



# Size diversity of phototrophic microplankton under different trophic and hydrodynamical conditions

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## OBJECTIVES OF THE AIMS PROJECT

**Development and test of automated techniques for identification and characterisation of phytoplankton and bacteria population using analytical flow cytometry.**

**-Phytoplankton identification with neuronal network, based on the optical properties of single cells measured by flow cytometry**

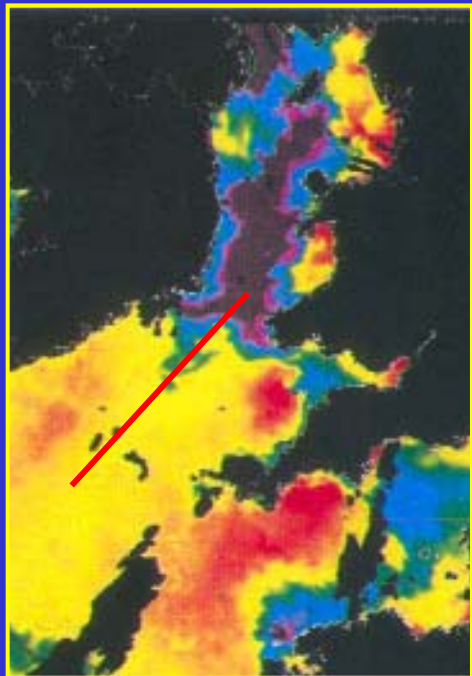
**-Provide algorithms that convert raw data from flow cytometry into inherent properties like cell size, volume, carbon and pigment content.**

**However, commercial available flow cytometry is limited to cells  $<20\mu\text{m}$ , and the evaluation of AIMS developed methodologies during the field experiment (PROPHEZE CRUISE) requires the consideration of the importance of cells  $>20\mu\text{m}$  under different trophic and hydrodynamic conditions**

We present the microplankton size diversity and biovolume under the different hydrodynamic and trophic conditions found during the AIMS field evaluation cruise (PROPHEZE) carried out on the R/V Discovery in May 2000.

### Sample sites

#### Celtic Sea

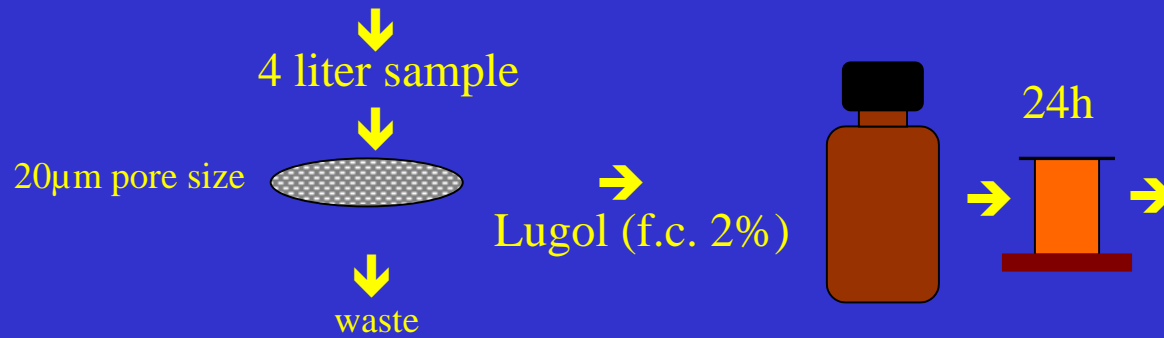


Surface Temperature

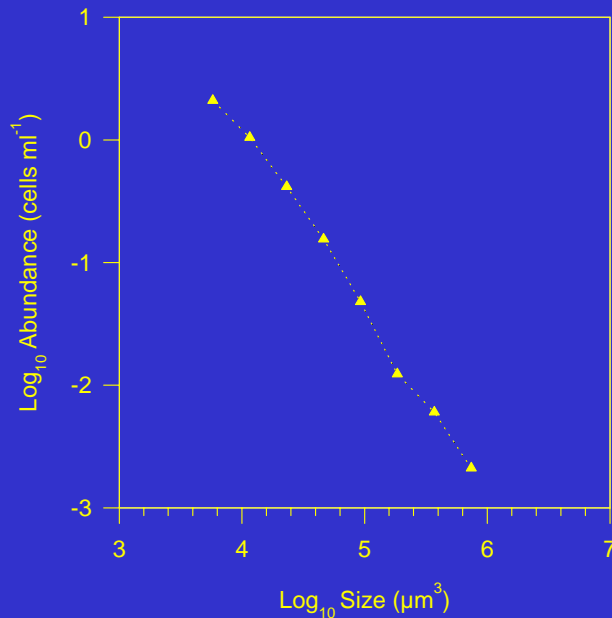


# Sample treatment and elaboration of the Size Abundance Spectra (SAS)

## Rosette sampling



## Image Analysis



← Size-spectra

- a) classify cells in log2 size-classes
- b) Log<sub>10</sub> abundance vs. Log<sub>10</sub> size class

