Progess of Work around MEECE scenarios

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- Climate Change : focus on european seas and model intercomparison
- Ocean Acidification : New developpemnts
- Fishing : Towards end-to-end coupling PISCES-APECOSM
- Scenarios

Impact of climate change

Climate Change impact on marine productivity

- PISCES coupled to IPSL Climate Model

- Resolution: 2°x2°cos(ϕ)

– Simulations from 1860 to 2100
forced only by GHGs & aerosols

- Fluvial inputs /
Dust deposition remain constant

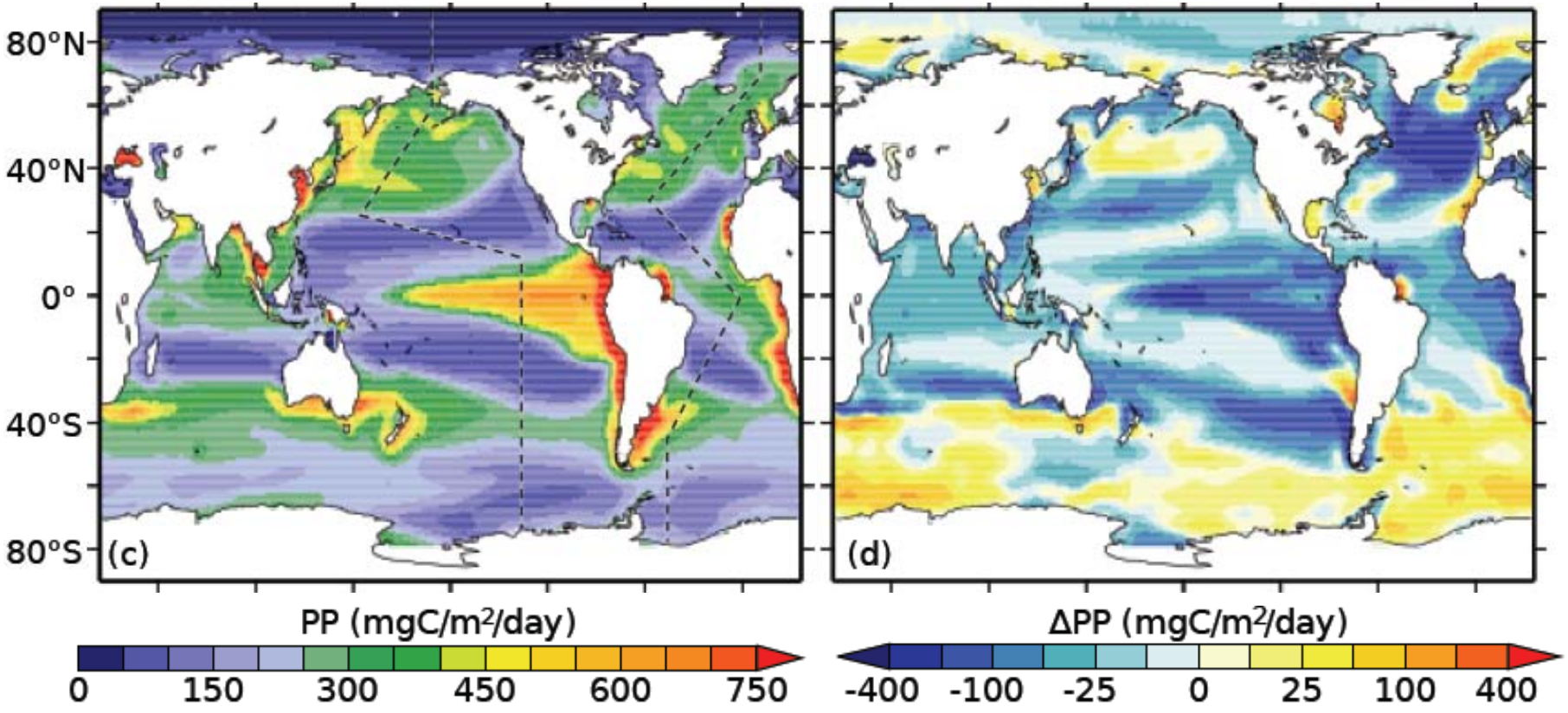
Impact of climate change

- **Climate Change impact** on marine productivity

IPSL-PISCES

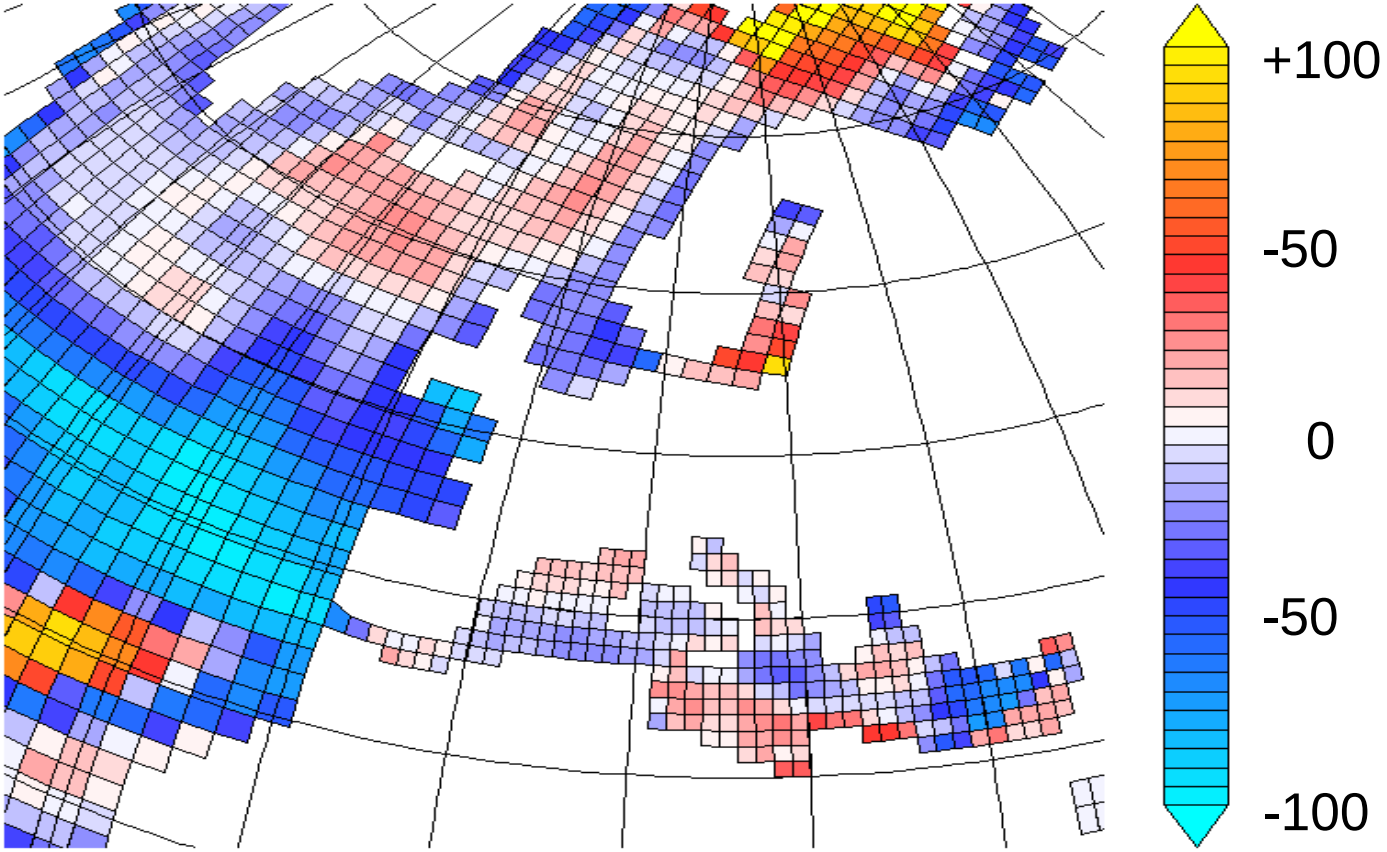
NPP in 2000

Changes in NPP in 2100
(Scenario SRES-A2)



