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# SEAMoBB: **S**olutions for **sE**mi-**A**utomated **M**onitoring of **B**enthic hard **B**ottoms

Monitoring of the **species composition** of communities

- Establish connectivity networks (physics & population genetics) (not presented today)
- **Sampling** marine communities (artificial and natural substrates)
- **Establishing community composition**: photo analysis and metabarcoding

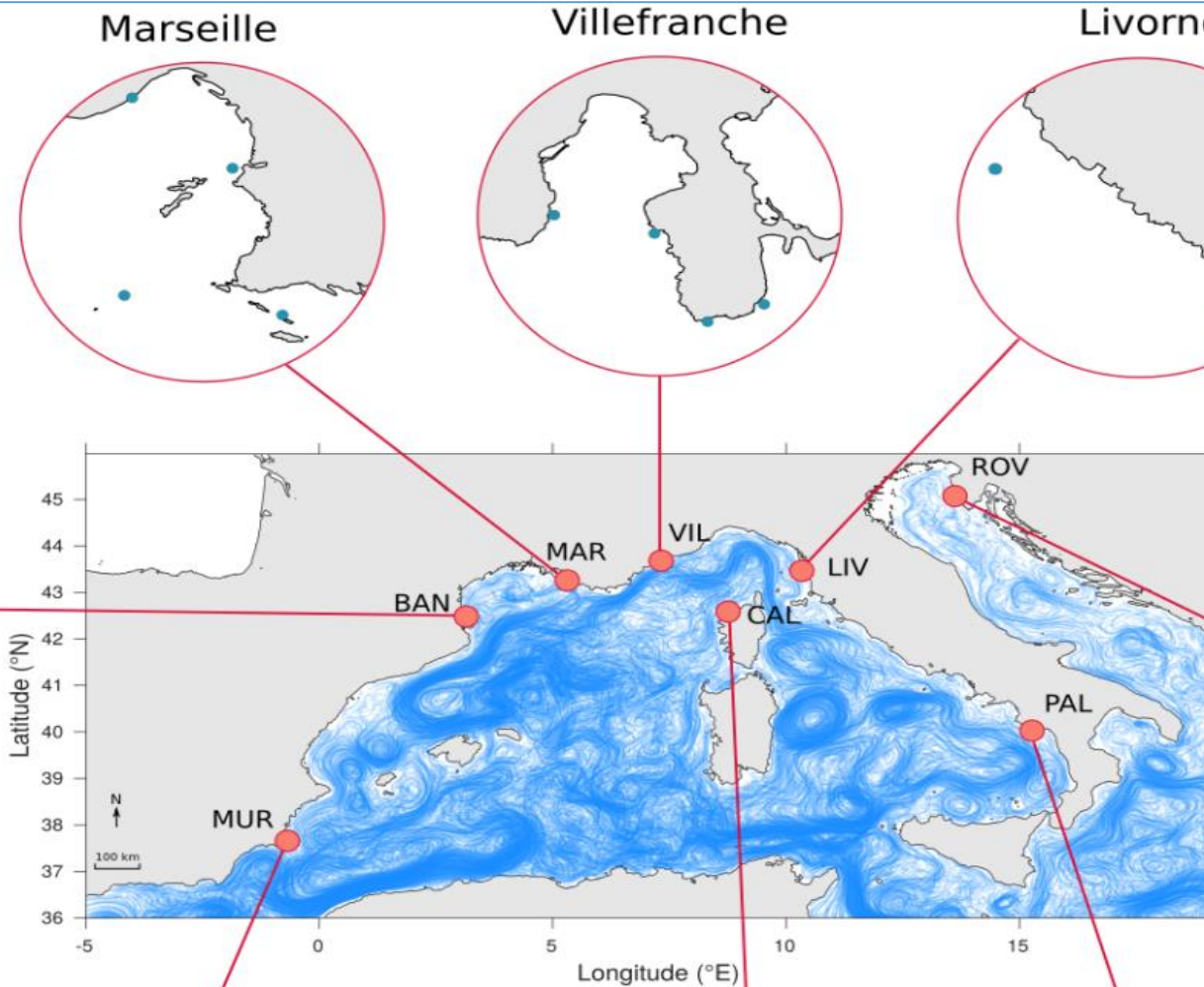
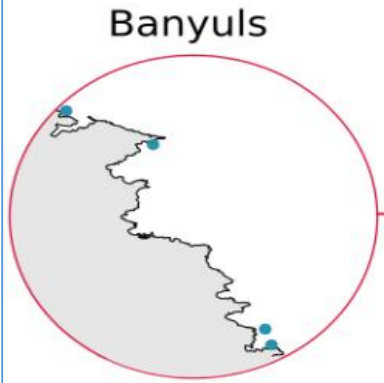
European FUNDING



