ISOBAY13, Santander, 12 April 2012

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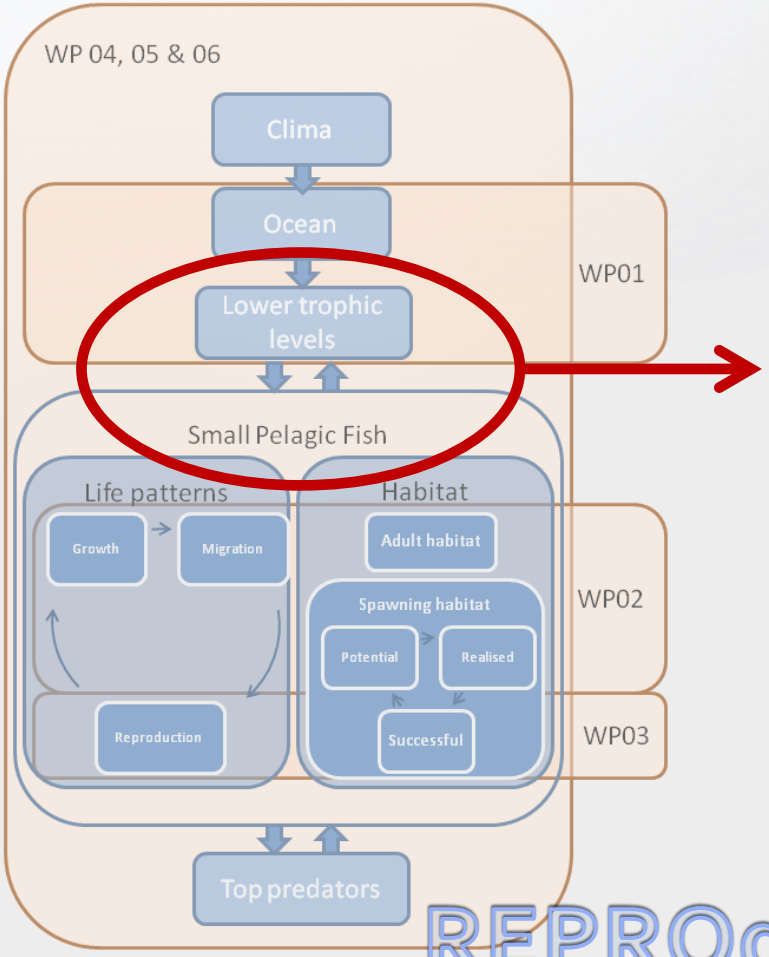
Spatial and vertical distribution of springtime zooplankton size-spectra

Results from survey (Pelacus – Pelgas) in the Bay of Biscay using L-OPC and nets/ZooScan datasets

1. *IFREMER, Brittany center, Brest, France*
2. *IFREMER, Atlantic center, Nantes, France*
3. *IEO – Gijon, Spain*
4. *IEO – Vigo, Spain*

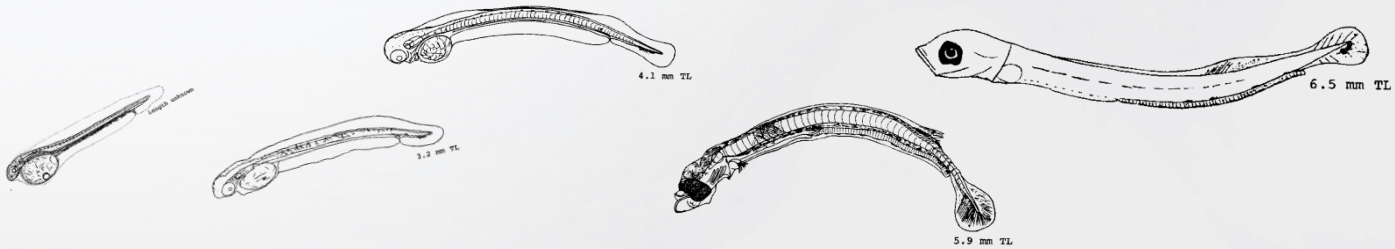
Context



ZOOPLANKTON -> survival and repartition of early life stage of anchovies and sardinia in the Bay of Biscay.

REPROdUCE Project

Feeding of larvae



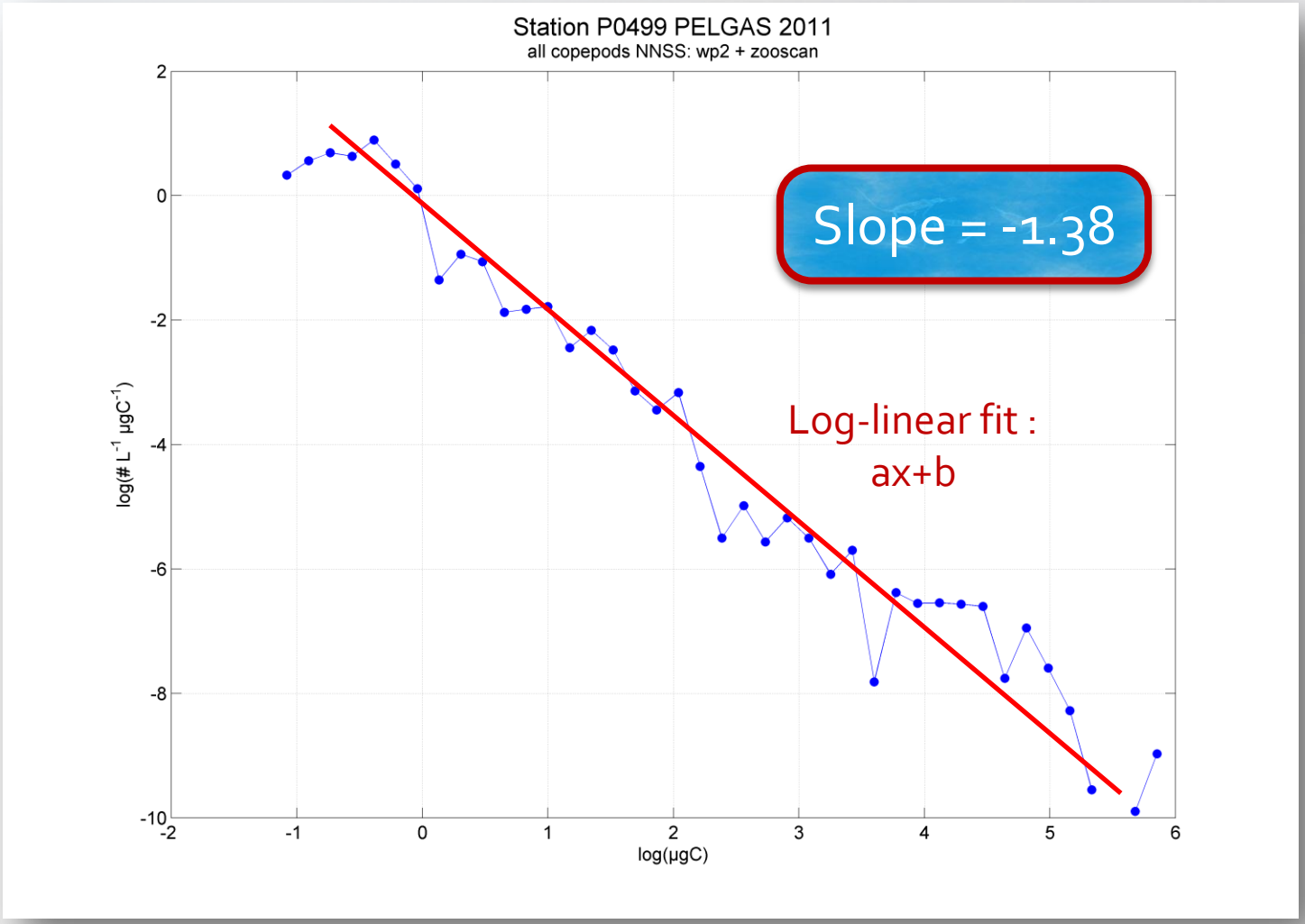
Conway et al. 1998 MEPS 175 / Poulet 1996 / Catalan et al. 2010 Est. Coast. & Shelf Sc. 86 / Morote et al. 2010 ICES J. Mar. Sc. 67 / Yanez-Rubio et al. 2011 J. Mar. Biol. Assoc. UK 91

Purpose and Content of the talk

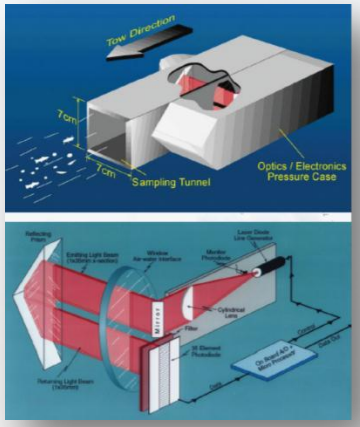
- Strong need of data on zooplankton size distribution in the Bay of Biscay:

1. How to measure it?
2. What is the quality of the measure?
3. Global distribution of zooplankton size-spectra
4. Classification of zooplankton size-spectra
5. Is there a link with environmental features?
6. Conclusion & Perspectives

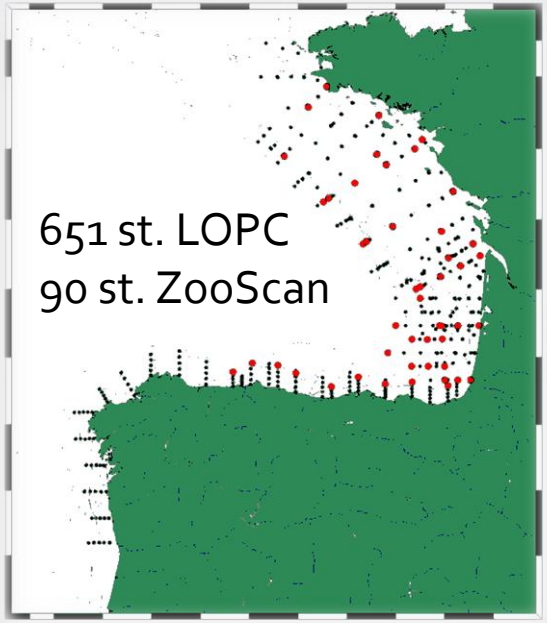
What is a Size-Spectrum?



