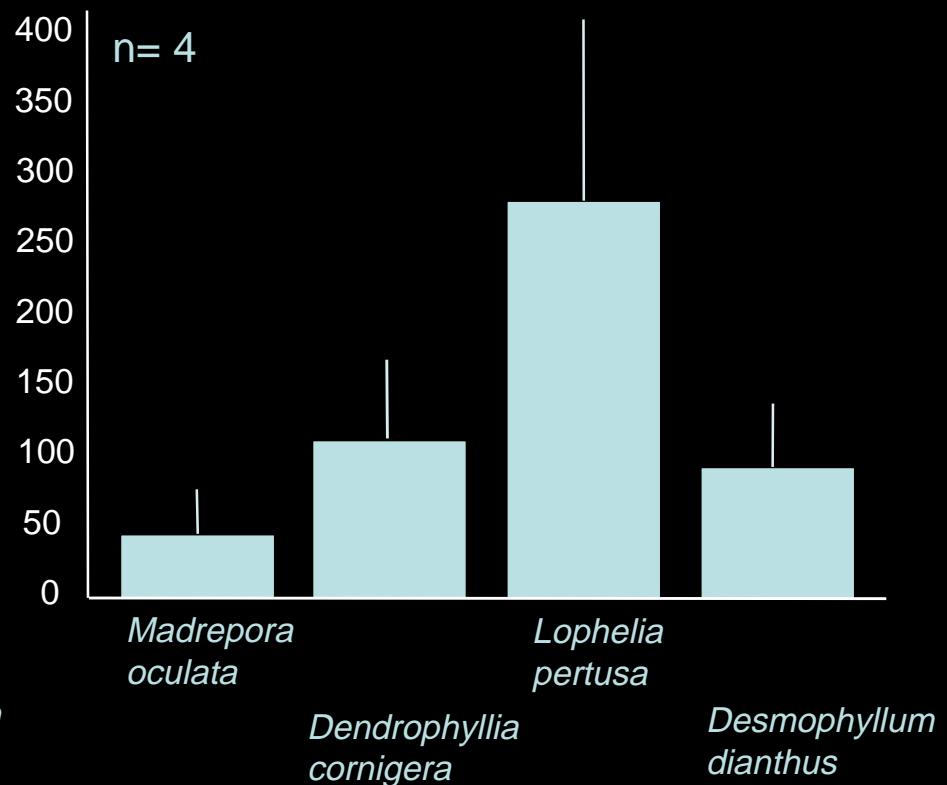
Cold-Water Coral ecophysiology

(feeding)