Oct. 2019

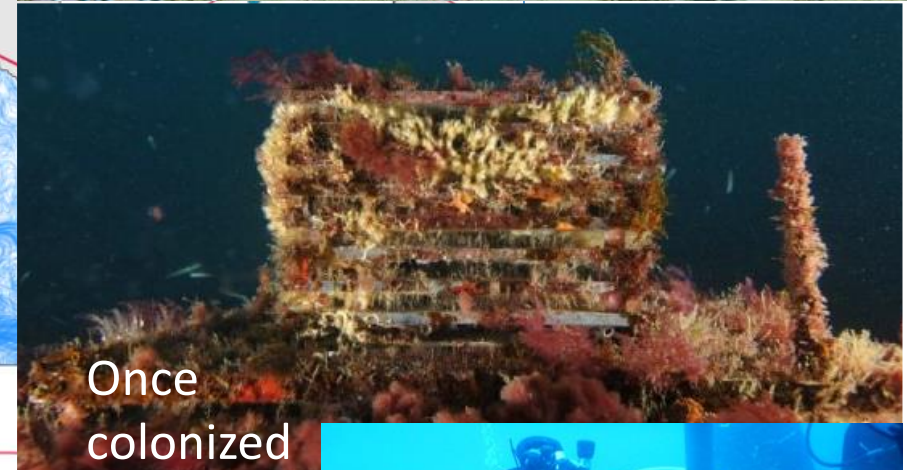
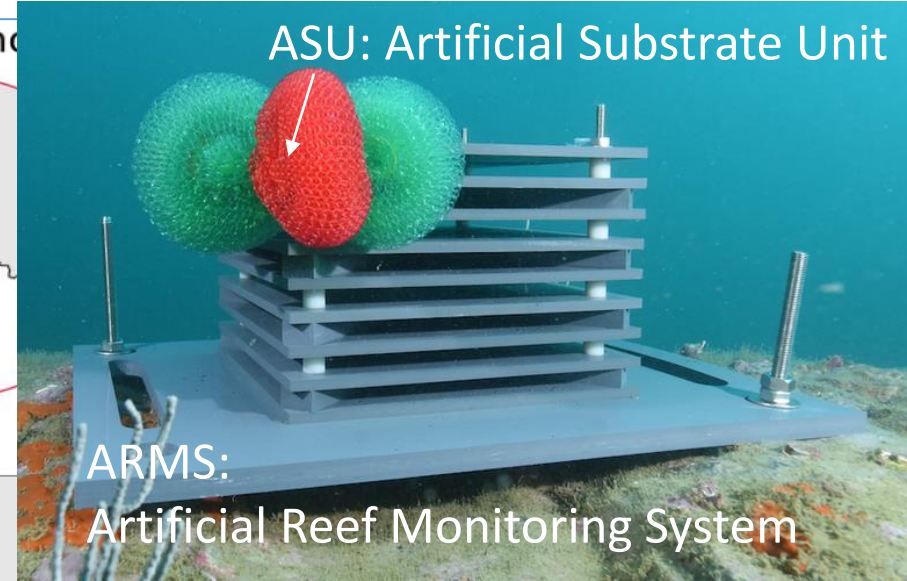
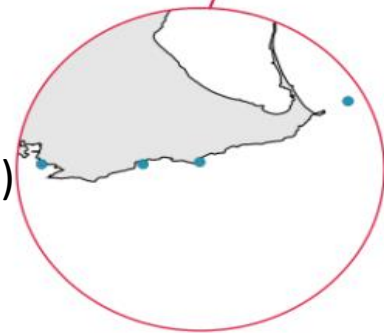


