

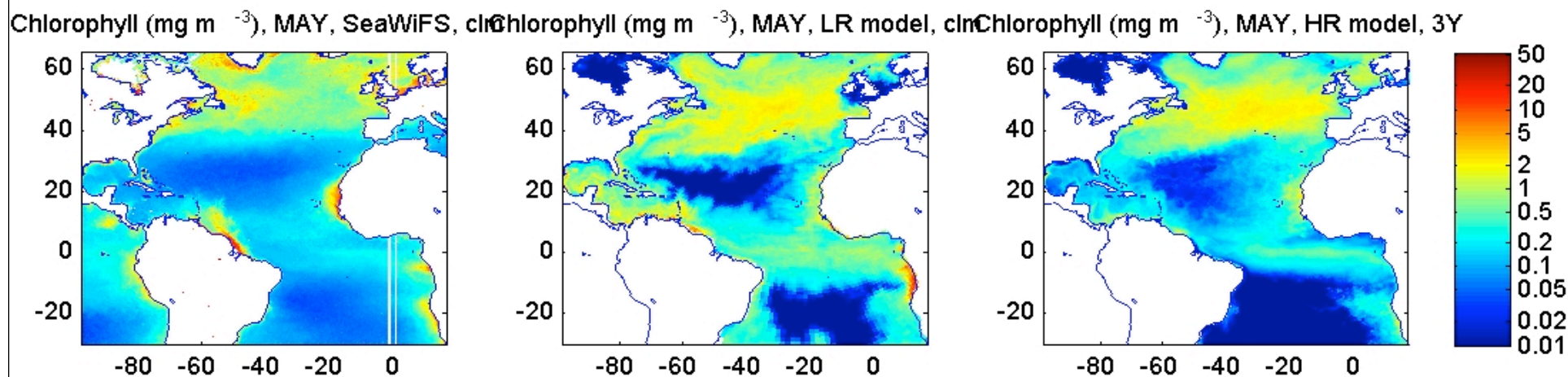
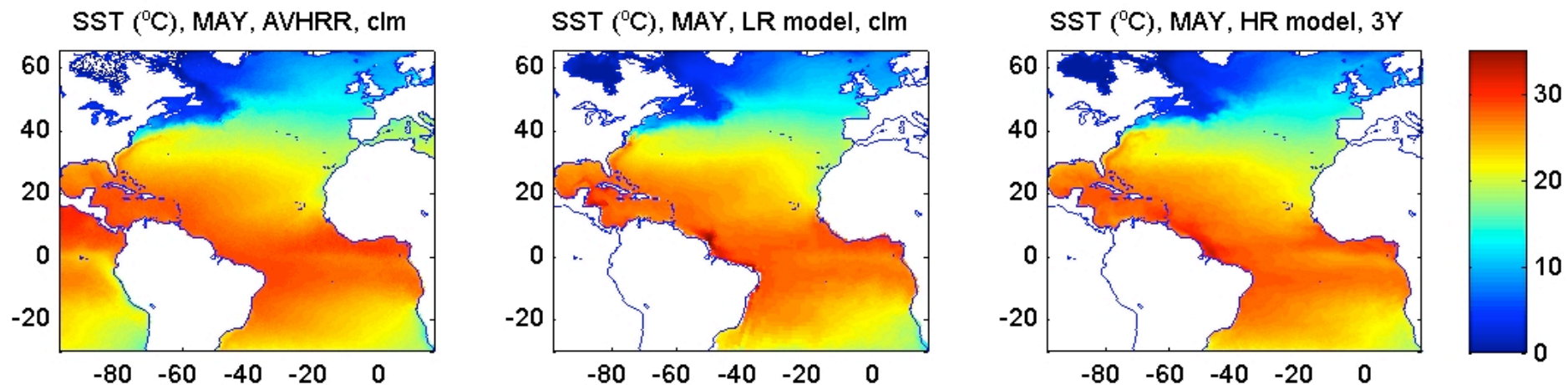
Results from HR and LR North-Atlantic ROMS-CoSiNE model

Fei and Lei, University of Maine

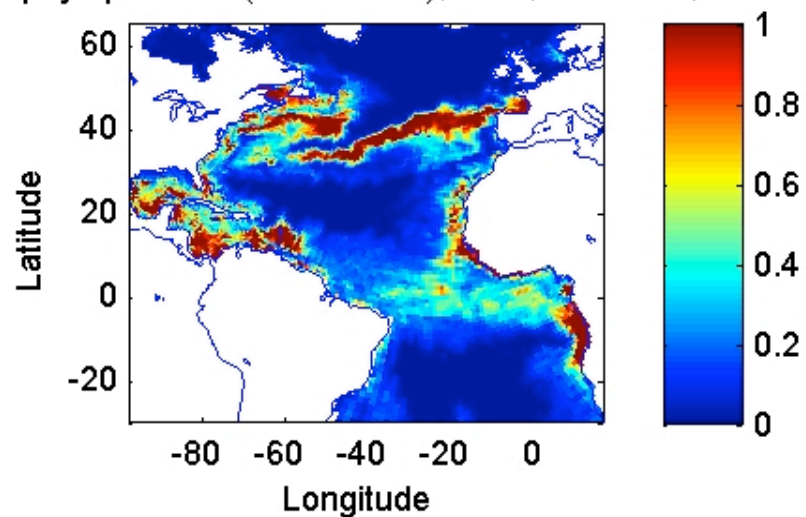
- UMaine CoSiNE biology code are used to simulate nutrients and plankton dynamics.
- No biology tracer nudging applied.
- All biology model parameters are identical.
- Both HR and LR major biology variables initial conditions are from WOA 2005.
- LR North-Atlantic ROMS-COSINE model had been integrated for 8-10 years using year 2004 forcing.
- HR North-Atlantic ROMS-COSINE model results here is 3 year average (climatology) from year 1985, 1986 and 1990.

General comments of HR and LW model simulations

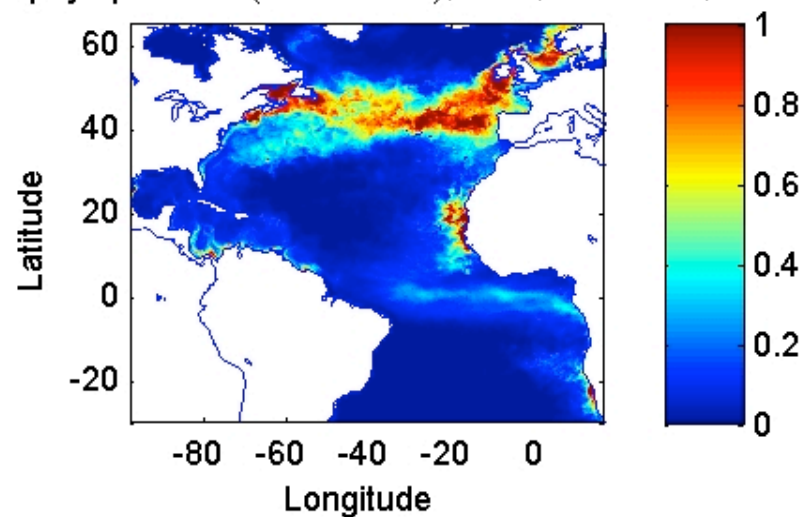
- 1) High resolution model produce a lower (more reasonable) nutrient (NO_3 , SiO_4) fields in tropic, and coastal upwelling regions
- 2) Due to relatively low nutrient level in HR model, HR model chlorophyll concentration in these regions are lower.
- 3) In high latitude, the LR and HR results are similar, at least on monthly averaged basis



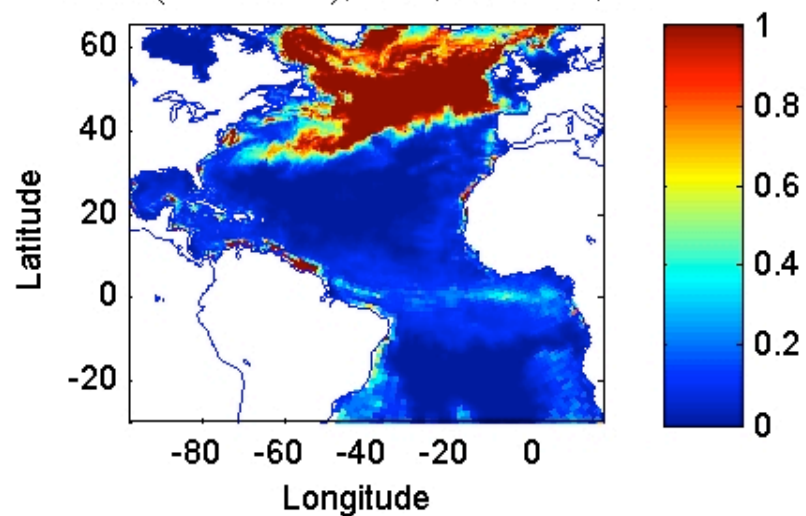
nanophytoplankton (mmol m^{-3}), MAY, LR model, c1m



