



# ***Preliminary results of RegCM-ES with an active biogeochemical component over the Med-CORDEX domain***

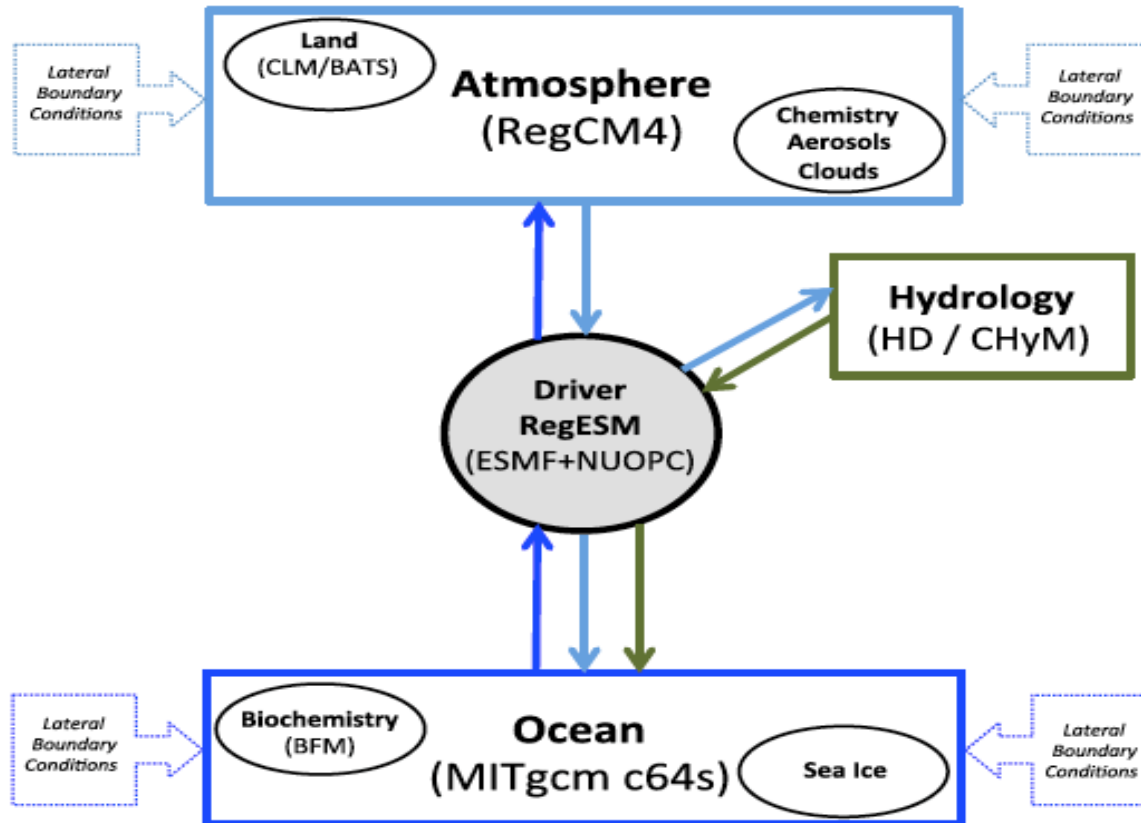
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# RegCM-ES (Earth System Regional Climate Model)



*-Sitz, L. E., et al. (2017), Description and evaluation of the Earth System Regional Climate Model (Reg CM-ES), J. Adv. Model. Earth Syst., 9, 1863–1886, doi:10.1002/2017MS000933.*

## RegCM.4.6.1

- **Horizontal resolution** : 30 km , 232x166 points in lon lat
- **Vertical resolution**: 23 sigma levels
- **ICs** : ERA-interim
- **BCs**: ERA-interim