# 1- SAMPLING



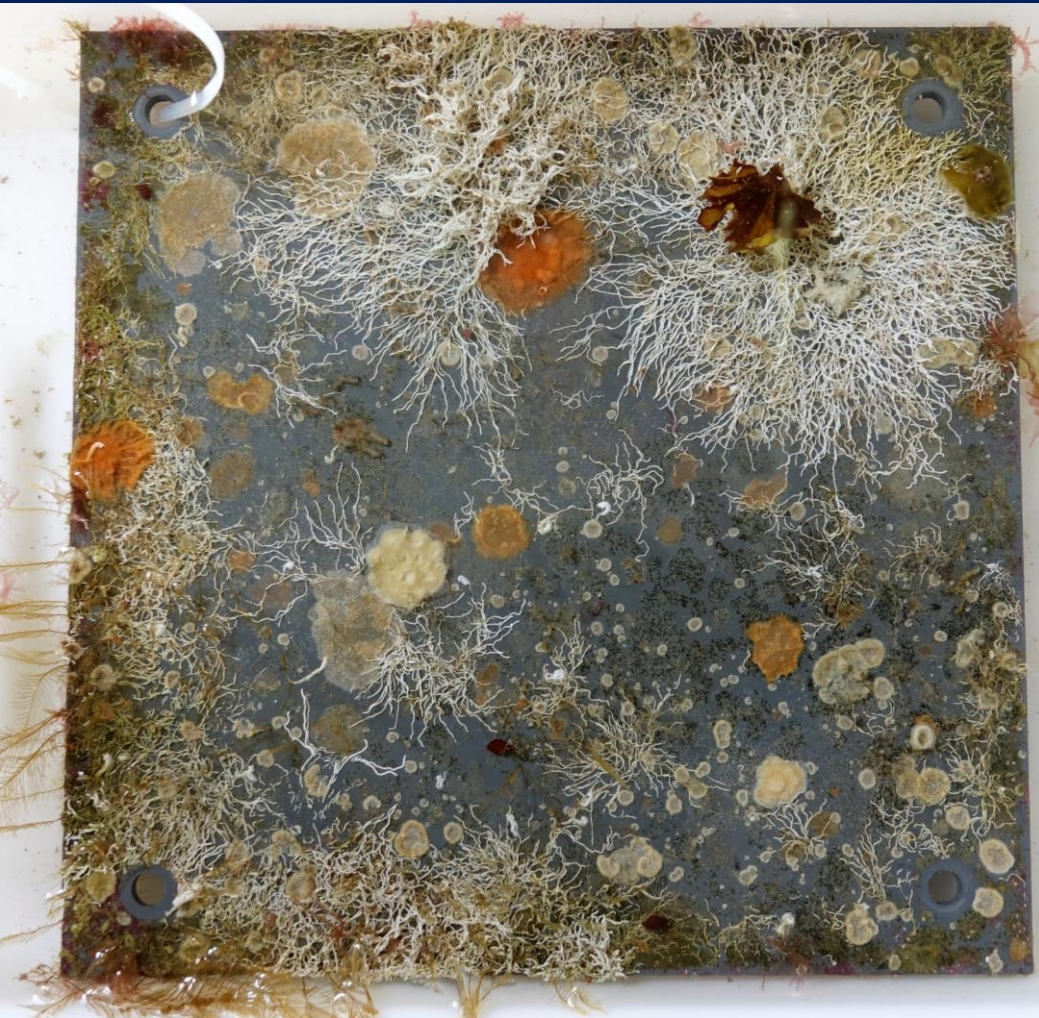
8 regions  
3-4 sites/region  
3 replicates /site  
(Tot = 54/year)

