COMPARATIVE FUNCTIONAL DIVERSITY OF THE PHYTOPLANKTON COMMUNITY FROM THE SOUTH ADRIATIC AND SOUTH TYRRHENIAN SEAS: A PIGMENT STUDY

Brunet Christophe, Casotti Raffaella, Lavezza Rosario, Tramontano Ferdinando e Conversano Fabio

Stazione Zoologica A. Dorhn
Napoli
brunet@szn.it

...Acknowledgements...

- Vector Program and SZN for funds

- People responsible for the lines 8.1, 8.2 and 8.5

- Captain and crews of:
Universitatis / Urania / DallaPorta

- Chief scientists and all the people
of the TransMed Legs II + III cruises

Overview of the talk

Scientific questions

Parameters and methodologies

Results

South Adridtaic and Tyrrhenian seas

Trans-Med

Final remarks...

Scientific questions

- **Assessment of the biomass and diversity of the phytoplankton algal community**

  ➘ **succession (seasonality and verticality)**

- **Insights into the functional diversity of autotrophic picoplankton**

Coupling the HPLC-pigment analysis with flow cytometry allows to estimate the pigment content per cell and its variation

➘**Picophytoplankton composition, diversity and physiological state (Brunet *et al*. 2006, 2007)**

➘ **Photophysiology**

- **Assessment of the adaptation and capacity of acclimation of autotrophic picoplankton to the environment**

➘ **Biological provinces / mixed layer and physical motions / water column**

Parameters and methods

Algal Pigments (chlorophylls and carotenoids) : HPLC

Two size classes: **> 3 µm (nano+microplankton)**
< 3 µm (picoplankton, > 0.2 µm)

Autotrophic picoplankton : Flow Cytometry

Three discriminated populations: *Synechococcus*, *Prochlorococcus* and Picoeukaryotes

+ red autofluorescence + orange fluorescence + size-related parameters

Phycobiliproteins (phycoerythrine + p-cyanins) : Spectrofluorometer

Filters Gf/F (~0.7 µm) – only on the TransMed.