Focus on european seas

- Changes in NPP (%)

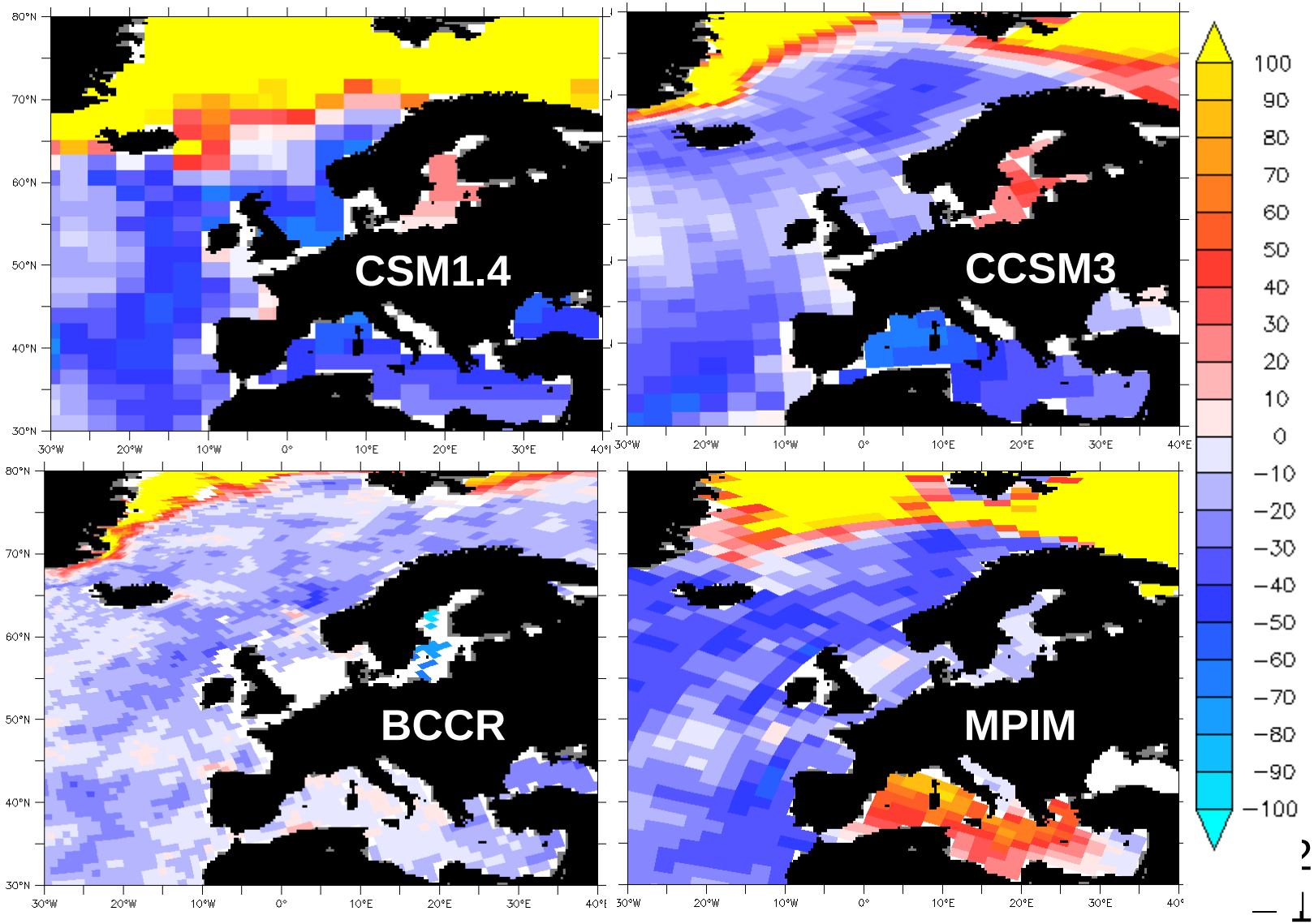


A1B Scenario
2080/2099 – 1980/2000

Focus on european seas : model intercomparison

- Changes in NPP or NCP (%)

(Steinacher et al. 2010)