We used two methods to measure it:

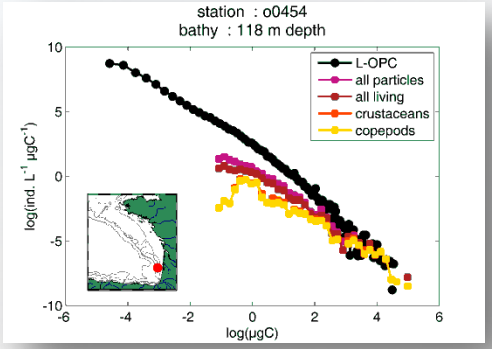


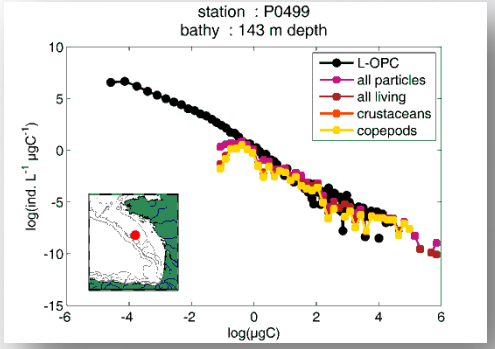
LOPC:
- In situ
- Vertical profiles
- Size only

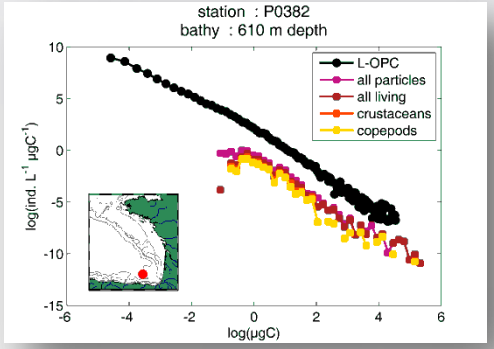


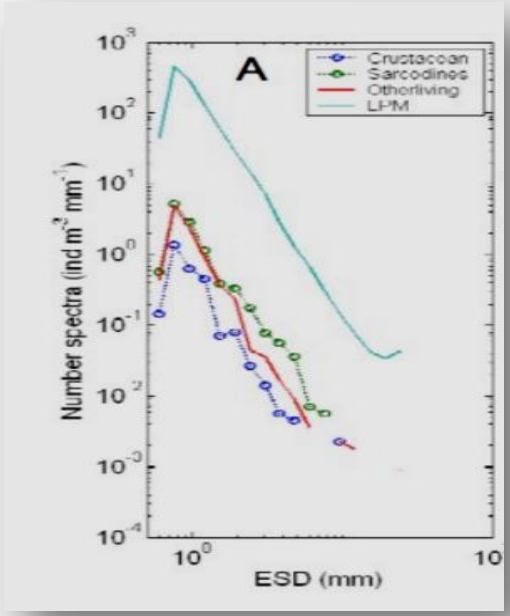
WP2 + ZooScan:
- Groups + size
- In lab
- 0-100m (no vertical distr.)
- Time consuming
- Net broke up fragile objects

Overestimation of LOPC due to detritus





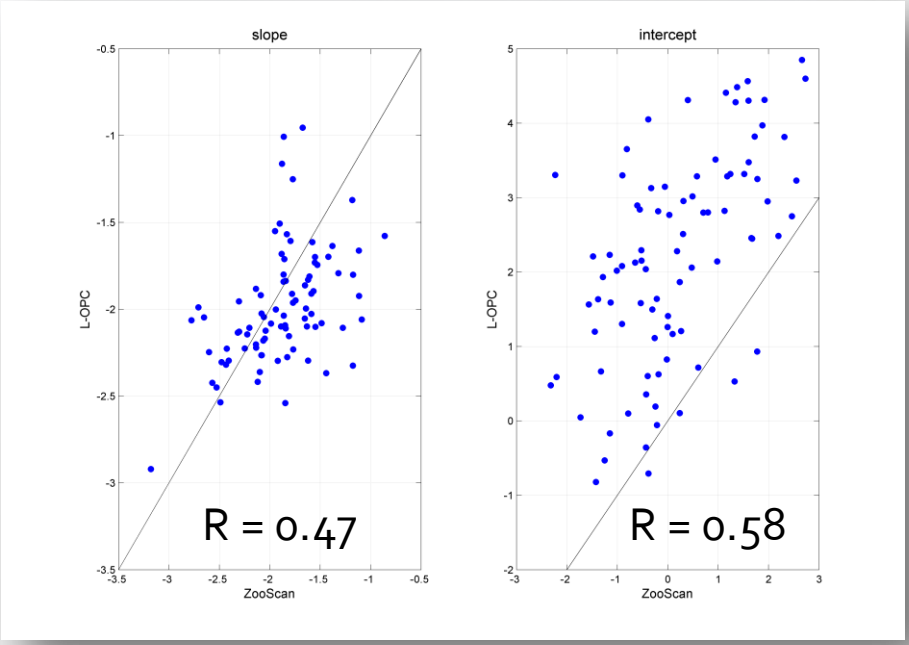


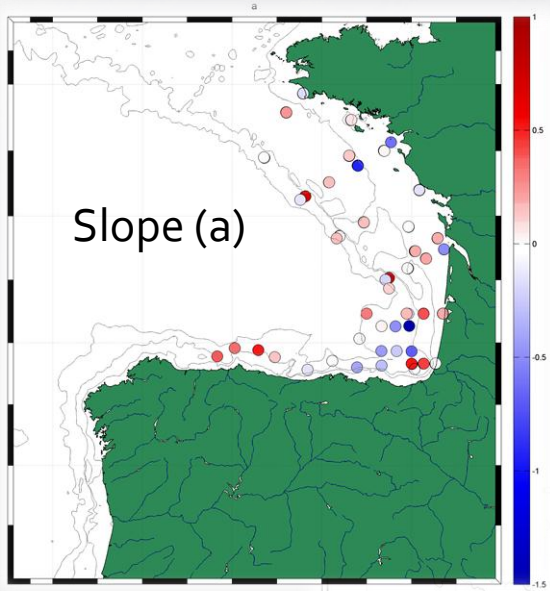


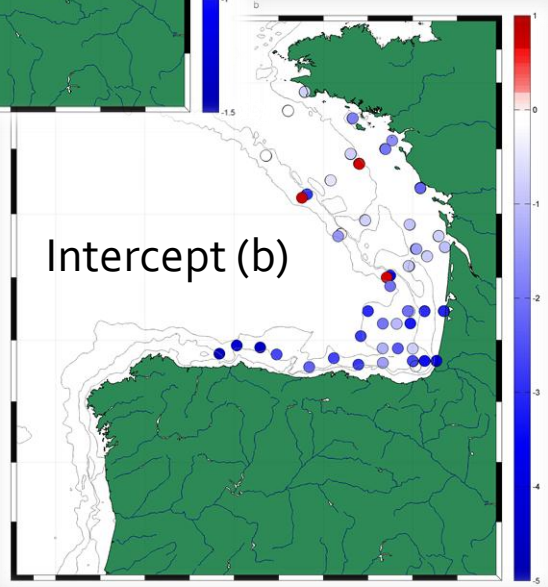
Detritus (aggregates) are fragiles particles -> desaggregation in nets (like larvaceans, gelatinous…)

Overestimation of LOPC due to detritus

LOPC SS + a.x + b -> Zoo SS

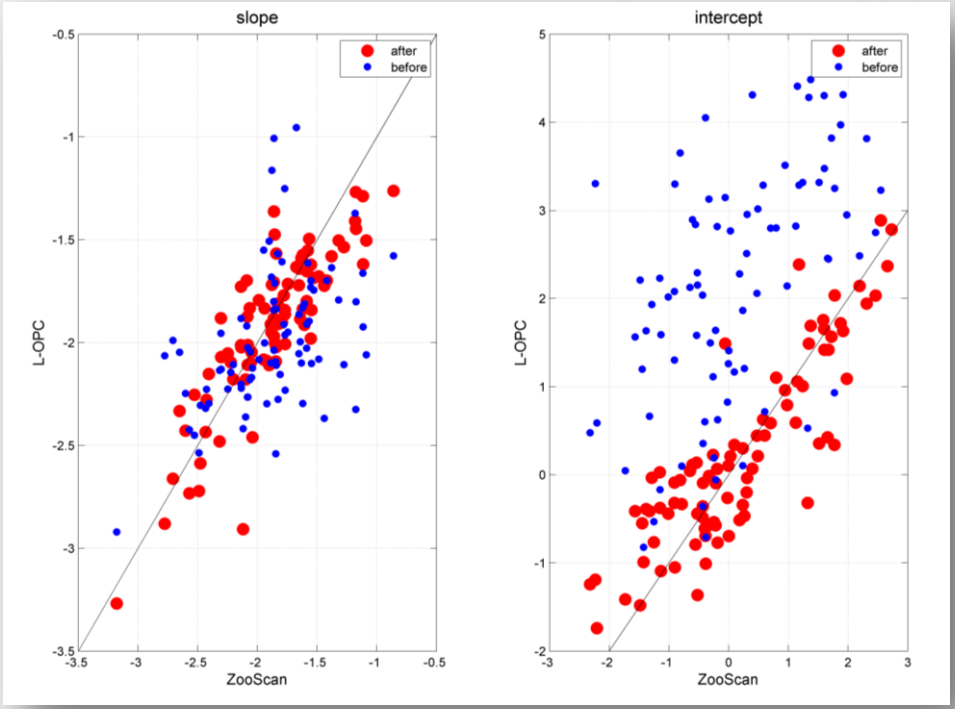






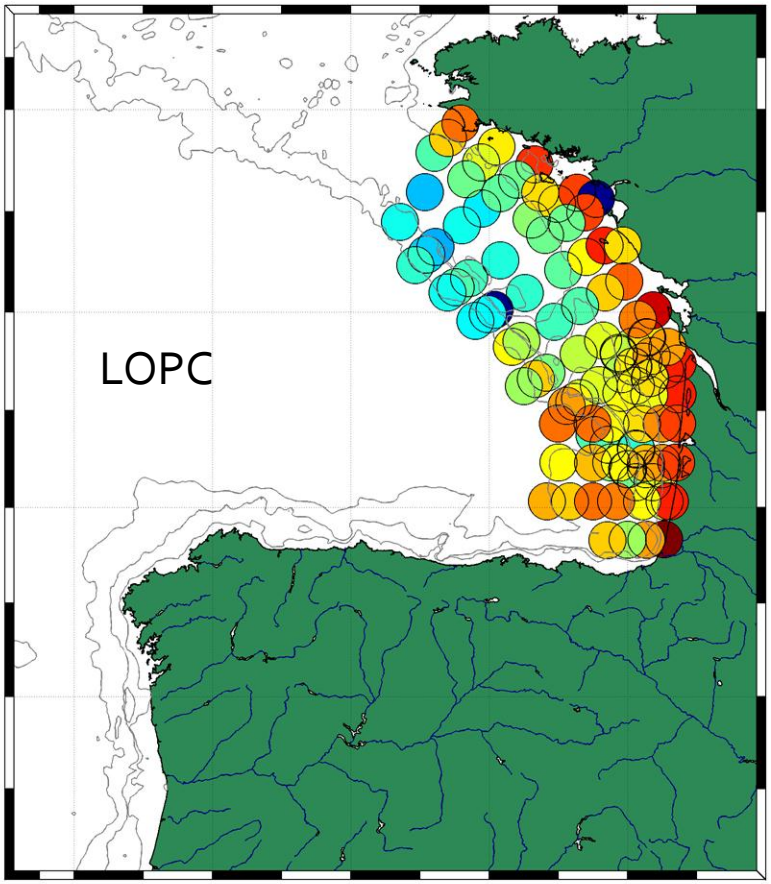
Can we correct LOPC size-spectra?