2017-2018 (3 regions)  
2018-2019 (all)  
2019-2020

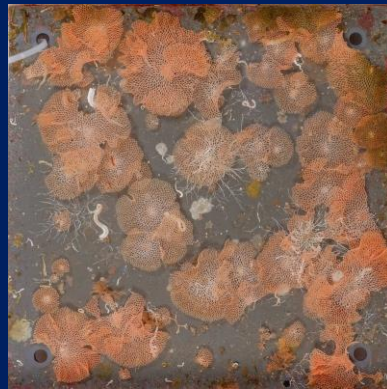


## 2- ESTABLISHING SPECIES COMPOSITION

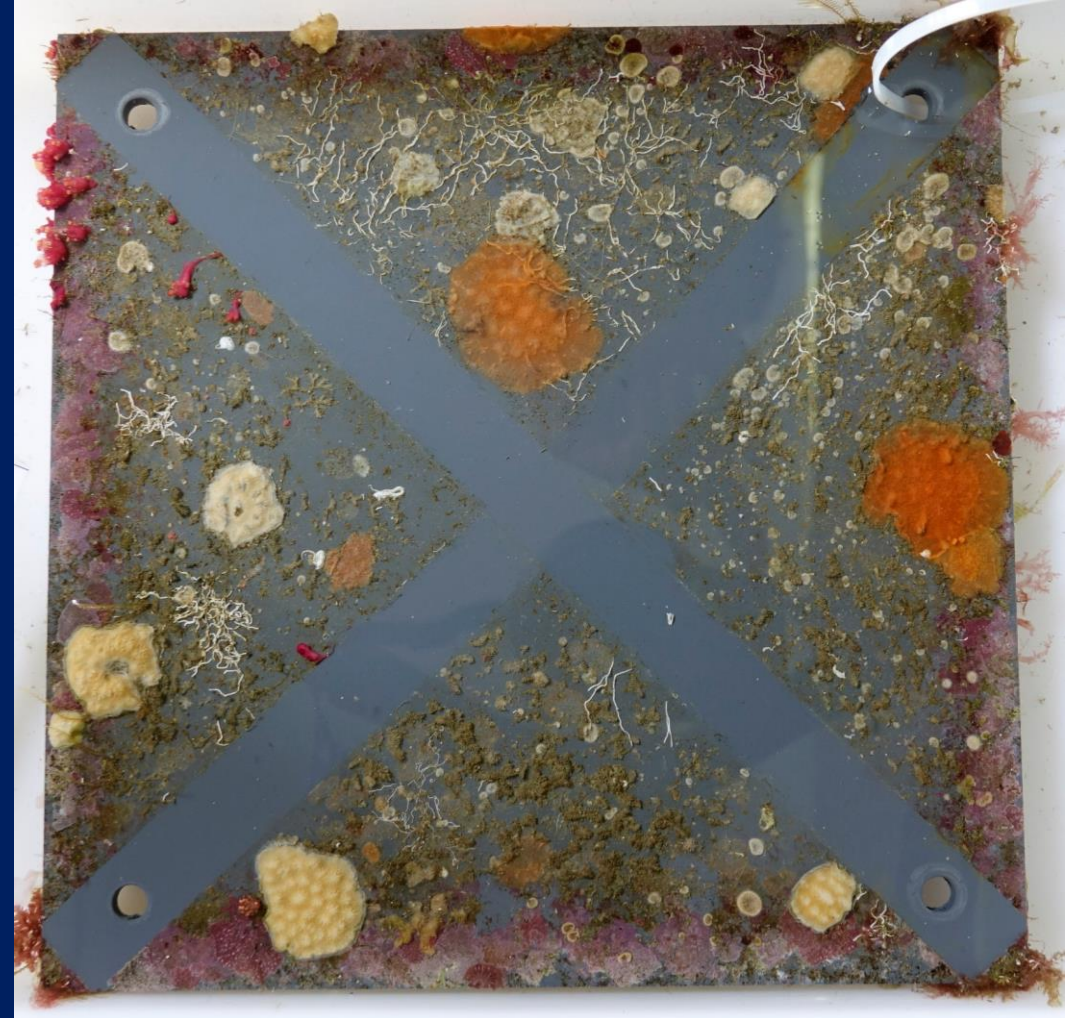
A- Photo analyses: computer vision algorithms (CORALNET NOAA)



64 random points  
/ photo



Example of a « bottom » face



Example of a « Top & compartmentalized » face

The program learns rapidly: 3 weeks at the beginning, then only 4 days to analyse one region (200 photos)

About 80 taxa identified (more or less precisely)