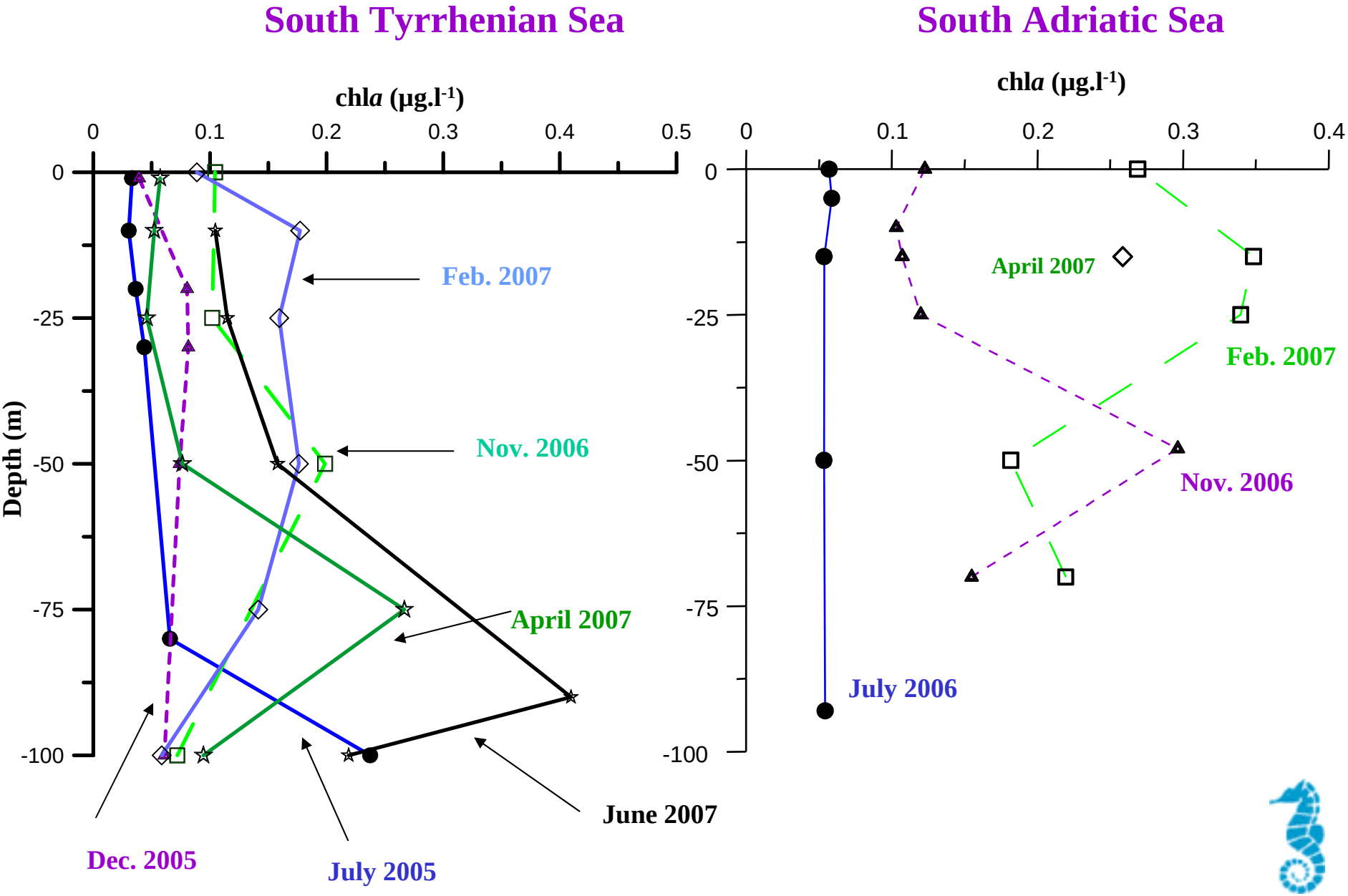
Irradiance profiles: Satlantic probe

Data set available

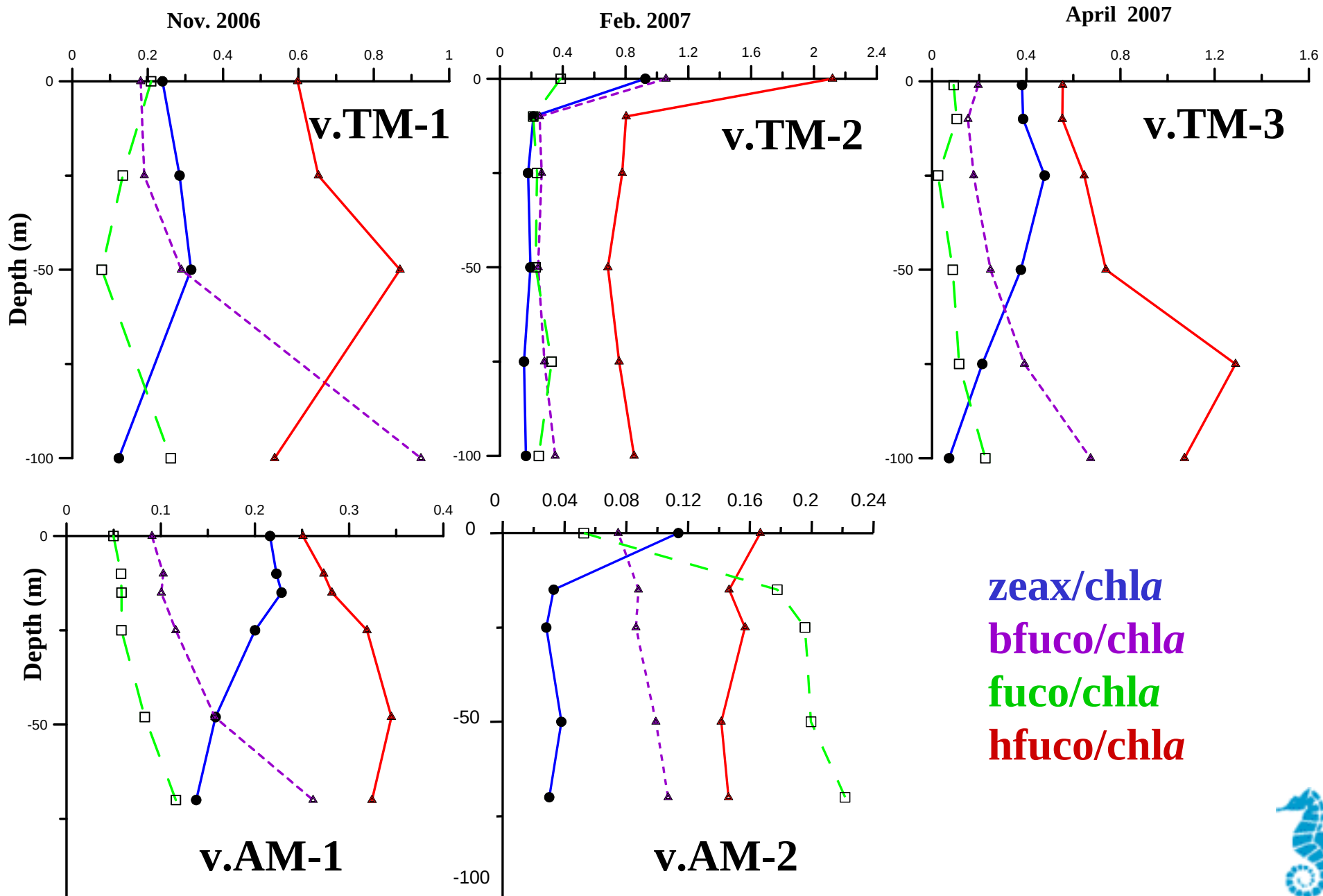
	S. Adr.	S. Tyrrh.	TransMed.
dates	**January 2006 Nov. 2006 Feb. 2007 April 2007**	**July 2005 Dec. 205 Nov. 2006 Feb. 2007 April 2007 June 2007**	**May - June 2007**
n°stations	**3-8**	**1**	**10**
n° depths	**5-6 (0 – 100 m)**	**5-6 (0 – 100 m)**	**6-7 (0 – 100 m)**


…Andare, andare, simme tutt'eguale
affacciati alle sponde dello stesso mare
e nisciuno è pirata e nisciuno è emigrante
simme tutte naviganti
allez, allez il n'y a pas de barrière
nous sommes tous enfants de la même mer
il n'y a pas de pirate il n'y a pas d'émigrant
nous sommes tous des navigants…
E. Bennato, 2002 " Che il mediterraneo sia"
1
AM
TM
3
4
6
9