## MITgcm

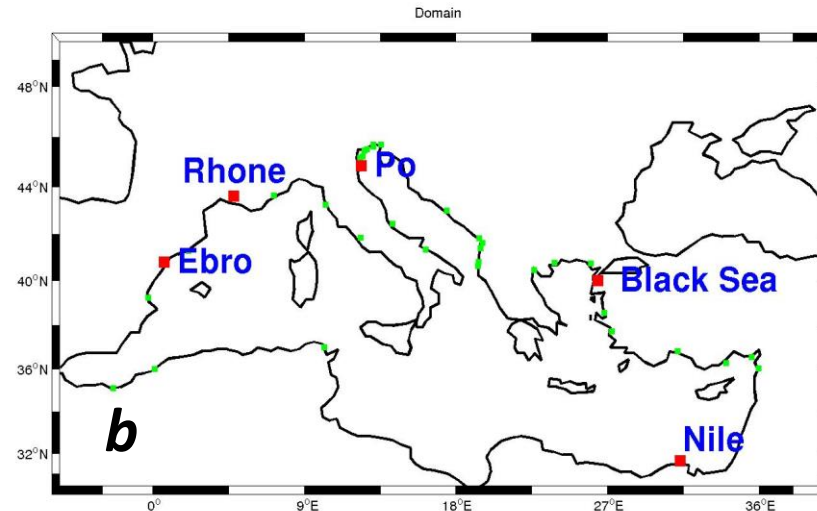
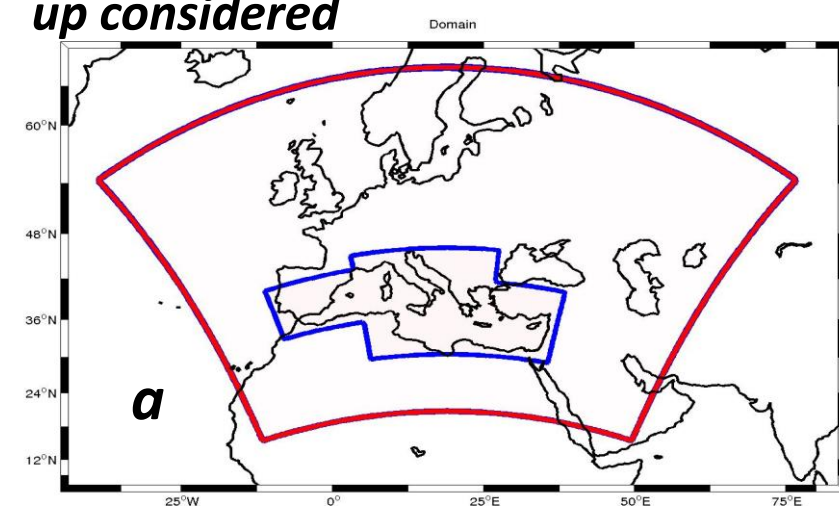
## BFM

- **Horizontal resolution** : 1/12 in degree of lon/lat , 570x264 points in lon lat
- **Vertical resolution** : 75 vertical levels
- **ICs** : Medar/Medatlas (both physical and biogeochemical)
- **BCs** : Medar/Medatlas (both physical and biogeochemical)