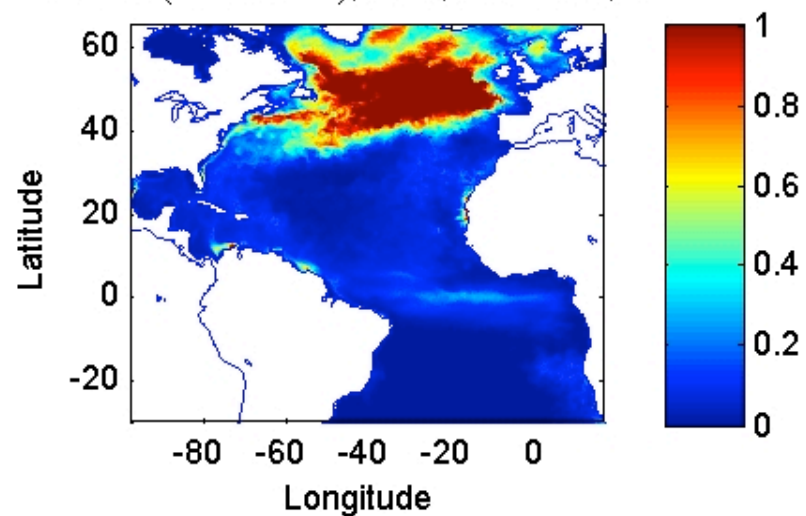
nanophytoplankton (mmol m^{-3}), MAY, HR model, 3Y



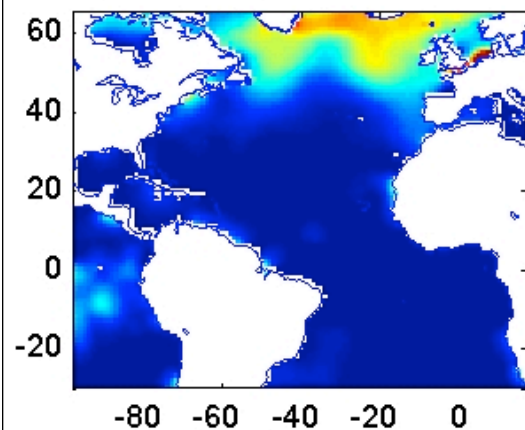
diatom (mmol m^{-3}), MAY, LR model, c1m



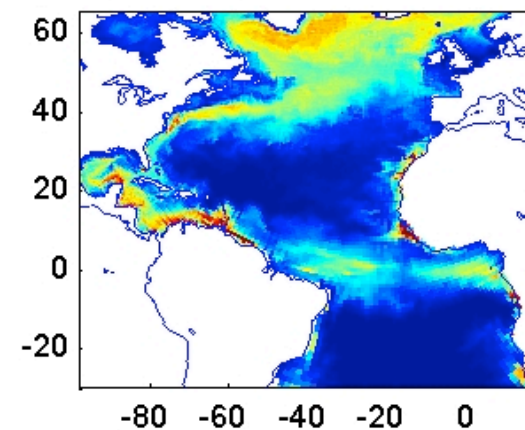
diatom (mmol m^{-3}), MAY, HR model, 3Y



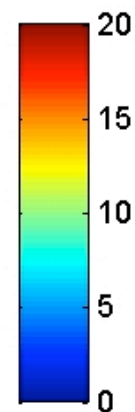
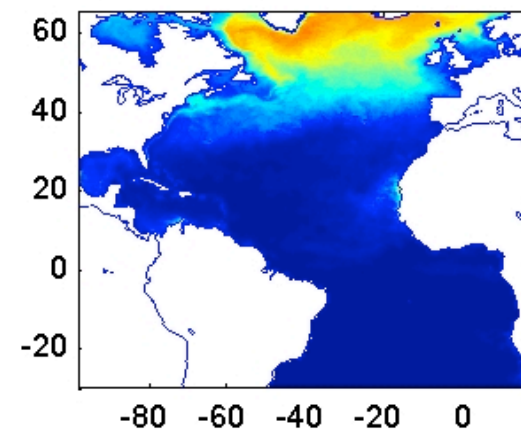
NO₃ (mmol m⁻³), MAR, woa2005, c1m



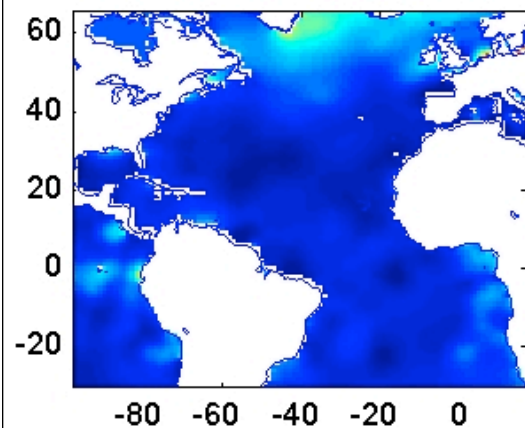
NO₃ (mmol m⁻³), MAR, LR model, c1m



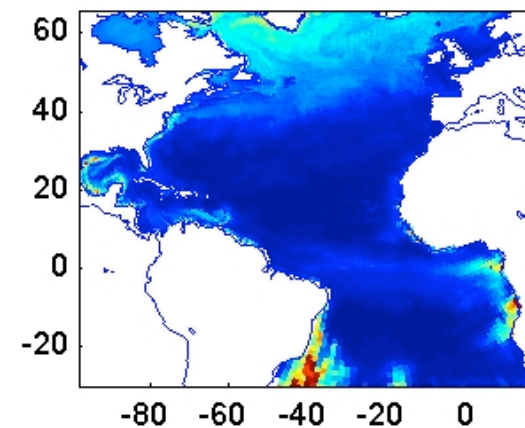
NO₃ (mmol m⁻³), MAR, HR model, 3Y



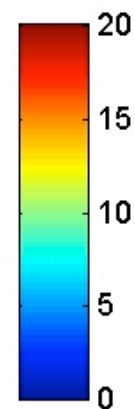
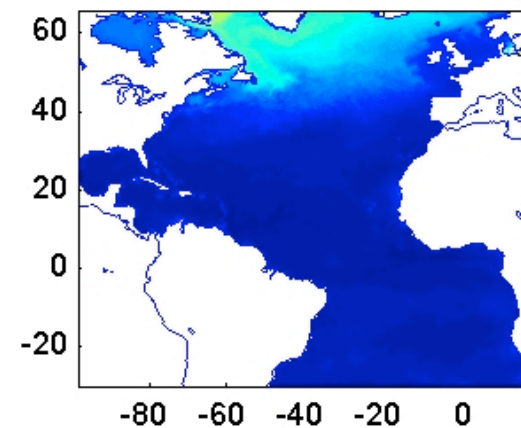
SiO₄ (mmol m⁻³), MAR, woa2005, c1m