Results

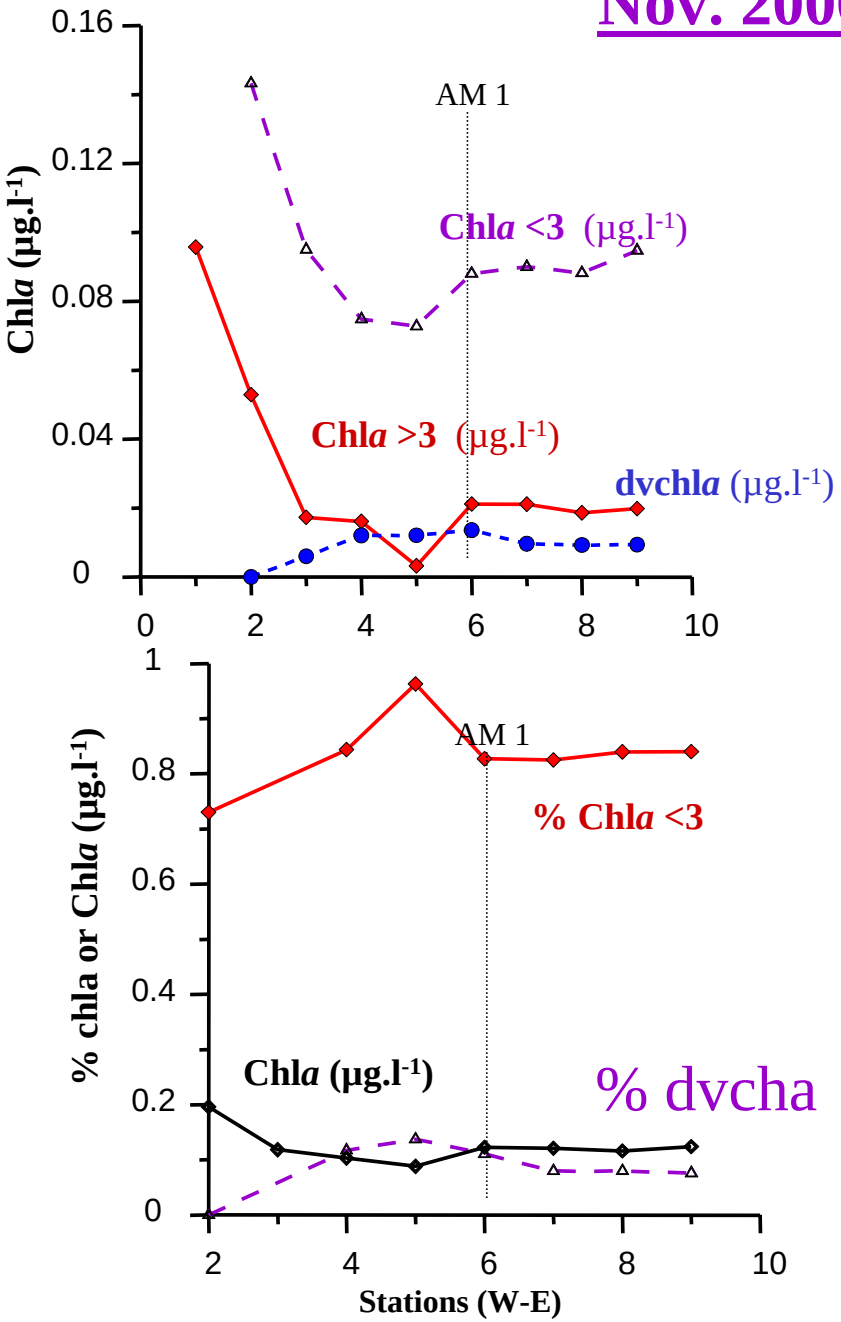

South Tyrrhenian Sea
South Adriatic Sea
chla (µg.l-1)
0
0.1
0.2
0.3
0.4
0.5
Depth (m)
-25
-50
-75
-100
Feb. 2007
Nov. 2006
April 2007
June 2007
Dec. 2005
July 2005
July 2006

