

Geography Seminar Series

Trinity College Dublin

February 11th 2009



University of Algarve
School of Technology

Are mudflats really flat?

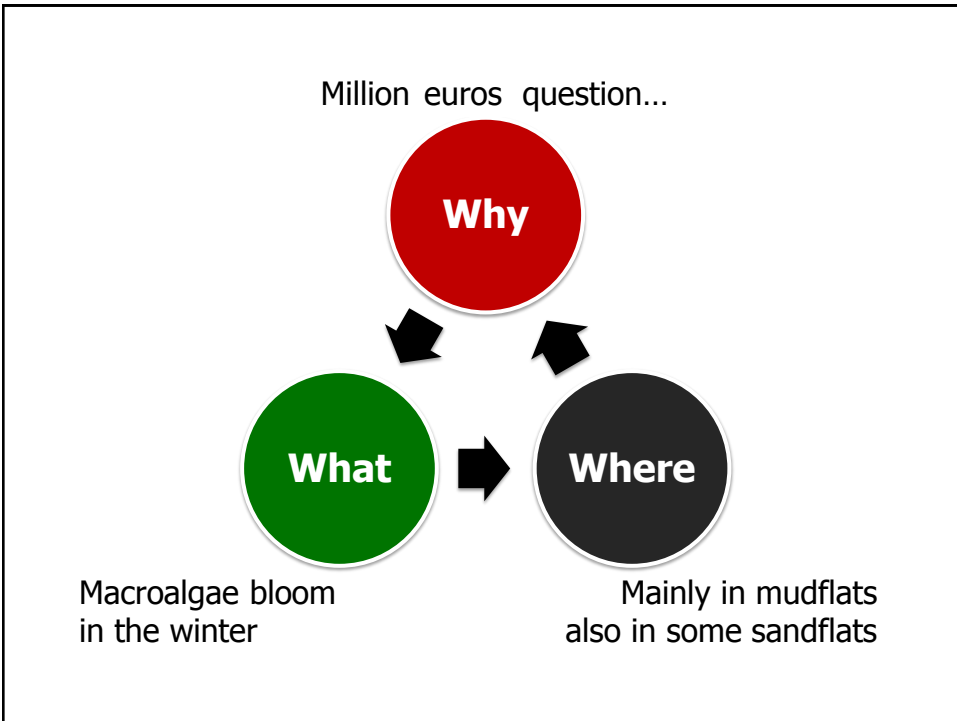
Jaime Aníbal

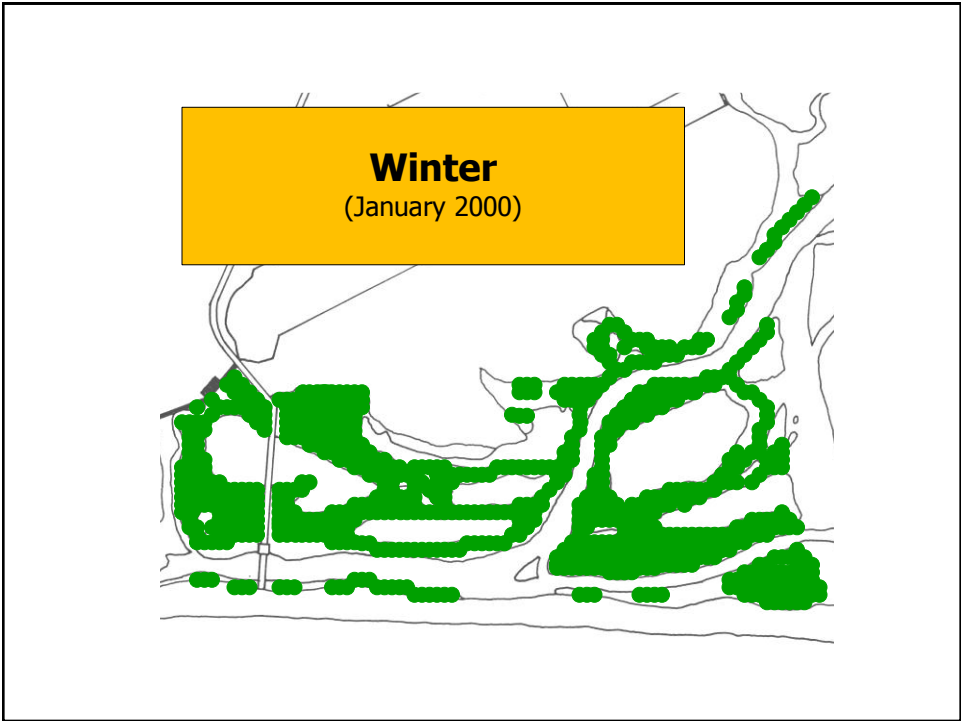
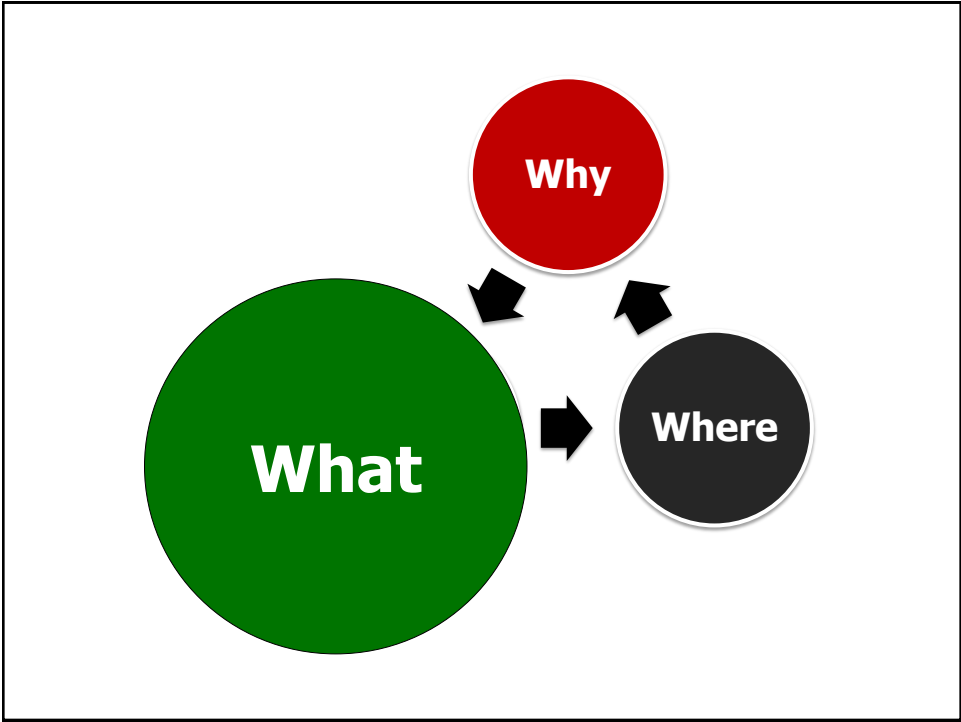
**A tale of shapes and blooms
in a temperate tidal lagoon**

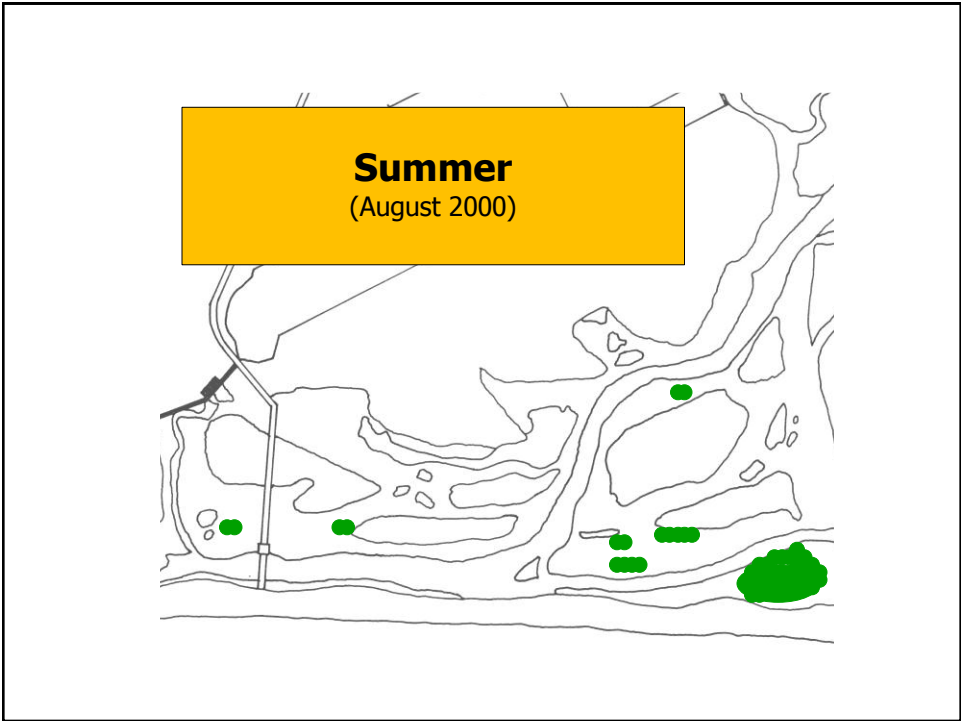
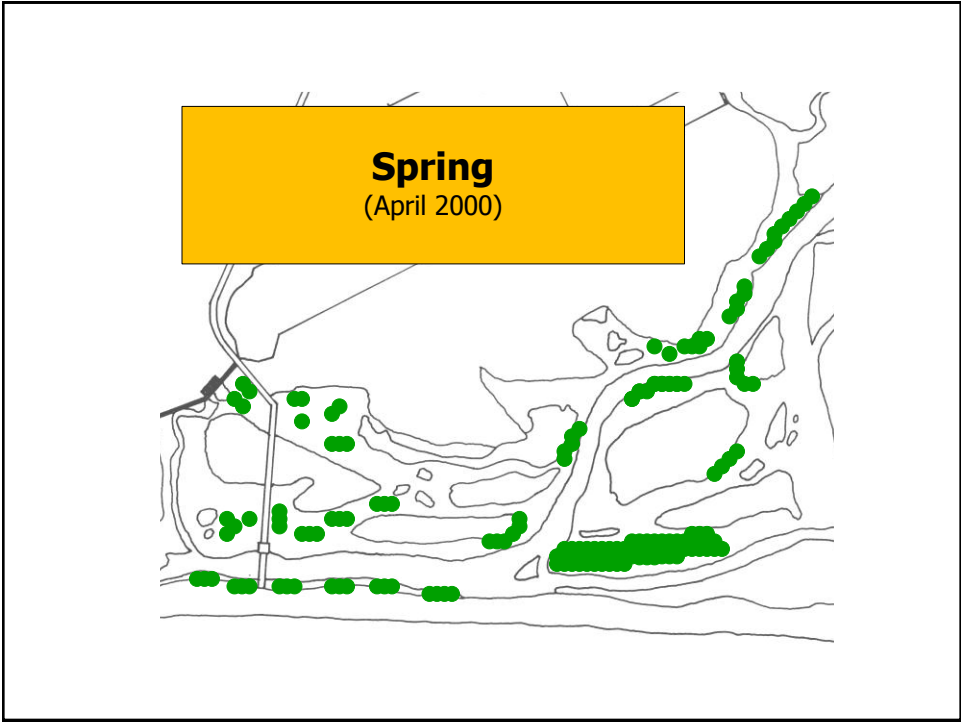
Ria Formosa, south Portugal