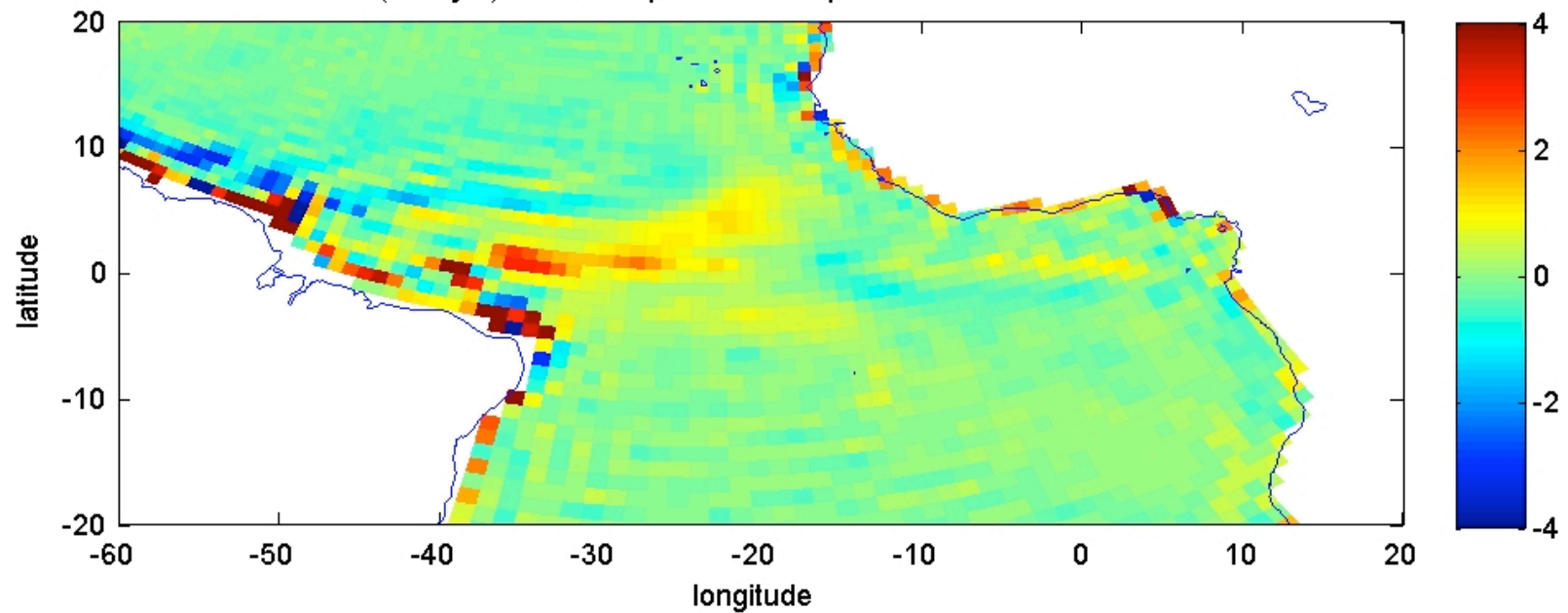
SiO₄ (mmol m⁻³), MAR, LR model, c1m



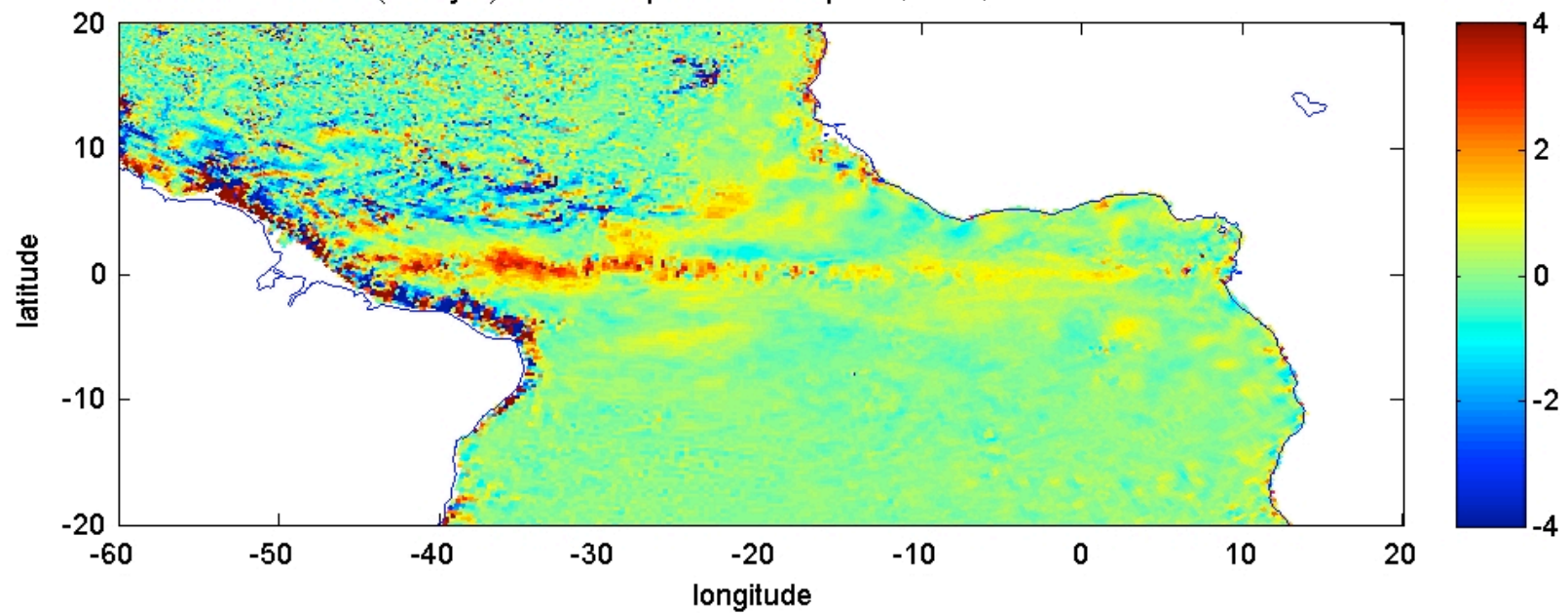
SiO₄ (mmol m⁻³), MAR, HR model, 3Y



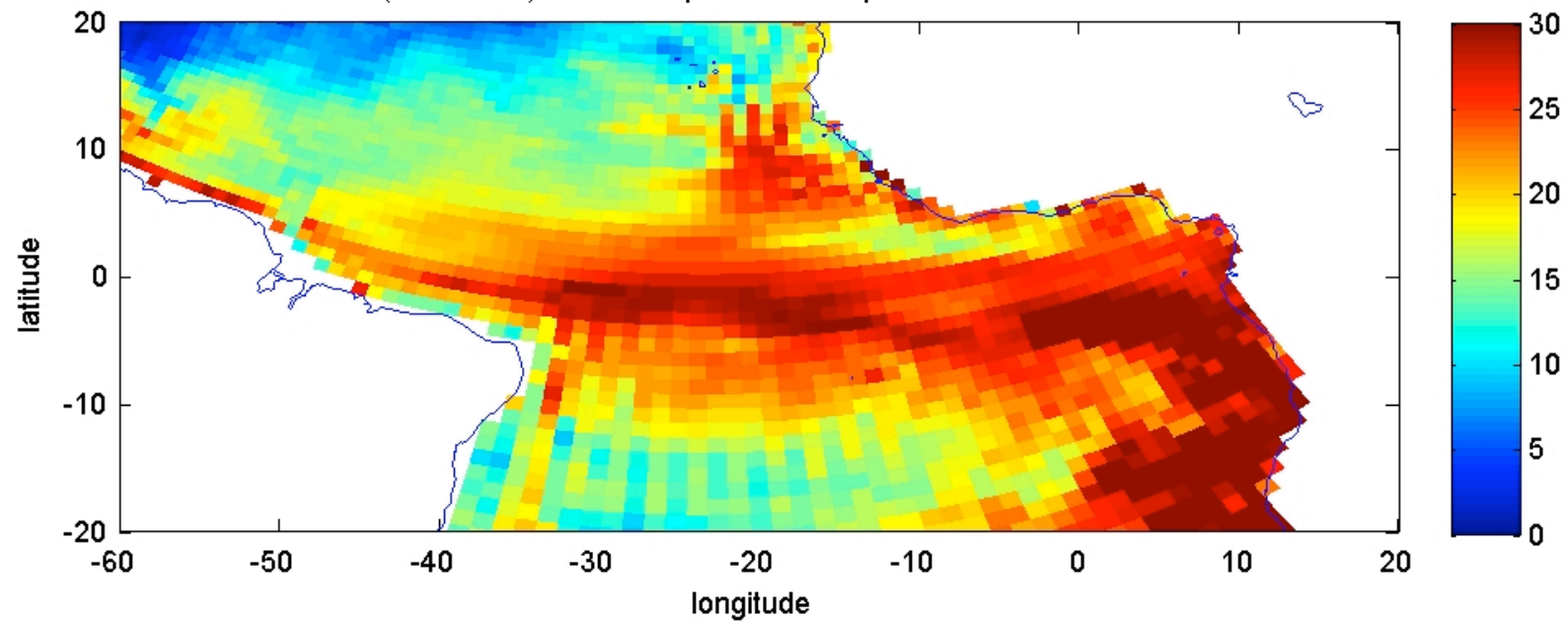
w (m day⁻¹) at 50 m depth around Equator, MAR, LR model



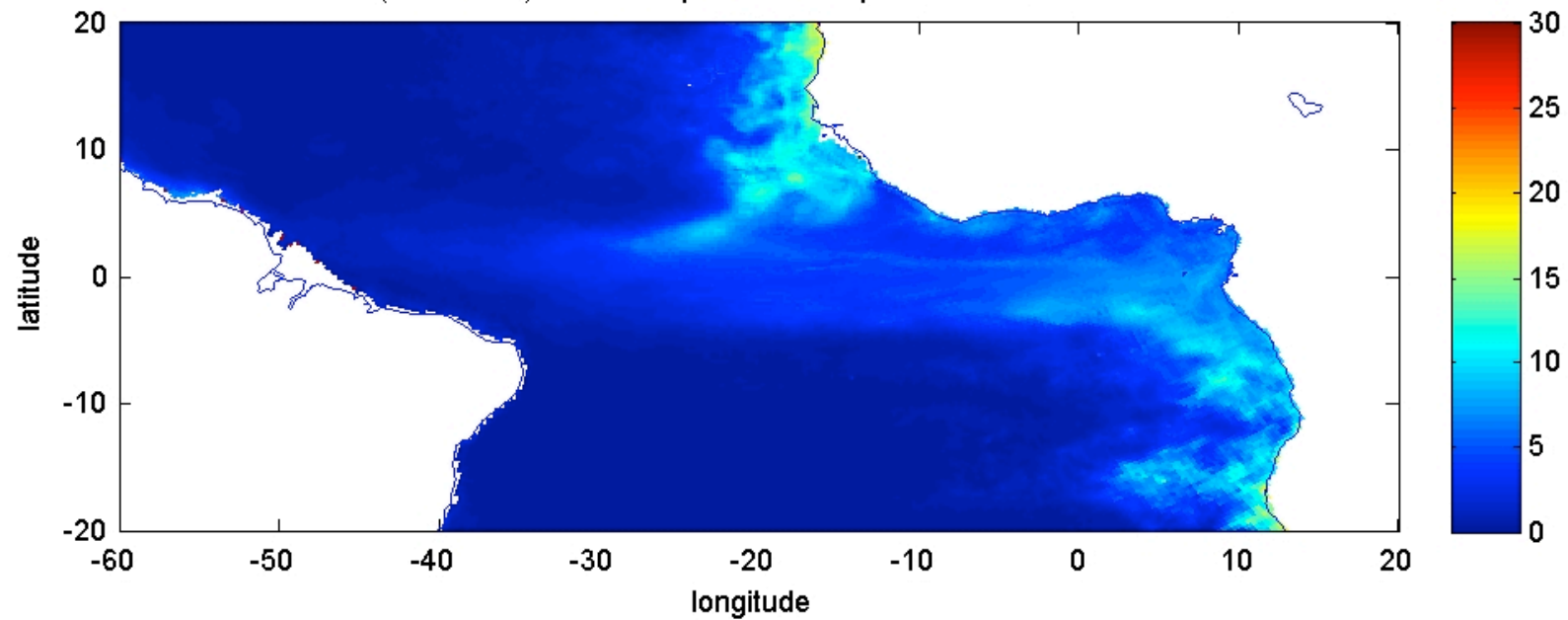
w (m day⁻¹) at 50 m depth around Equator, MAR, HR model