← cell size & abundance

↓  
 Biovolume

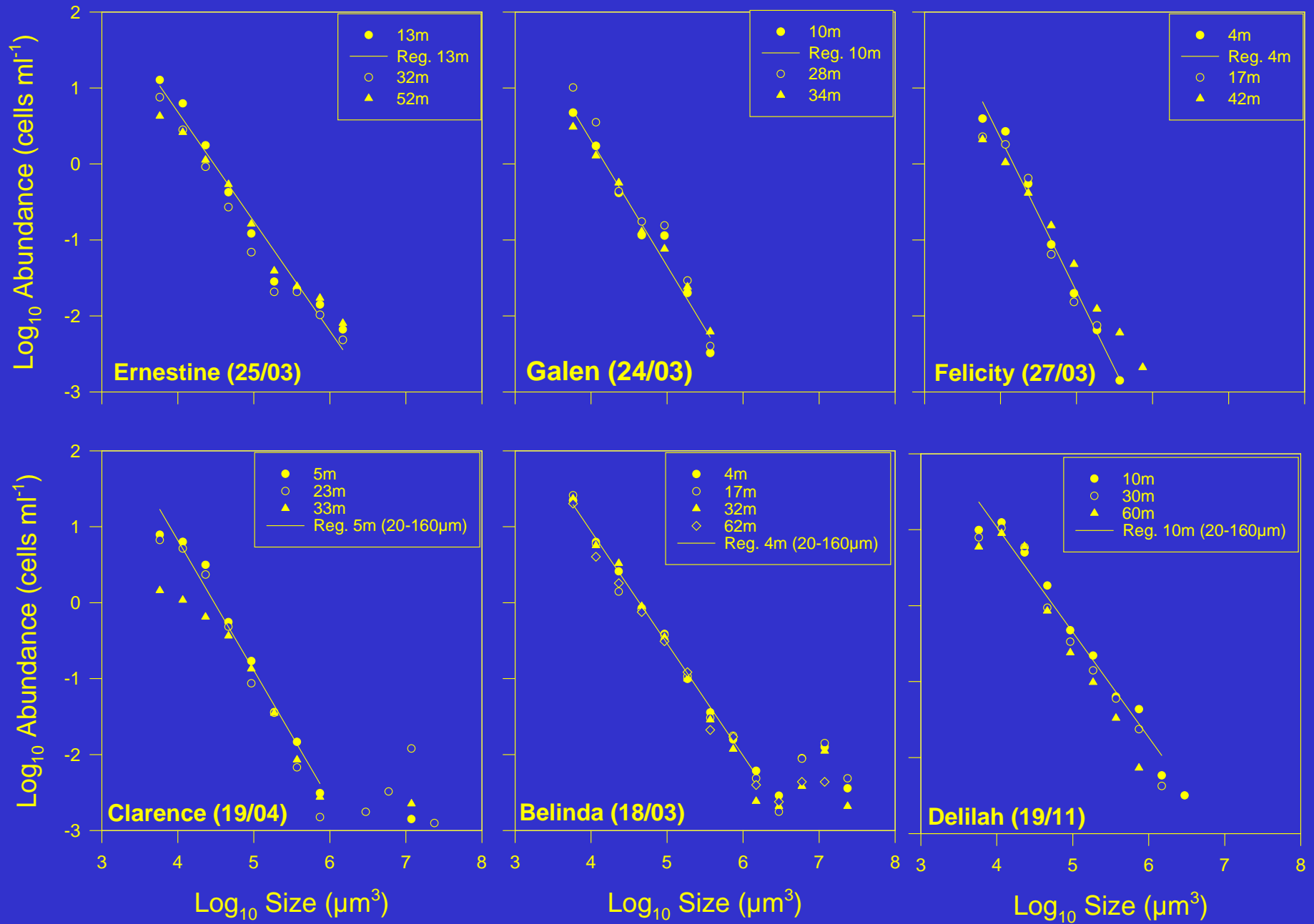
$$Bv = \sum bv_i * ab_i$$