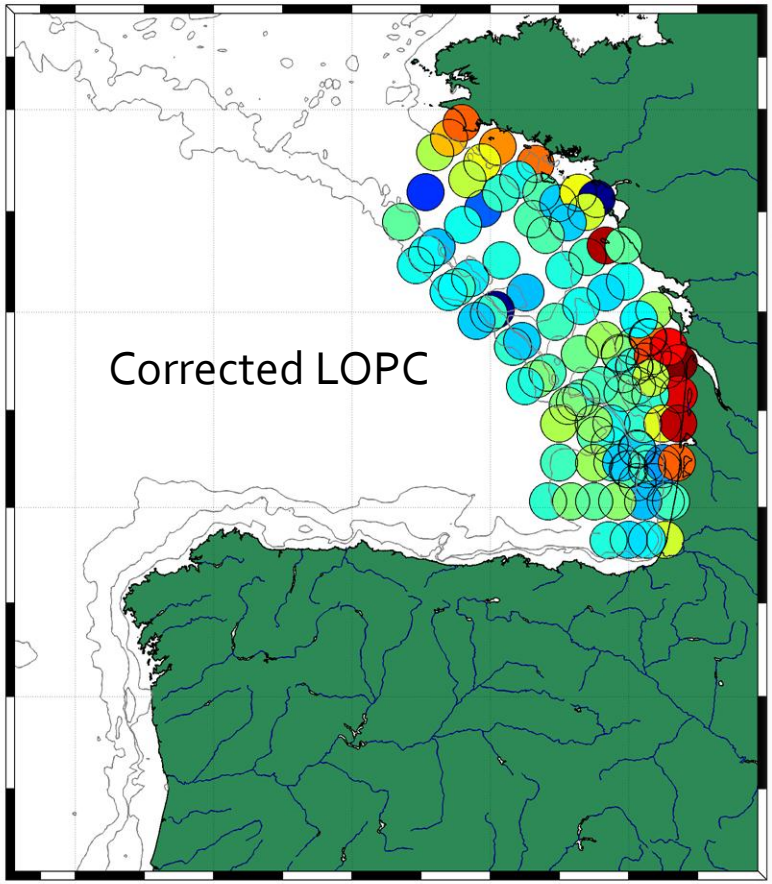
- Prediction of differences (detritus) with:
  - environmental parameters
    - Surface and deep (100m) temperature, salinity, density, max fluo, depth of max fluo, satellite chla and mes, bathy…
  - LOPC size-spectra
- Multivariate regressions:
  - random removal of n stations
  - Estimation of parameters
  - x iterations
  - Slope (n=5, x=1000)
    - R: 0.47 -> 0.85
  - Intercept (n=5, x=1000)
    - R: 0.58 -> 0.87



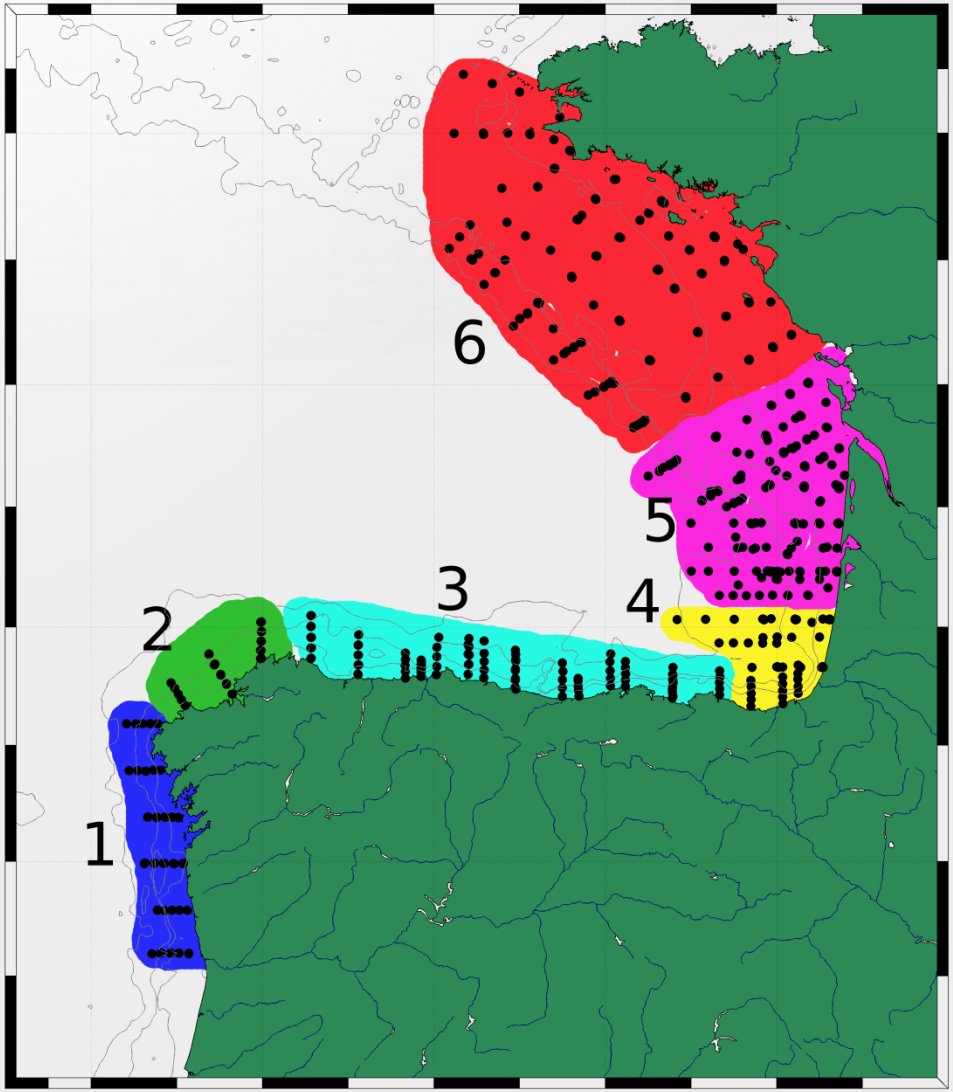
Impact of correction example

Biomass estimates during PELGAS 2011



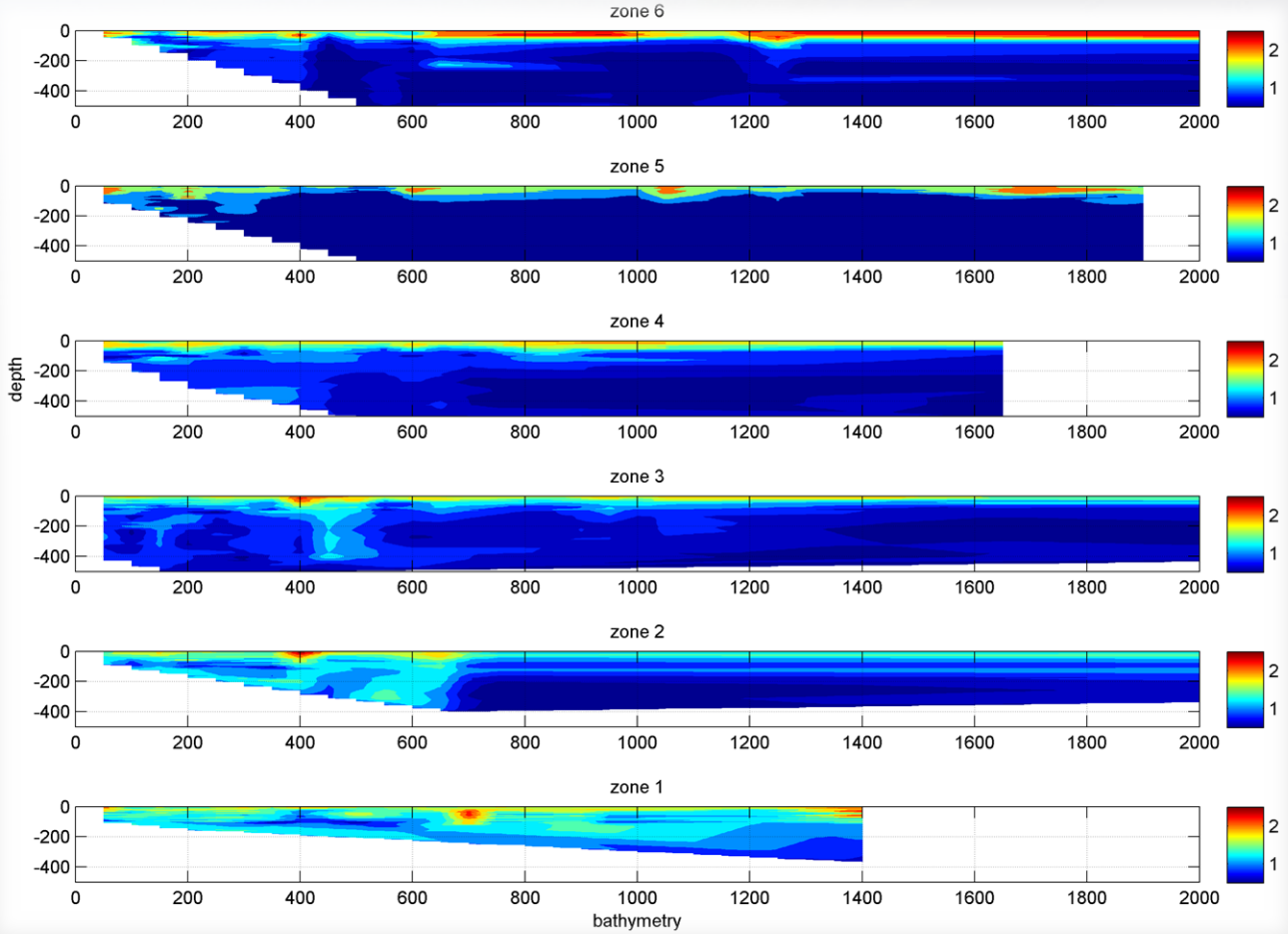


Separation by zones



Vertical distribution (LOPC not corrected)