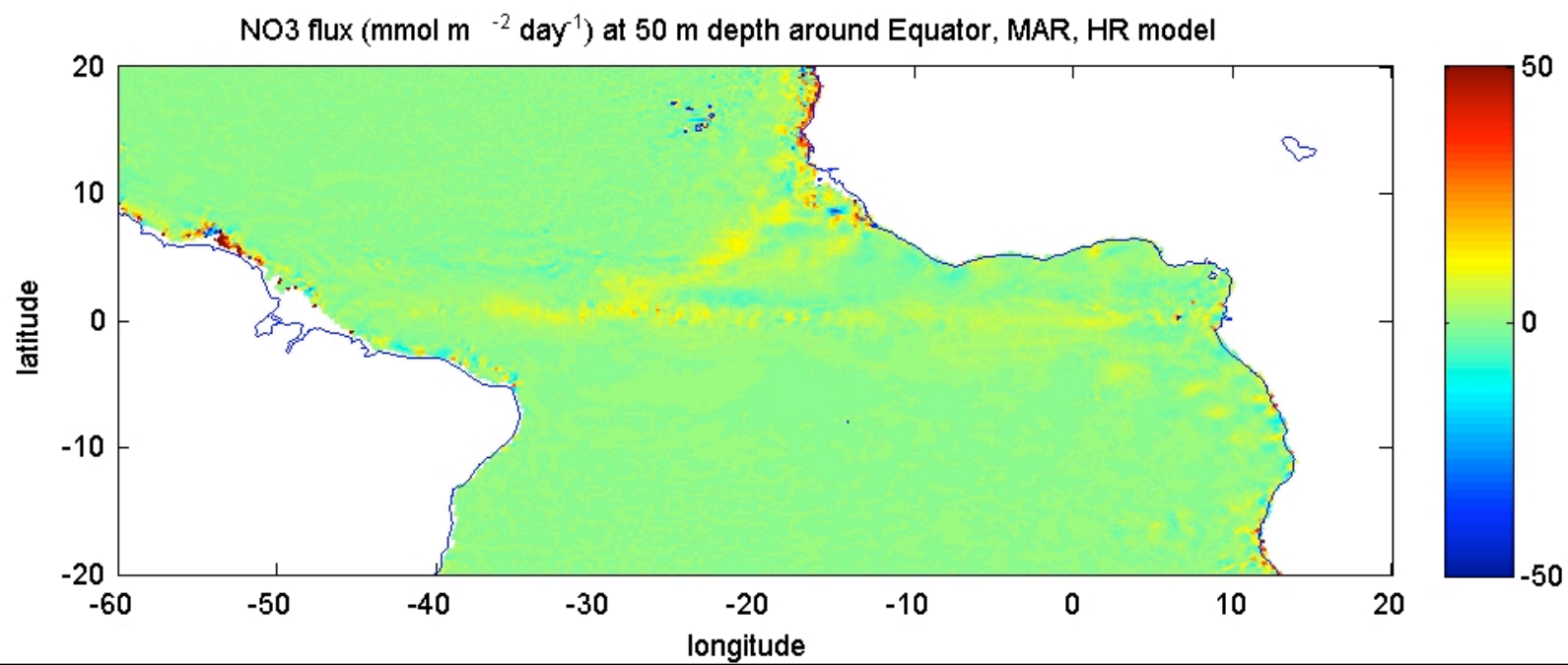
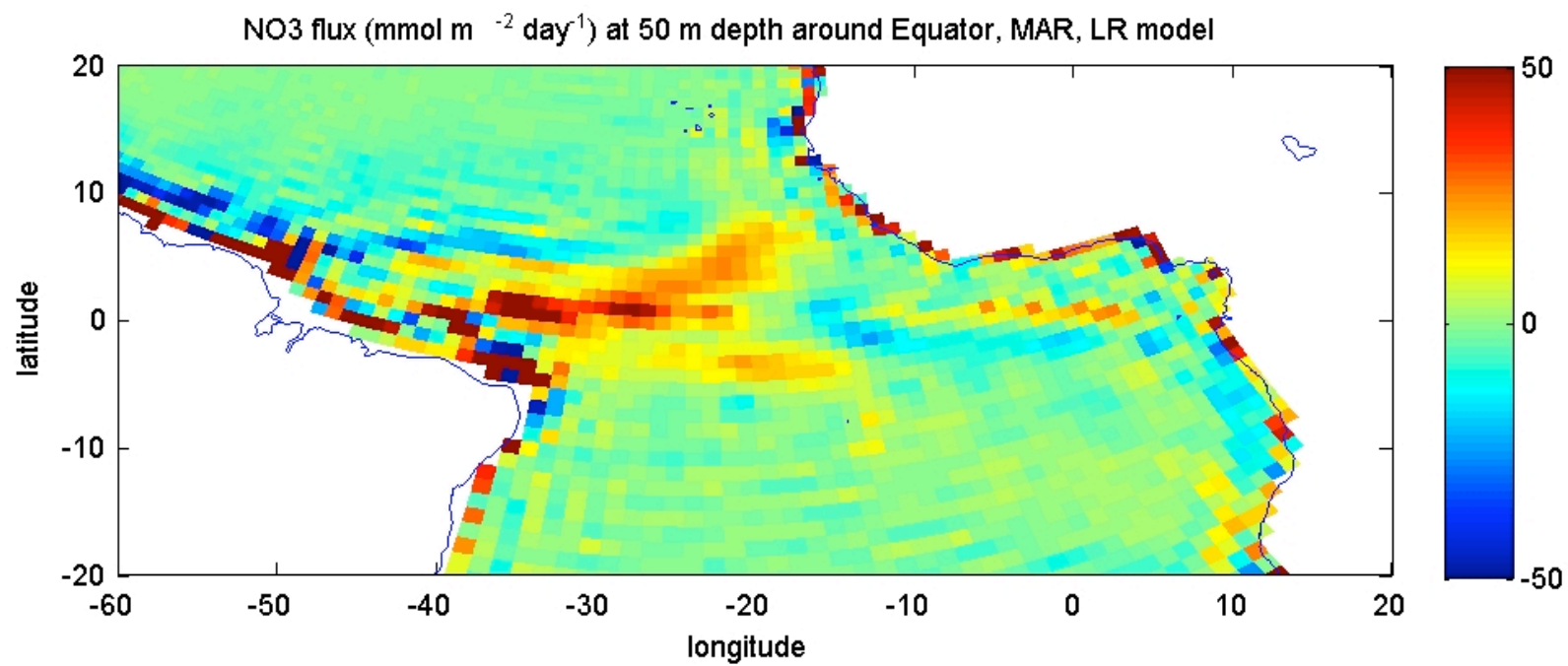