Bv: Biovolumen

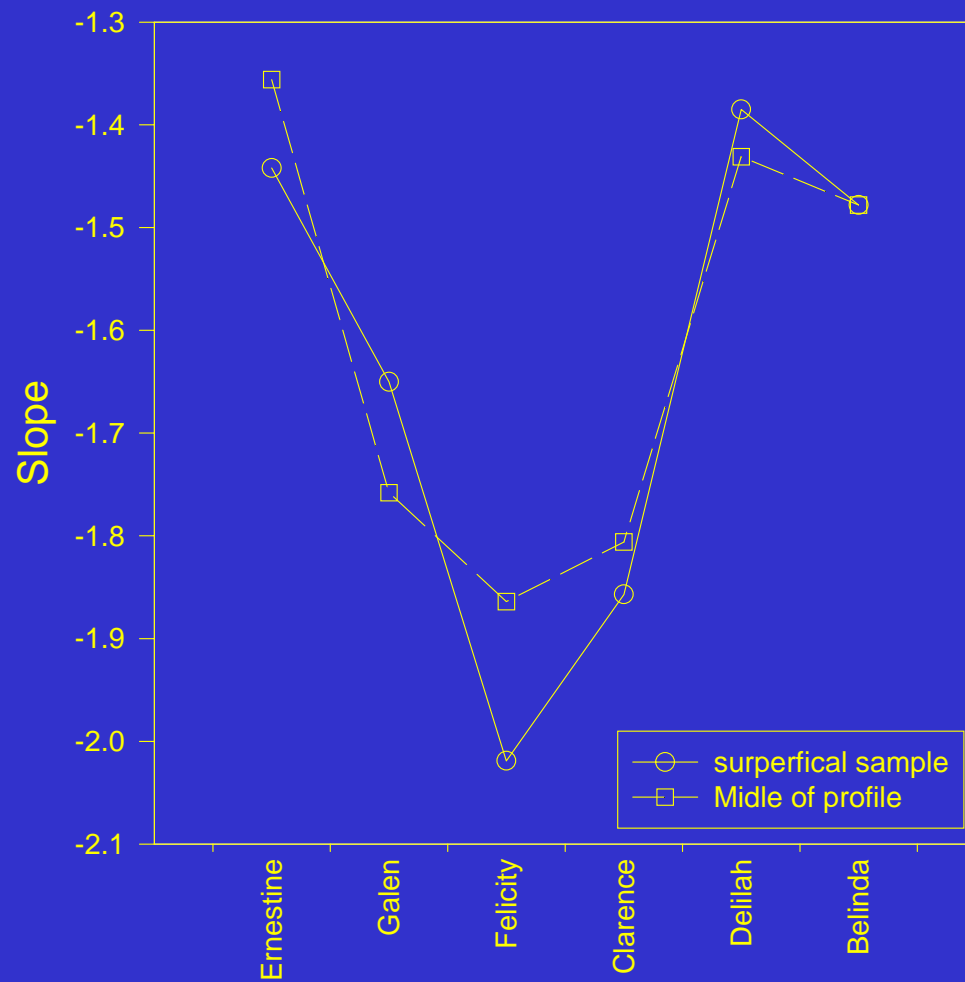
bv<sub>i</sub>: biovolume of cell <sub>i</sub>