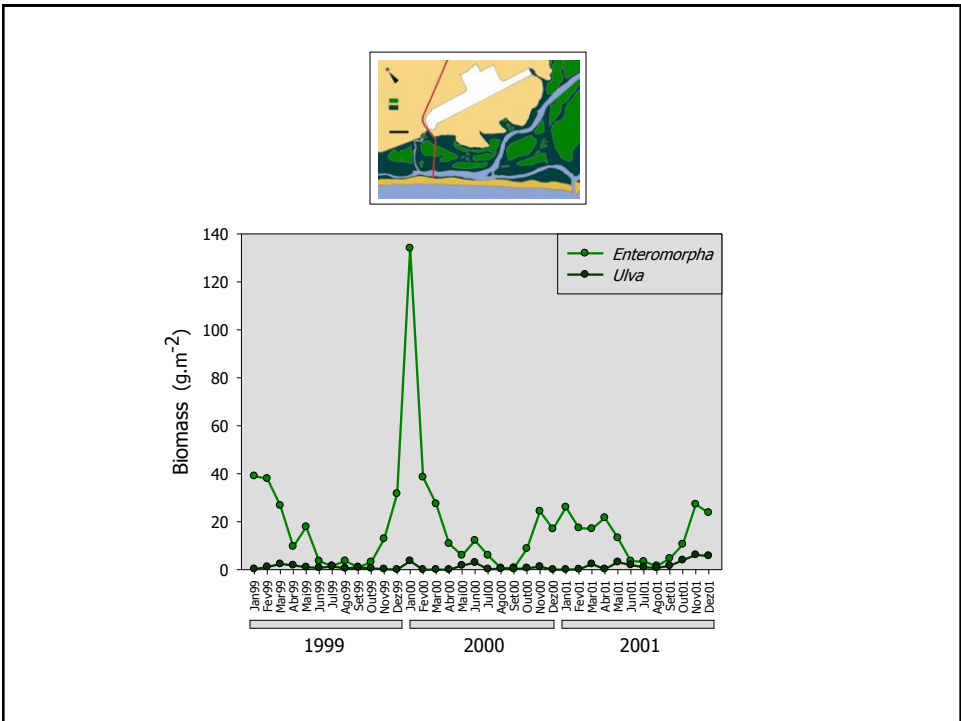
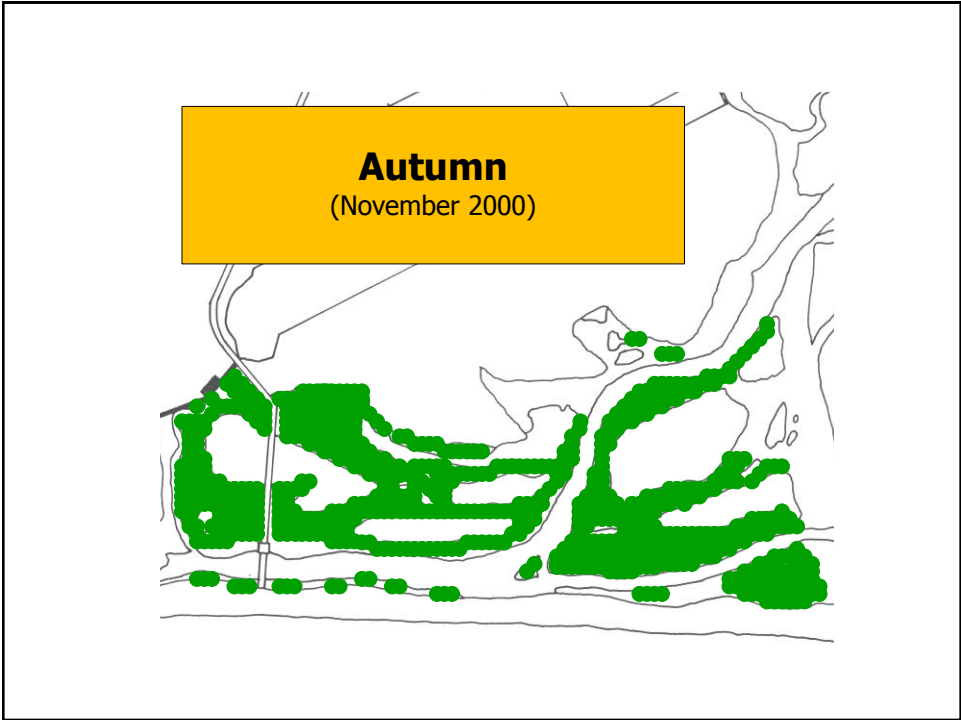


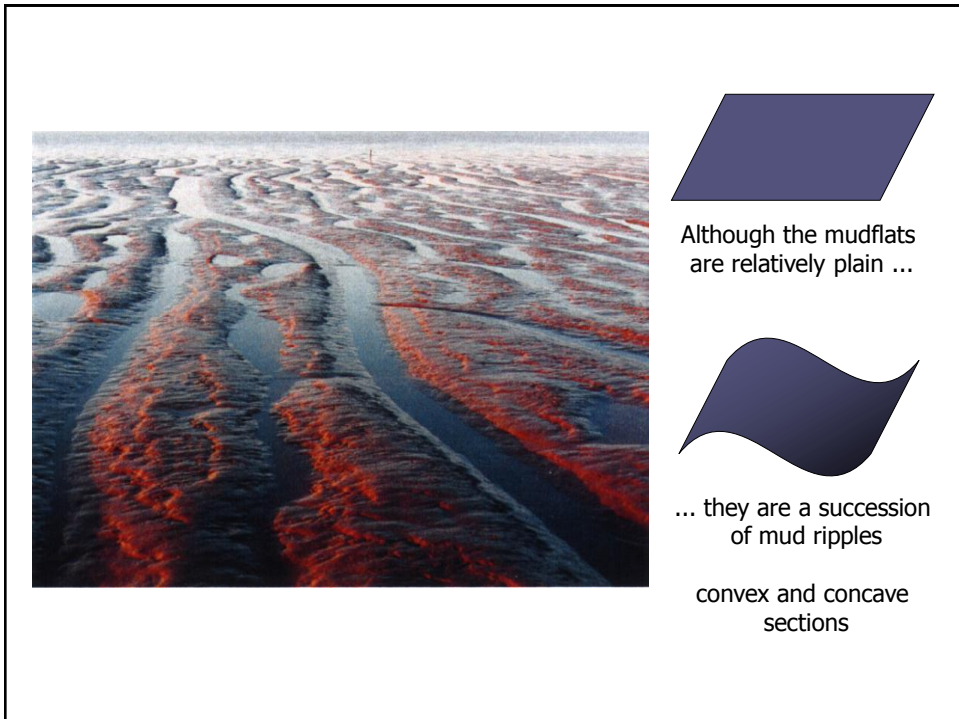
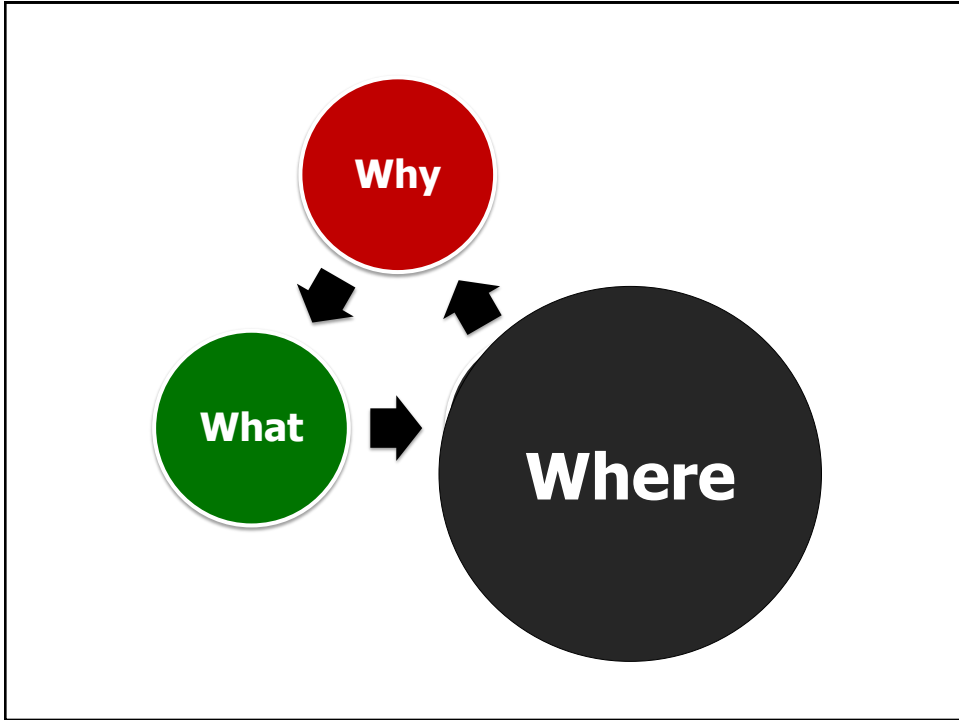
Center for Marine and Environmental Research