Nº Artemia polyp $^{-1}$ h $^{-1}$

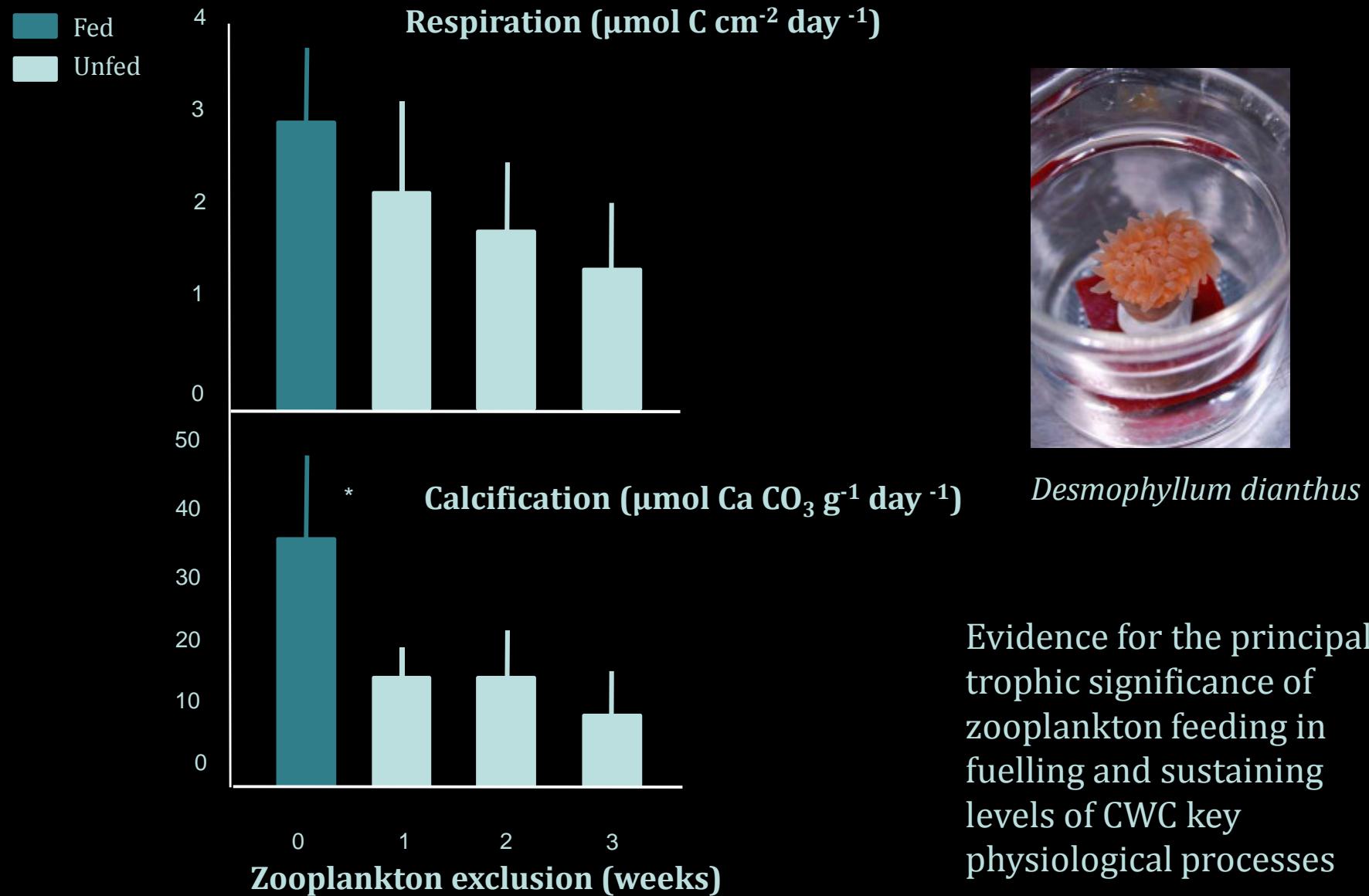


Nº Artemia nauplii polyp $^{-1}$ h $^{-1}$