Biomass (in log10)

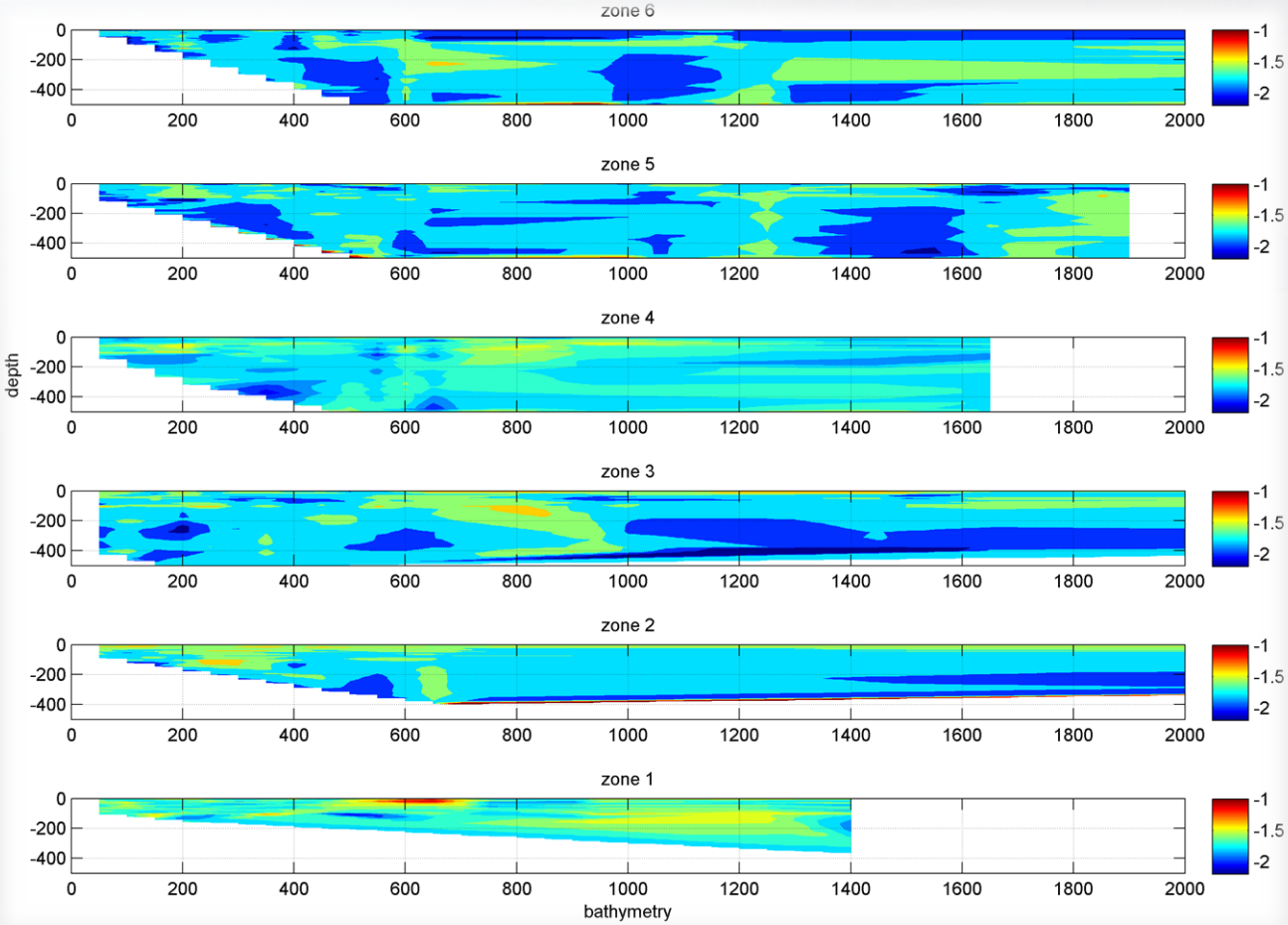


Depth

Bottom depth

Vertical distribution (LOPC not corrected)