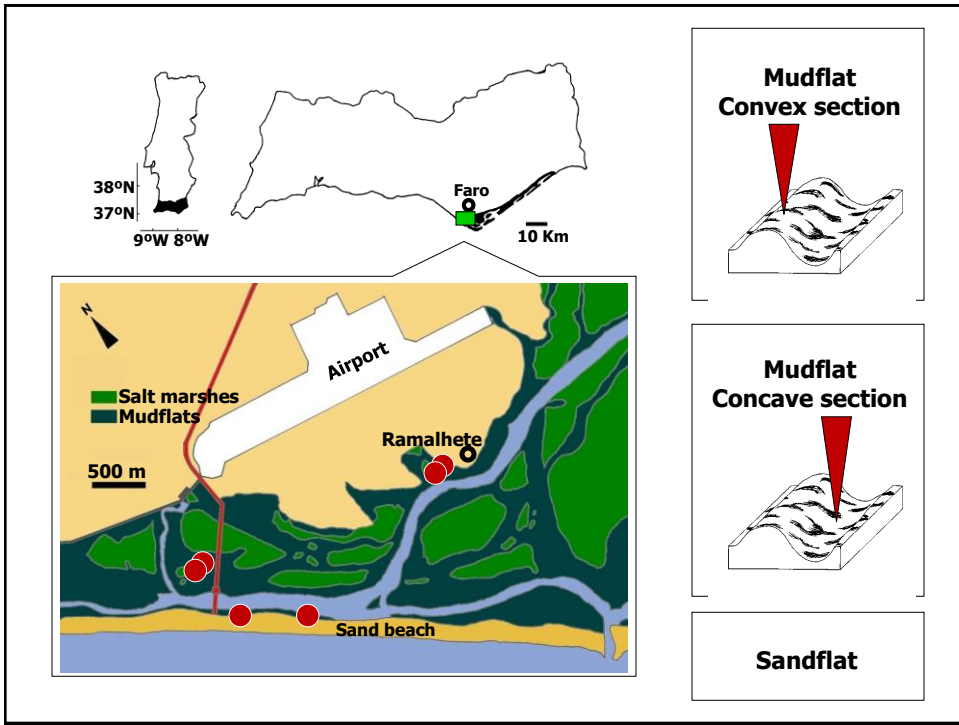


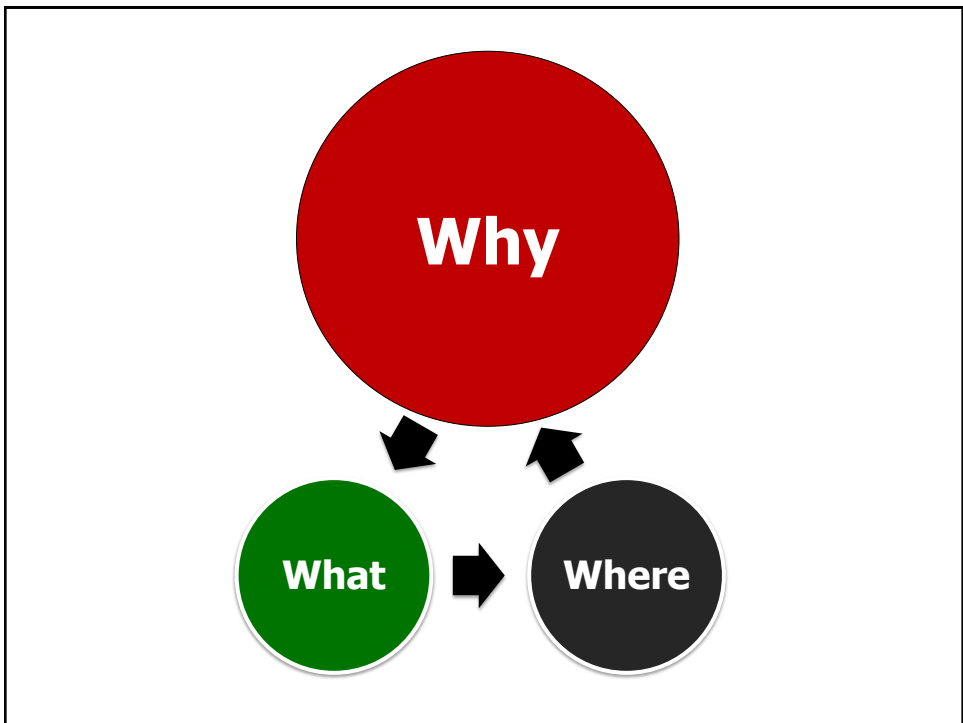
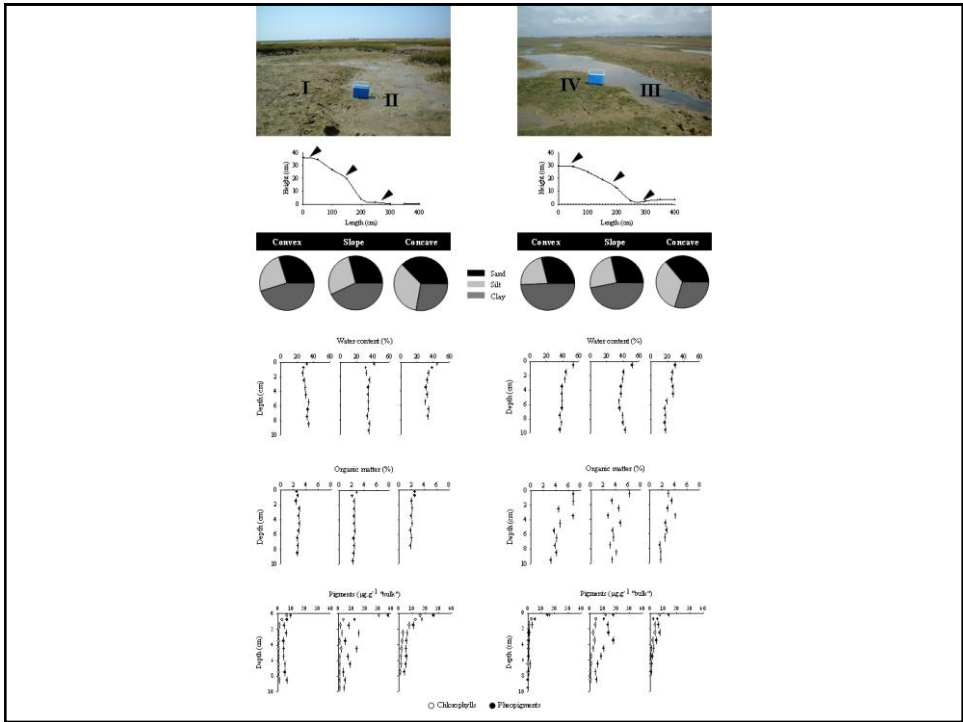