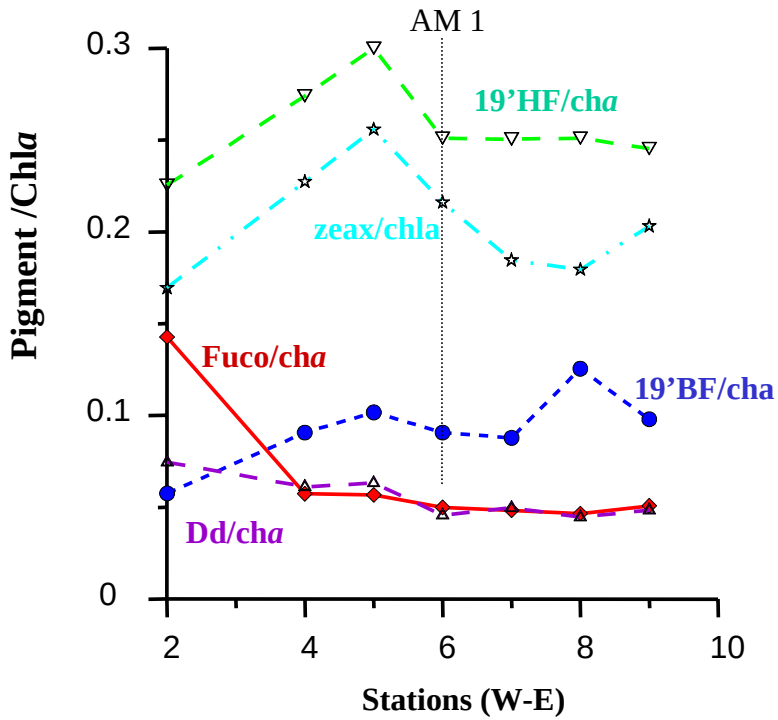
Pigment / chl*a* ratio



Nov. 2006 ; - 1 m depth

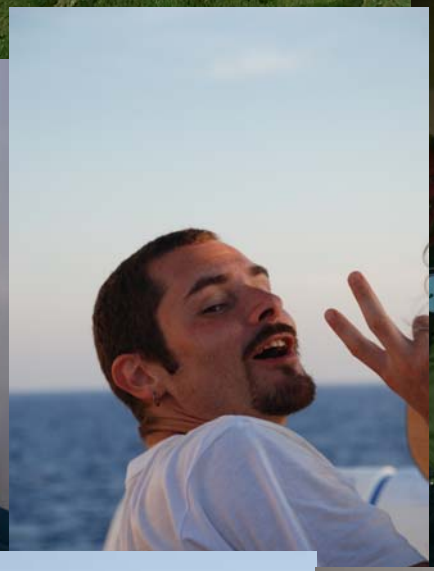
v. AM1 cruise





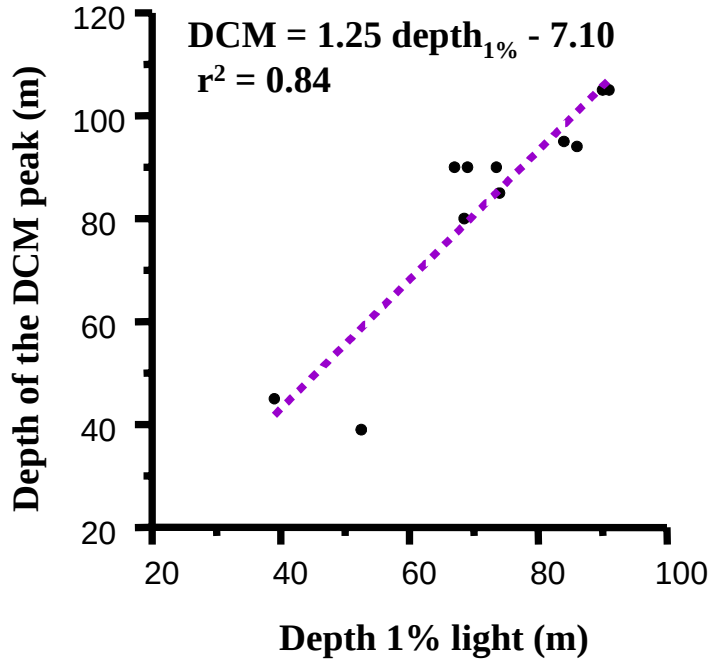
Trans-Med

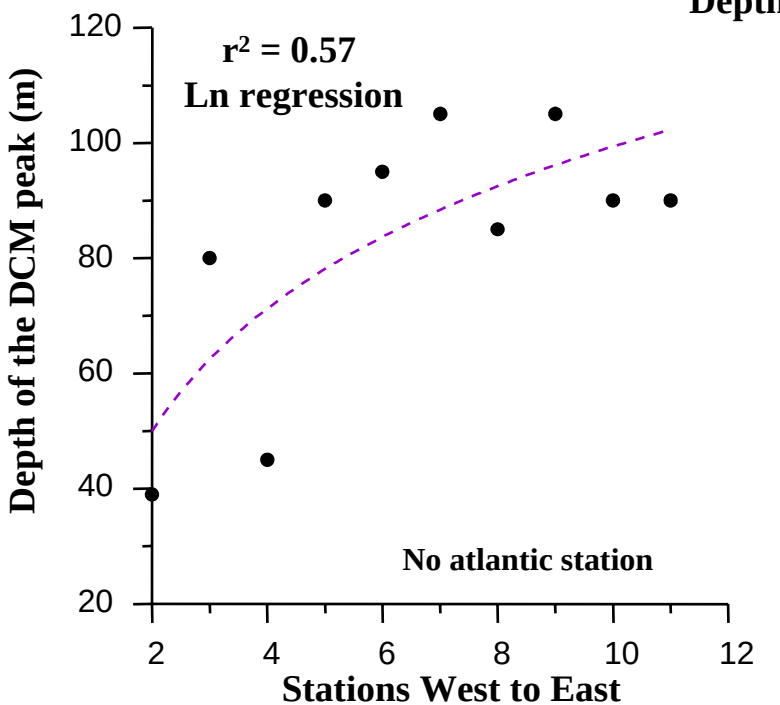
…Andare, andare, sir
affacciati alle sponde
e nisciuno è pirata e r
simme tutte naviganti