ab<sub>i</sub>: abundance of cell <sub>i</sub>

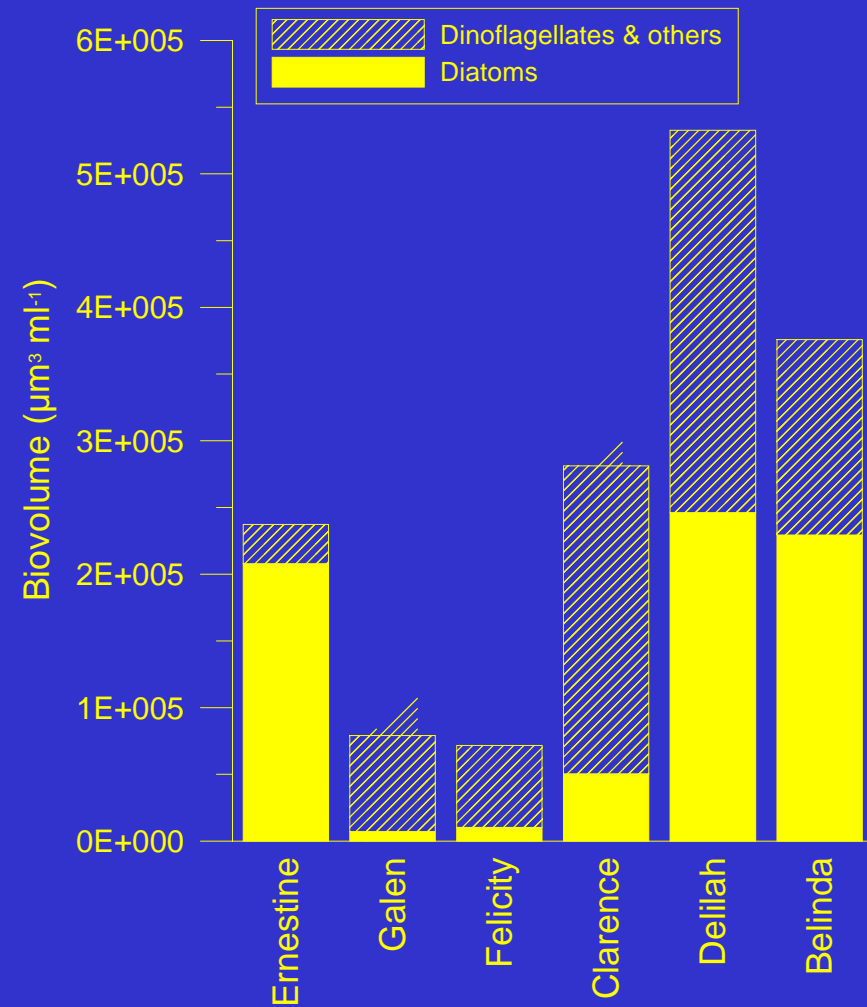
# SAS of phototrophic microplankton at 6 sample sites in the Celtic Sea