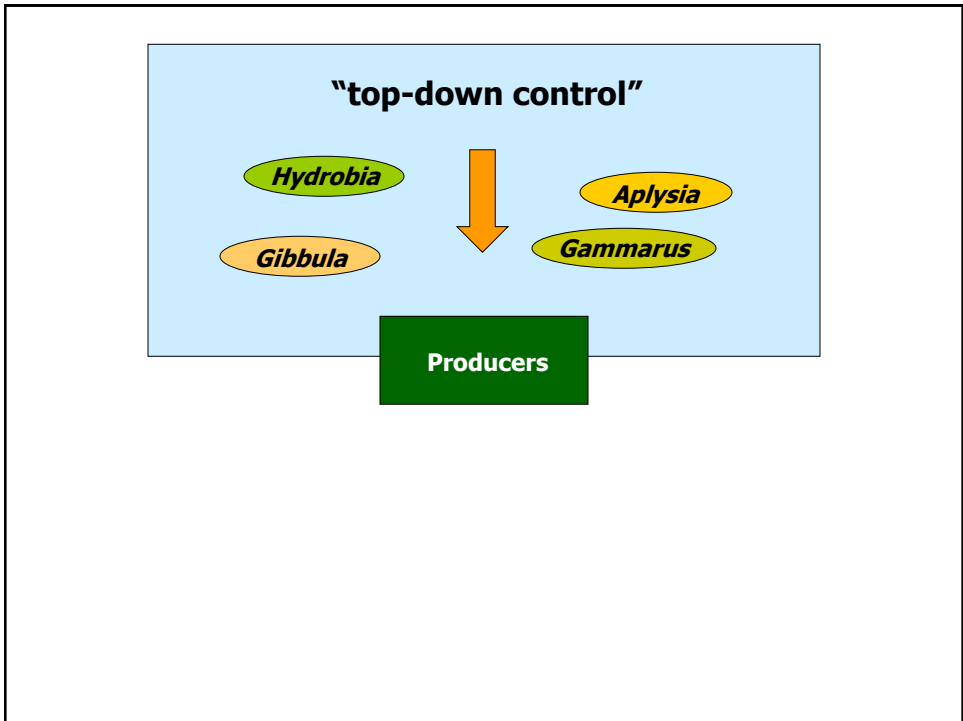
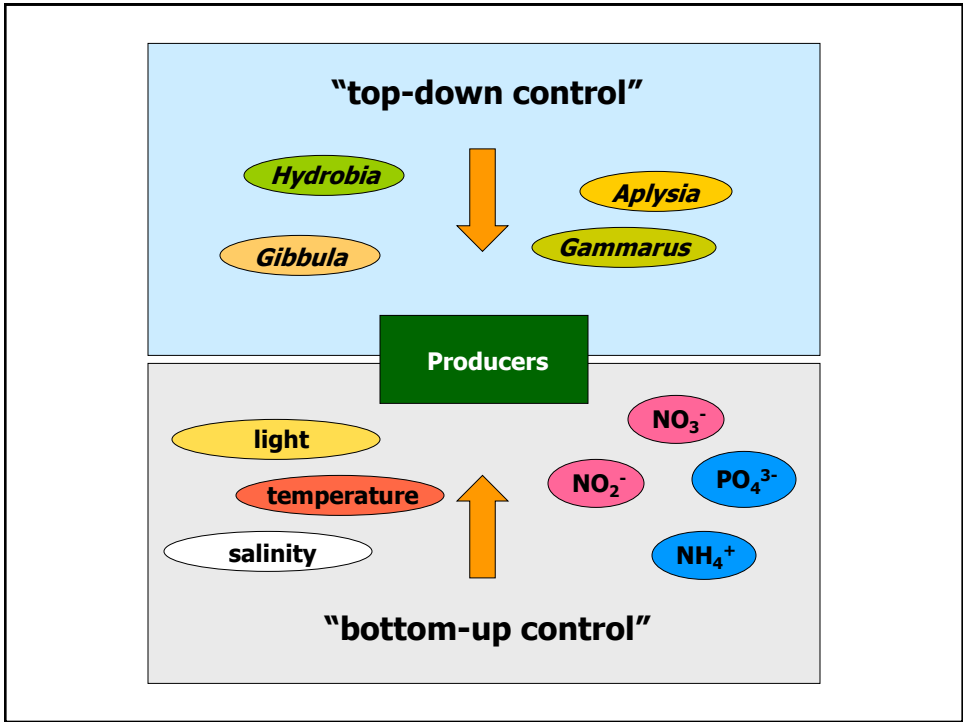




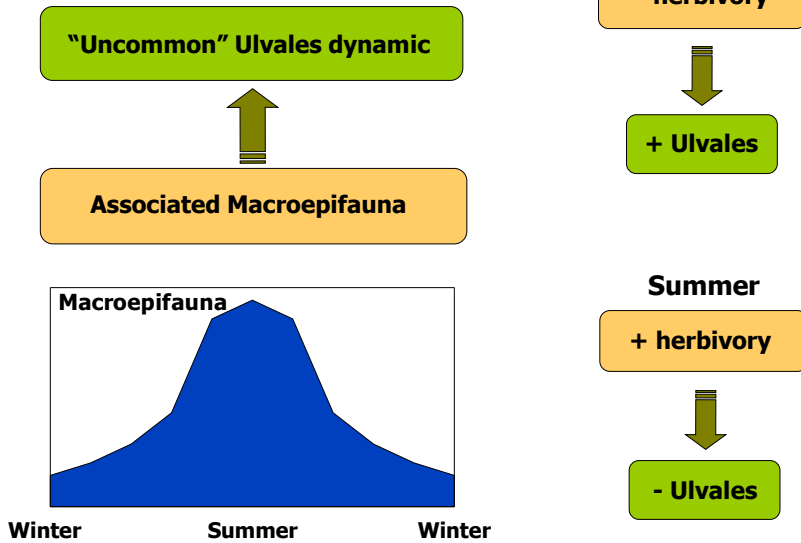






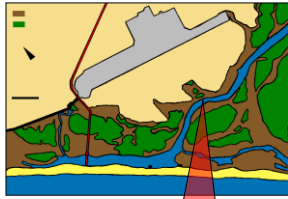


Hypothesis

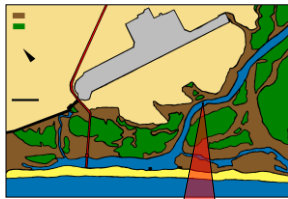
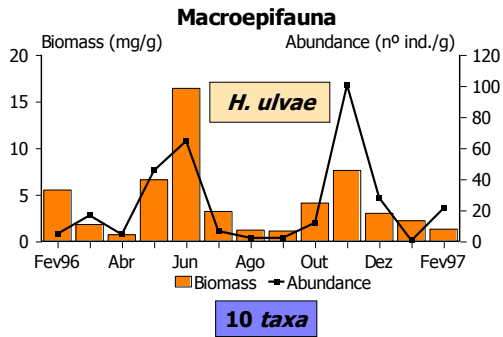
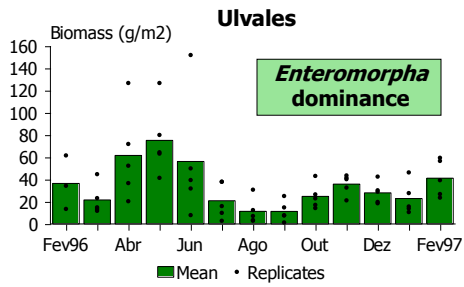
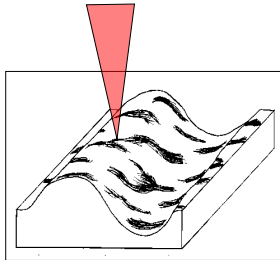


Results

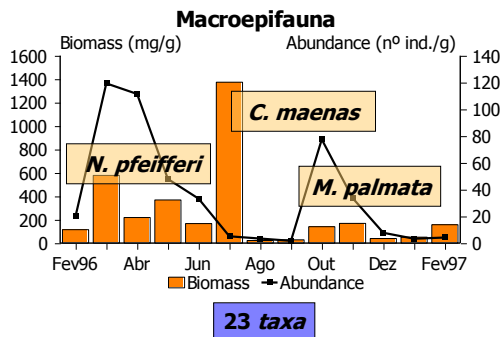
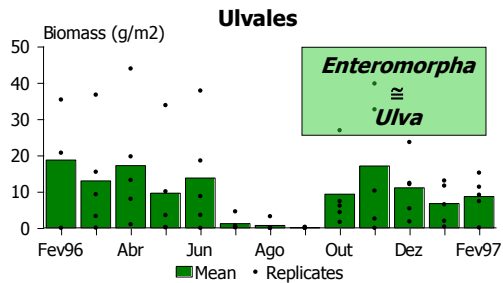
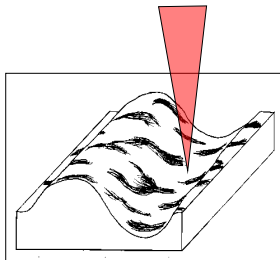
Ulvaes 2 taxa	Macroepifauna 28 taxa	Gastropods 10 sp.
<i>Enteromorpha</i> <i>Ulva</i>		Crustaceans 13 sp.
		Insects (larvae) 2 fam.
		Echinoderms 1 sp.
		Fishes 2 sp.