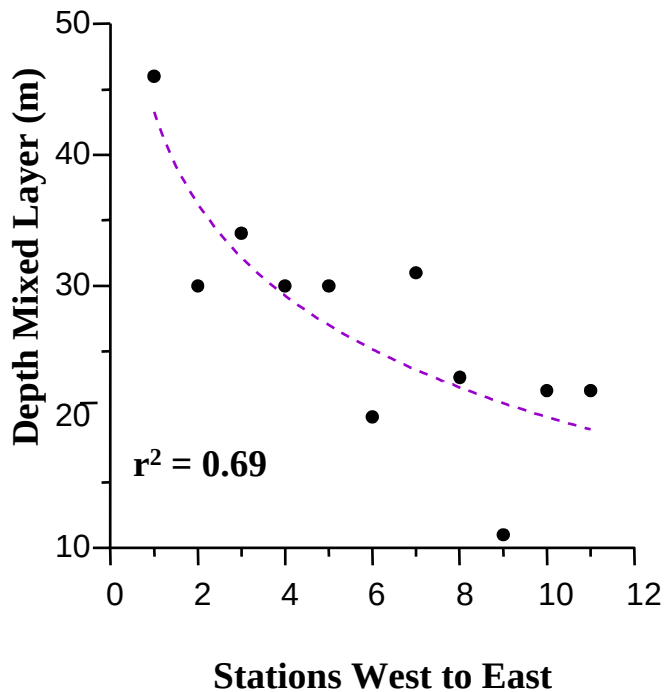


General trend Trs-Med

DCM & Mixed layer

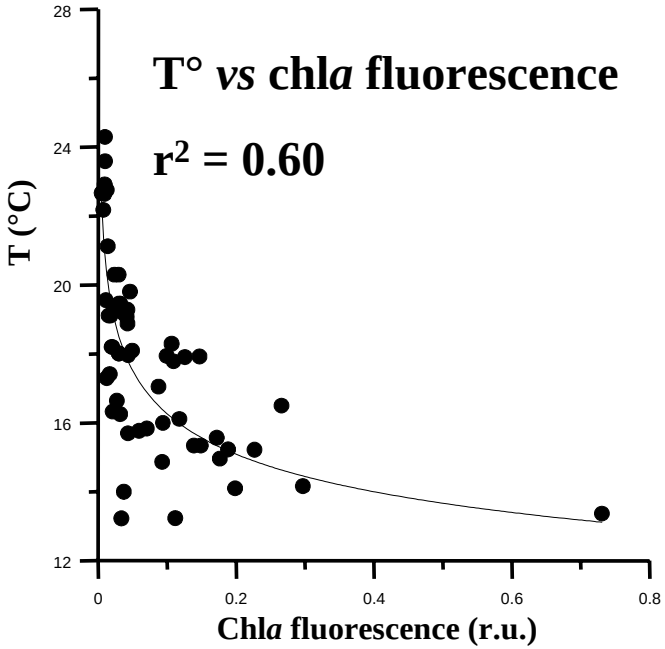


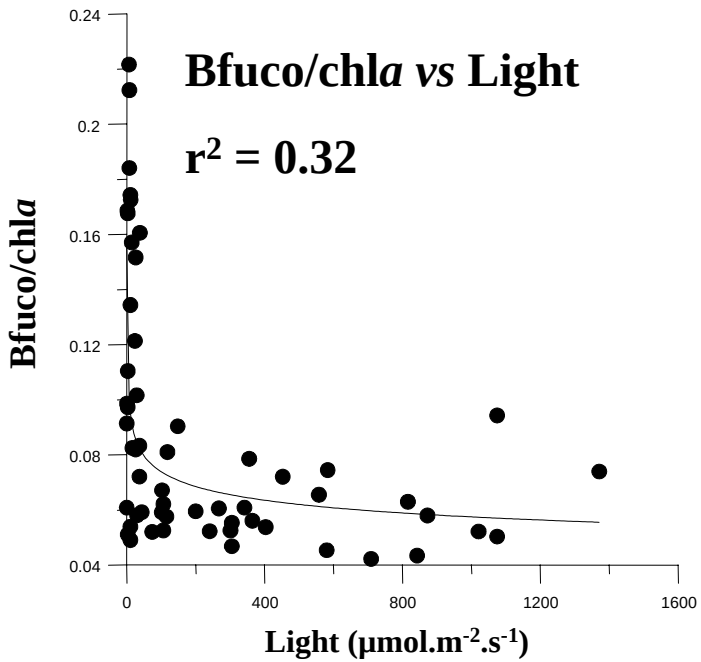


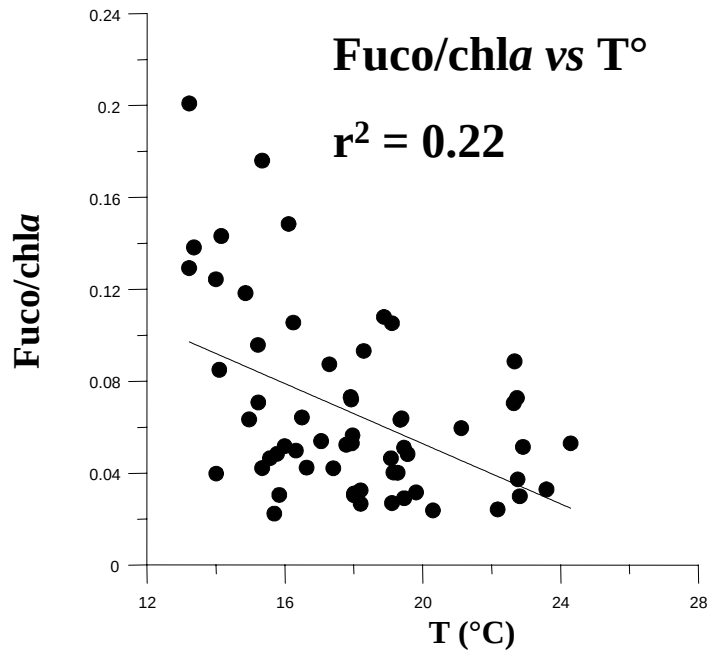


General trend Trs-Med

Biomass distribution

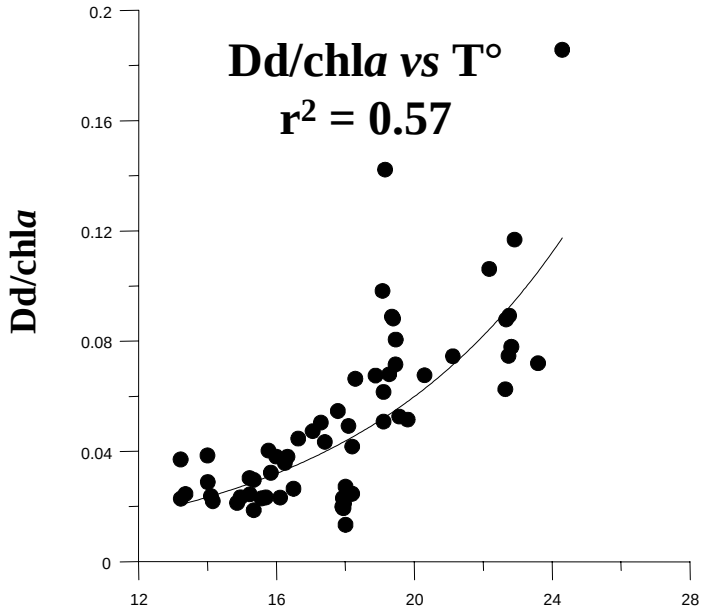