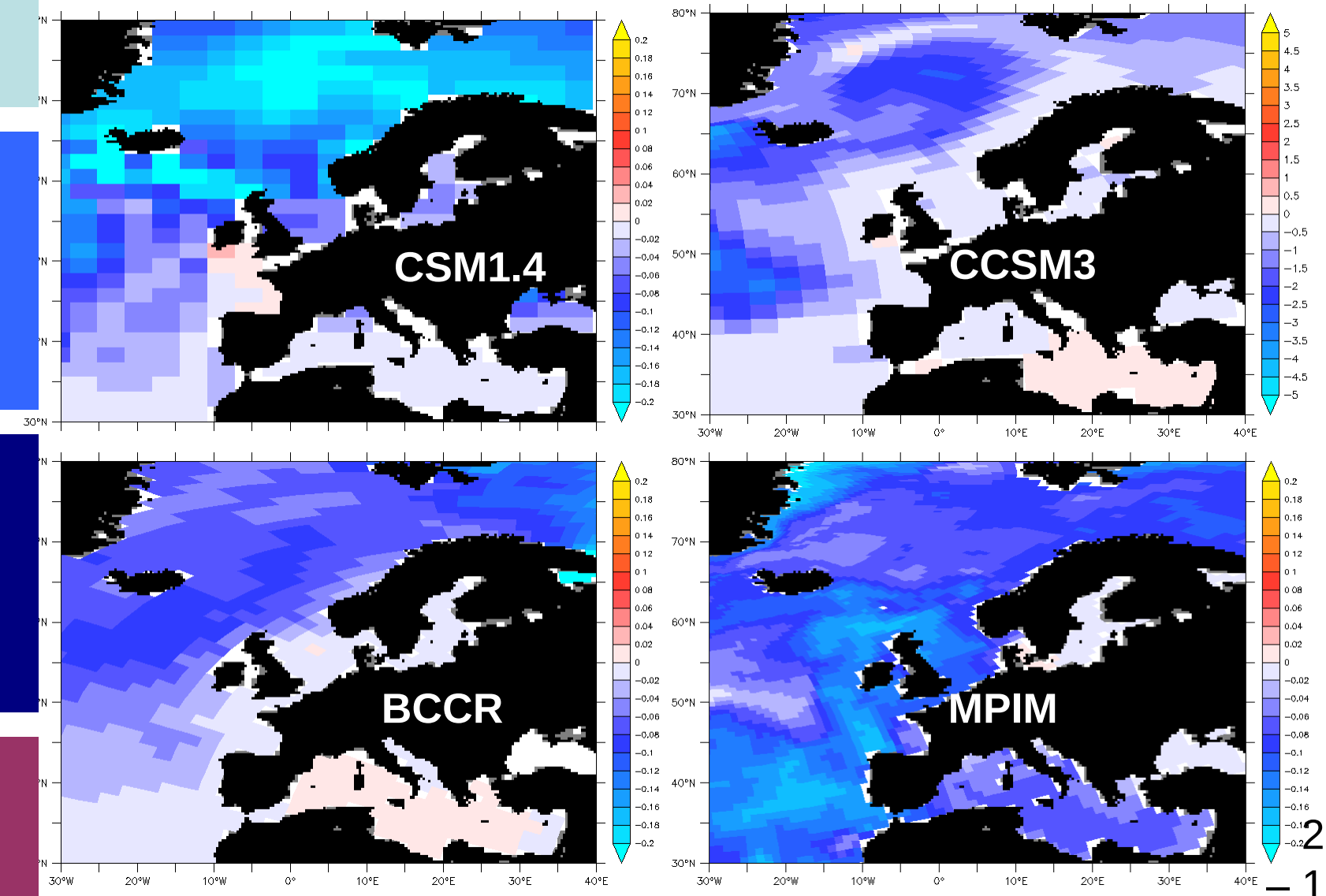
A2

2080/2099

– 1980/2000

Focus on european seas : model intercomparison

- Changes in Nutrients (PO4 or NO3) (Steinacher et al. 2010)



A2
2080/2099
– 1980/2000

Focus on european seas : model intercomparison

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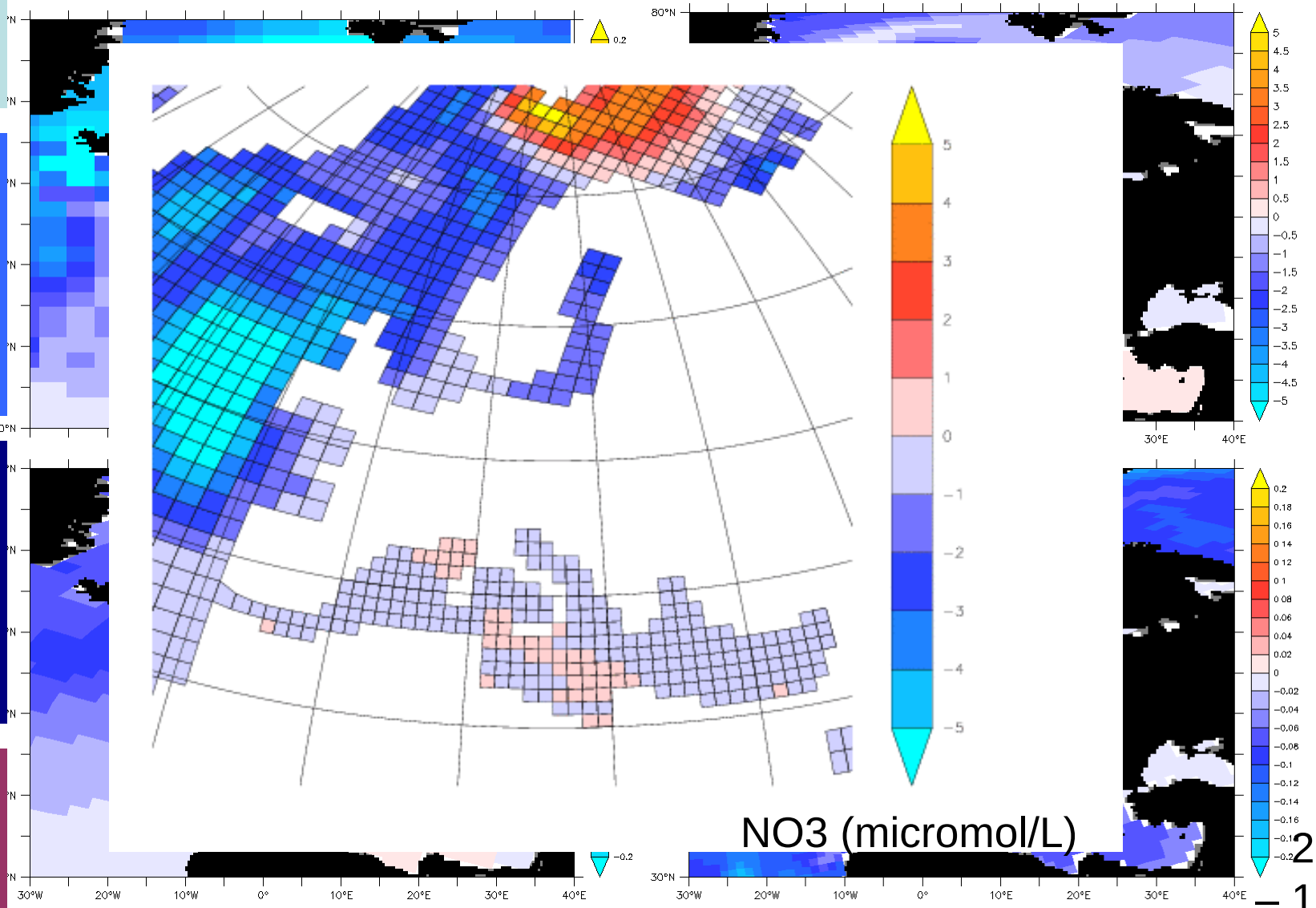


Impact of ocean acidification

Ocean Acidification impact on marine productivity

- Impact on calcification (Gehlen et al. 2007, Gangsto et al. 2008)

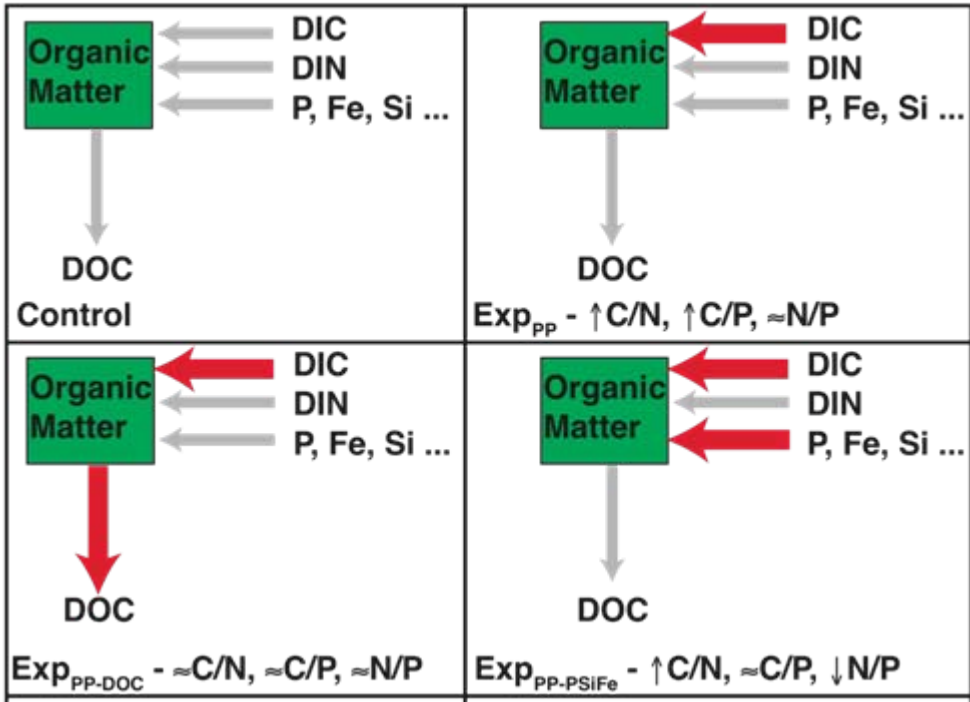
- Impact on stoechiometric ratios (Tagliabue et al. in prep)