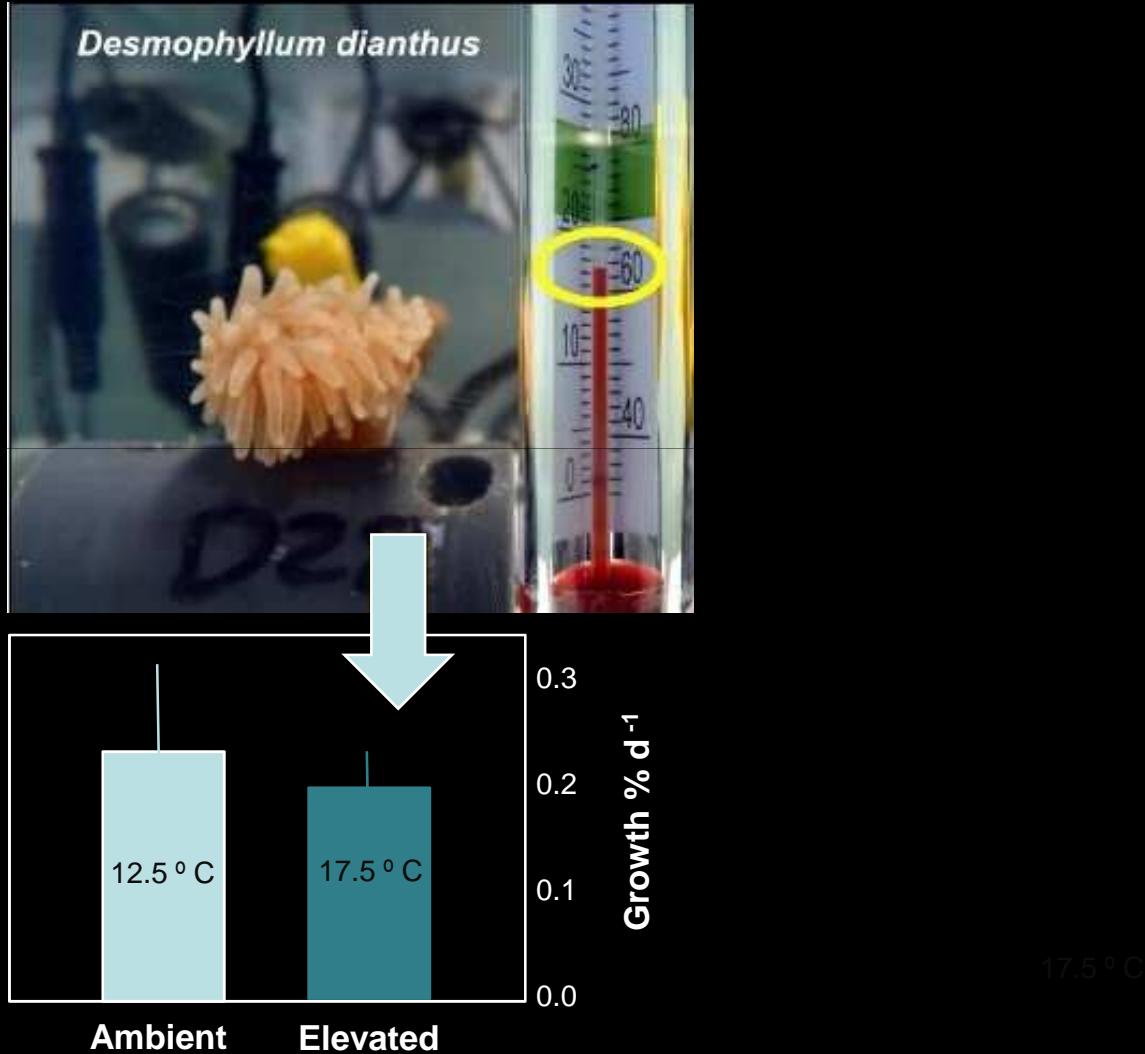


Different capture rates for different prey size