NO₃ (mmol m⁻³) at 50 m depth around Equator, MAR, LR model

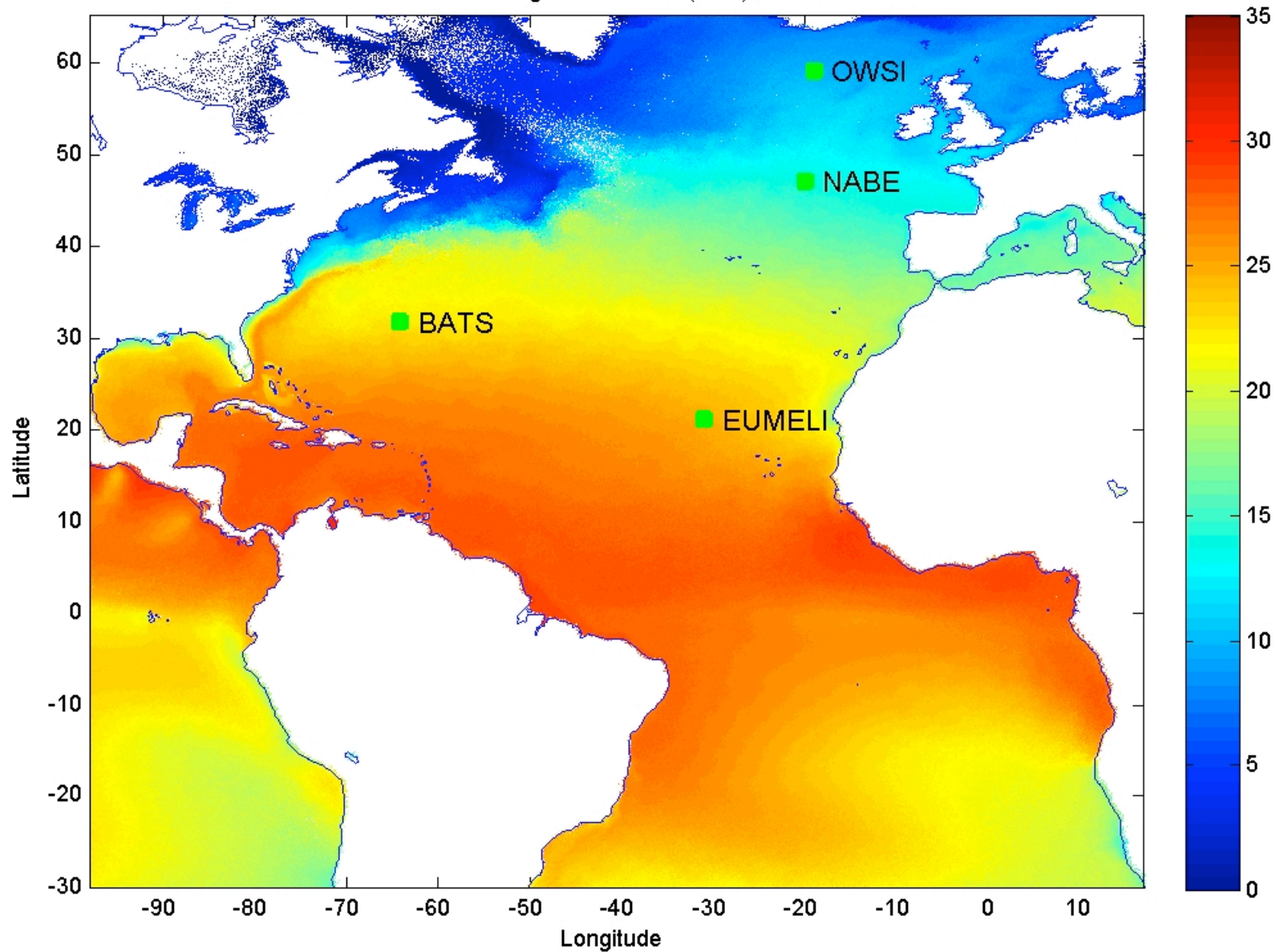


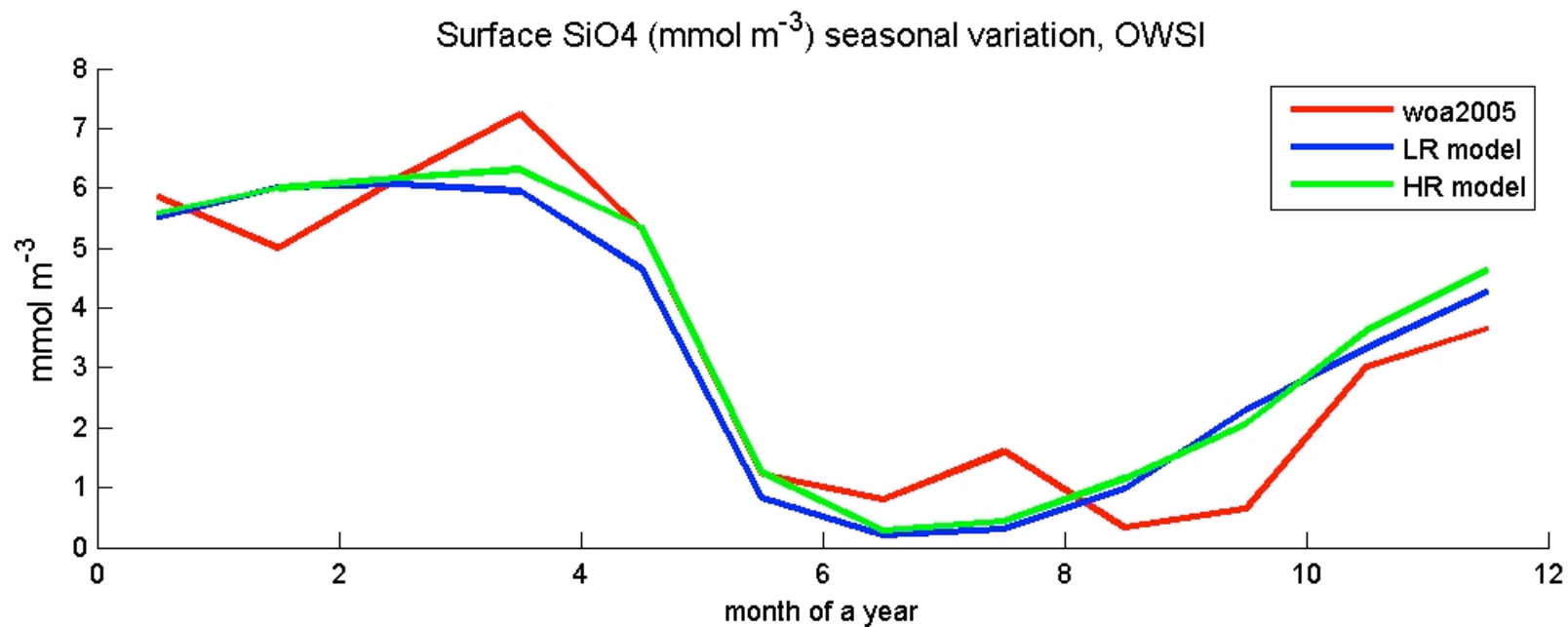
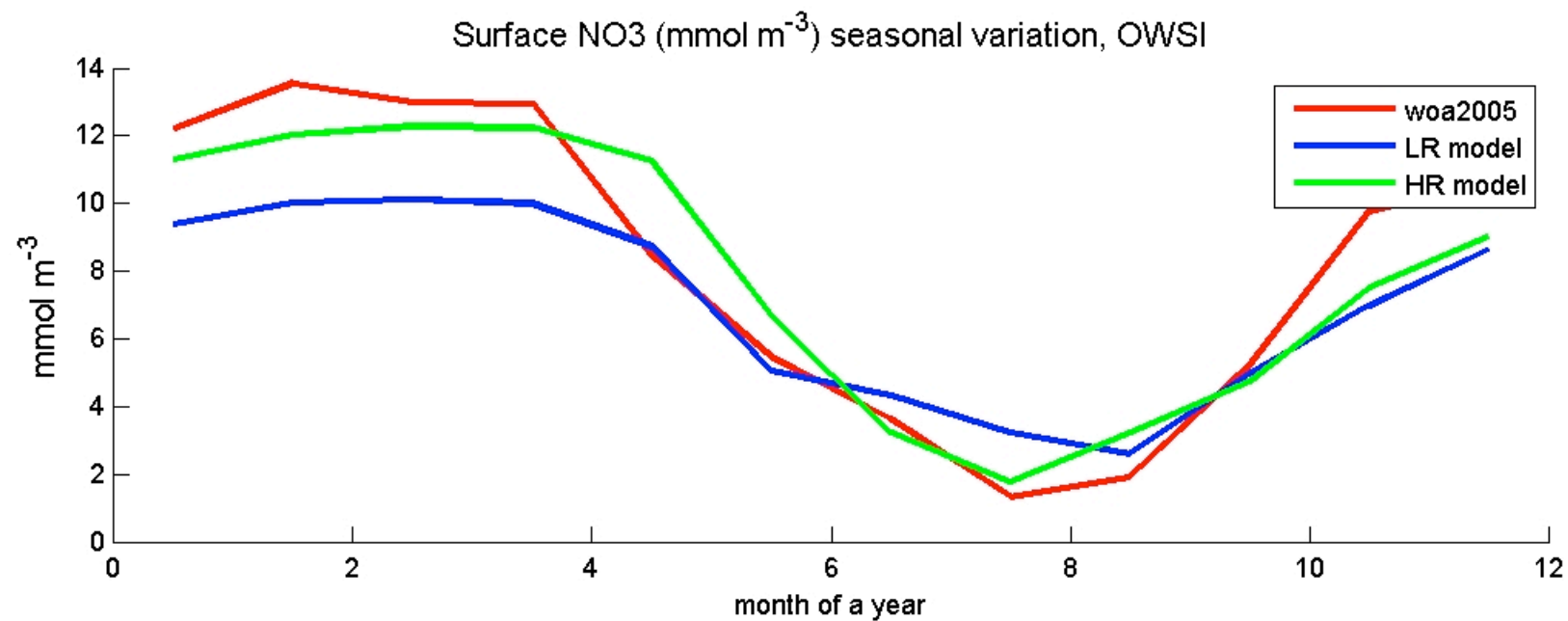
NO₃ (mmol m⁻³) at 50 m depth around Equator, MAR, HR model