… C/N/P decoupled in PISCES

… [CO2] impact on C/N
(Riebesell et al; 2007)

… Excess C to POC or DOC

… Other nutrients up-regulated or not



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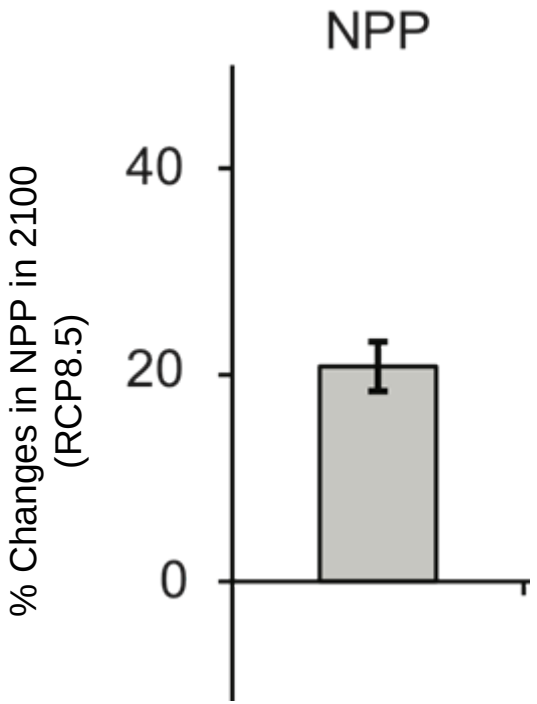
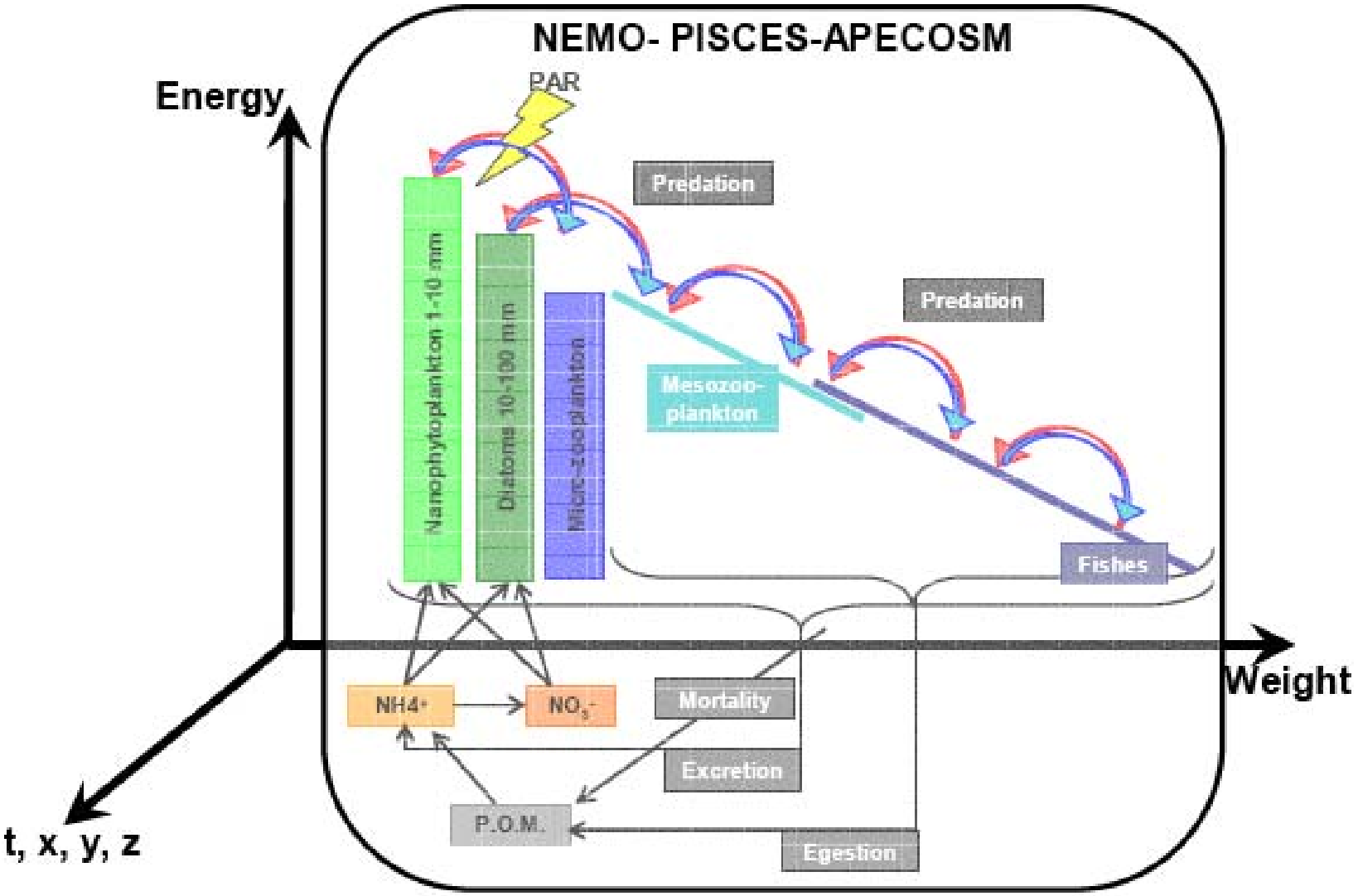
… Other nutrients (P,Fe,Si) up-regulated or not



Impact of Fishing : End-to-end coupling

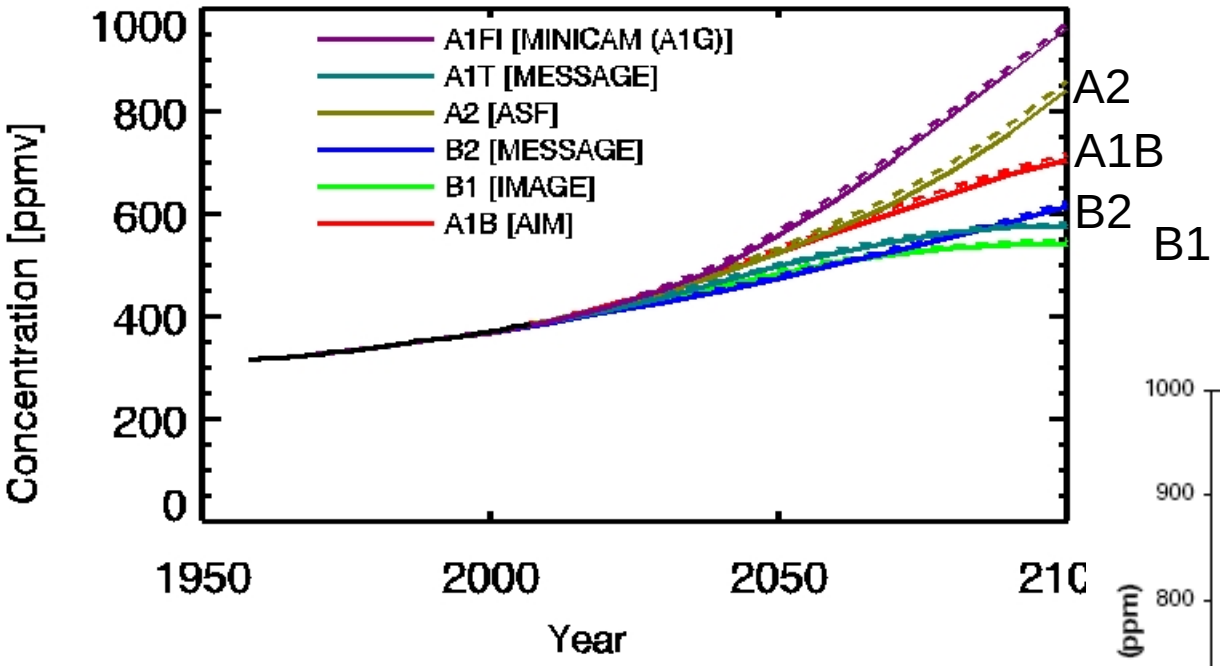
- Coupling with higher trophic levels: PISCES & APECOSM