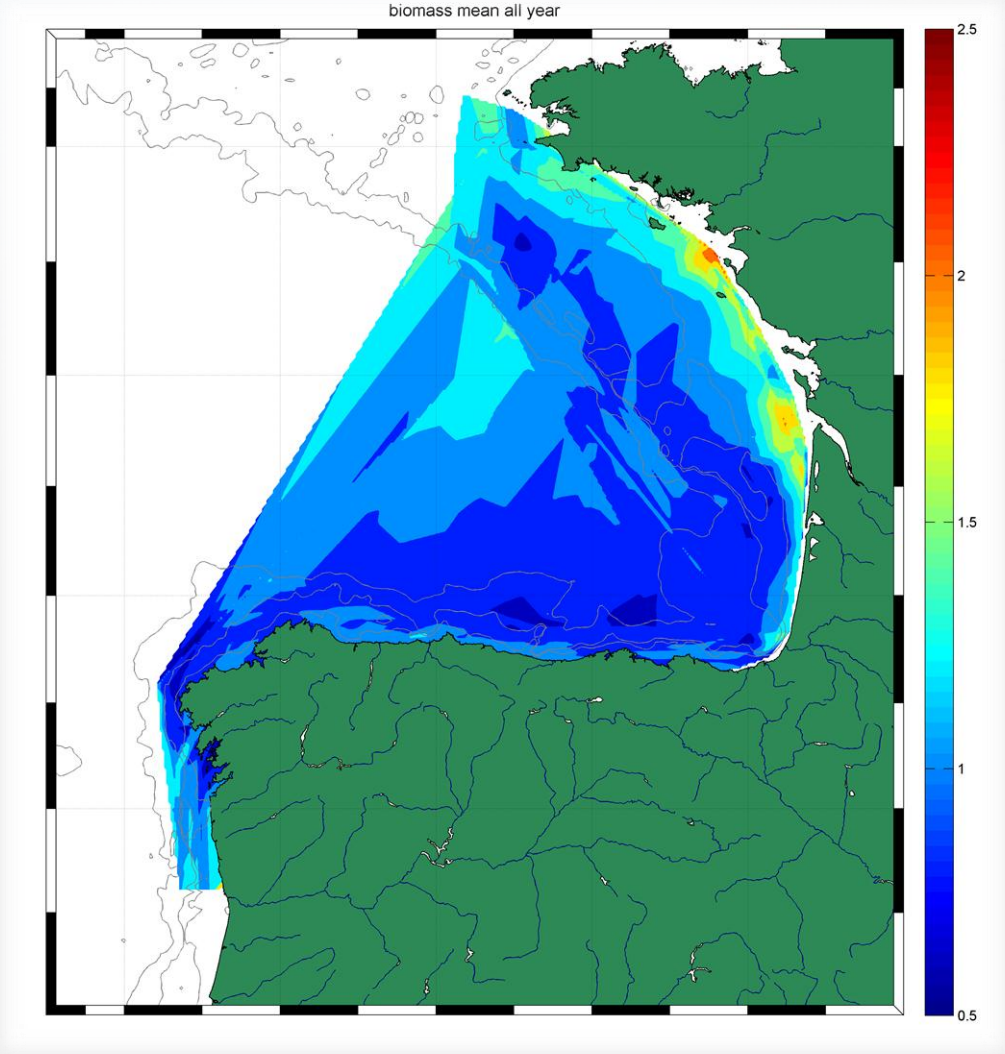
Slope



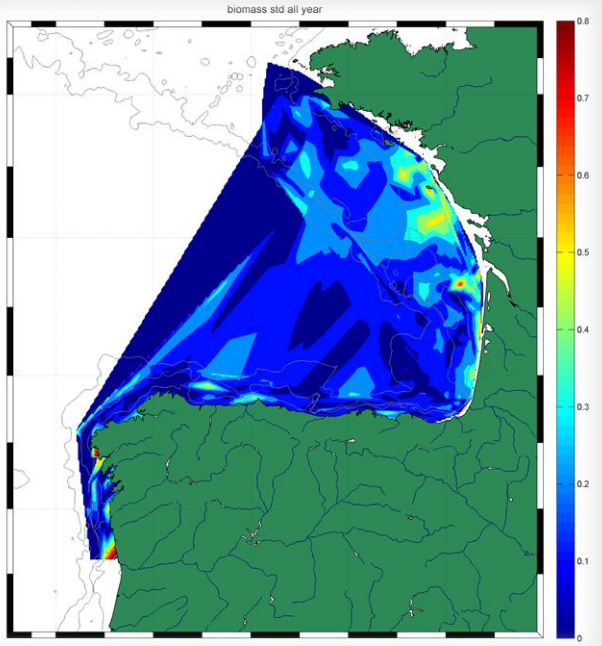
Depth

Bottom depth

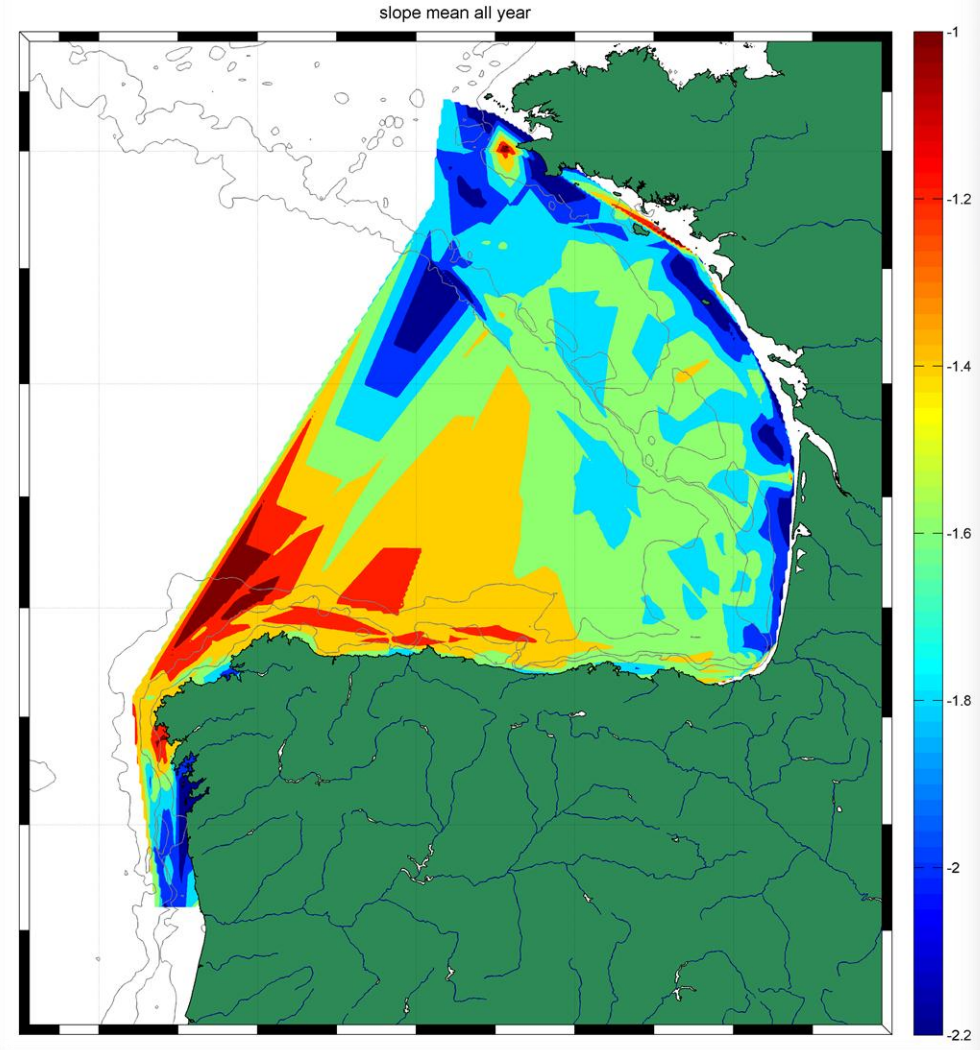
Spatial distribution (LOPC corrected)



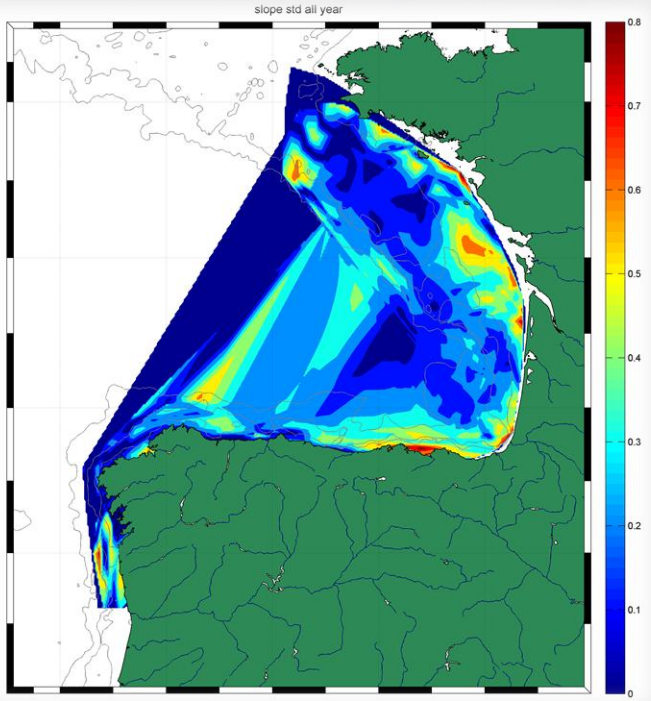
Biomass average year and std



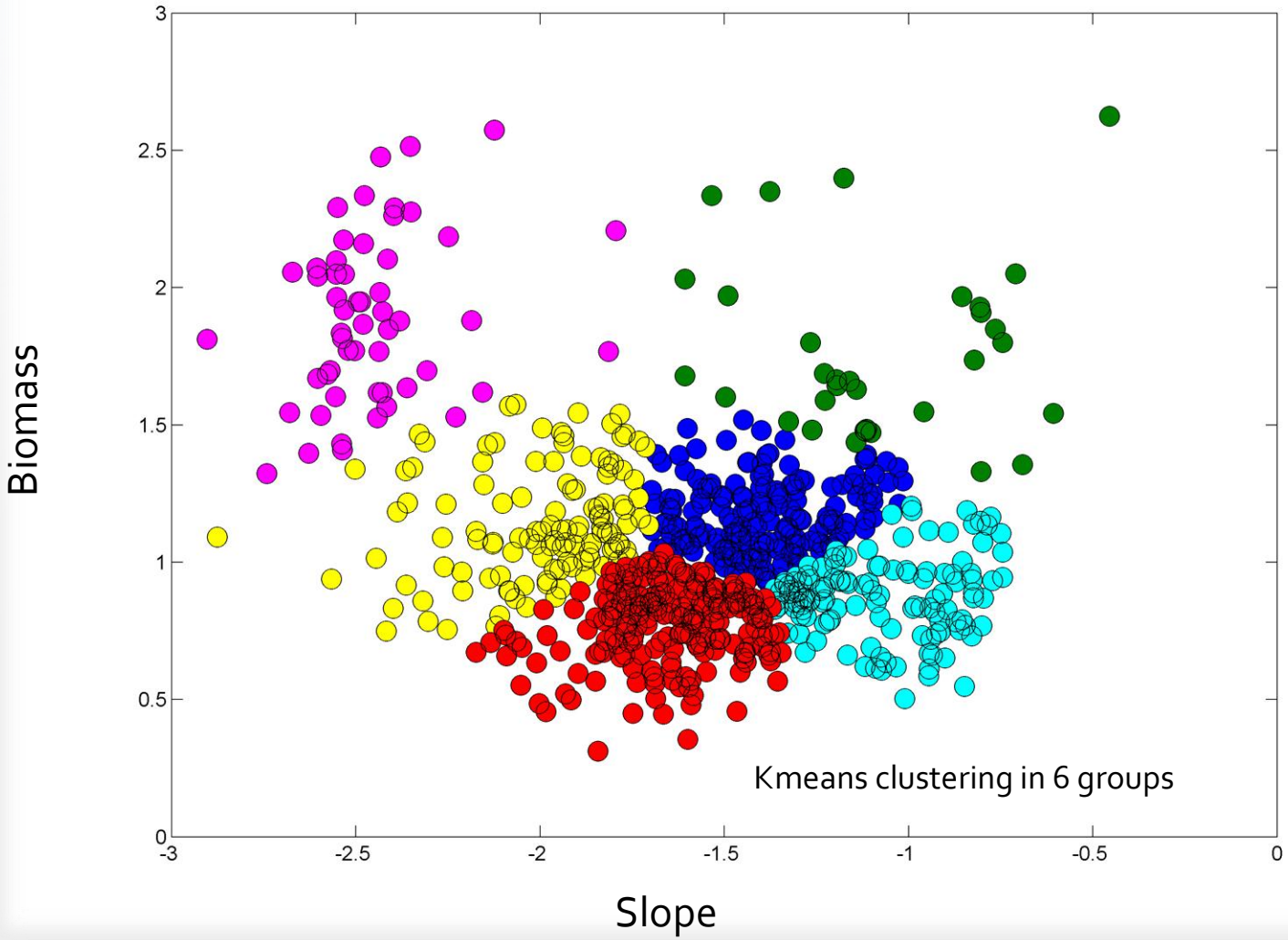
Spatial distribution (LOPC corrected)



Slope average year and std

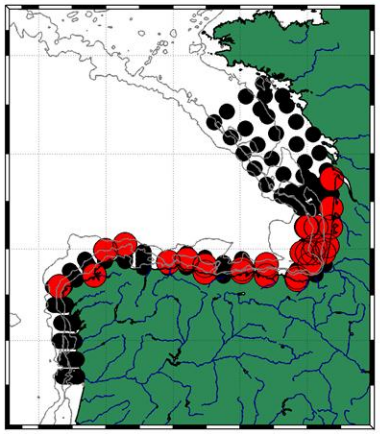


Classification



Spatial distribution of groups

2005



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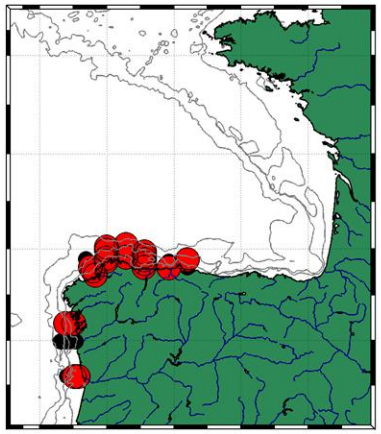

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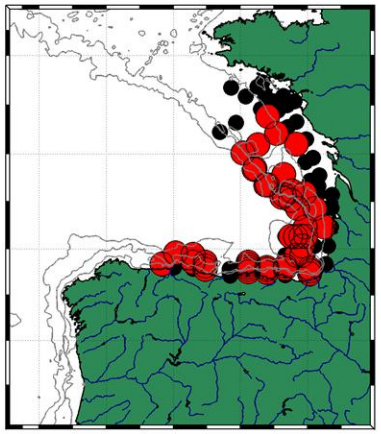

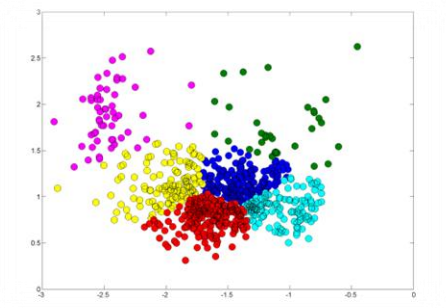

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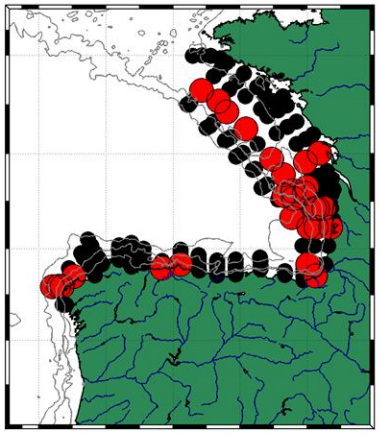