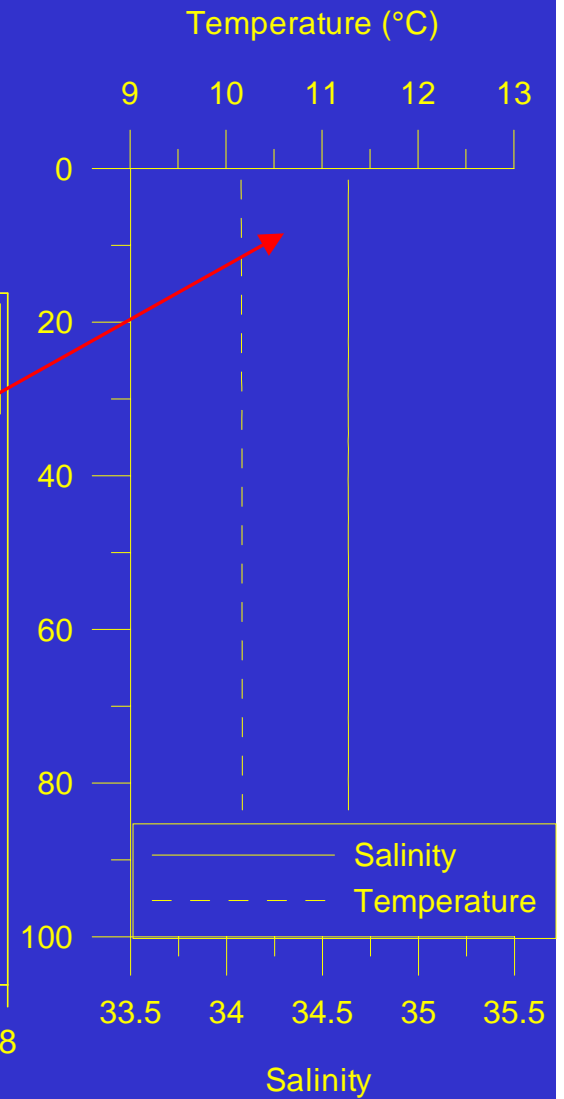
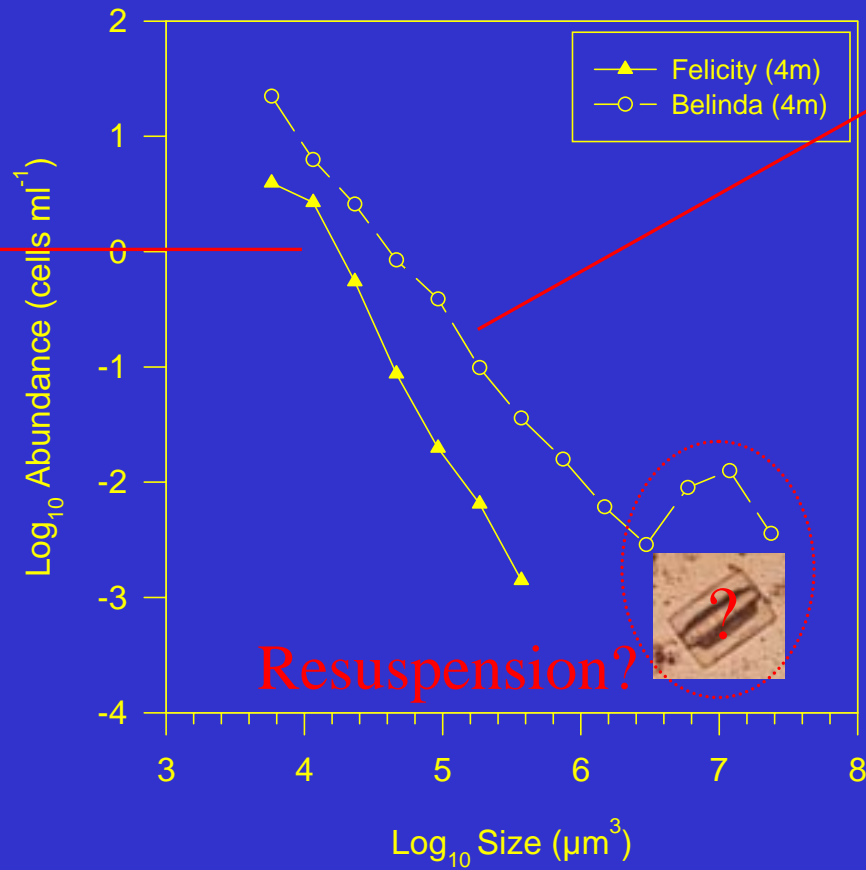
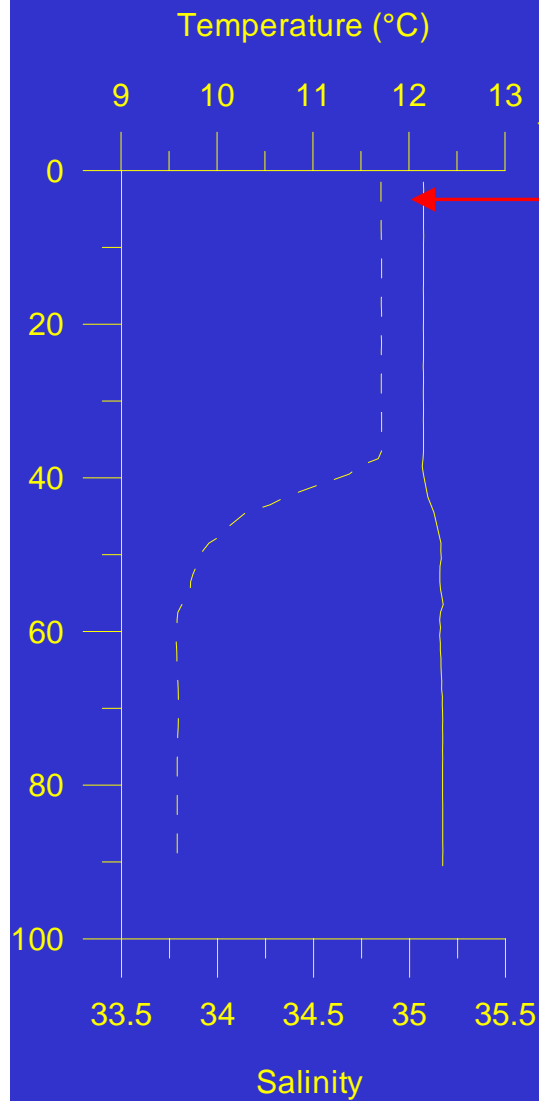
## Slope of the lineal part (20-160 $\mu\text{m}$ of the microplankton SAS