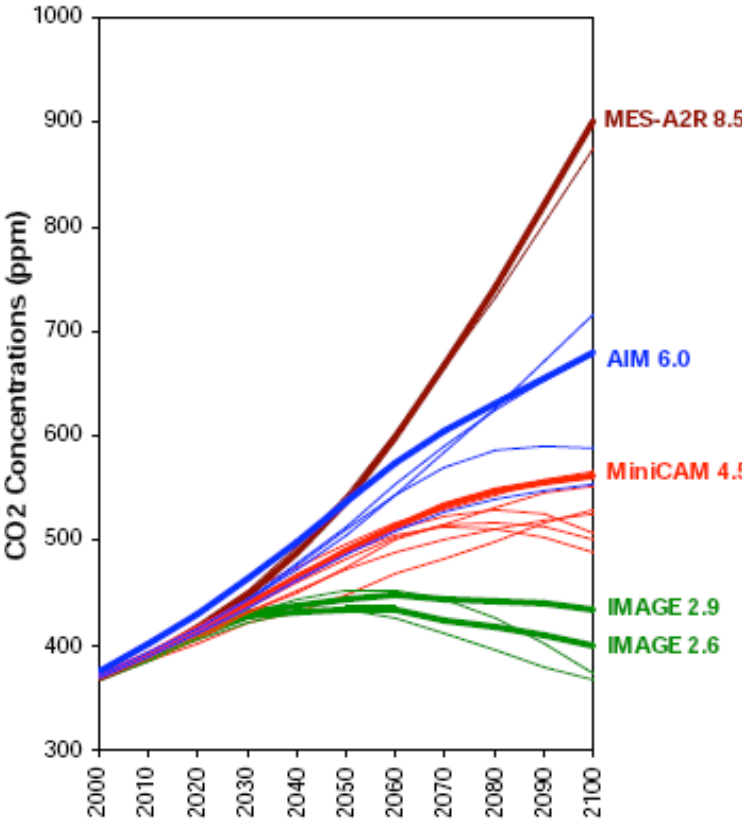
FP7-MEECE & ANR-MACROES

From SRES Scenarios to RCPs…

- IPCC AR4 Scenarios

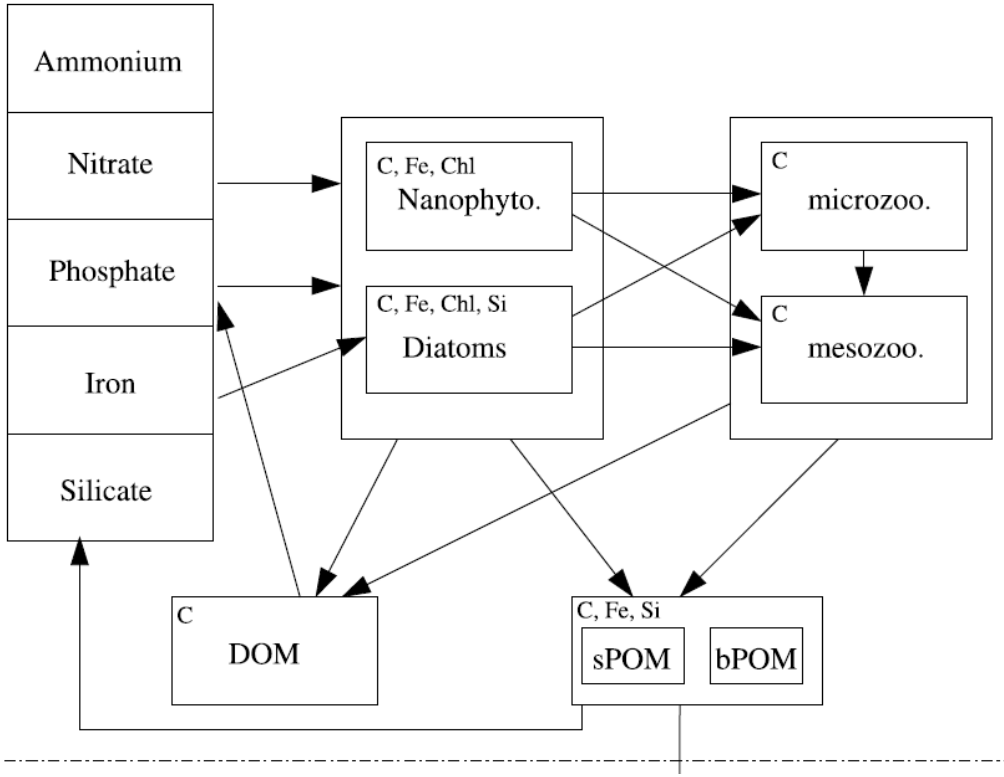


- IPCC AR5 – RCPs
  (Representative Concentration Pathways) :
  simulations will be done for the end of the year…



Main Characteristics of PISCES

- 5 **nutrients**:
  NH_4, NO_3, PO_4, Fe, Si
- **Sources** of nutrients:
  Rivers (all)
  Atmosphere (Fe, Si, P, N)
  Sediment (Fe)
- 2 **Phyto**plankton – 2 **Zoo**plankton:
  Diatoms / Nano-Pico
  Micro / Meso Zoo
- "Redfieldian" for C:N:P
  Variable **Si/C**, **Fe/C**, and **Chl/C** ratios
- Oxygen, Carbon Cycle (DIC & Alklainity), and calcite production
- Described in details in Aumont and Bopp, 2006 (Equations & Atlas)