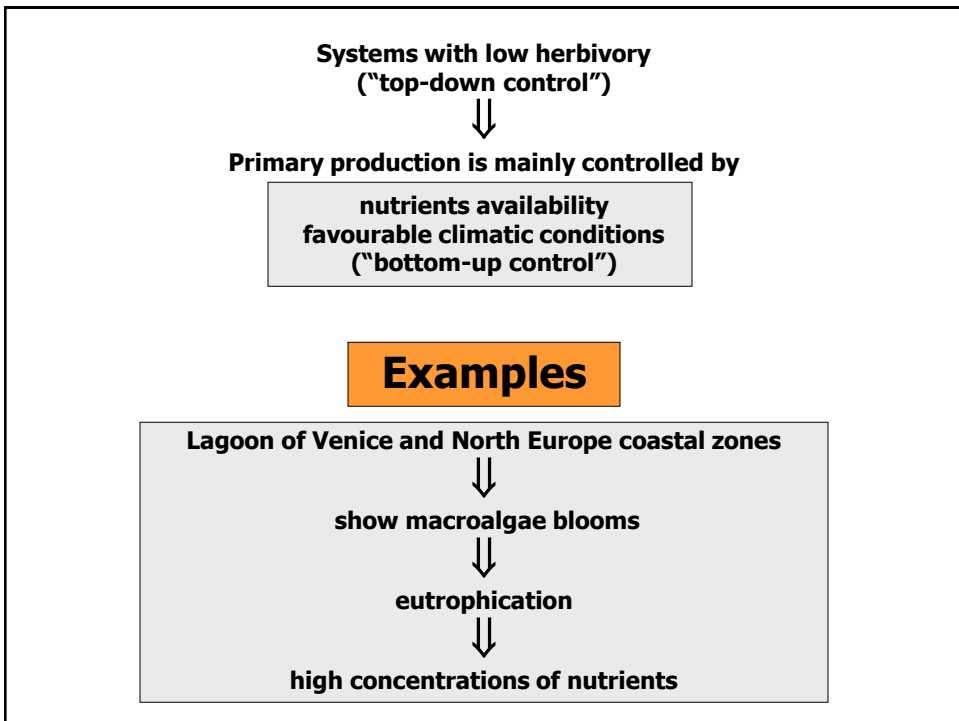
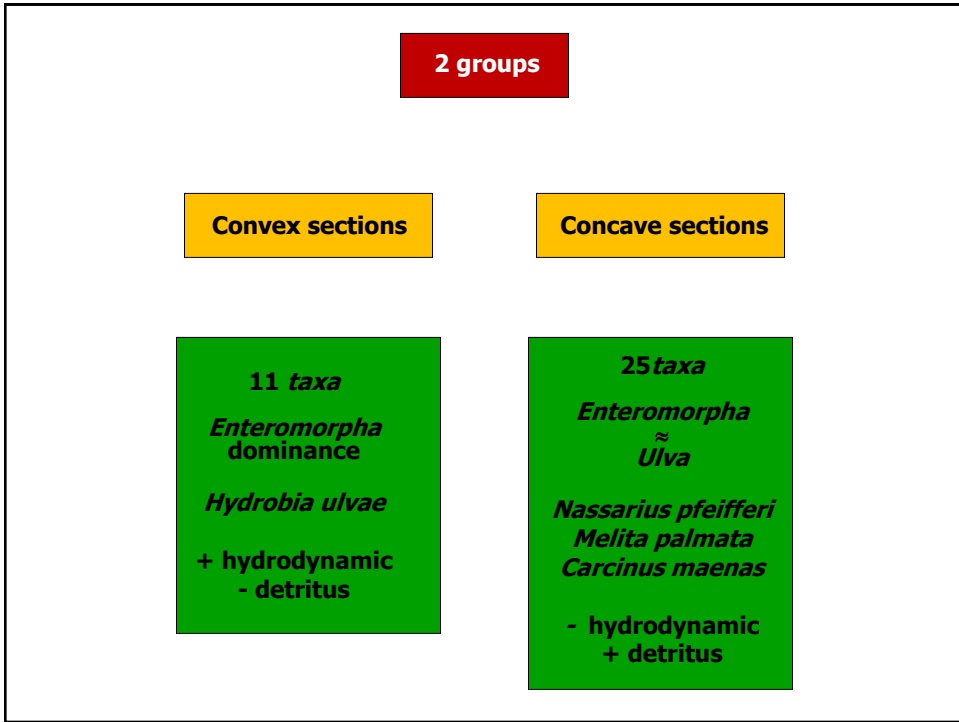


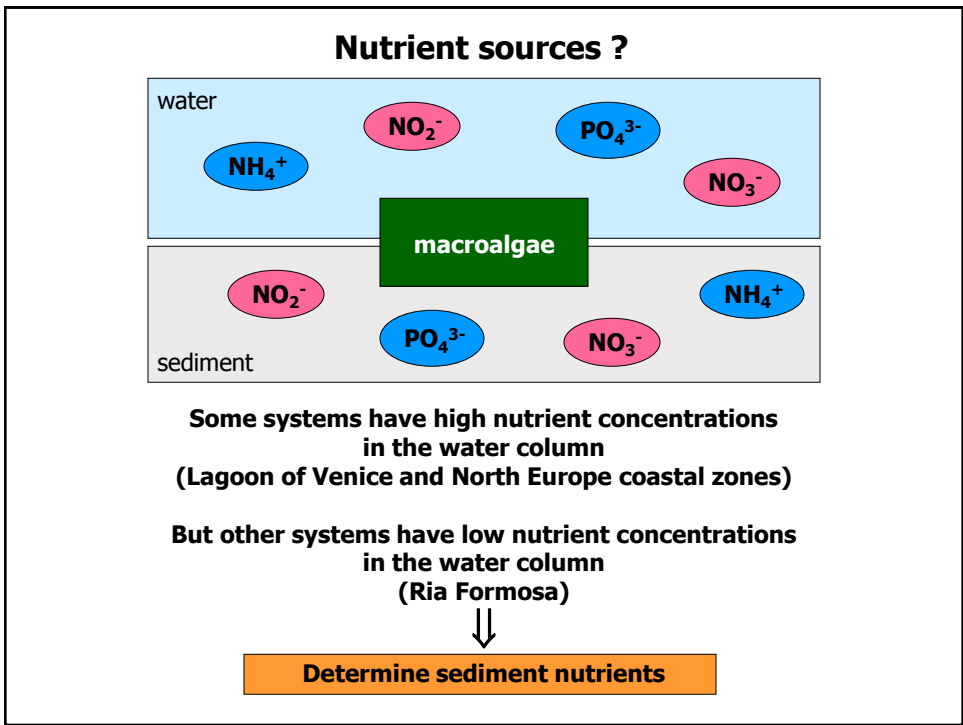
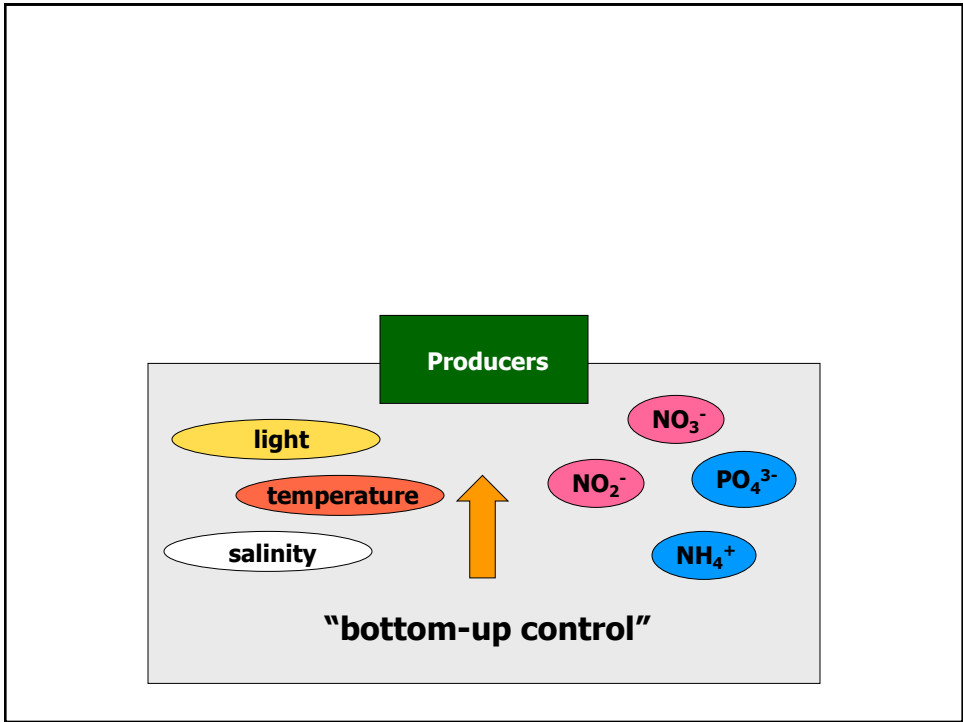
Mudflat Convex section