## HD

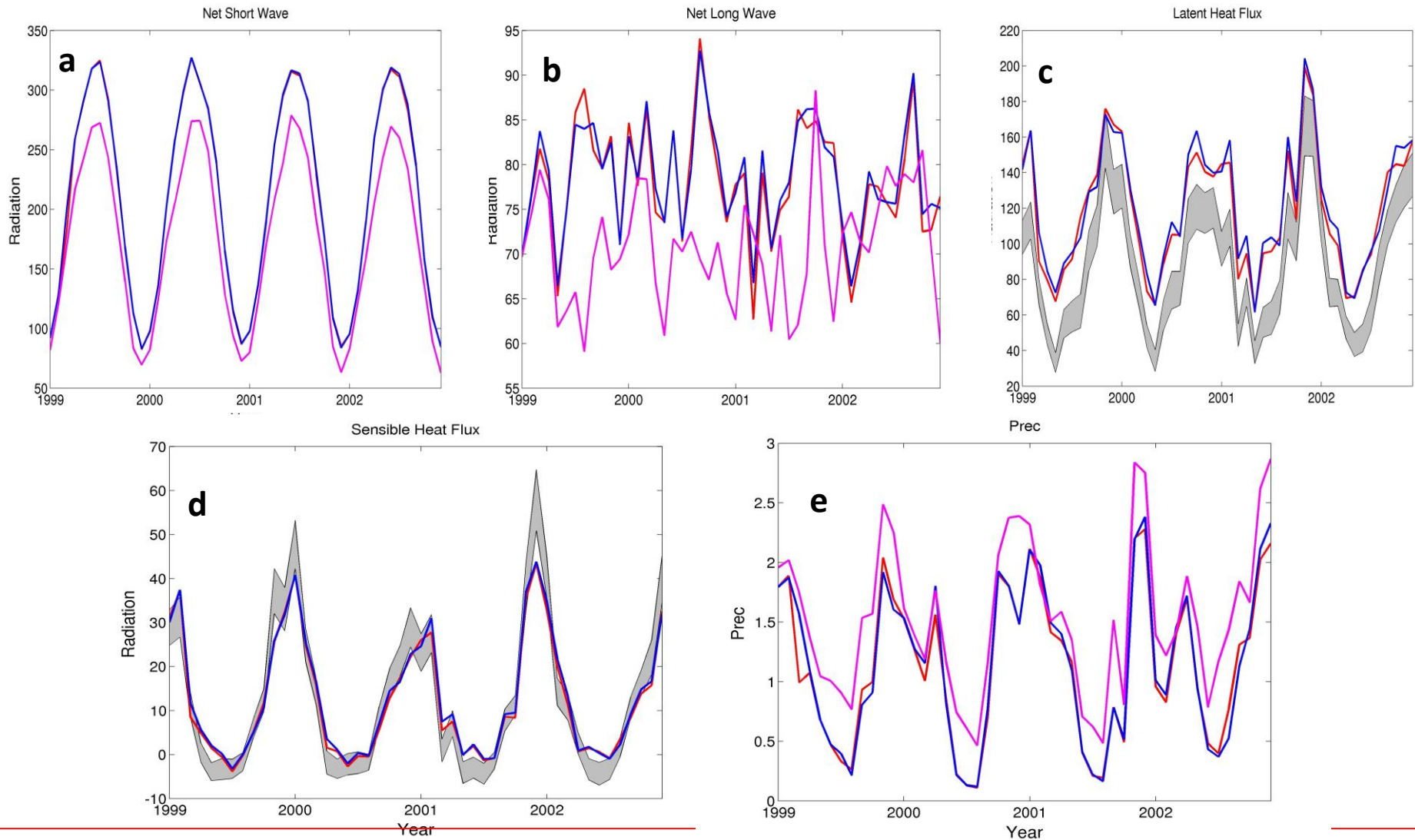
- **Horizontal resolution** : 0.5 in degree of lon/lat