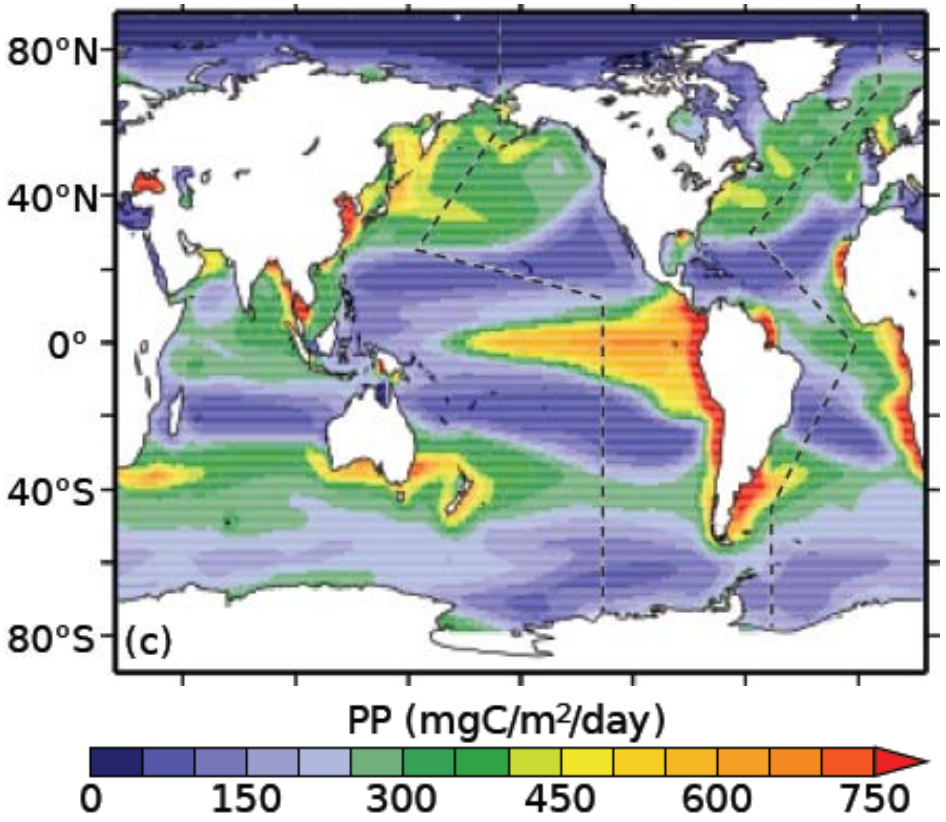


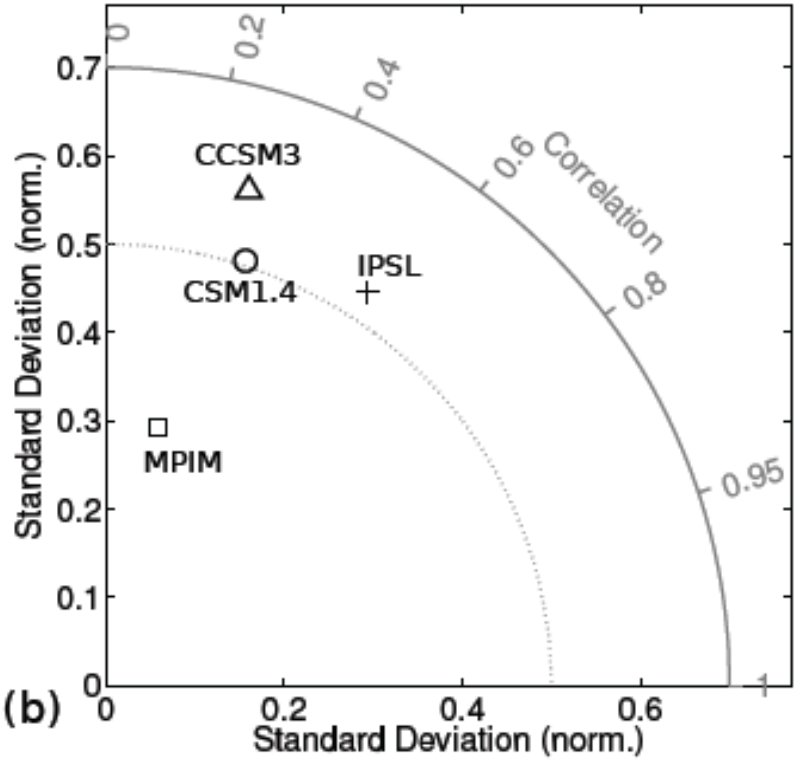
- Being coupled to APECOSM (see Thomas's talk this afternoon)

Impact of climate change

- **Climate Change impact** on marine productivity

- Evaluation of simulated Chl / NPP (Schneider et al. 2009)