among the four species

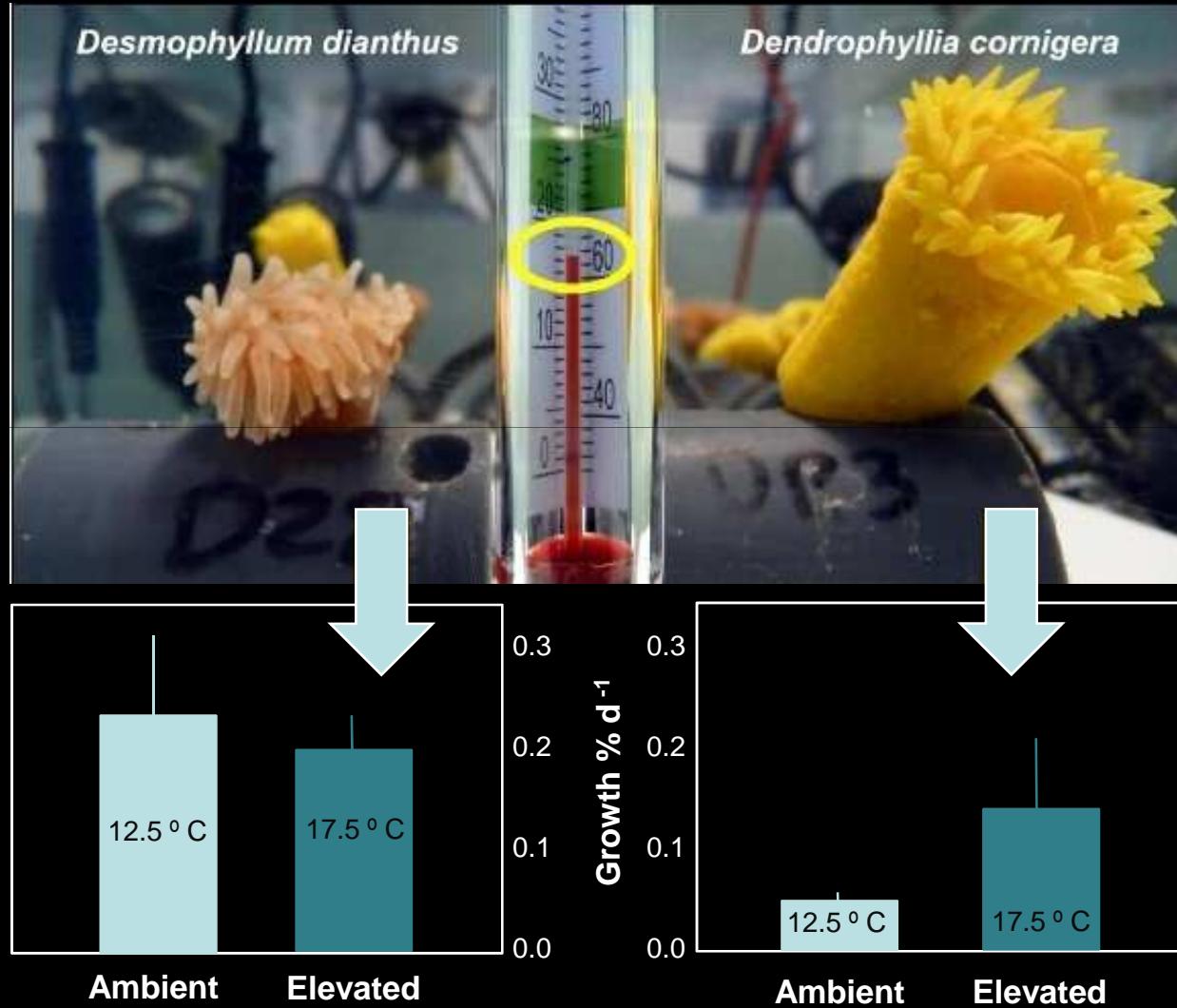
Cold-Water Coral ecophysiology (feeding)