**Simulation** : 01/01/1998 -31/12/2002; Argo cluster (ICTP) ; 180 cores ; 240h ; no spin up considered



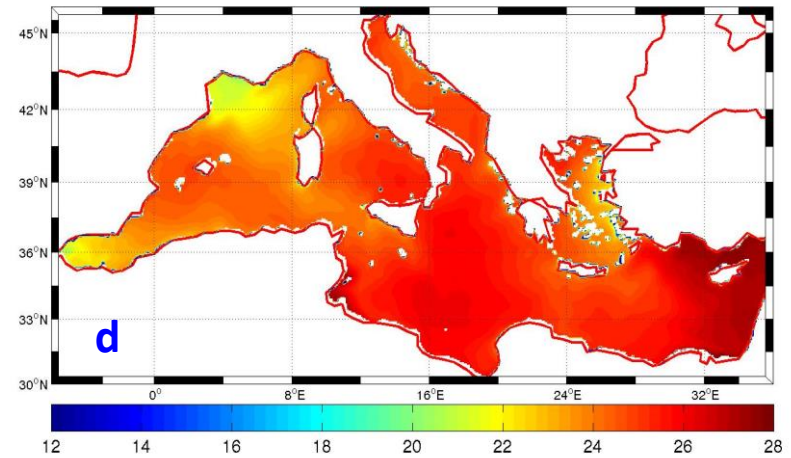
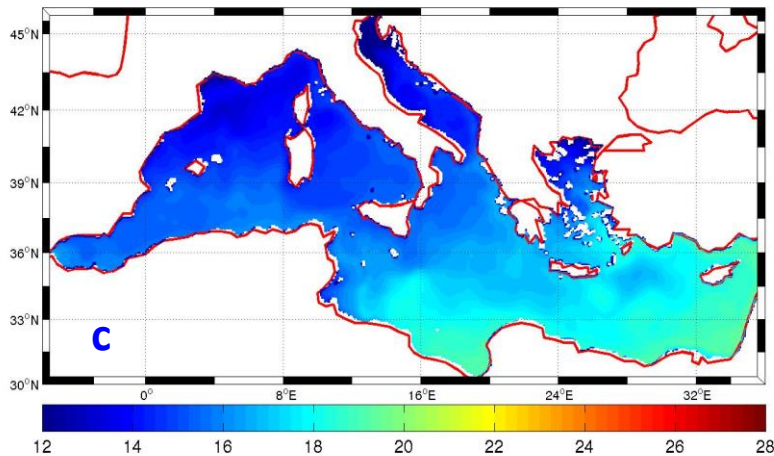
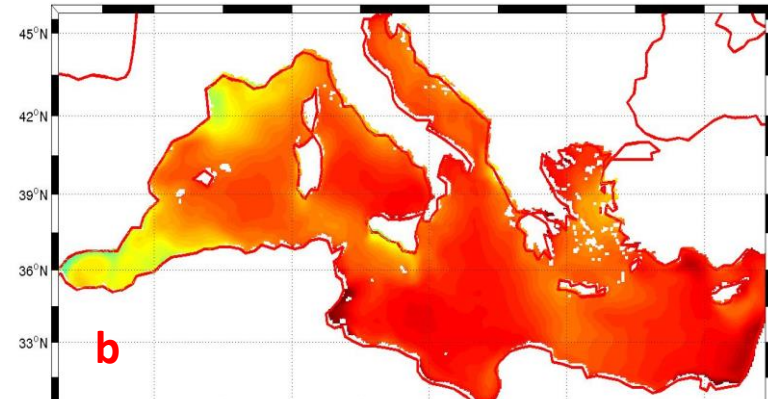
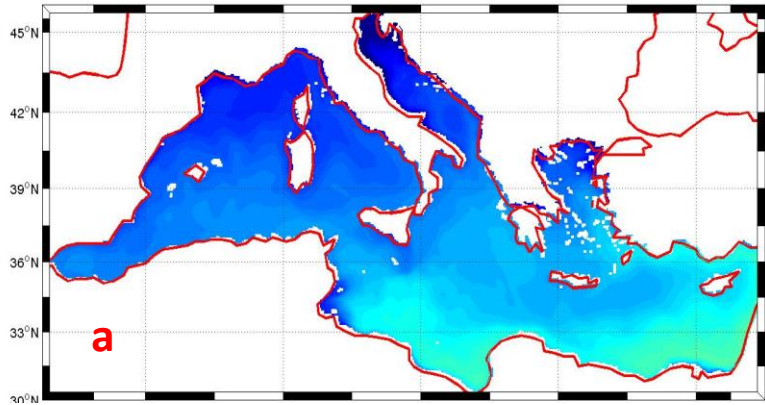
(a) Domain of integration of the **Atmosphere/Ocean** Model ; (b) River implemented in the **River discharge** model