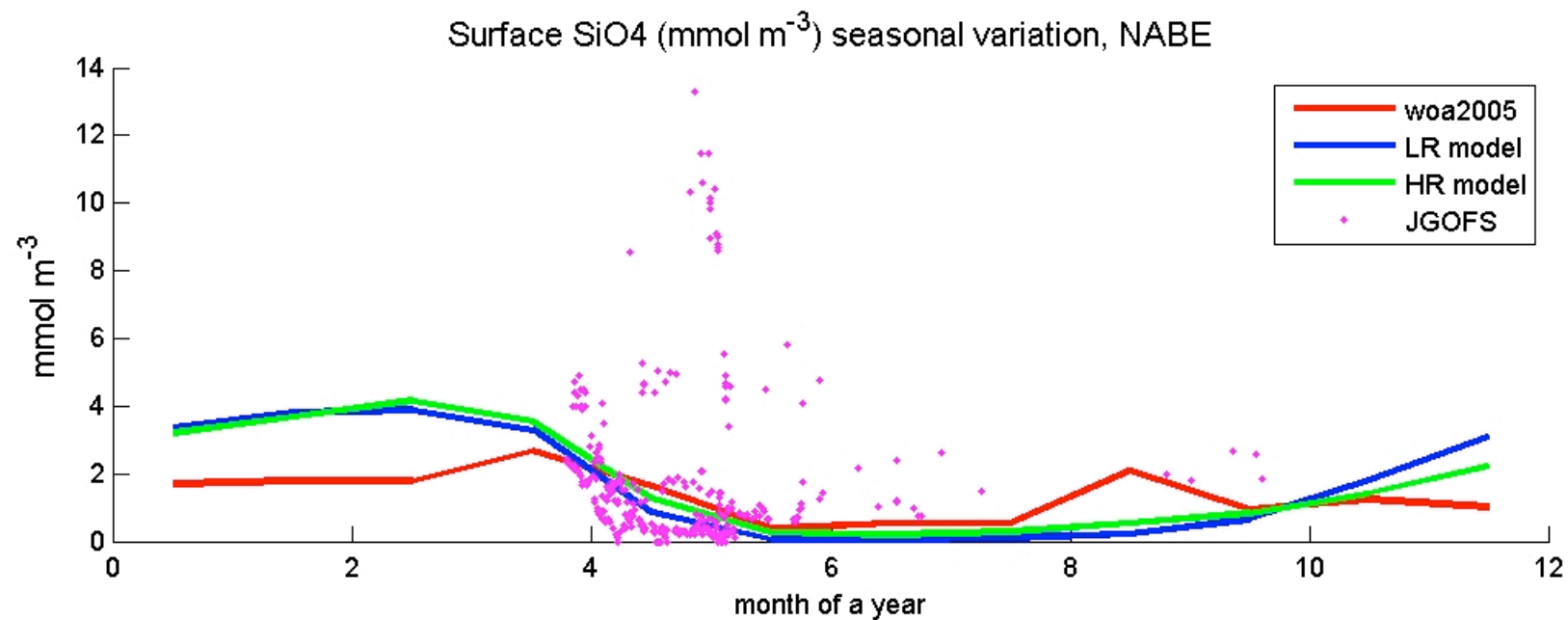
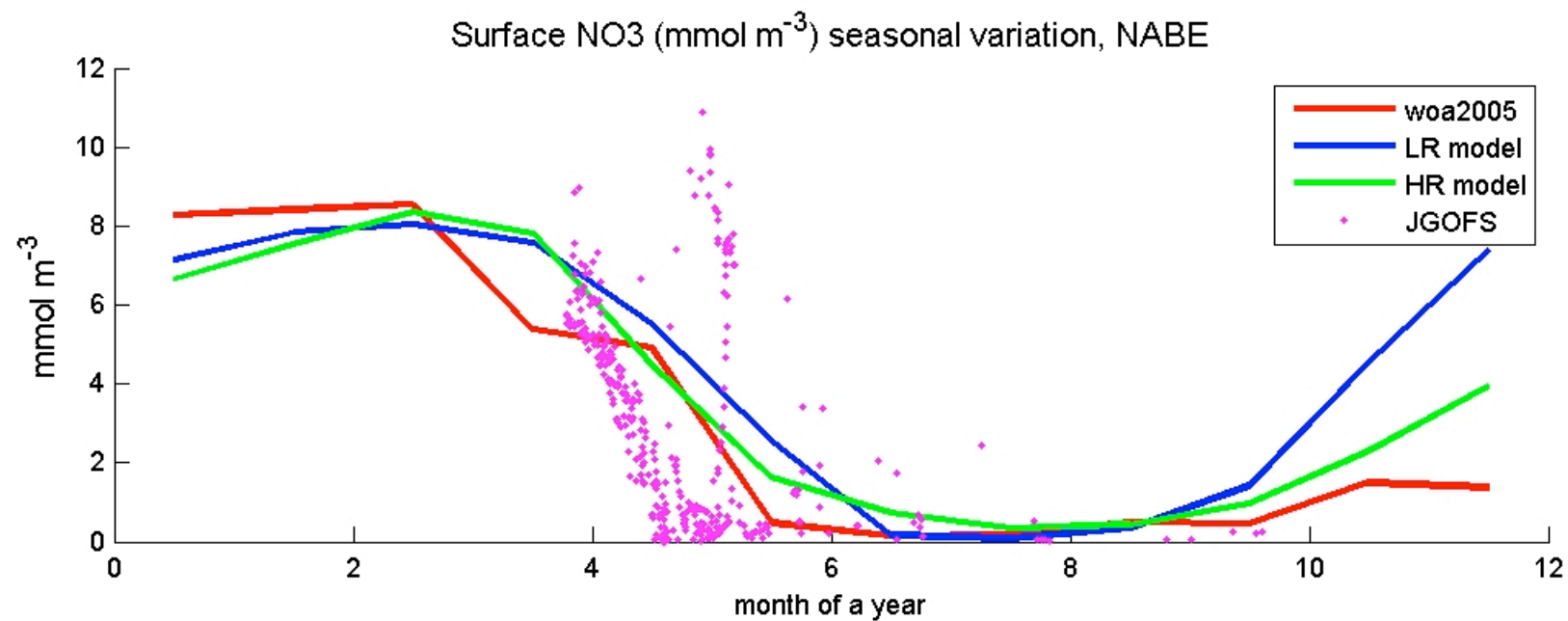




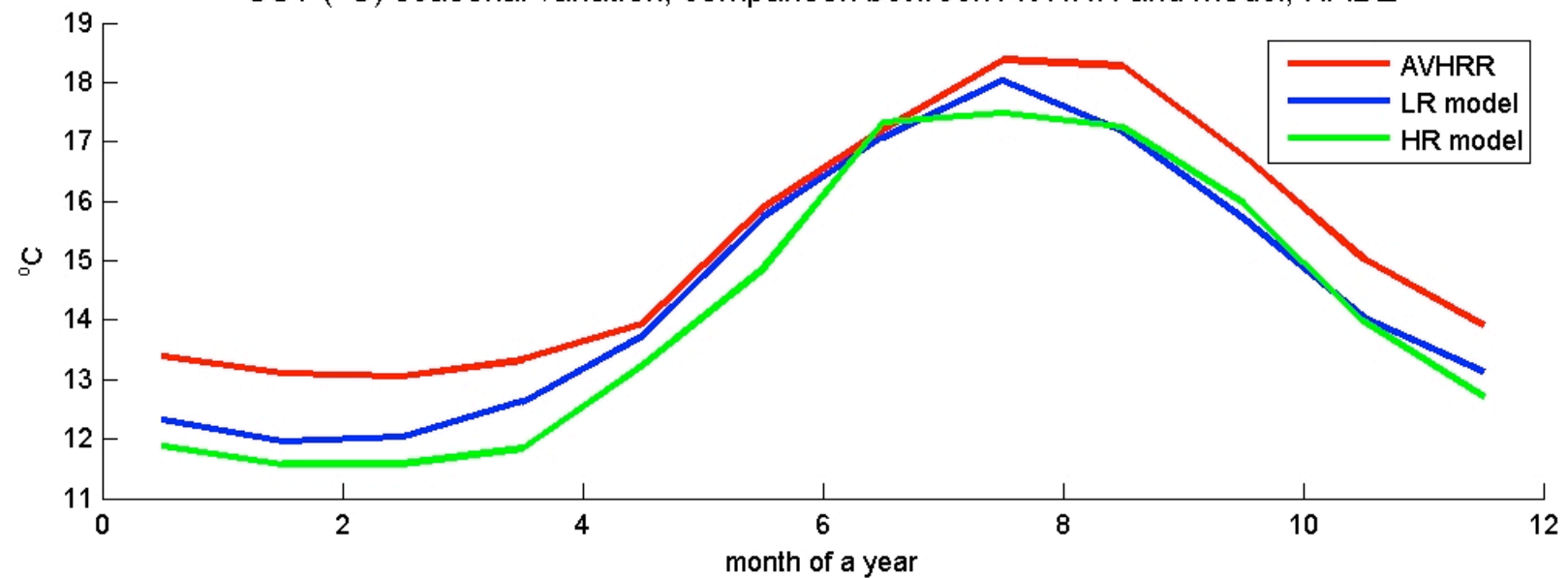
Station locations with background of SST (°C), DEC, AVHRR, cIm