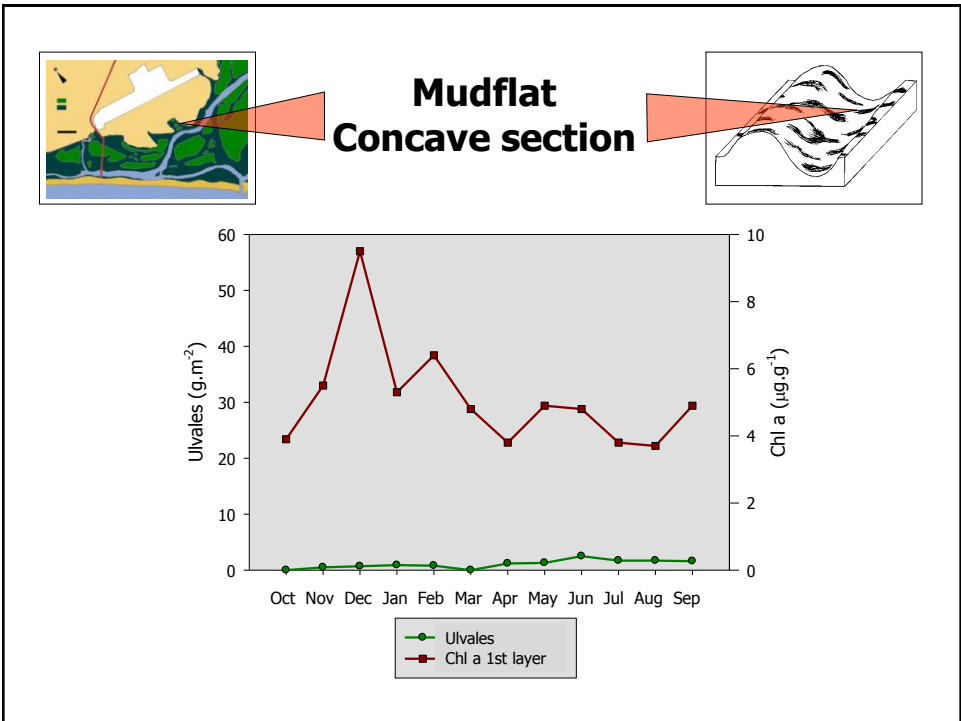
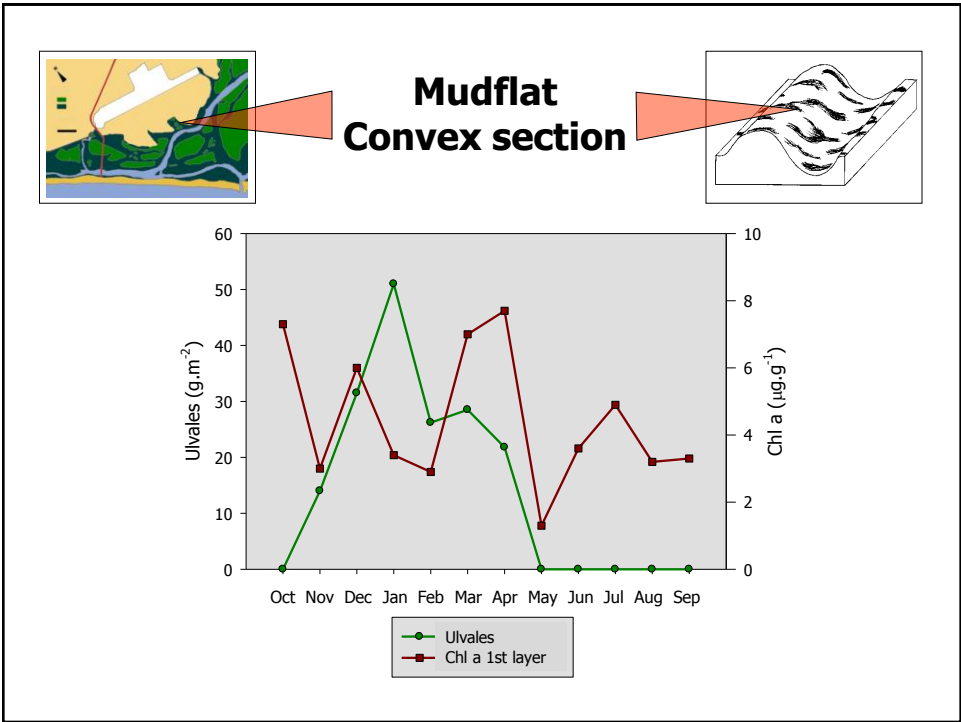


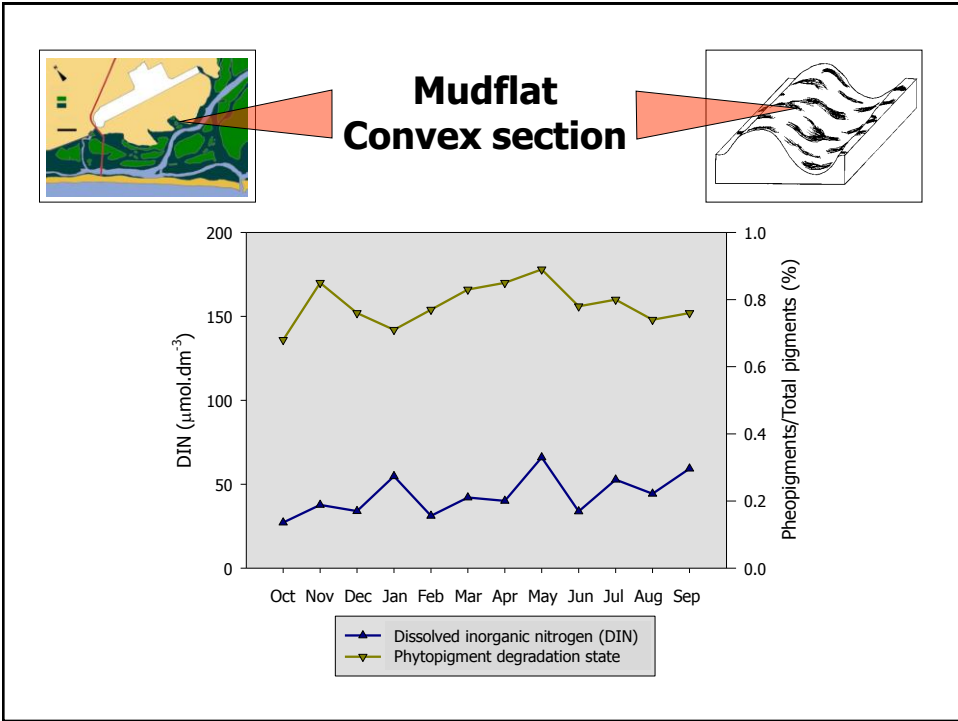
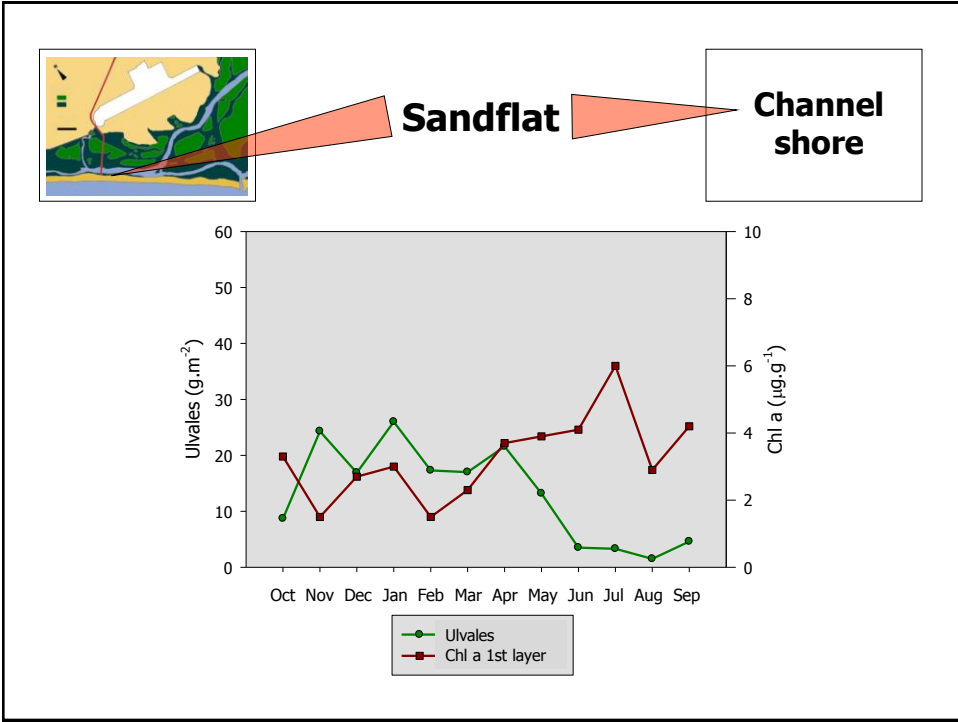
Mudflat Concave section