### Statistical analyses of community composition

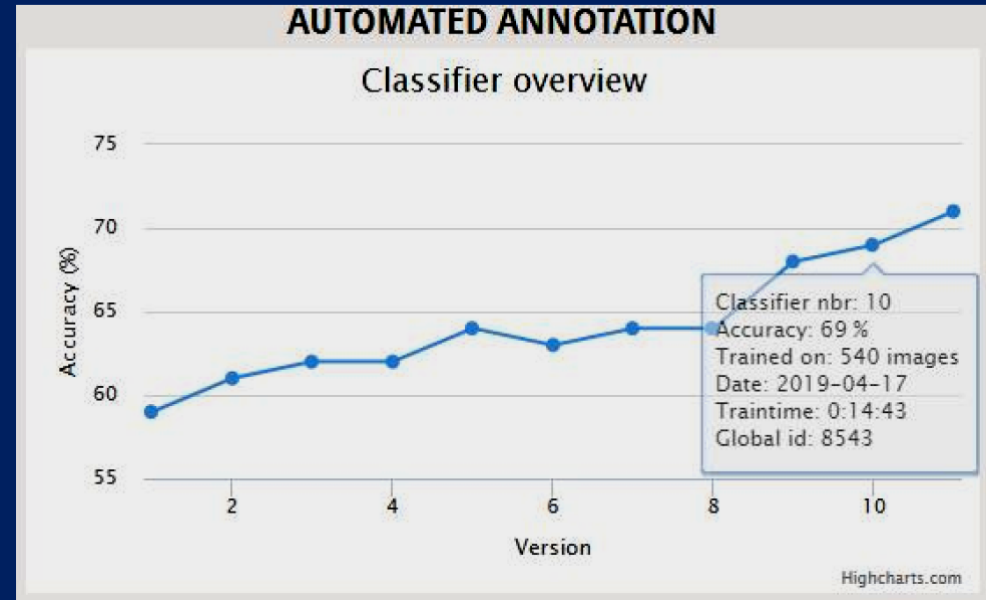
	Colonial ascidia	Reteporella	Crambe crambe	Rhodophyta	...
Photo1	0	0	0	4	3
Photo2	40	6	2	0	0
Photo3	2	45	0	0	
Photo4					
...					

-Top Superior plate: more algae, stochasticity (grazing or not)...

-Level of diversity : varies among and within regions

PERMANOVA (600 photos, France): Community composition depends on:

Region \*\*\* (Site \*\*\*) x Orientation \*\*\* x Compartmentalization \*

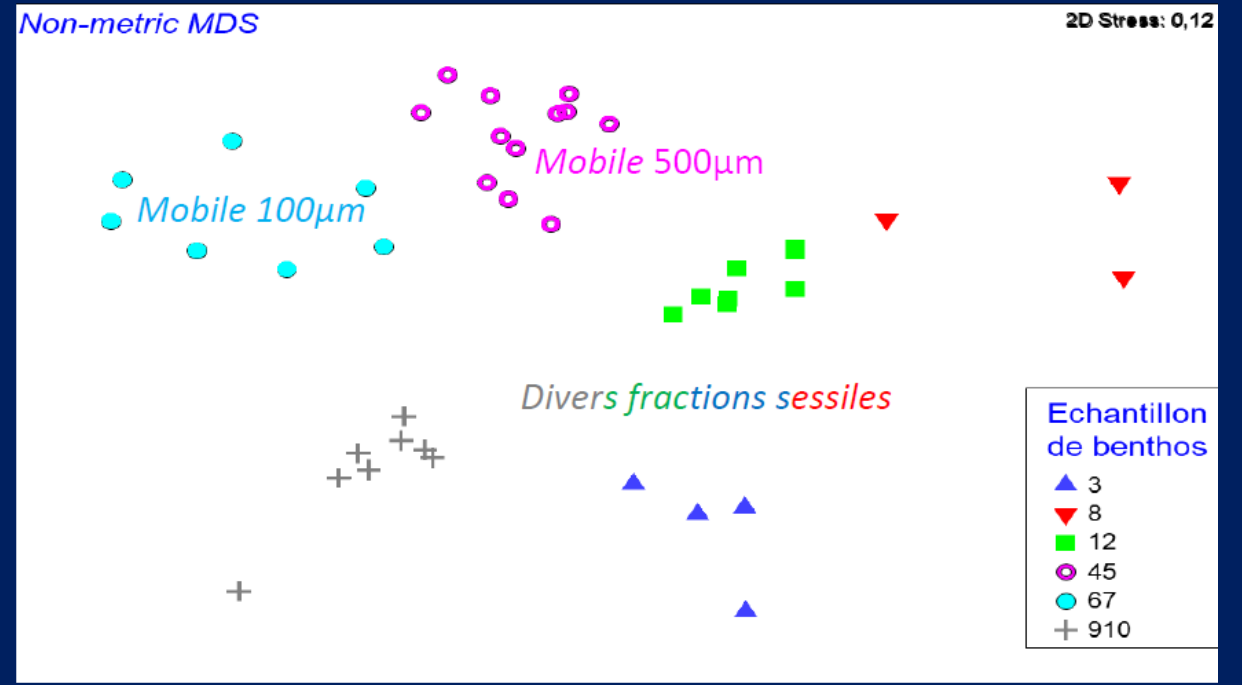
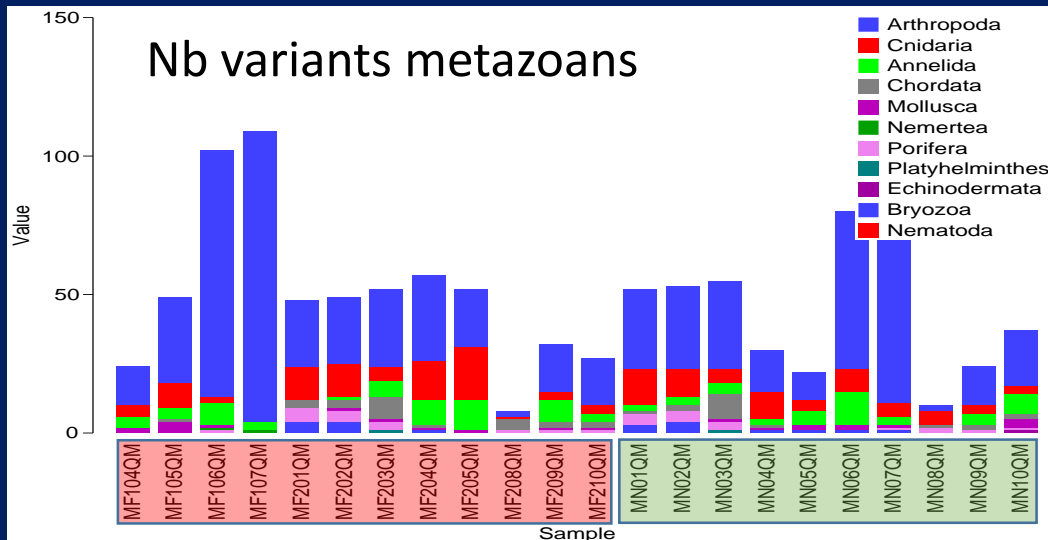
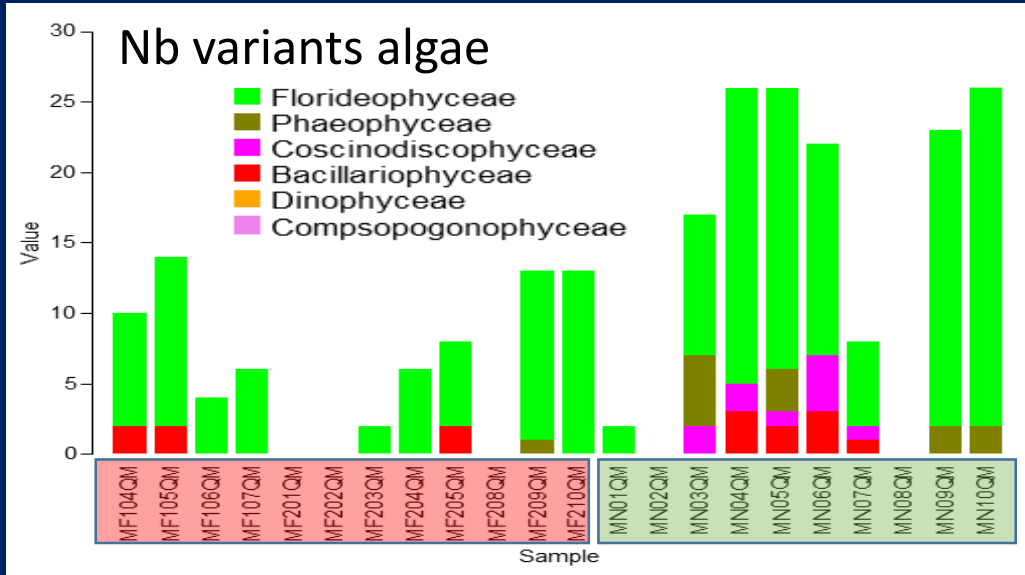


### Interest of the ARMS for photo-analyses (multi-layers):

- Mimic complex 3D-habitats (better than simple plates)
- Distinct micro-habitats (stat. power)  
*(David et al, 2019, Mar Pol Bul)*

# B- Metabarcoding

## Importance of the DNA extraction method



- Similarity among biological replicates
- Differences among biological fractions

700 variants from only 2 sites (in 1 region)

x 10 diversity detected / photographs

**Marie-Curie Post-docs WANTED**