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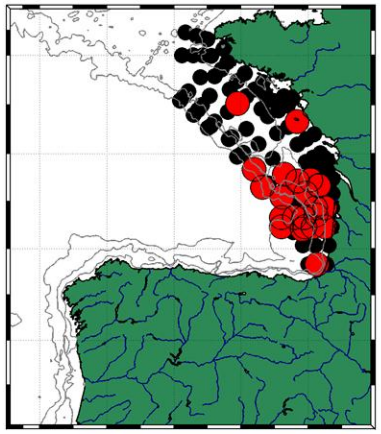

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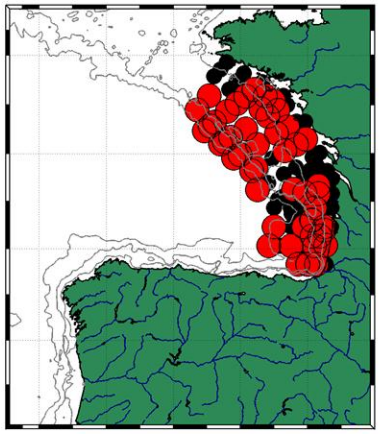

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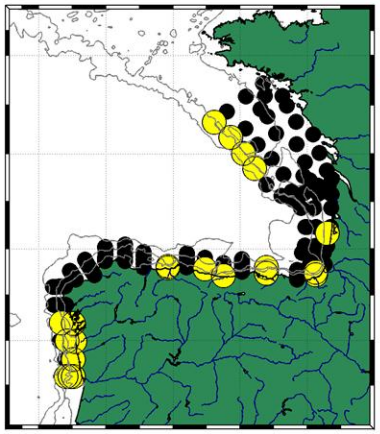

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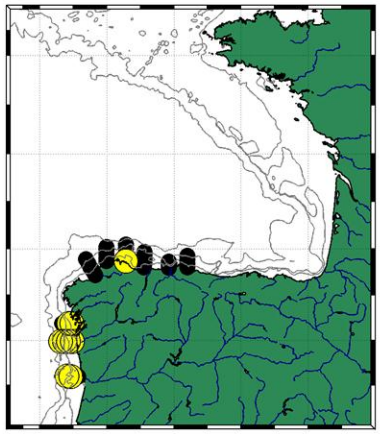

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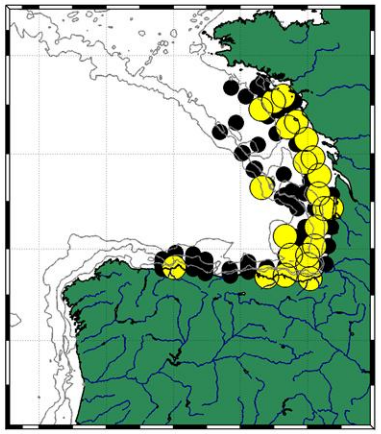

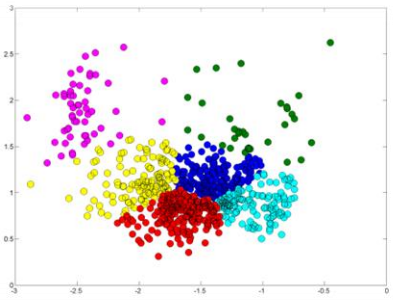

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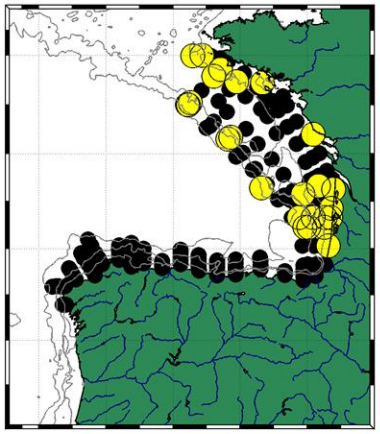

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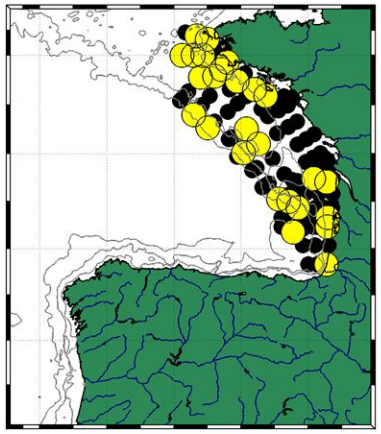

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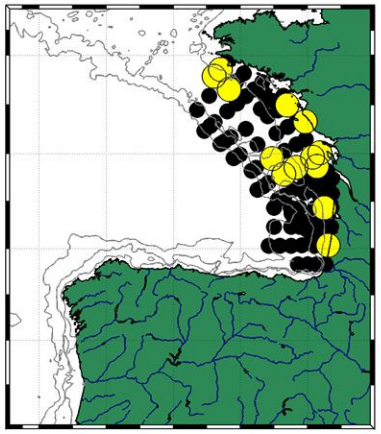

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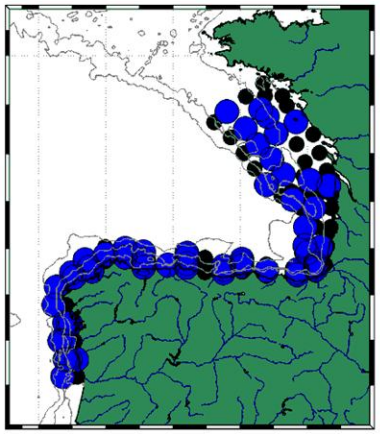

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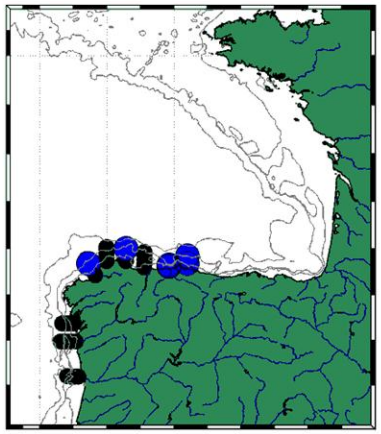

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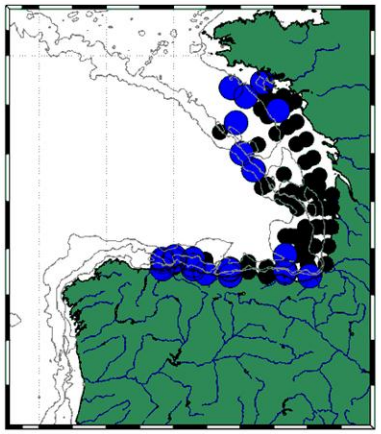

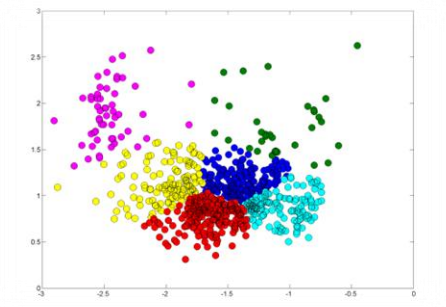

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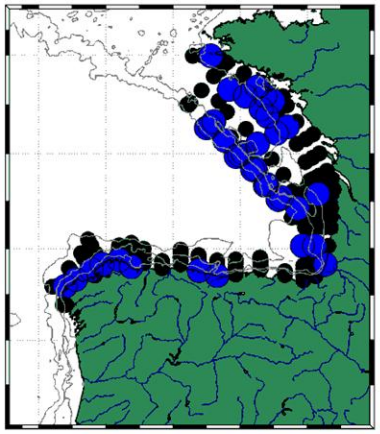

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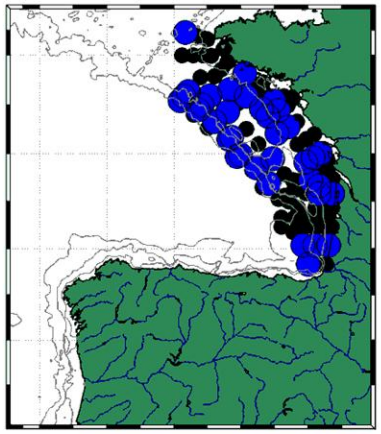

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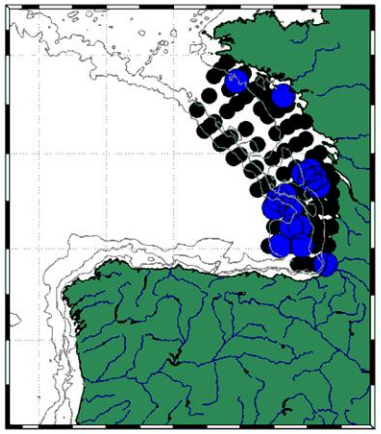

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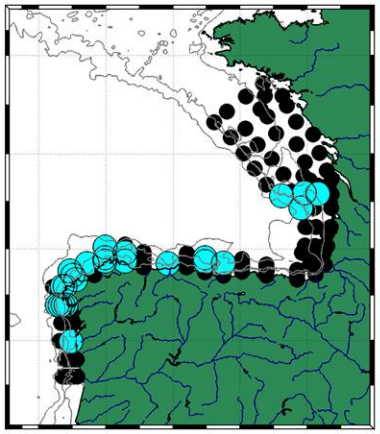

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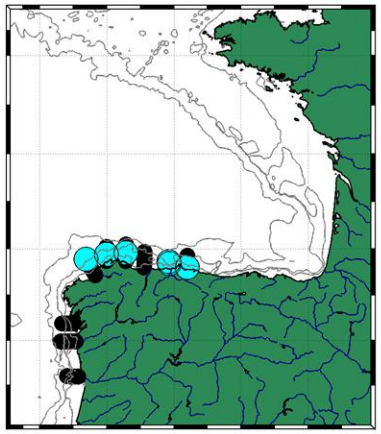

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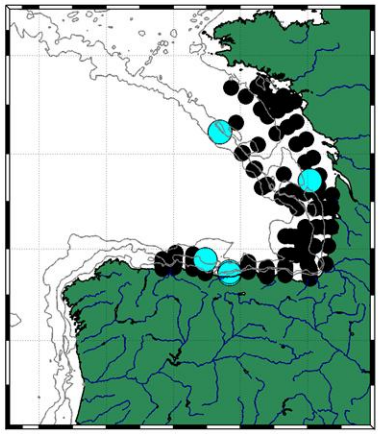