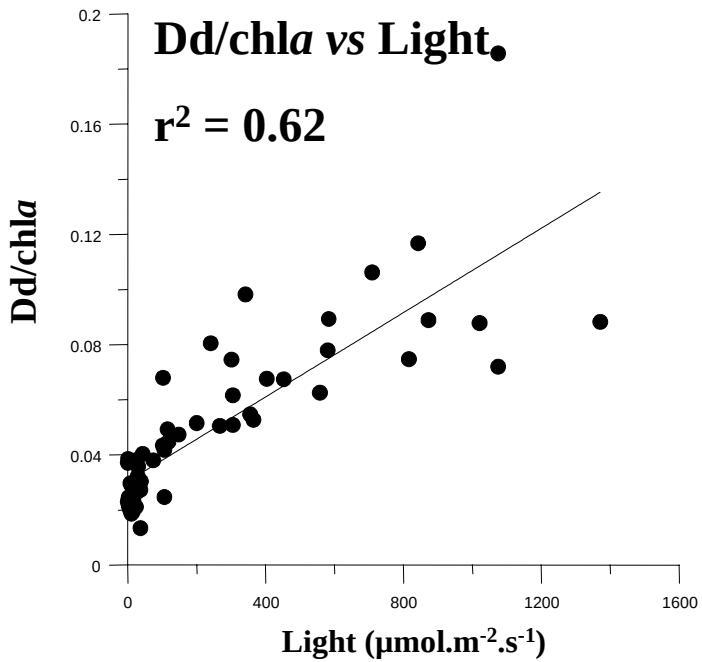


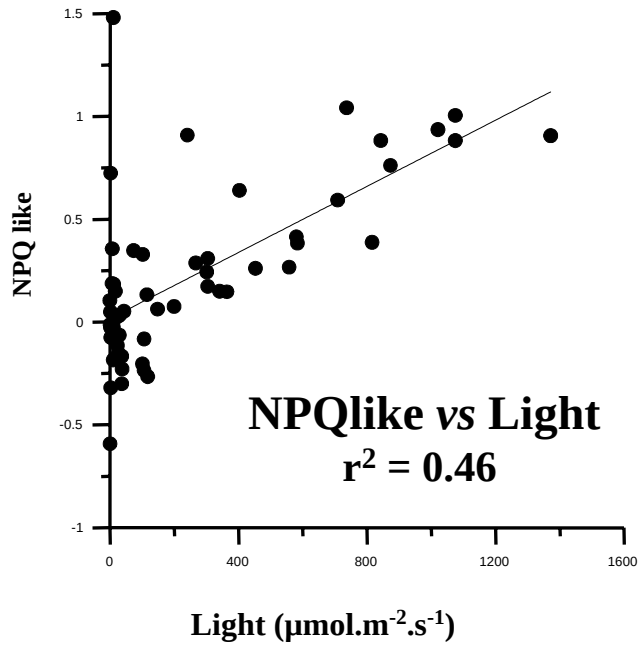


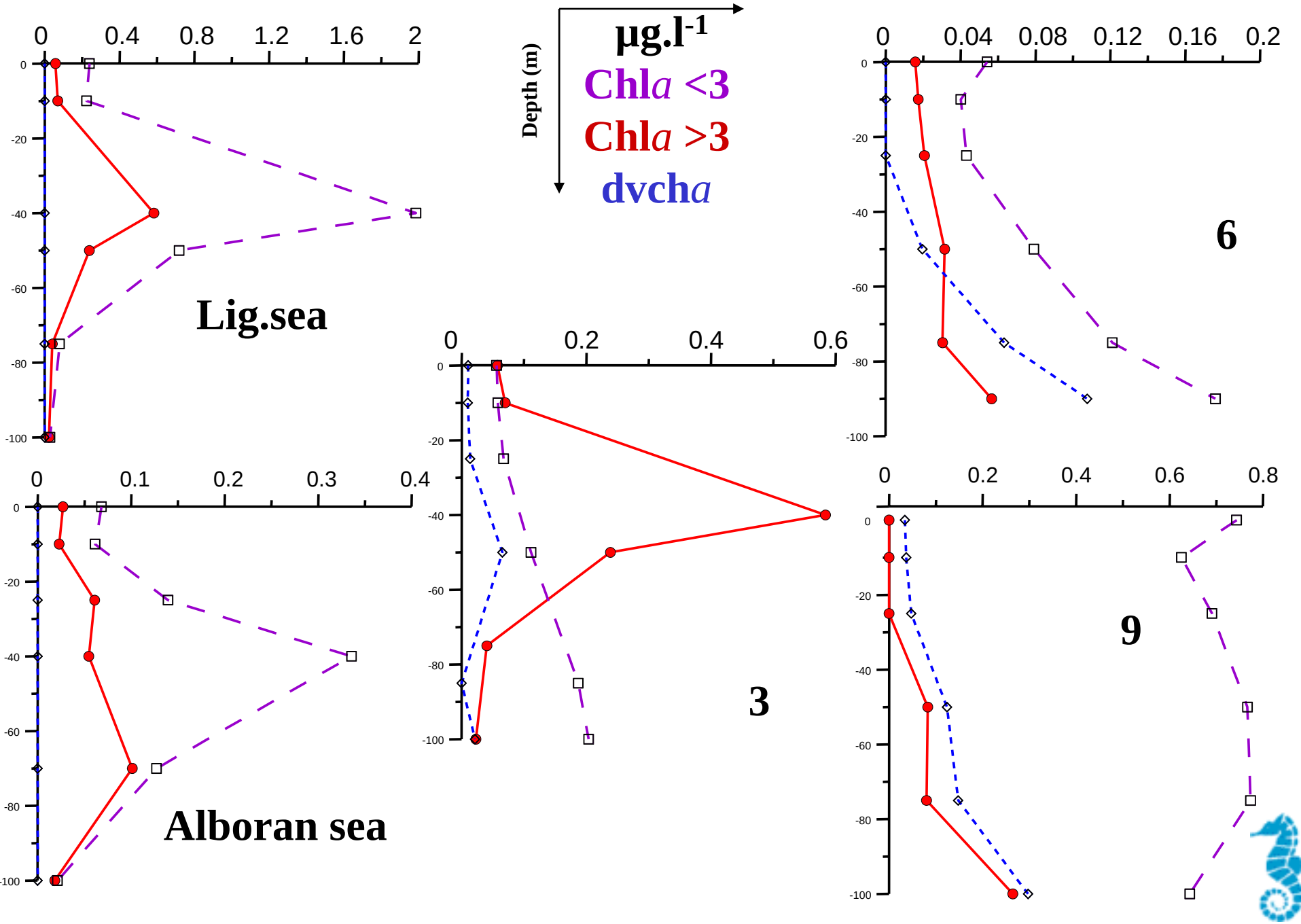
General trend Trs-Med

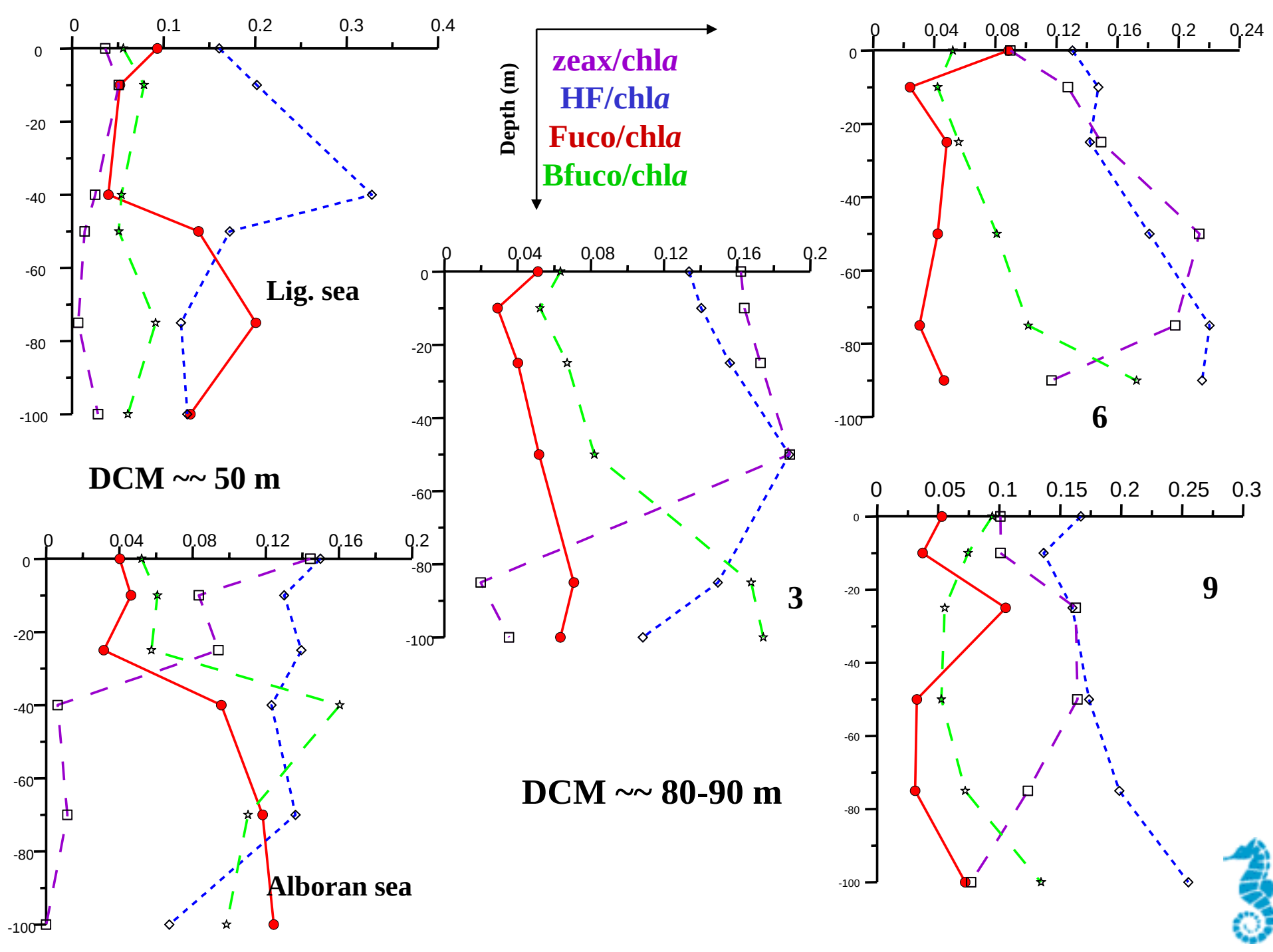
Photodependent parameters

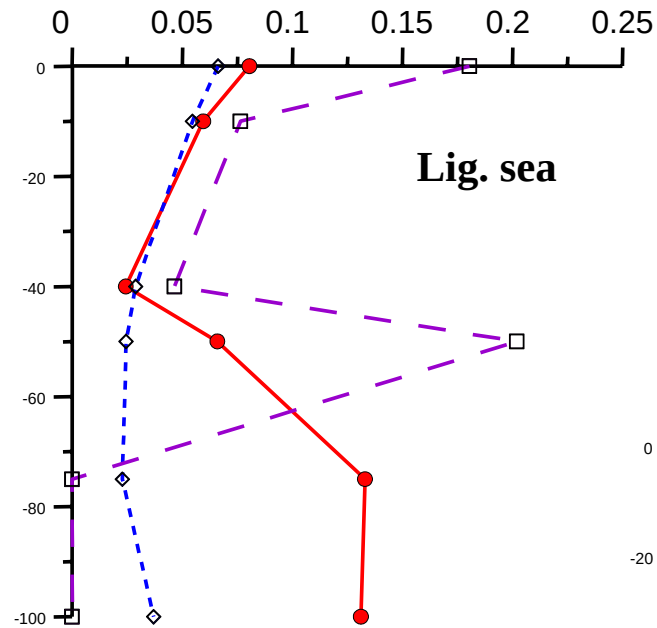