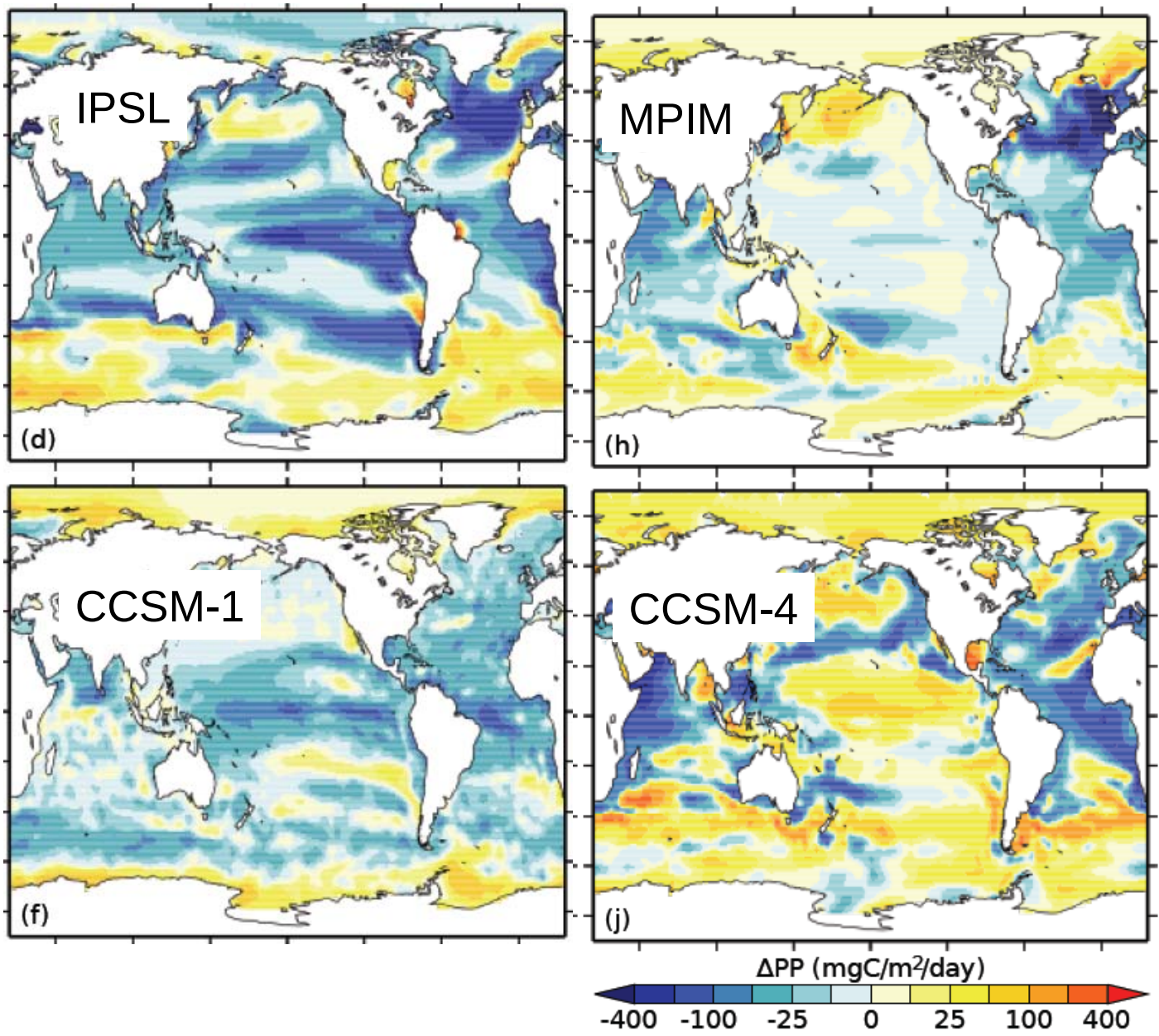




Comparison to other coupled models

Climate Change impact on marine productivity

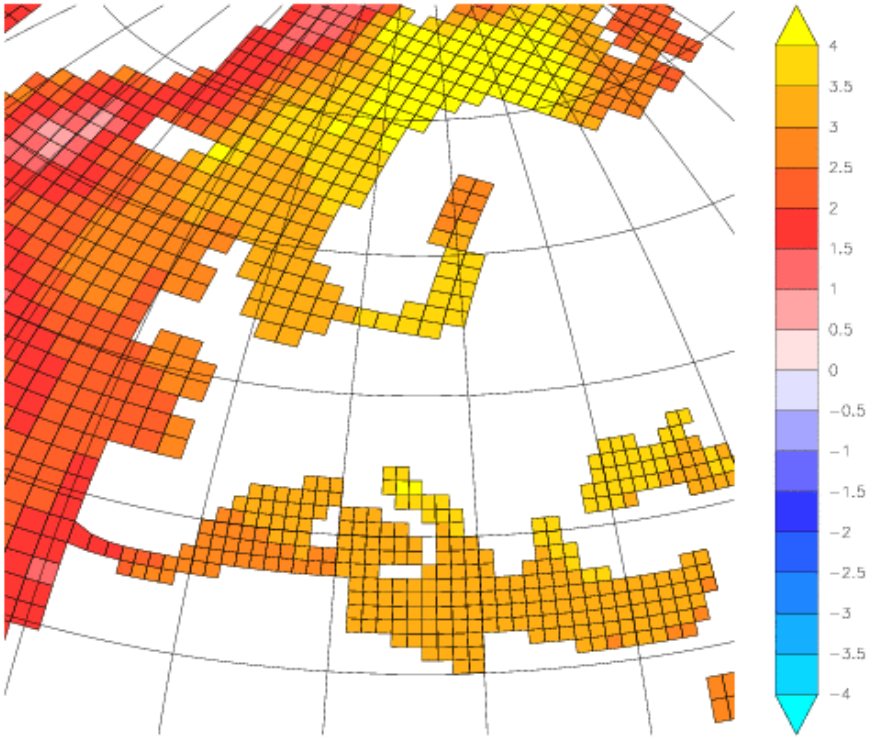
Changes in NPP in 2100 (SRES-A2)



(Steinacher et al. 2009)