# Evaluation of Air-Sea interaction



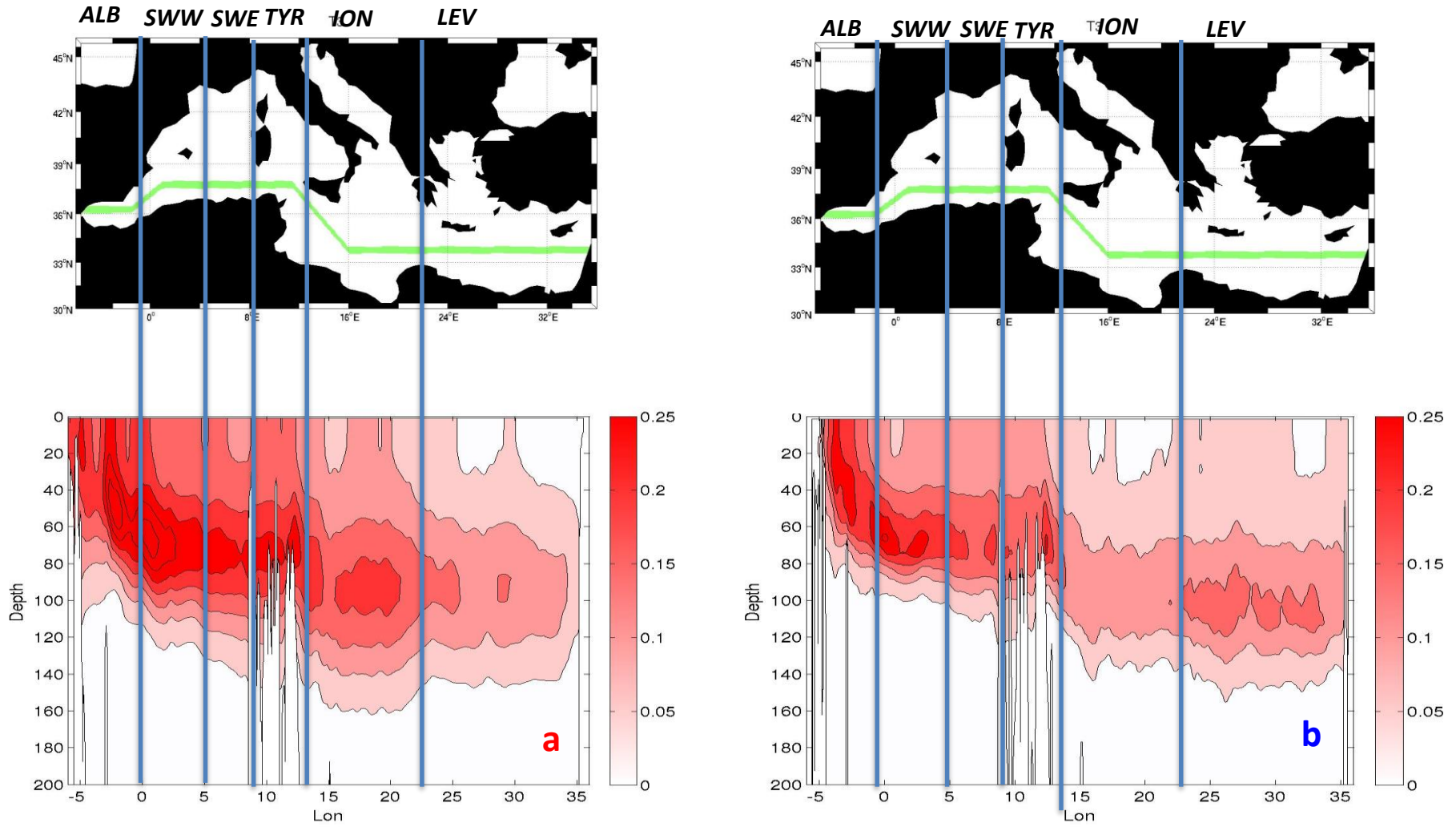
**Monthly Time Series over the Mediterranean Sea (in  $W/m^2, mm day^{-1}$ ) in the period 1998-2002 of Net Short Wave (a), Net Long Wave (b), Latent (c), Sensible (d) and Precipitation (e) in RegCM.4.6.1, RegCM-ES and Observations. Grey represents the spread in the observations when it is available (OA Flux/GPCP)**