## Biovolume corresponding to the lineal part of the SAS at surface

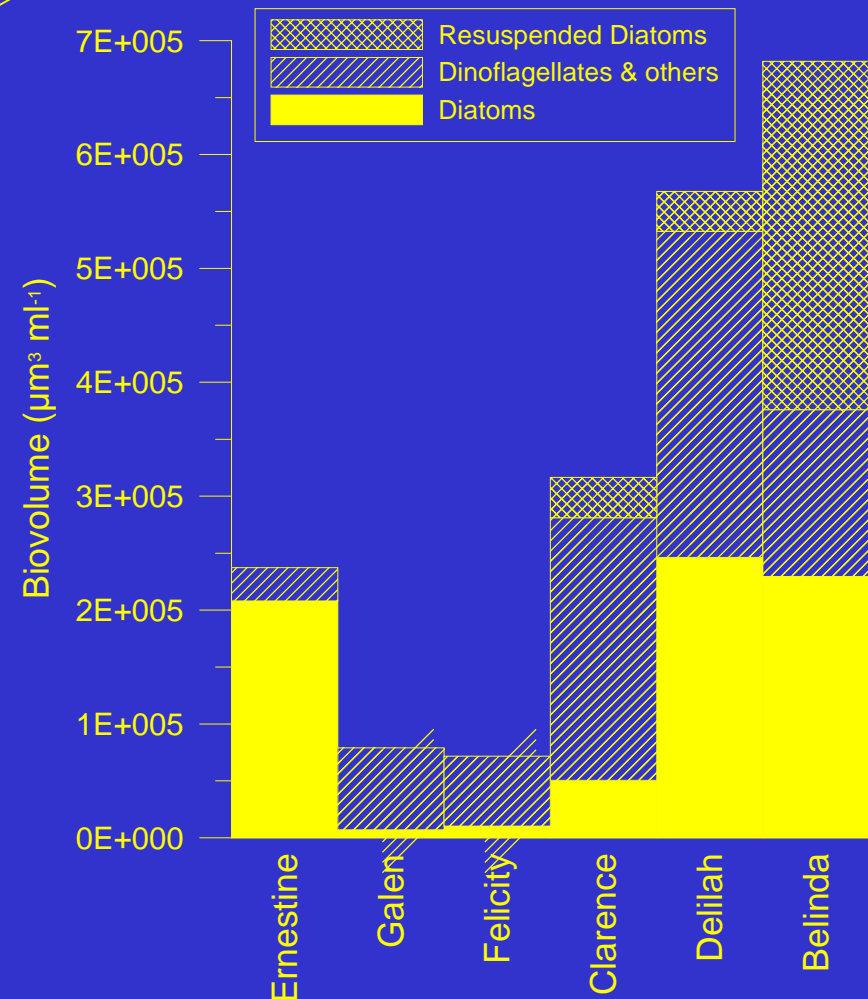
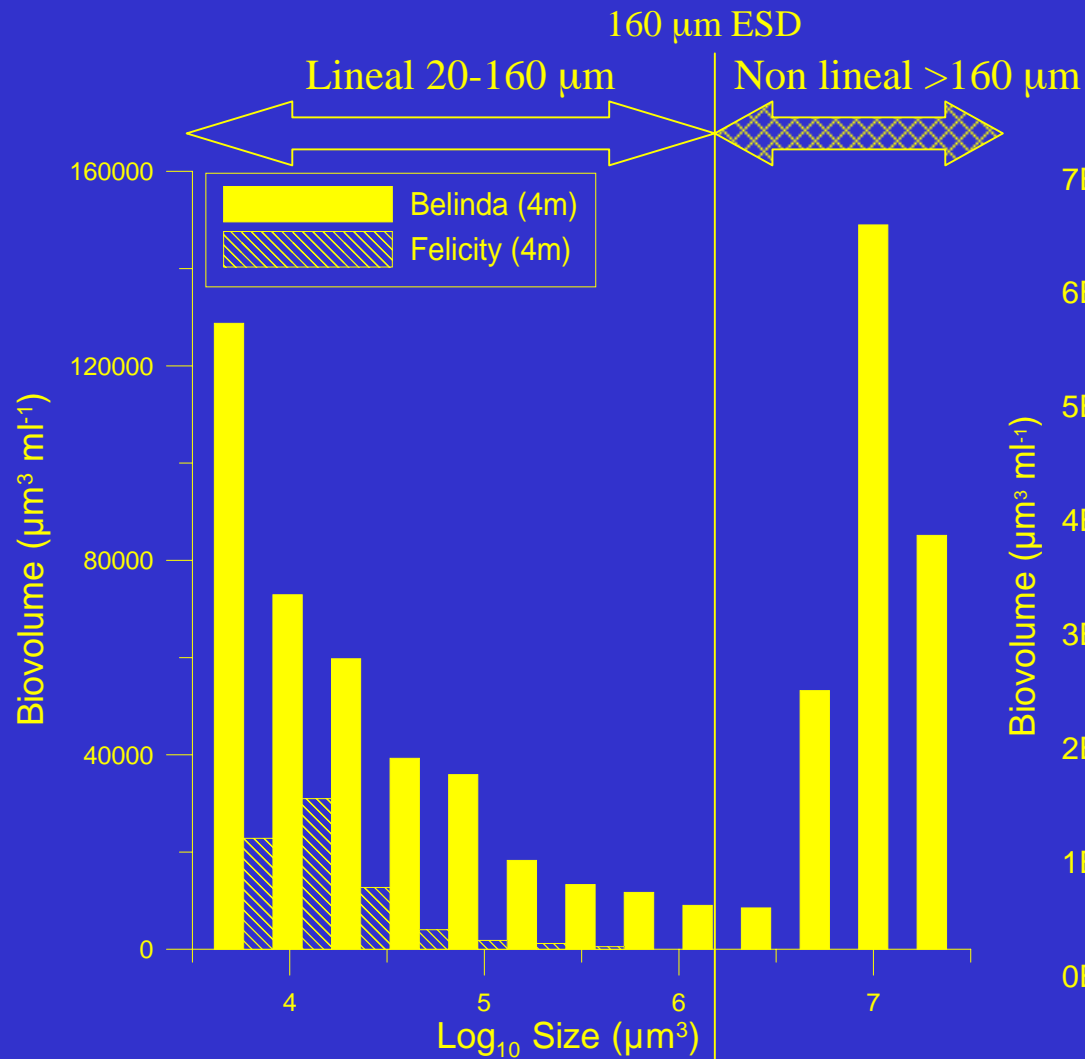