µg.l-1
Chla <3
Chla >3
dvcha
Depth (m)
Lig.sea
Alboran sea
3
6
9


zeax/chla
HF/chla
Fuco/chla
Bfuco/chla
Depth (m)
Lig. sea
DCM ~~ 50 m
3
DCM ~~ 80-90 m
6
9
Alboran sea



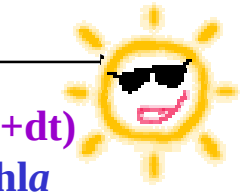
Lig. sea

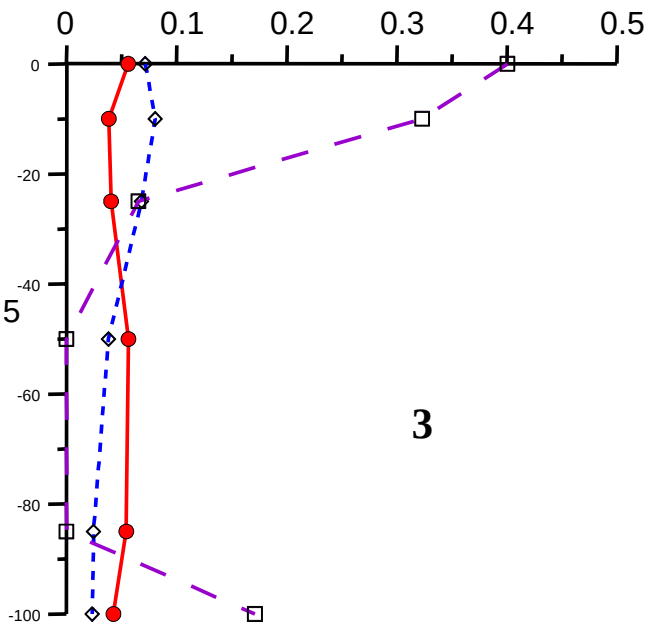
Depth (m)

Dt/(dd+dt)