# Surface Ocean Characteristics



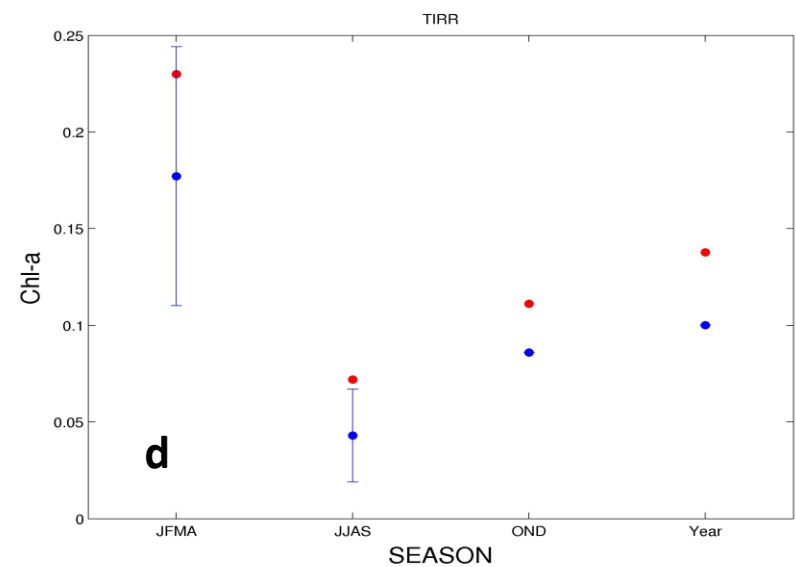
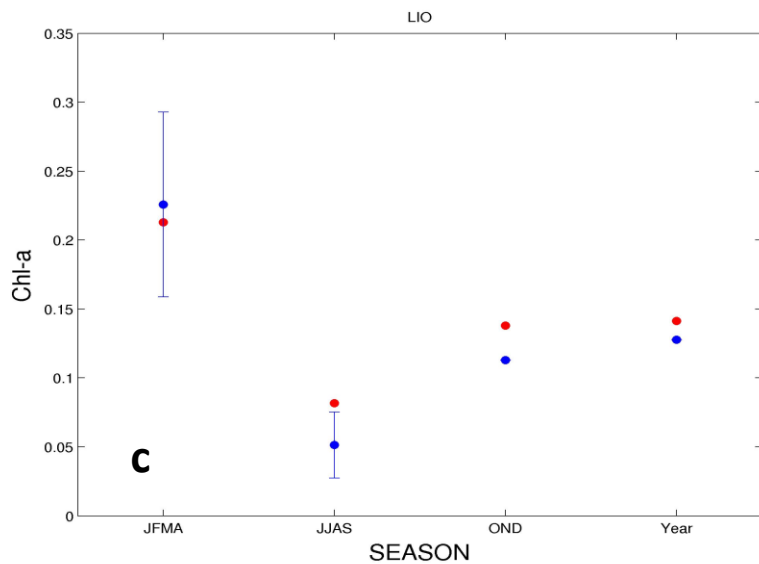
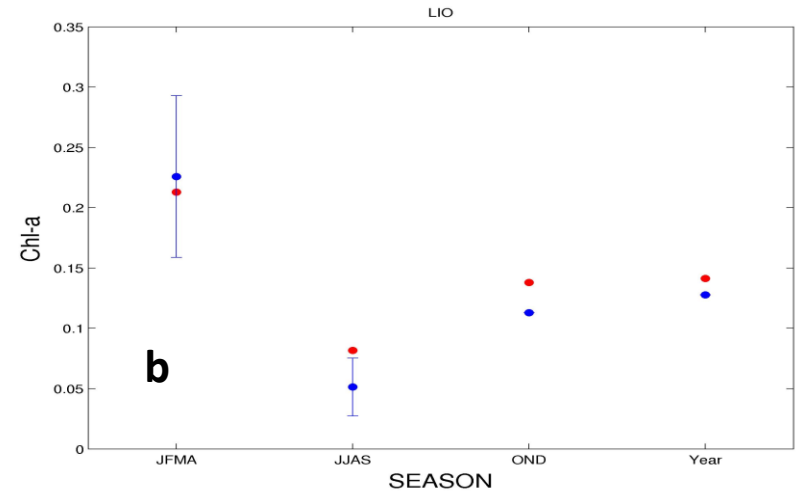
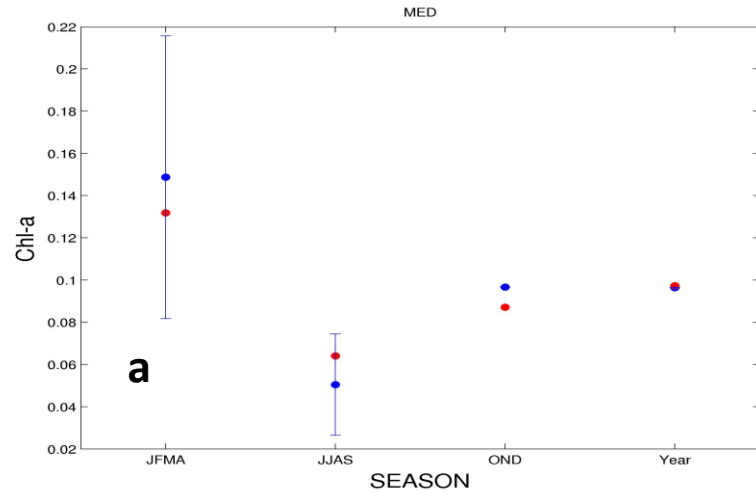
**Winter (JFM, a,c) and Summer (JAS, b,d) SST (in C) in RegCM-ES and MyOcean Reanalysis in the period 1998-2002**

# Chlorophyll-a dynamics



Vertical section along the transect of the average chlorophyll-a (mg/m<sup>3</sup>) in the period 1998-2002: **RegCM-ES (a)** and in the **Copernicus Reanalysis (a)**