# SAS and Stratification of the water column

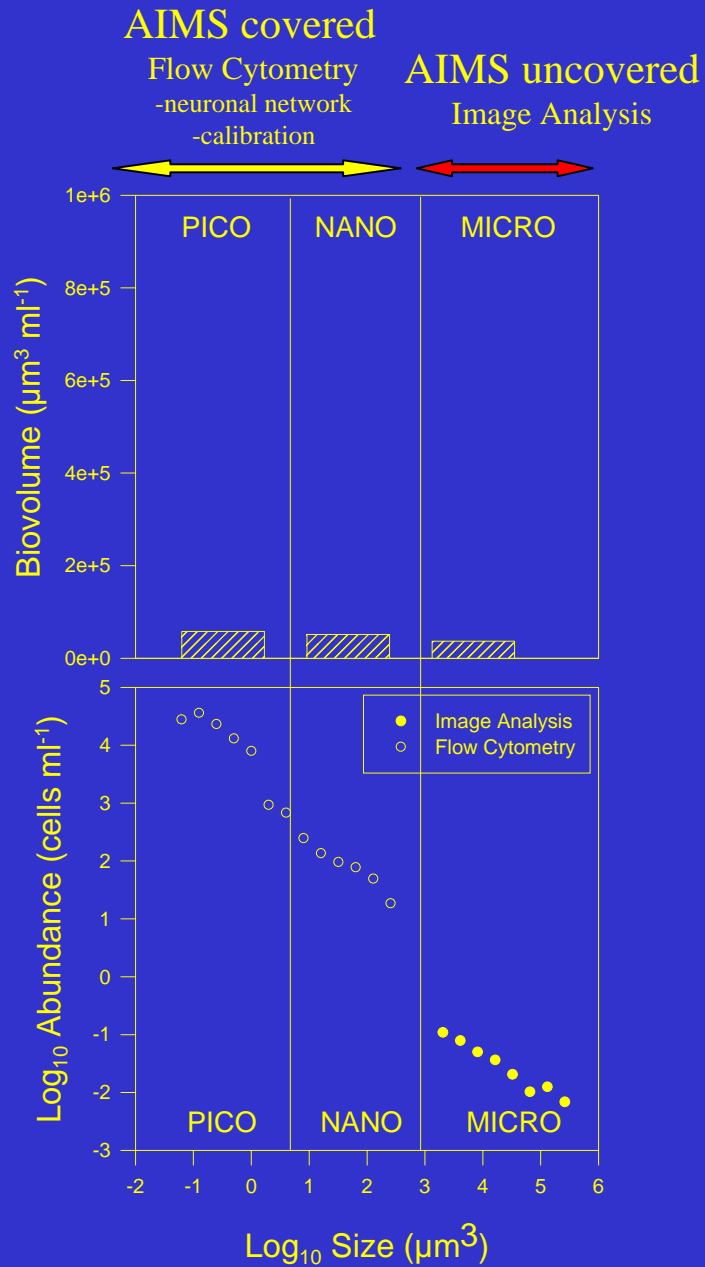


Biovolume spectra  $>20\mu\text{m}$  at the mixed (Belinda) and stratified (Felicity) station.