Focus on european seas

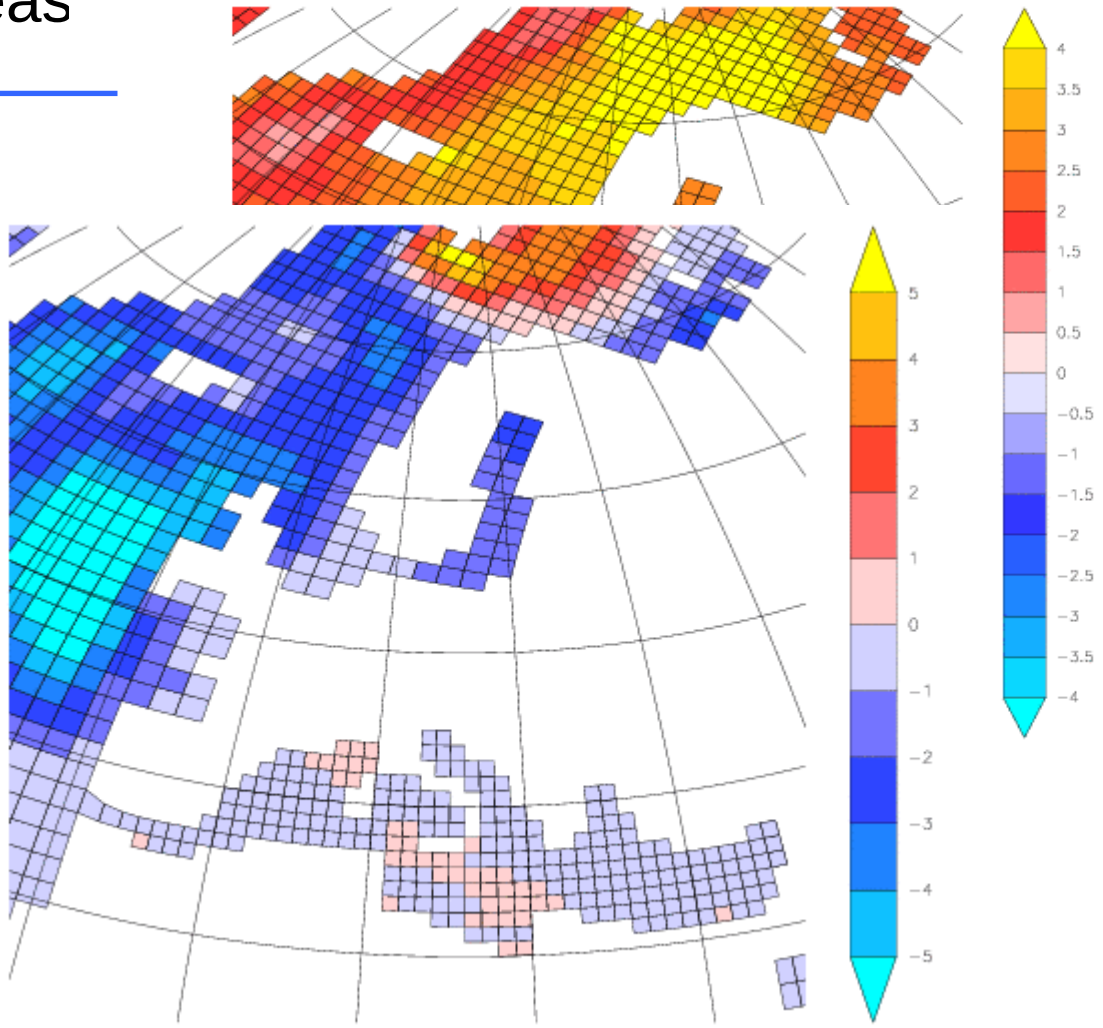
- Changes in SST



SST (°C)
2080/2099 – 1980/2000

Focus on european seas

- Changes in SST
- Changes in NO3

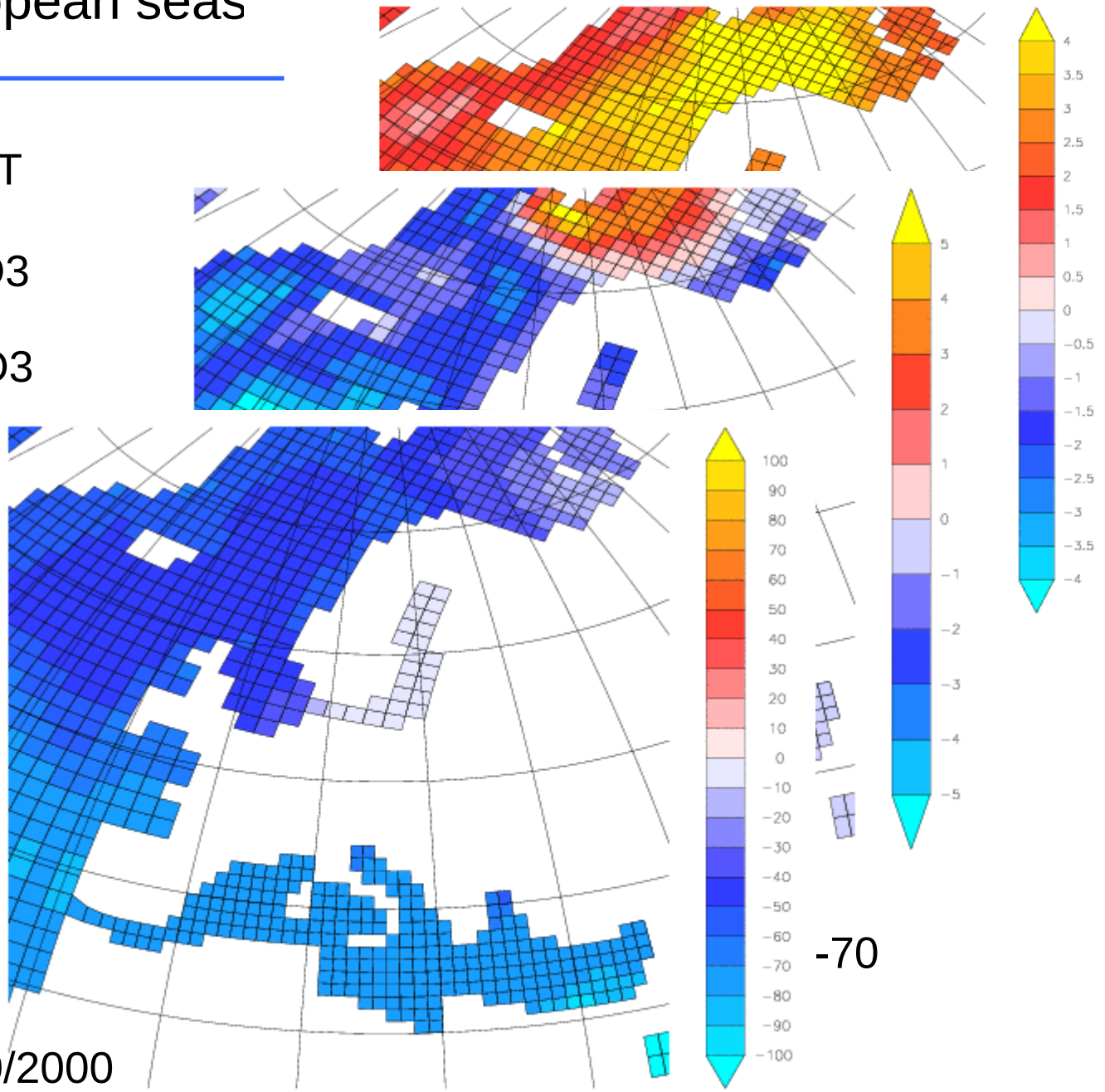


NO3 (micromol/L)

2080/2099 – 1980/2000

Focus on european seas

- Changes in SST
- Changes in NO3
- Changes in CO3 (acidification)

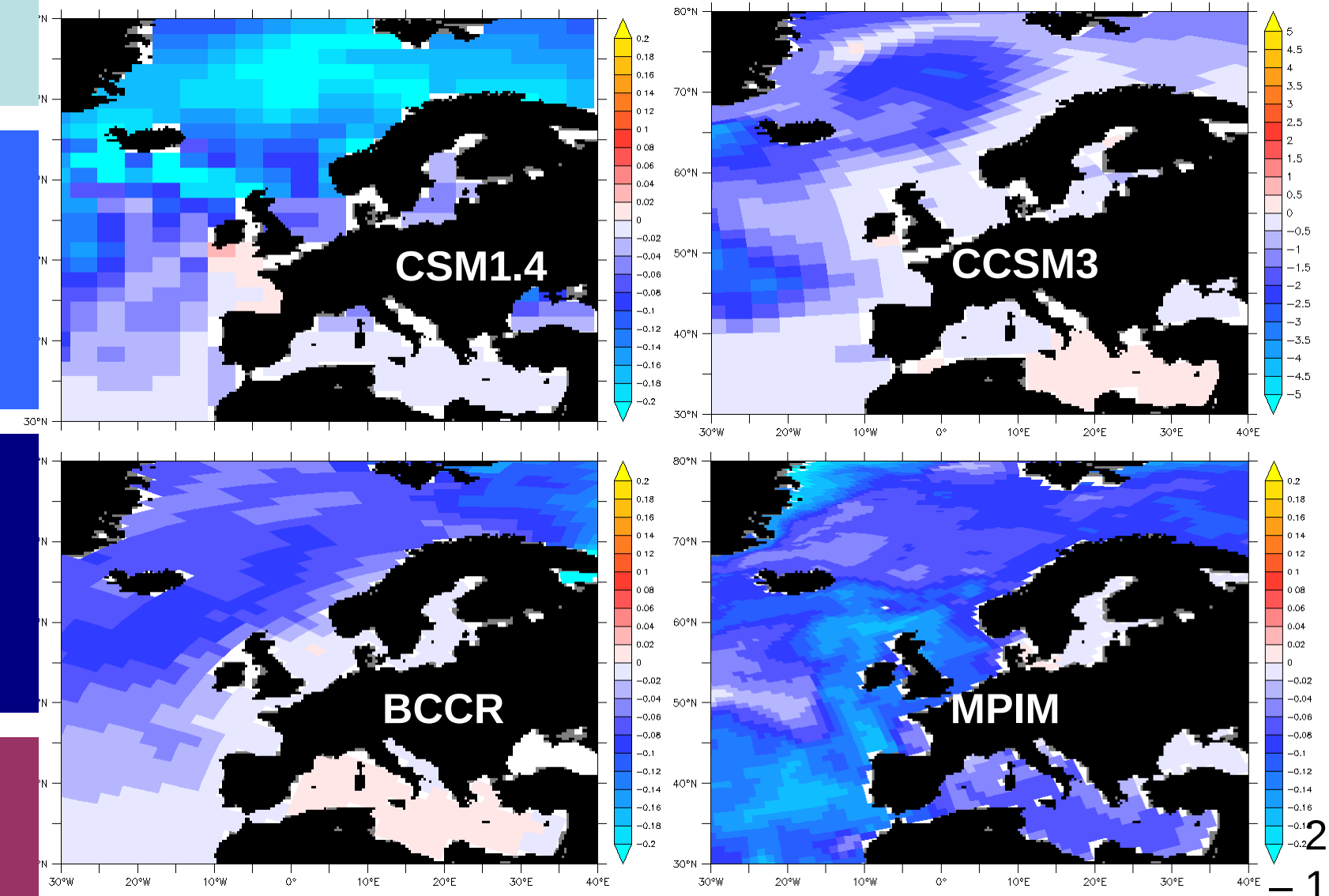


CO3
(micromol/L)
2080/2099 – 1980/2000

-70

Focus on european seas : model intercomparison

- Changes in Nutrients (PO4 or NO3)



A2
2080/2099
– 1980/2000