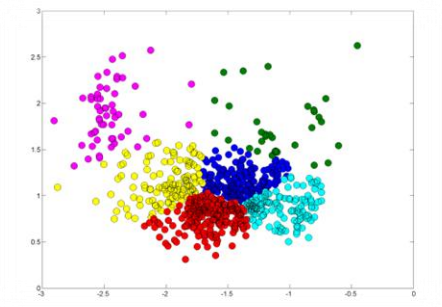

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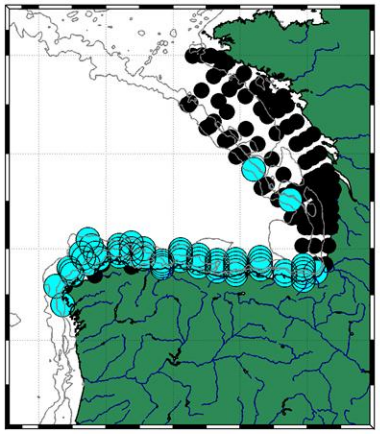

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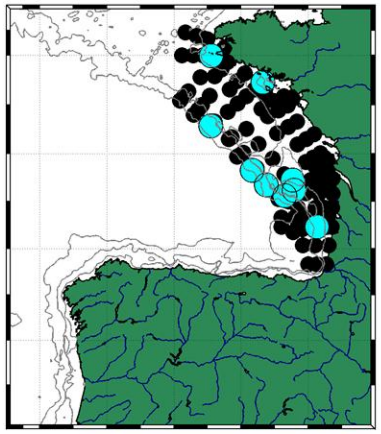

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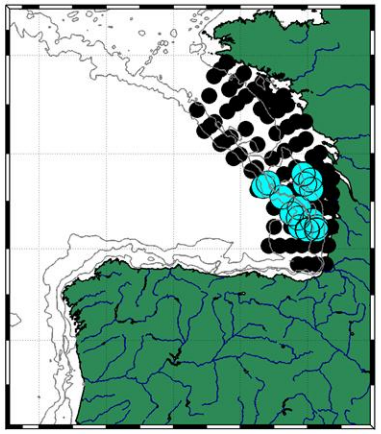

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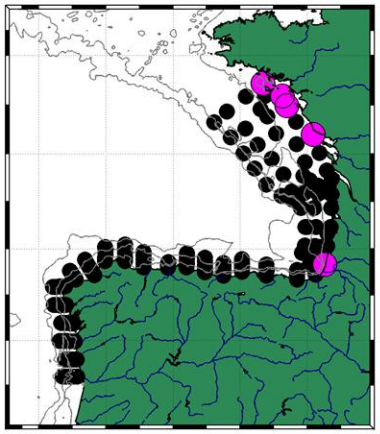

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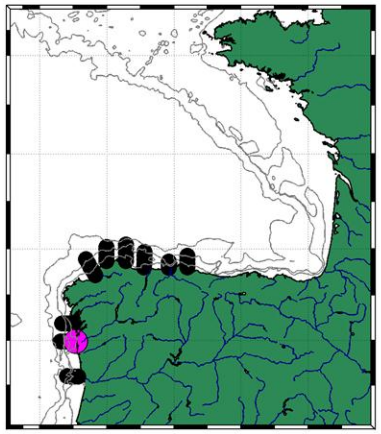

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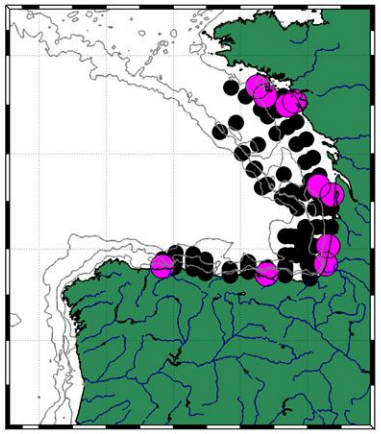

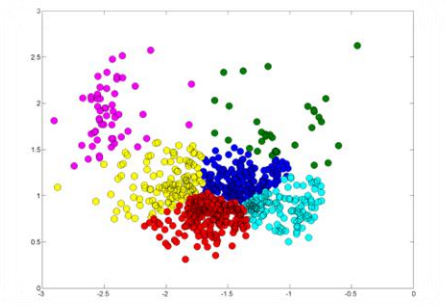

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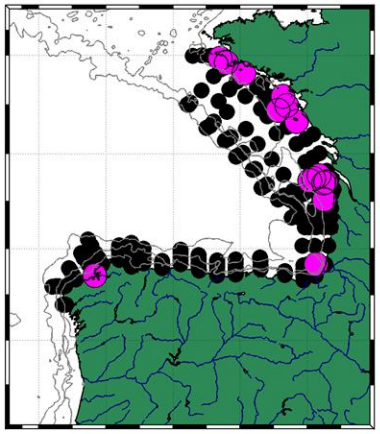

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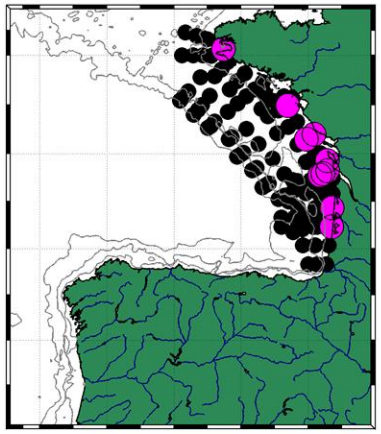
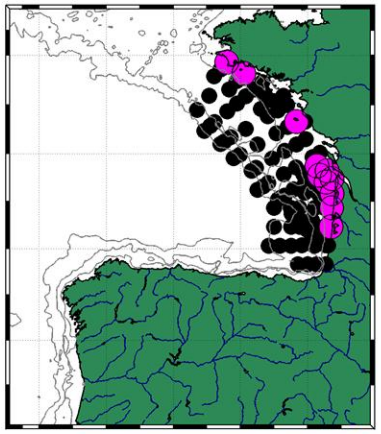
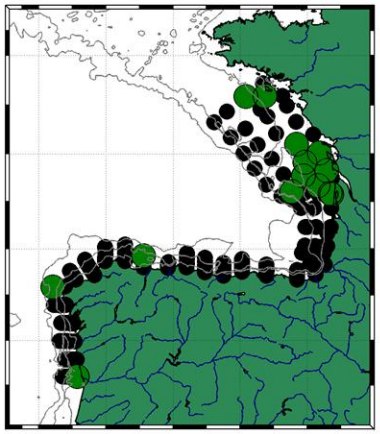