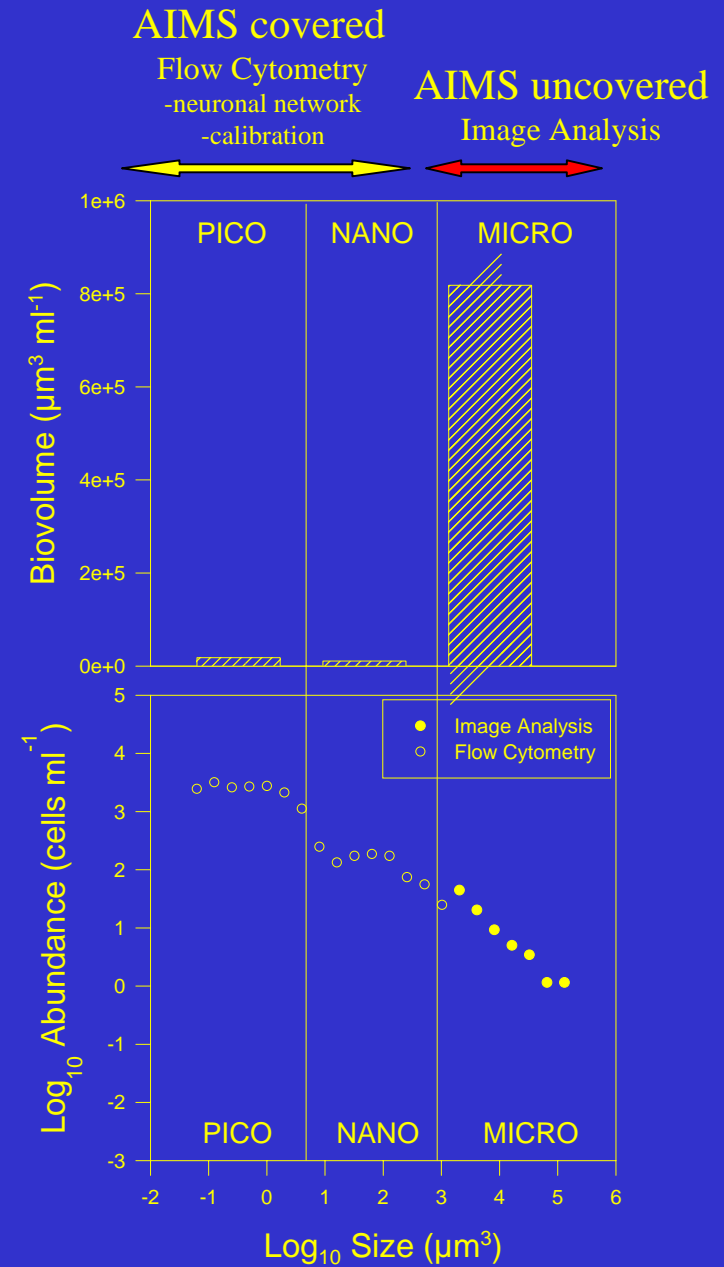
Biovolume of the whole SAS  $>20\mu\text{m}$  at surface of the six sampling stations



## Oligotrophic



## Fertilised



\* Data from CANIGO project, Strait of Gibraltar

## CONCLUSIONS

Also at a secondary scale (size-range of microphytoplankton, 20-160 $\mu$ m ESD) of the SAS, there is a tendency for more steeper SAS at oligotrophic environments, with a well stratified water column.

The SAS approach suggests that up to 50% of the microplankton biovolume at the shallow and well mixed station is explained by resuspension of big, previously settled or benthonic, cells.

The microplankton biovolume corresponding to the lineal (pelagic) part of the SAS increased by a factor  $>5$  from the oligotrophic station (Felicity) to the well mixed station (Belinda), suggesting that the relative importance of flow cytometry biomass derived from AIMS algorithms decreases considerably at mixed and fertilised stations.