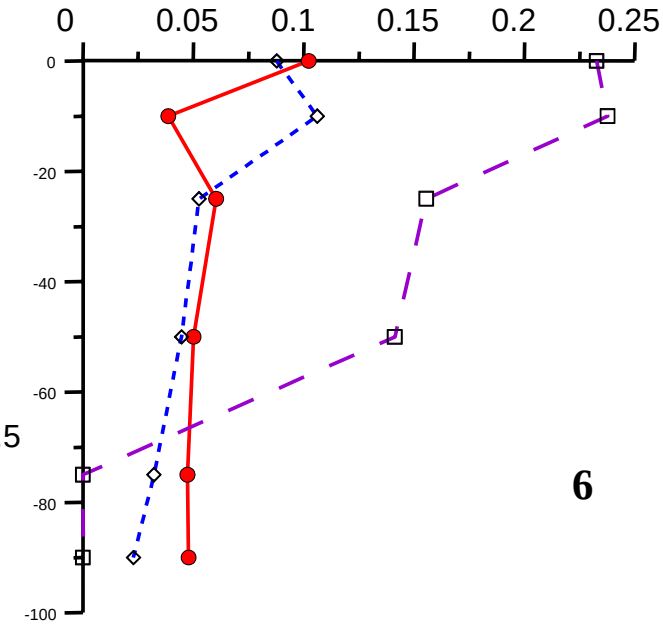
Dd/chl*a*

Phbid*a*/chl*a*

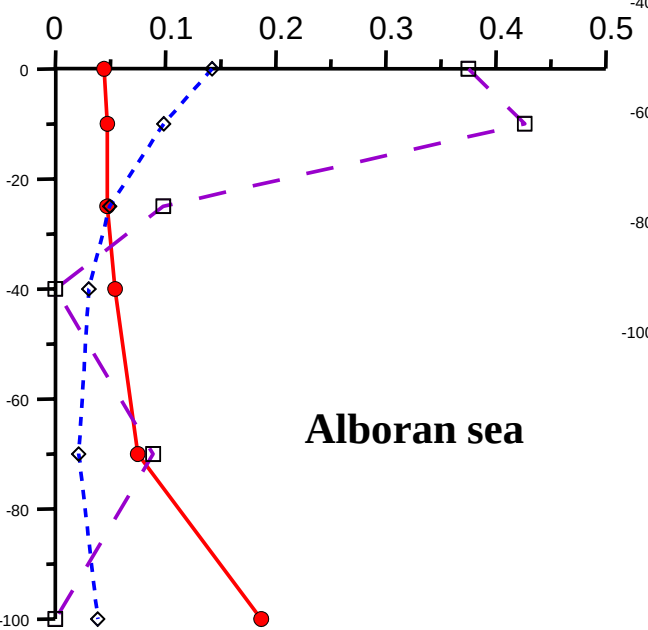




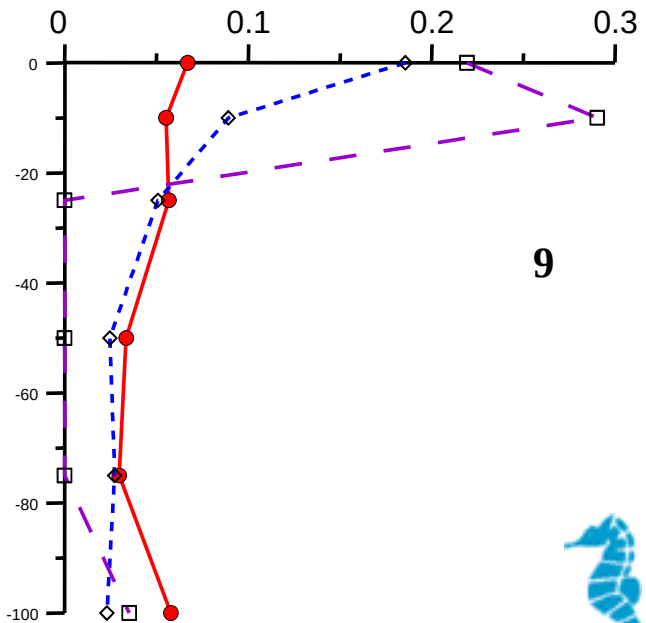
3



6



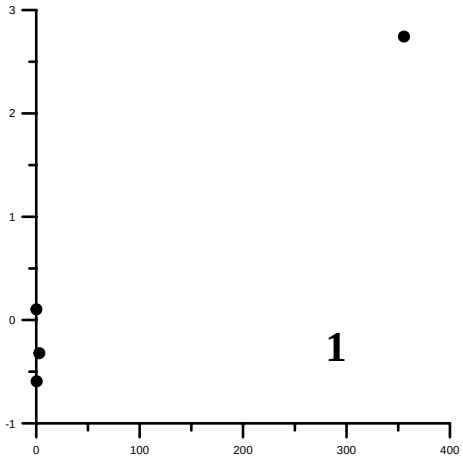
Alboran sea

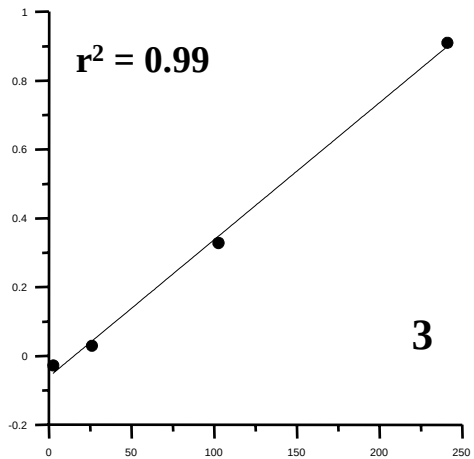


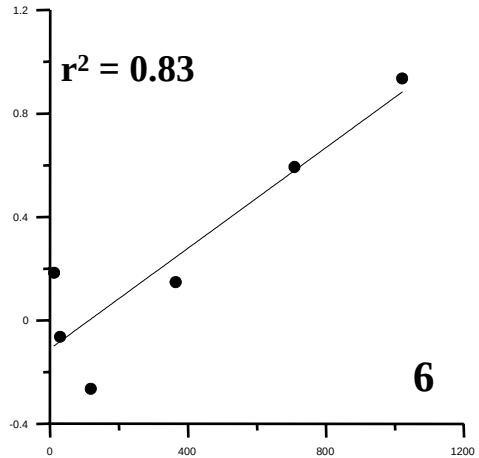
9

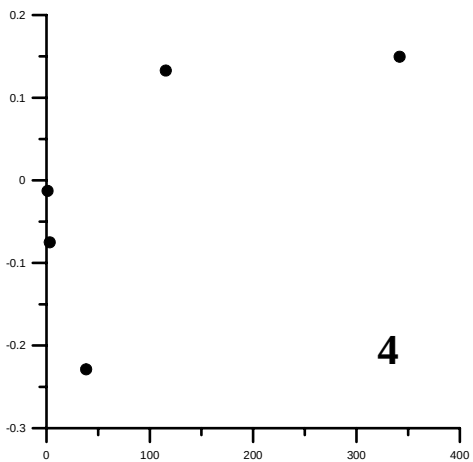
NPQlike *vs* Light...

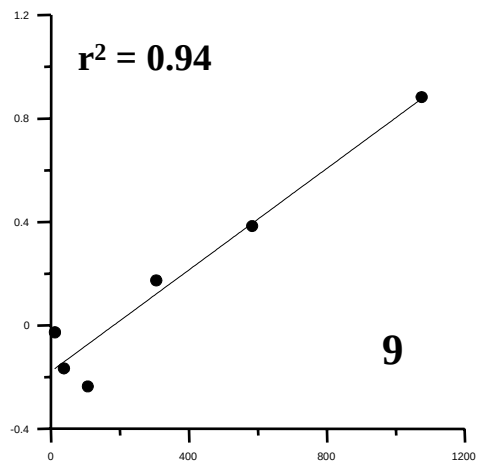
“Water column dependent relationship”











(not) conclusive remarks...

It seems that:

- Different trophic situations occur over the Med. Sea transect
  Alboran and Ligurian seas ≠ all the other stations
- DCM deeper in the Eastern b. *vs* Western b.
- Mixed layer weaker from W to E

Pigment community:

- Few differences between Eastern and Western basins
- No great difference between v. AM and v. TM stations

- **Next step:** Integration of the pigment results with FC and phycobiliprotein to get better insight into the picoplancton functional diversity