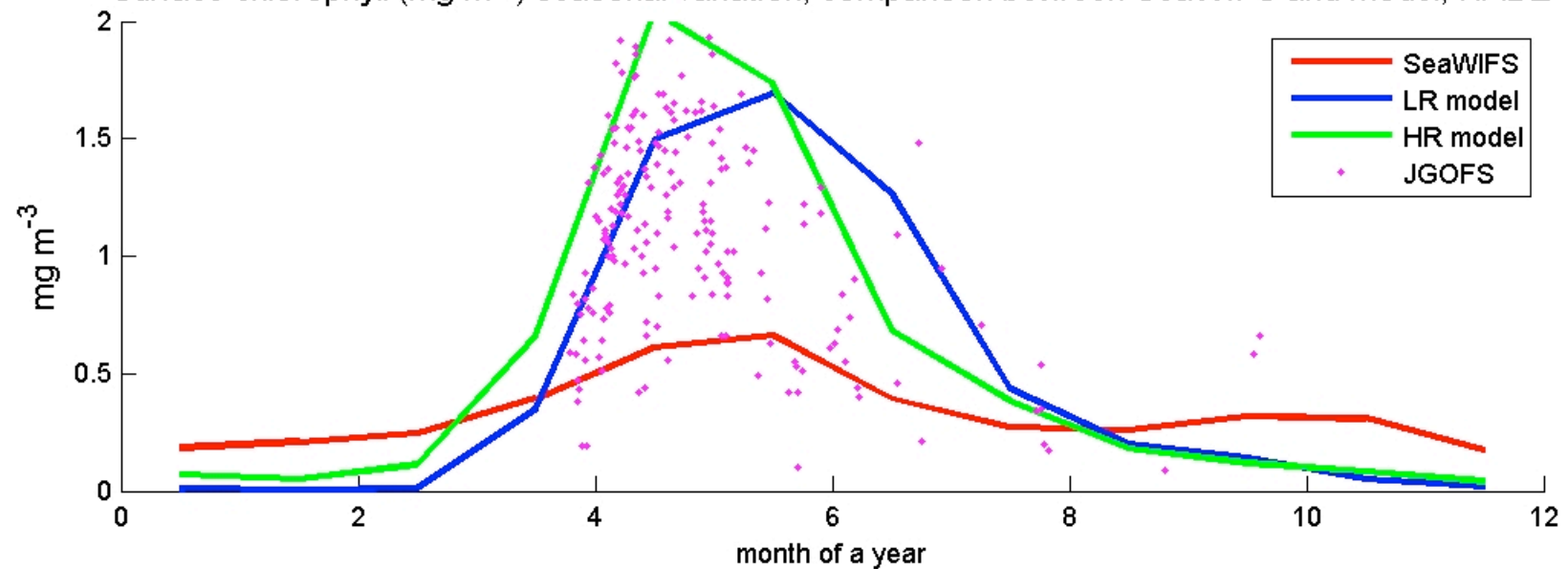




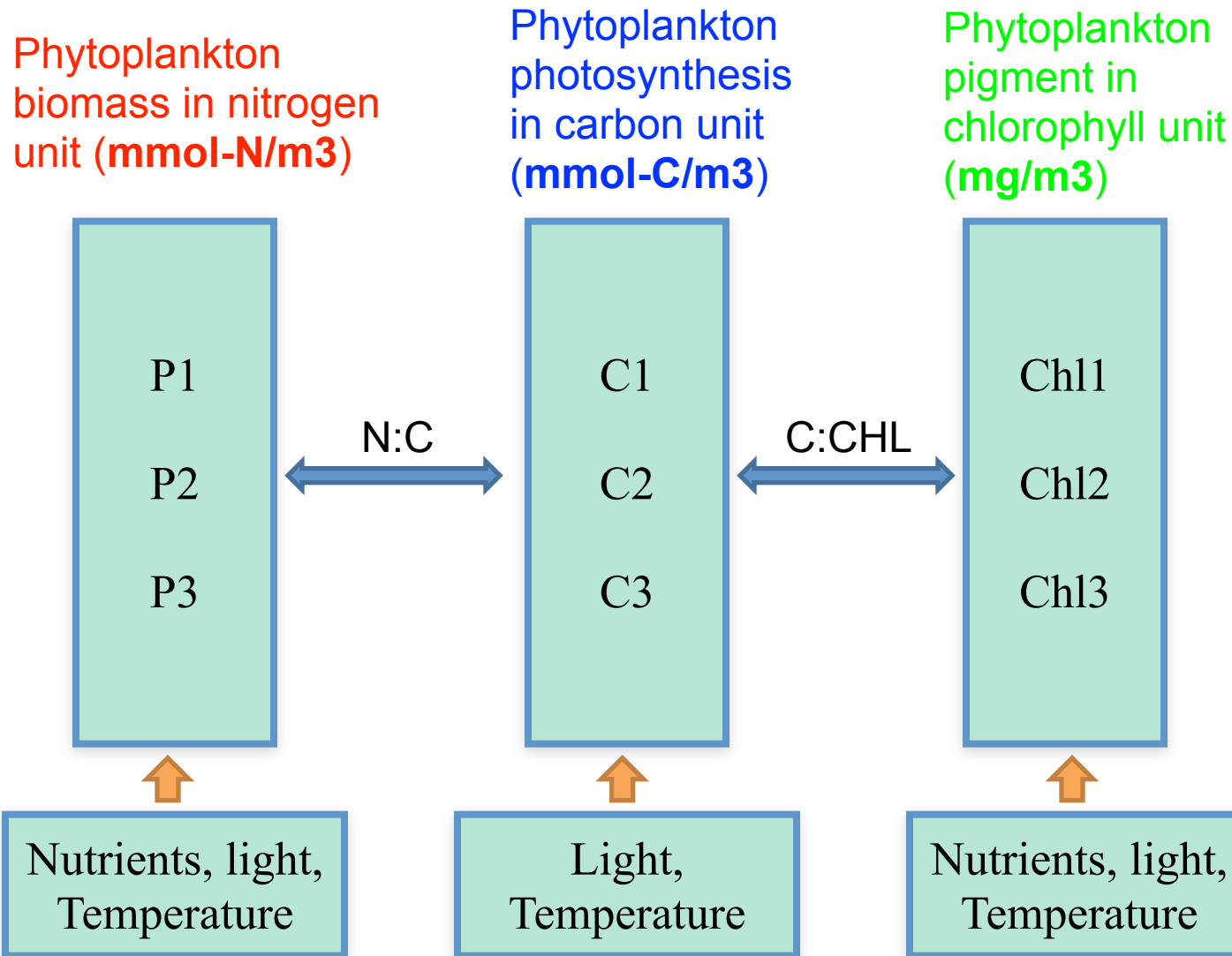
SST ($^{\circ}\text{C}$) seasonal variation, comparison between AVHRR and model, NABE