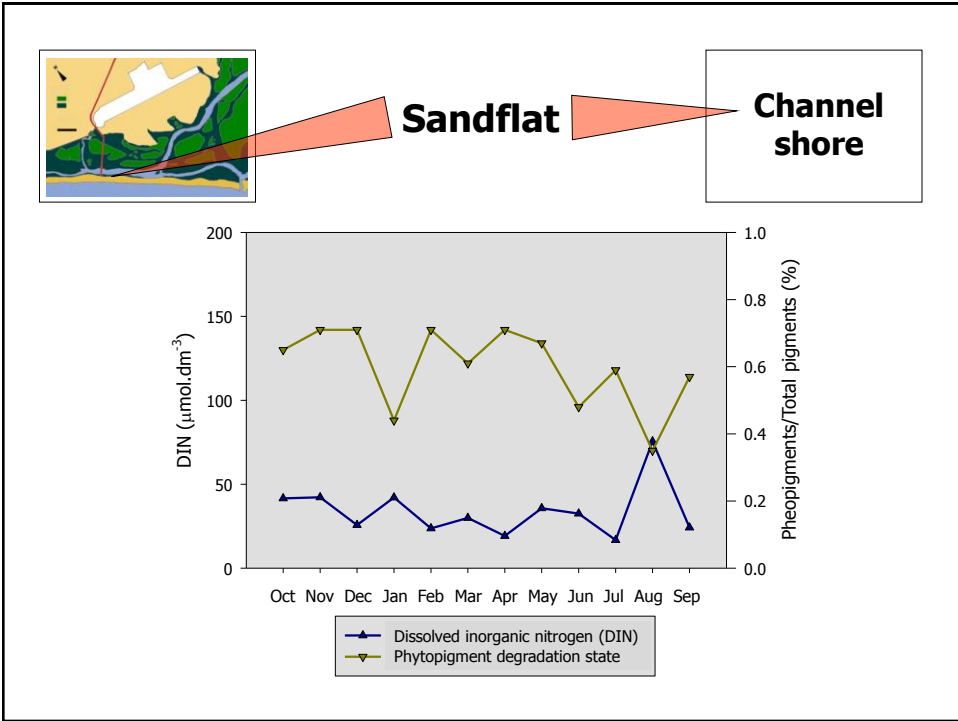
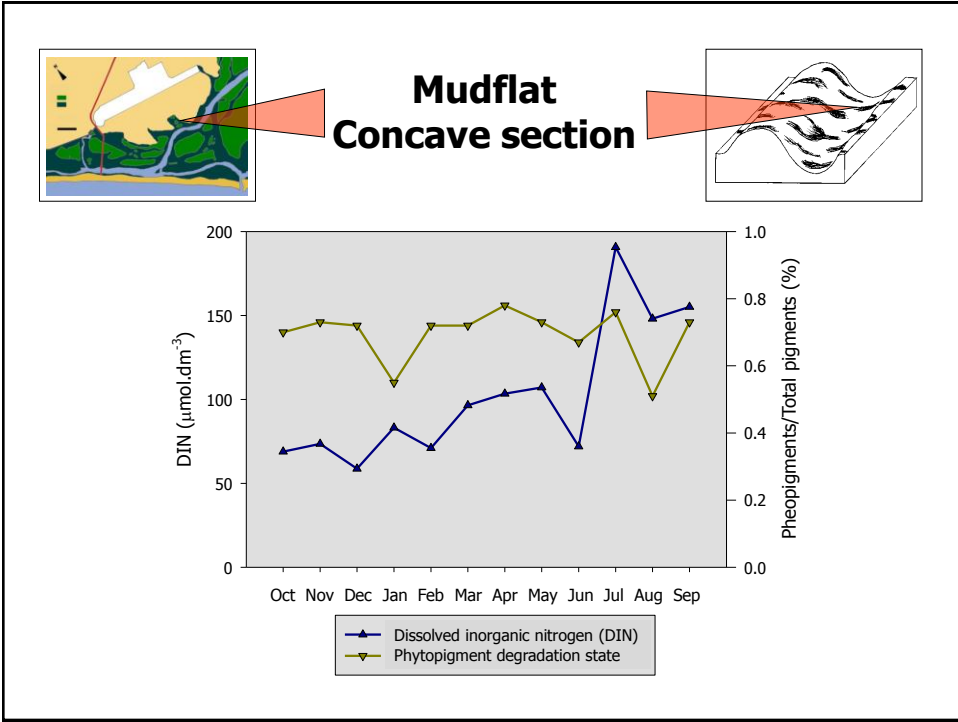


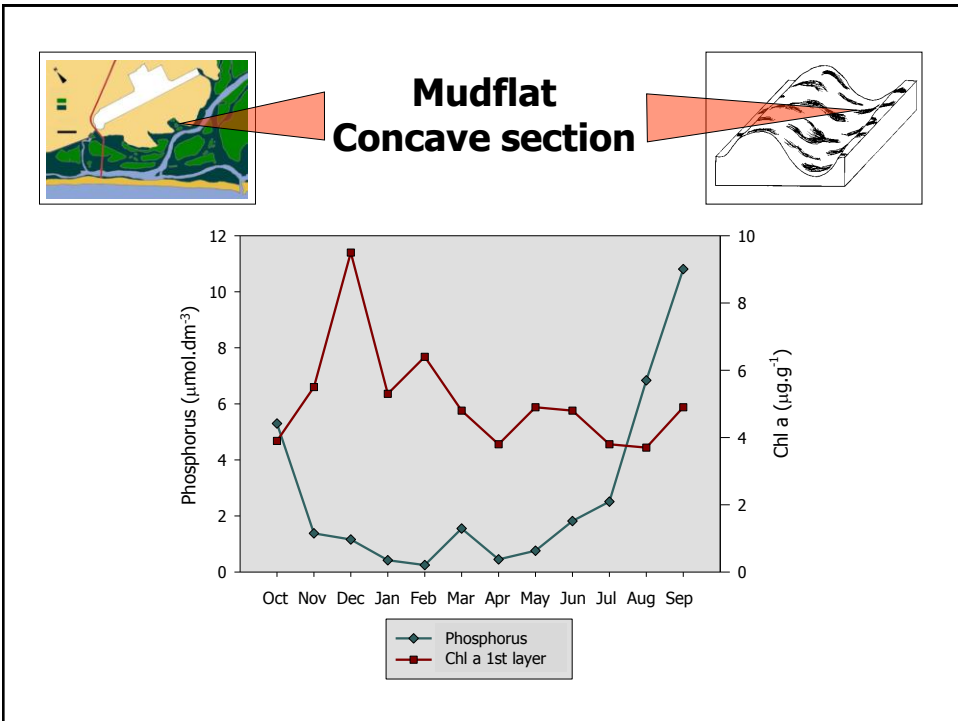
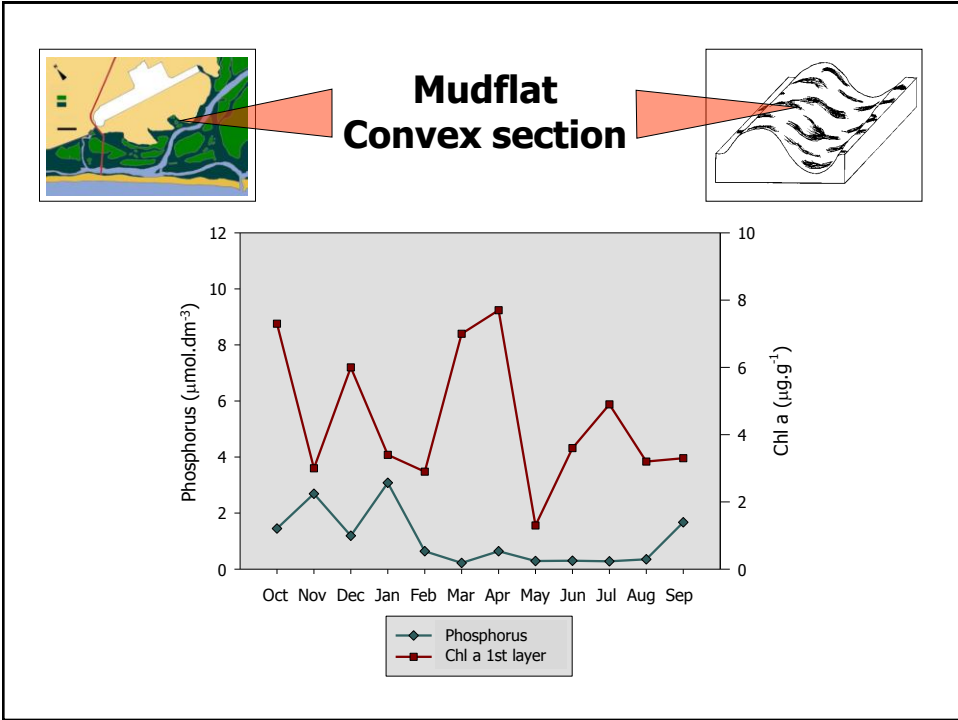


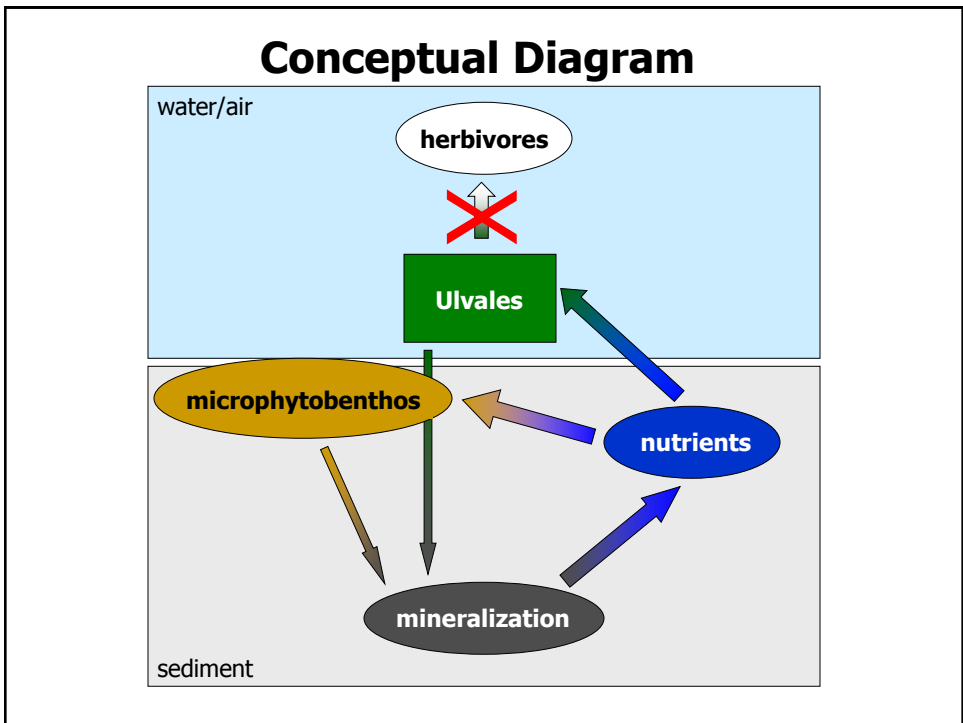
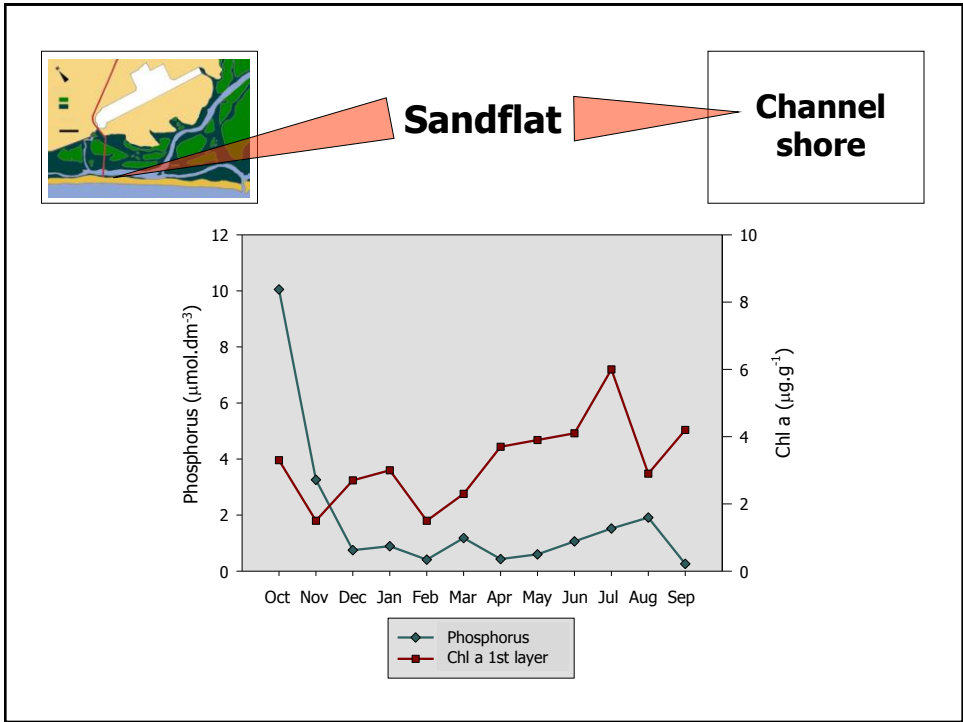