# Chlorophyll-a dynamics



Seasonal chlorophyll-a ( $\text{mg}/\text{m}^3$ ) averaged over the first 10 m in the *Mediterranean* (a) , *Western Mediterranean* (b) , *Gulf of Lions* (c) and *Tyrrhenian* (d) in the period 1998-2002: **RegCM-Es** and **Copernicus Reanalyses** . The error bar represents the spread in the dataset



## **Conclusions and future of RegCM-ES**

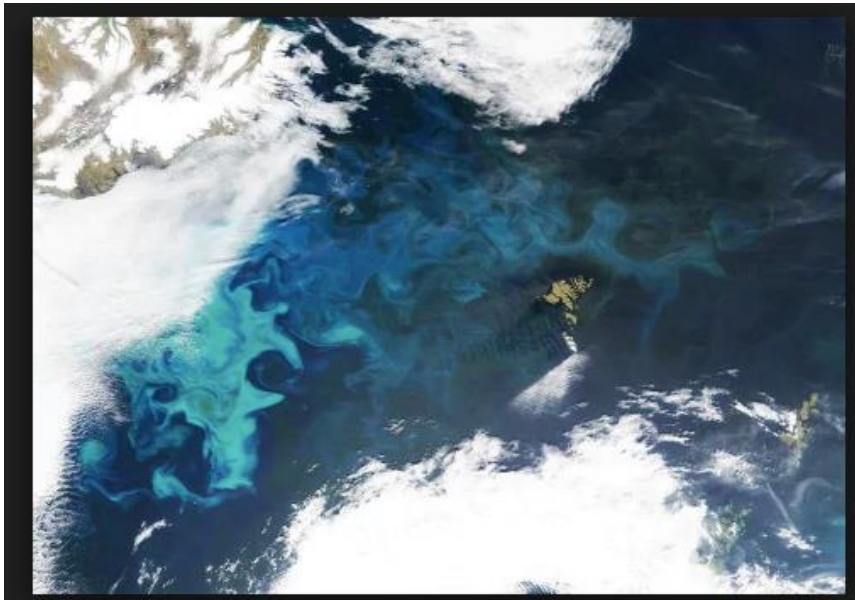
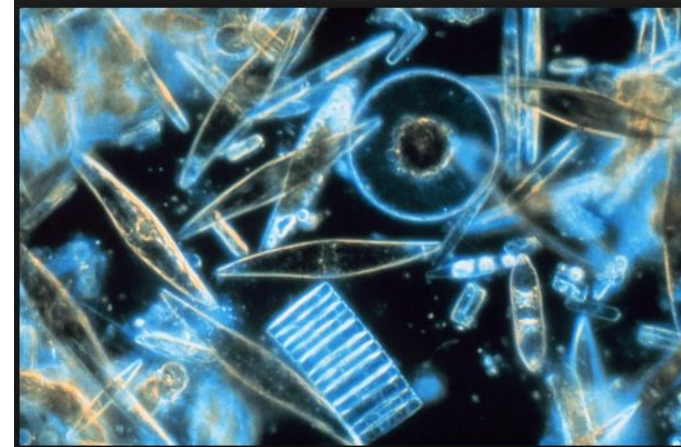
- **RegCM-ES is able to reproduce the main features of the Mediterranean Sea climate and biogeochemistry with respect to the observed references.**
- **Source of uncertainties in the model** are represented by :
  1. **Atmosphere flux parametrizations**
  2. **Initial and Boundary** conditions (both physical and biogeochemical)
  3. **Nutrients load** from the **Rivers**
- **Future work includes :**
  1. **a more oriented study dedicated to evaluation of the spin up of model** trough a longer run
  2. **a longer run in order to provide a complete hindcast of biogeochemistry properties in the Mediterranean Sea since 1980**
  3. **Assessment of the impacts of the ocean circulation variability in the Mediterranean Sea on phytoplankton communities and nutrients dynamics**





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***Thanks a lot for  
your attention!!!***



# EVALUATION OF OCEAN SYNTHESSES

COST Action ES1402

<http://www.eos-cost.eu>

A COST Action to **improve the coordination** of European efforts

in the evaluation of ocean syntheses:

- better understanding of the value and use of ocean syntheses
- promote the use of ocean syntheses

Chairs:

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