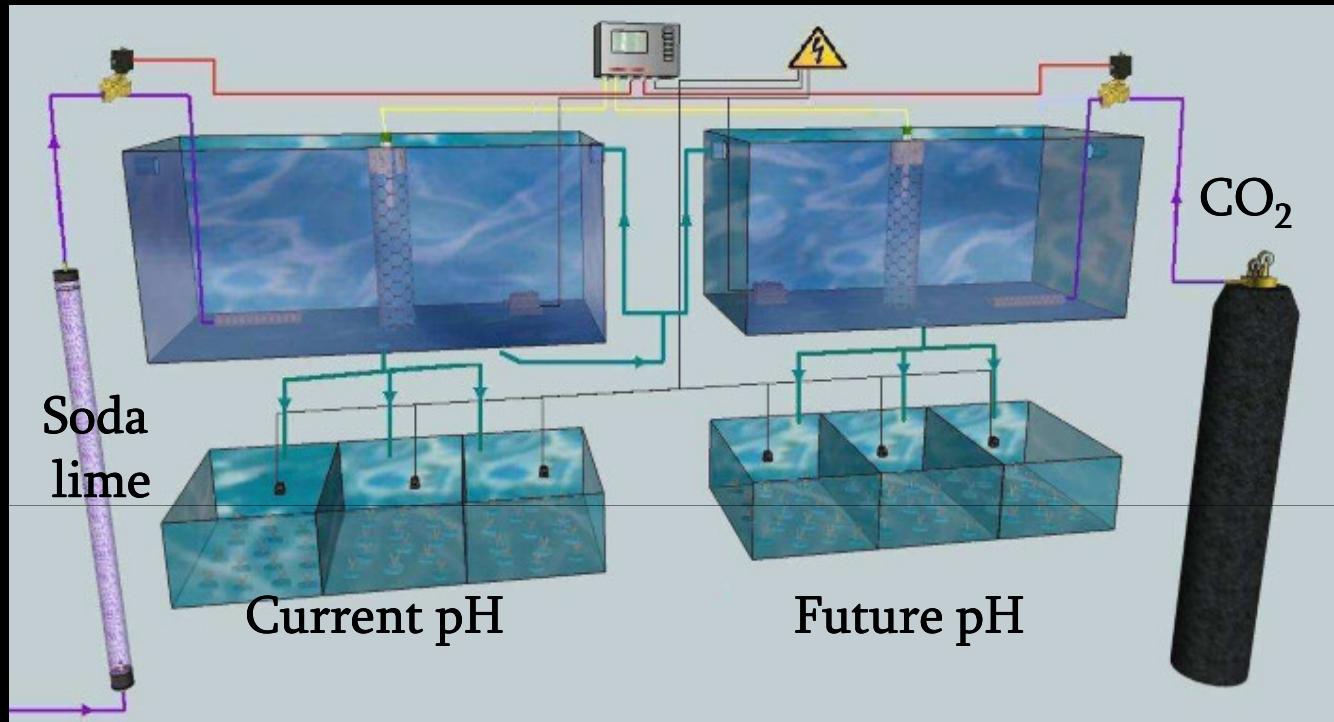


Cold-Water Coral ecophysiology (response to environmental conditions)



Cold-Water Coral ecophysiology (response to environmental conditions)





Experimental set-up

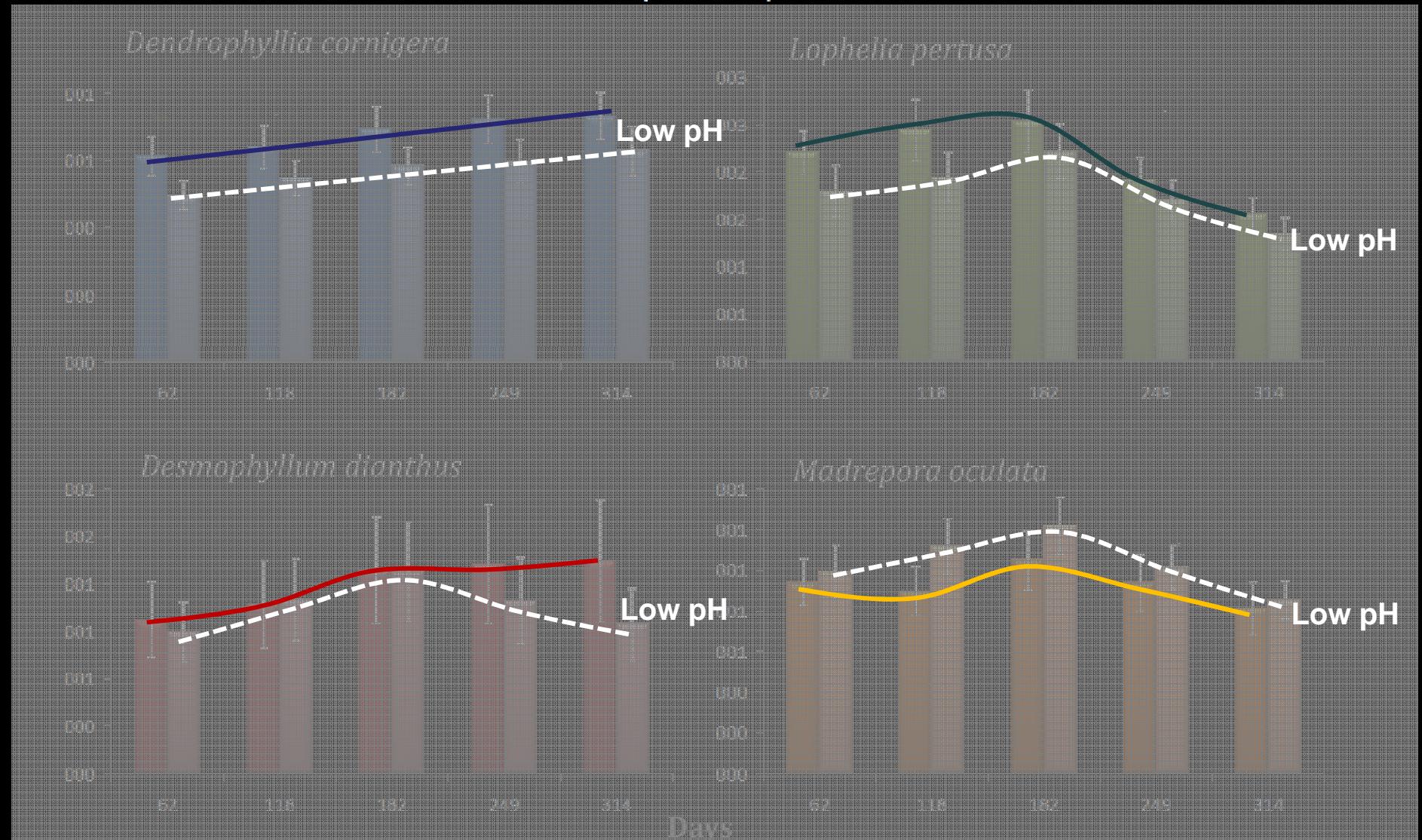
- Aquaria control (current pH = 8.12)
- Aquaria treatment (future pH scenario = 7.84)
- Temperature: 12° C / No Light / Same feeding