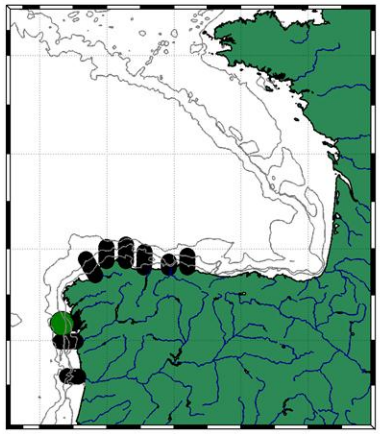
2011



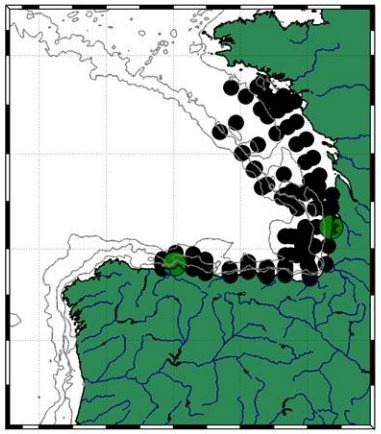
2005

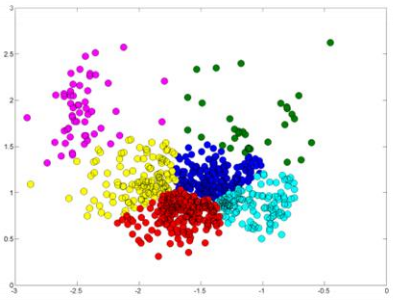


2006

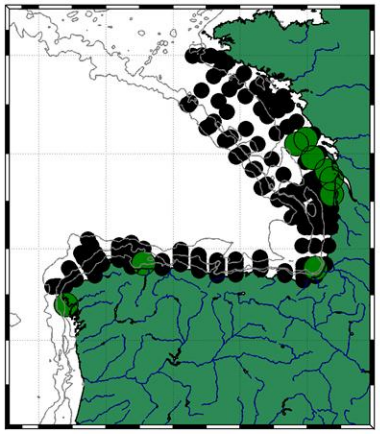


2007

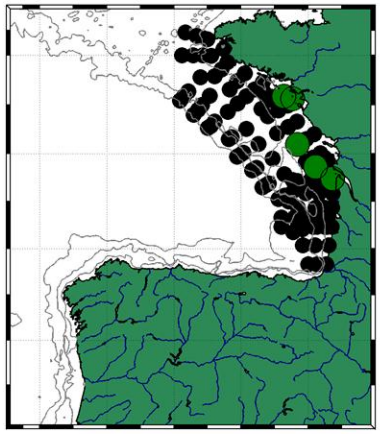




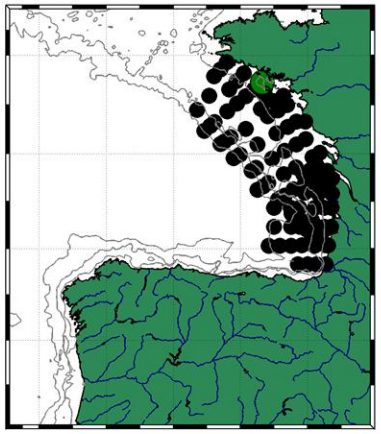
2009



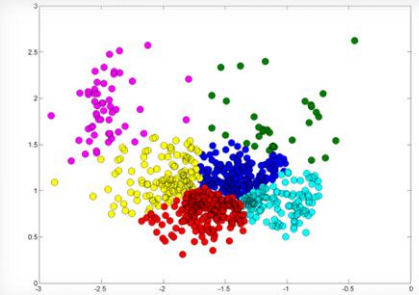
2010

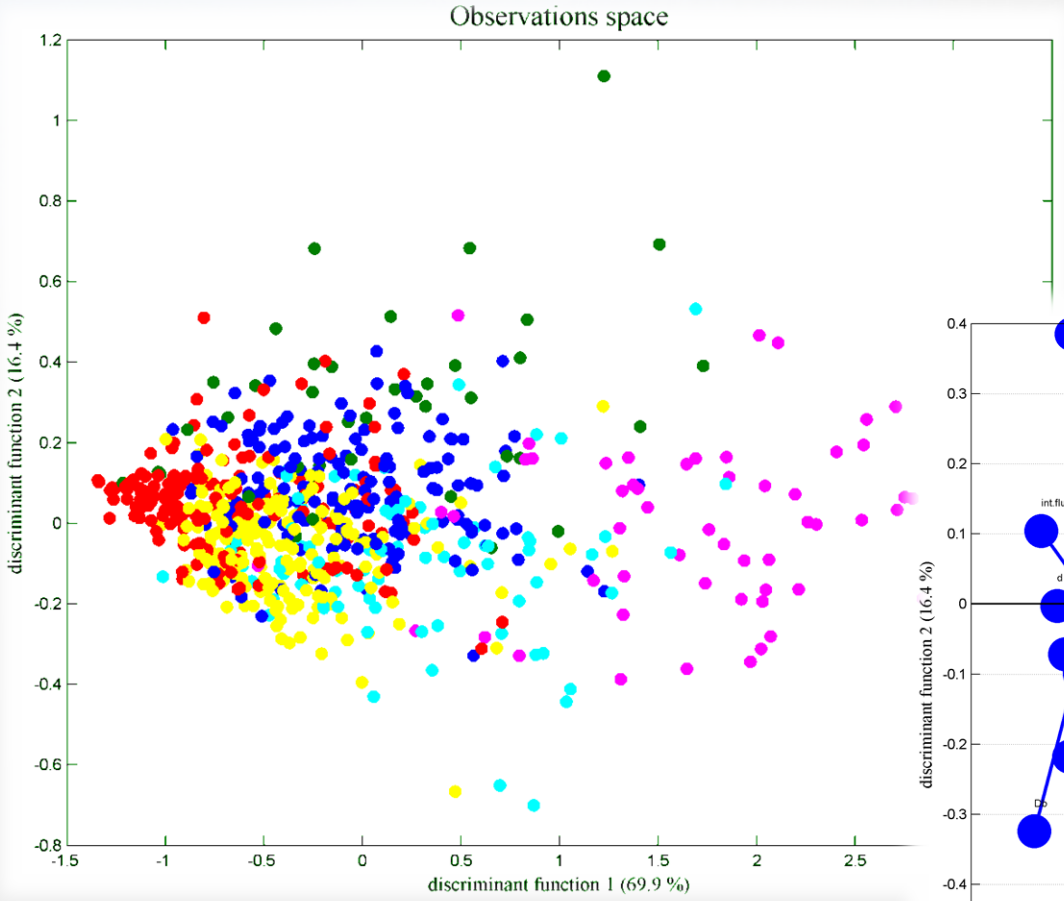


2011

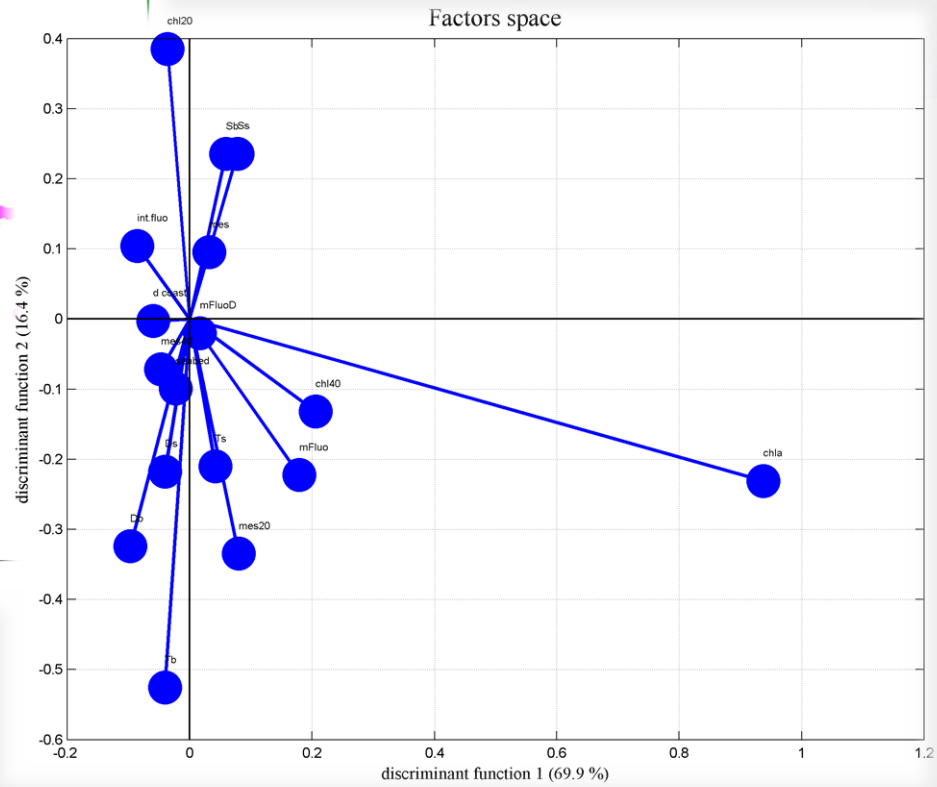


Links with environmental factors





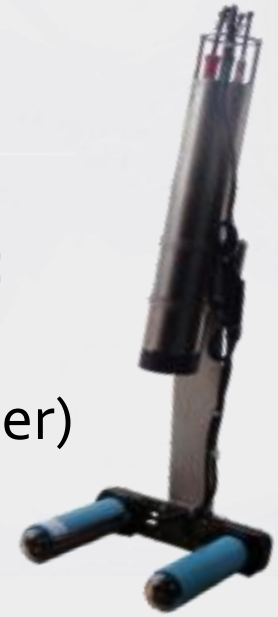
Factorial Discriminant Analysis



Conclusions

- Possibility to correct LOPC SS with use of wp2 nets and ZooScan…
- High variability but major gradients are observed
  - Coast – Offshore (different in Cantabrian Sea and French Shelf) and influence of estuaries
  - Vertical (stratification more important in French Shelf)
  - Inter-annual (coastal area more variable)
- Link with remotely sensed chlorophyll-a
  - Zooplankton distribution more linked to phytoplankton communities than physical factors

Perspectives

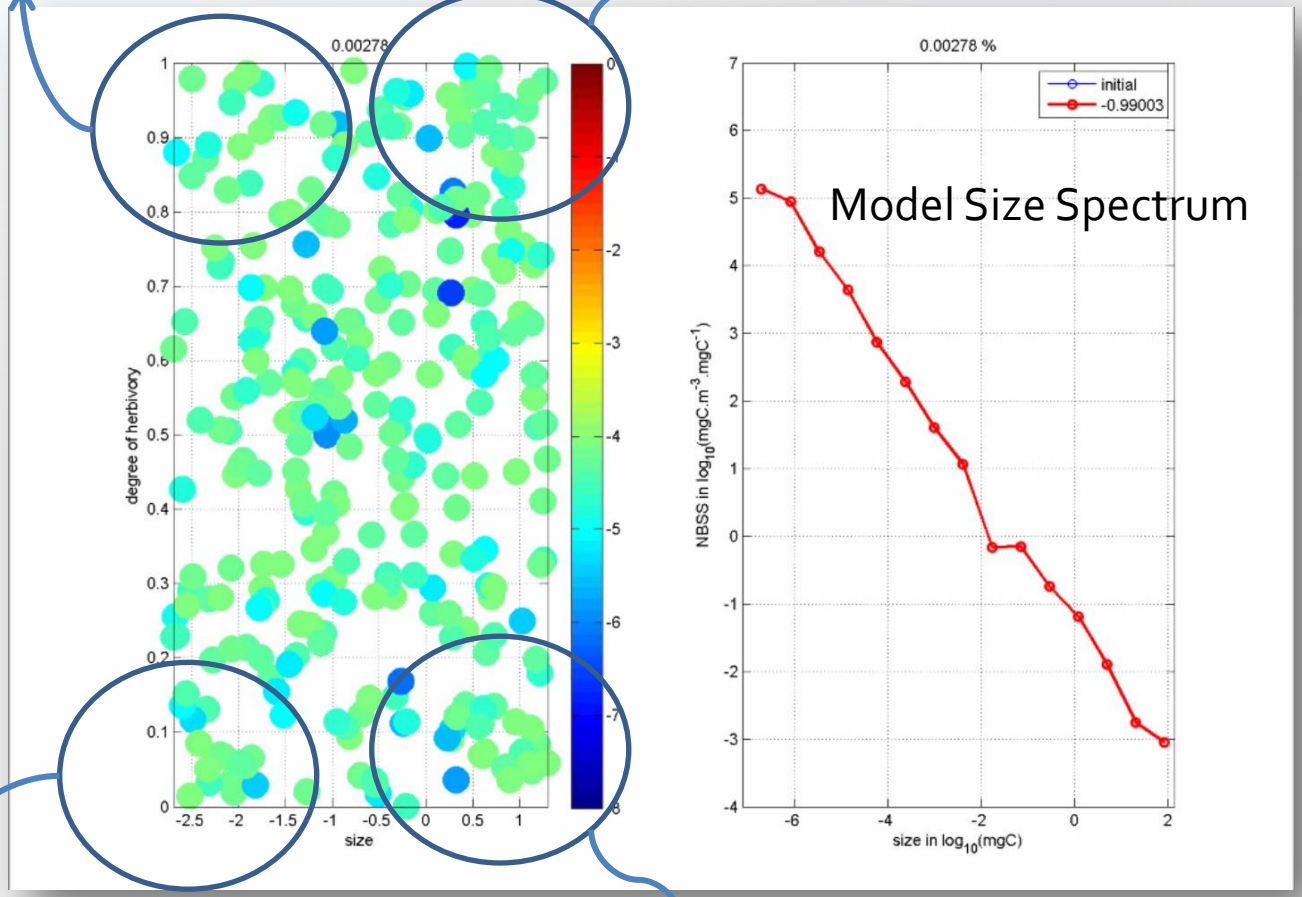


- Need to improve the quality of the measure:
  - Need to scan more samples
  - Use of new instrument (Underwater Video Profiler)
  - Third leg of Pelgas12
- Analysis of LOPC data made in Autumn (2003, 2005, 2007, 2009) -> no net samples analyzed
- Use of these data to calibrate (compared) with models outputs… ->

Perspectives

small herbivores (pico/nano)

large herbivores (microphyto.)



Small detritivores

Large carnivores


gracias
por escucharme !