Discussion

Ulvaes dynamics is probably controlled by two key moments

1) Bloom beginning

- temperature decrease
- photoperiod decrease
- high nutrient reserve concentrations in the sediment

2) Bloom decaying

- temperature increase
- photoperiod increase
- solar radiation increase
- air relative humidity decrease

Annual Ulvaes dynamics may happen in two phases

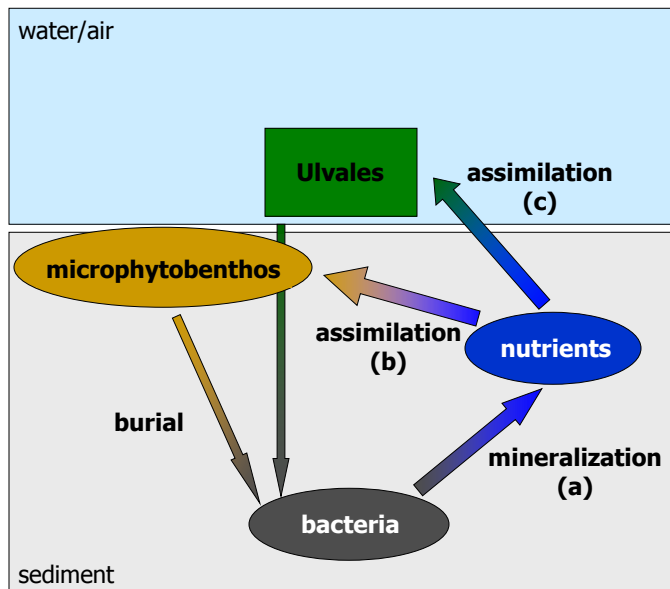
1) High primary production (October to May)

Nutrient competition between macroalgae and microphytobenthos
 ↓
 Controls the nutrient availability to Ulvaes

2) Low primary production (May a September)

Photoinhibition and desiccation
 ↓
 Organic matter increase
 Higher remineralisation
 Higher nutrient concentration

Conceptual Diagram

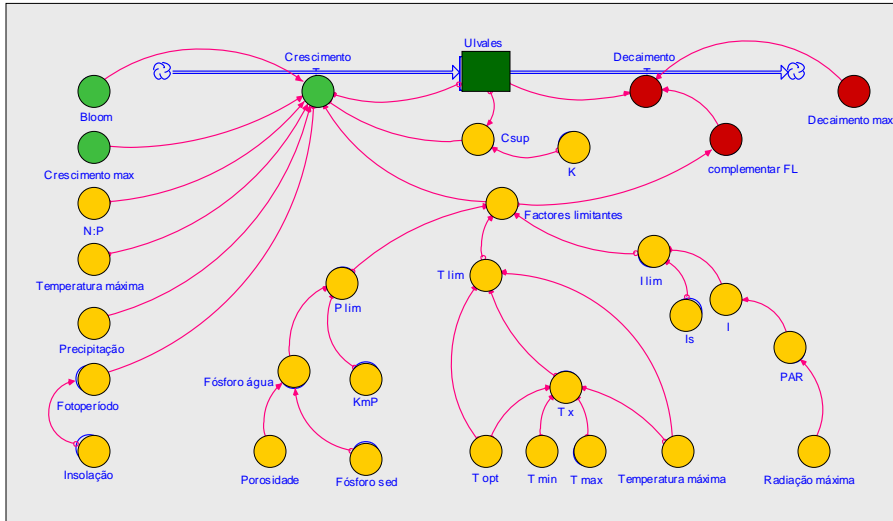


When:
 (a) increase
 (b) increase
 microphytobenthos bloom

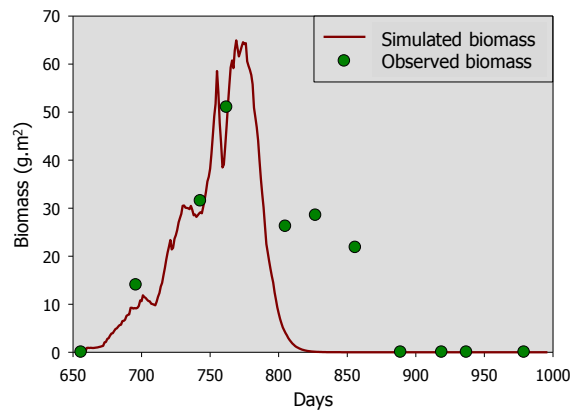
When:
 (b) = (a)
 microphytobenthos maximum

When:
 (b) > (a)
 microphytobenthos collapse
 ↓
 burial
 ↓
 mineralization
 (a) > (b)
 (c) > 0
 Ulvaes bloom

Conceptual Diagram (STELLA®II)

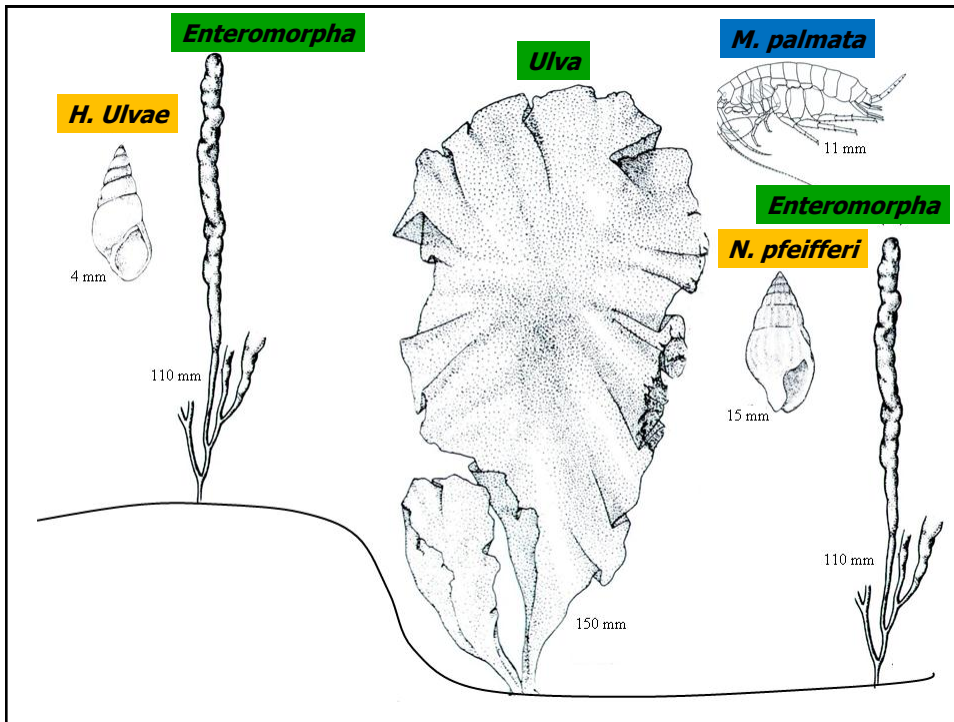


Observed biomass vs Simulated biomass



Model II regression + ANOVA
 $\text{sim} = 0,586 \text{ obs} - 1,075$; $p < 0,005$; $n = 11$; $r^2 = 0,604$

Spearman correlation
 $r = 0,863$; $p < 0,001$; $n = 11$



Thank you!

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