Cold-Water Coral ecophysiology

(effects of acidification)

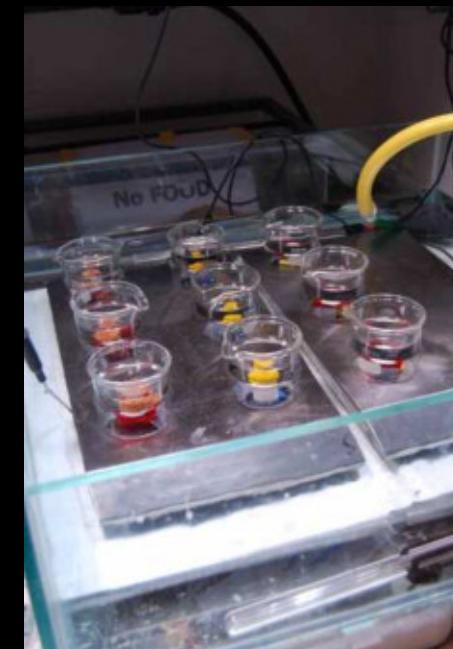
Calcification rates (mg CaCO₃ / g day)

(Mean ± SE)



Whats going on ...

- Ecophysiological responses of CWC to different seawater temperatures (Andrea Gori et al.)



- Development of a geospatial analysis for predictive mapping (Claudio Lo Iacono et al.)

This work has been and is being possible thanks to a **great** and very large **team!**



Ale



Jürgen, Karen
& JAGO



Andrea



Àngel



Jordi



Lorenzo



Teresa



Malik



Eva



Carles



Juancho



Christine



Cécile



Cova & Josep Maria



Many students



Claudio



Pere



Pablo



Arturo & all UTM
guys



García del Cid cap,
officers and crew

ETC,

ETC...

Thanks also to...

People from different Institutions who generously share knowledge,
experience and friendship with us during all these years :

Murray Roberts

Autun Purser

Norbert Frank

André Freiwald

Pål Mortensen

Thomas Lundälv

Claudia Wienberg

Jan Helge Fosså

Marina Carreiro

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Helmut Zibrowius

Carlos Jiménez

Christian Dullo

Francesc Pagès

Bego Vendrell

Werner Dimmler

Armin Form

Pedro Siles

Sergio Rossi

Mikael Dahl

Andrea de Lucia

Inken Suck

Julian Gutt

JAGO IFM-GEOMAR

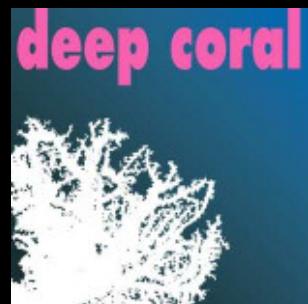
FIELAX

INSTALSUB

DIVING CENTER
CADAQUÉS

...and more !!

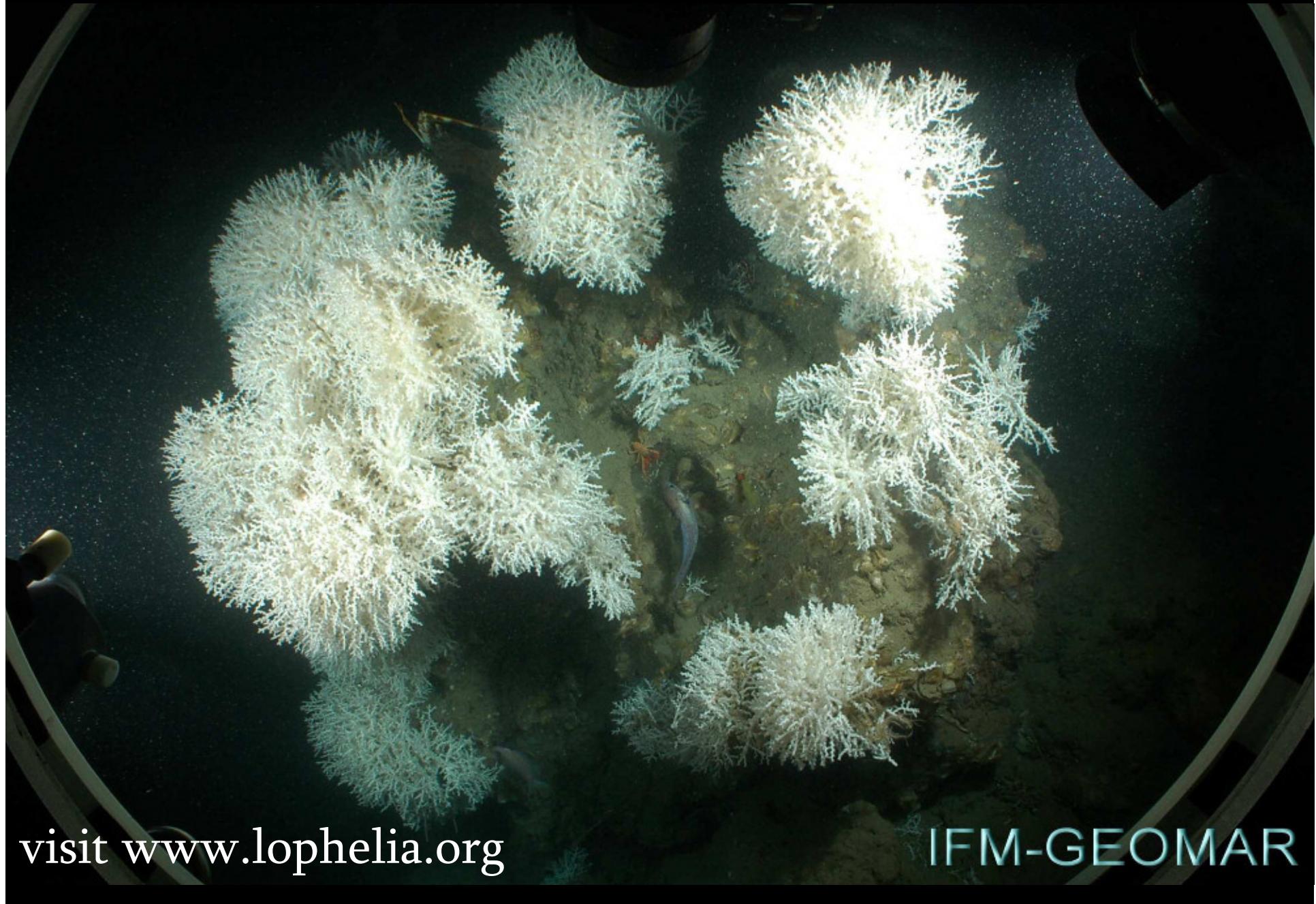
Thanks to many research Institutes, Institutions, and projects which support our work



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Thank you for your attention!



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