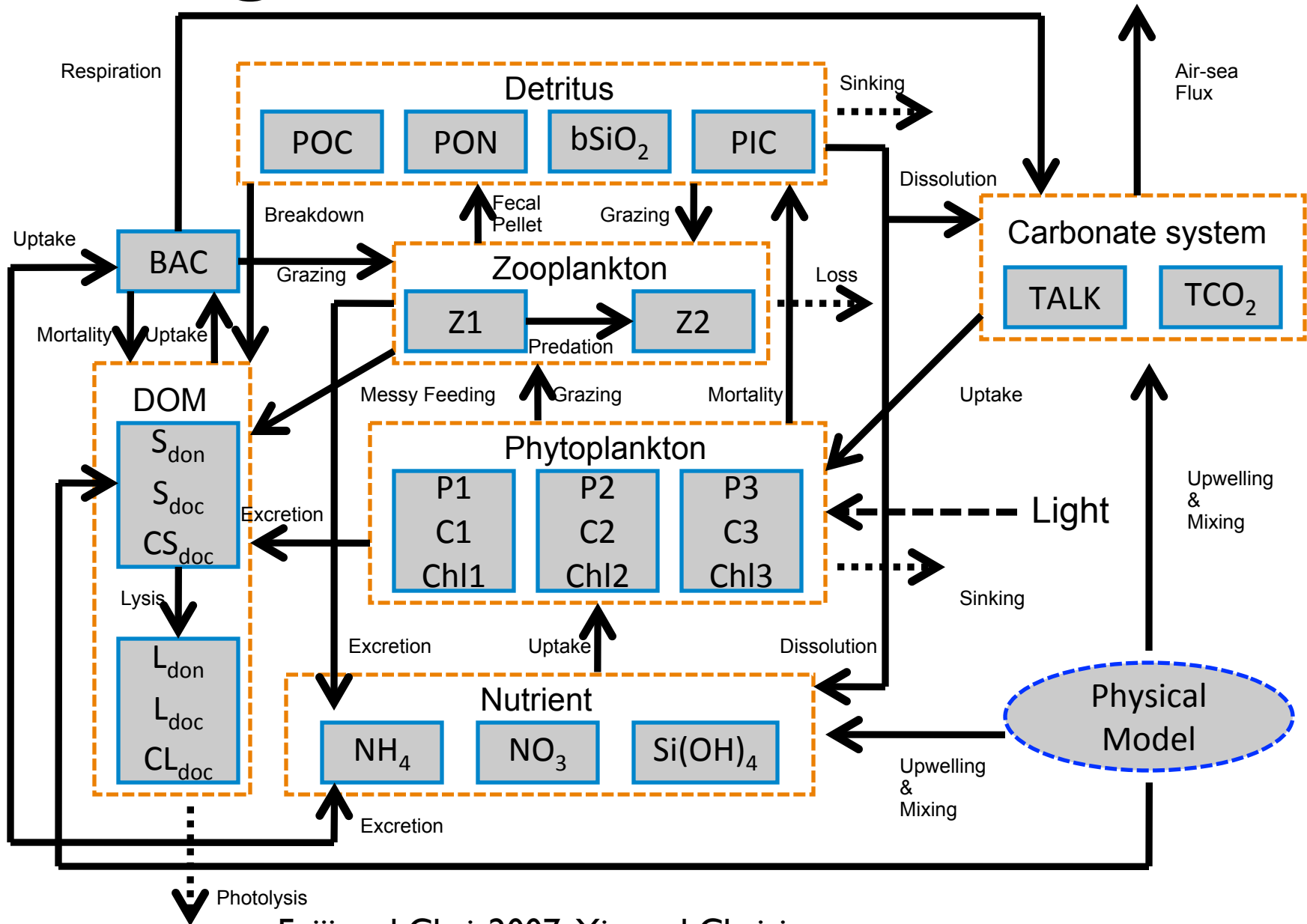
Surface chlorophyll (mg m^{-3}) seasonal variation, comparison between SeaWIFS and model, NABE



Phytoplankton Groups and Photo Acclimation



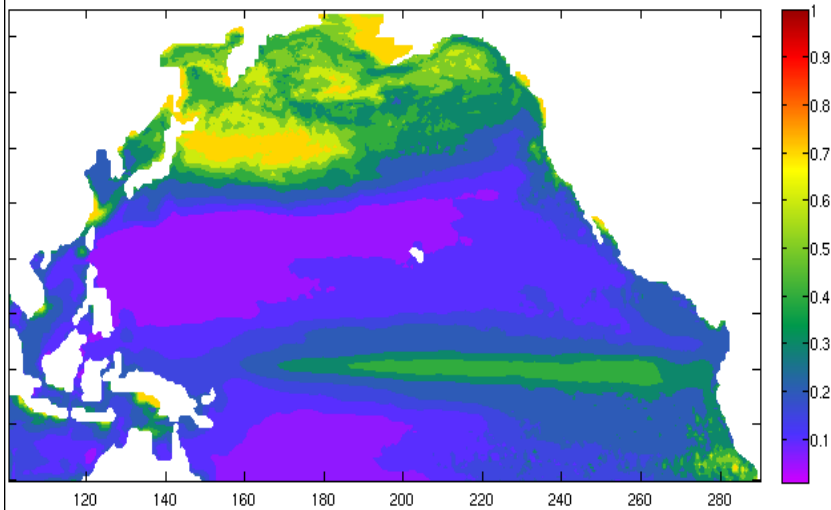
Adding More to the CoSiNE



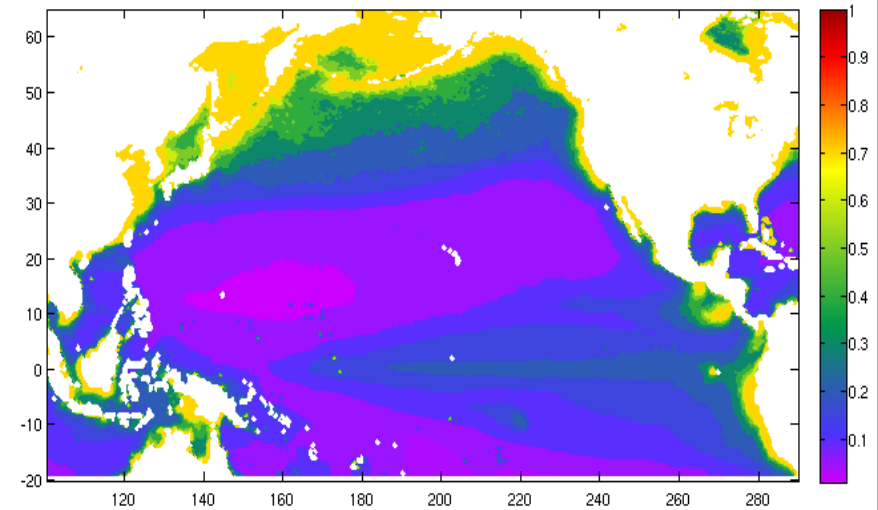
Fujii and Chai, 2007; Xiu and Chai, in prep.

Phytoplankton Comparison (1998-2007)

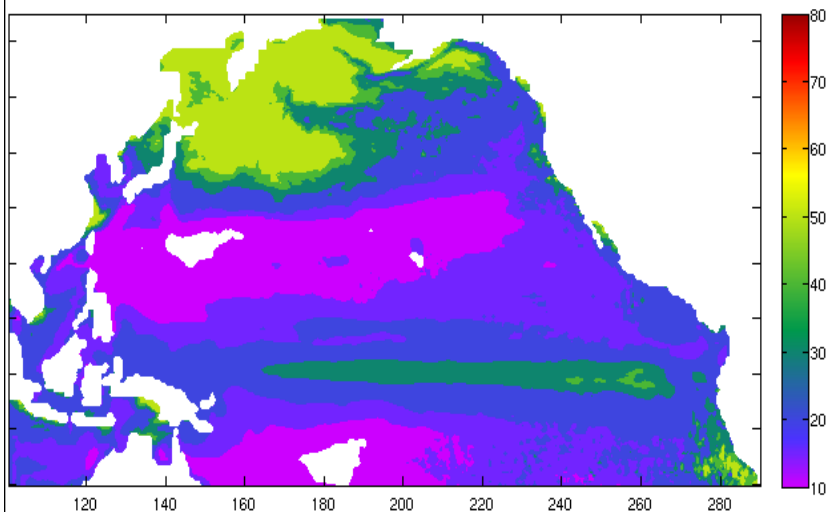
Modeled Chlorophyll



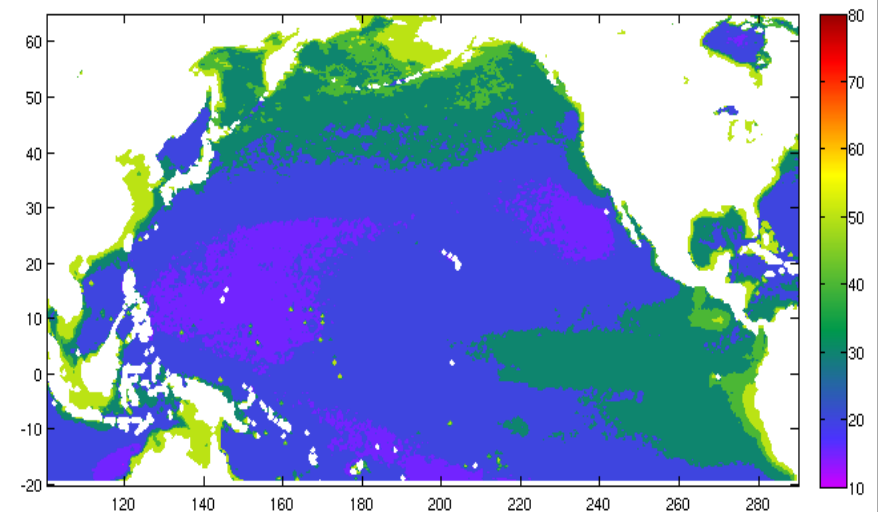
SeaWiFS Chlorophyll



Modeled Phytoplankton Carbon

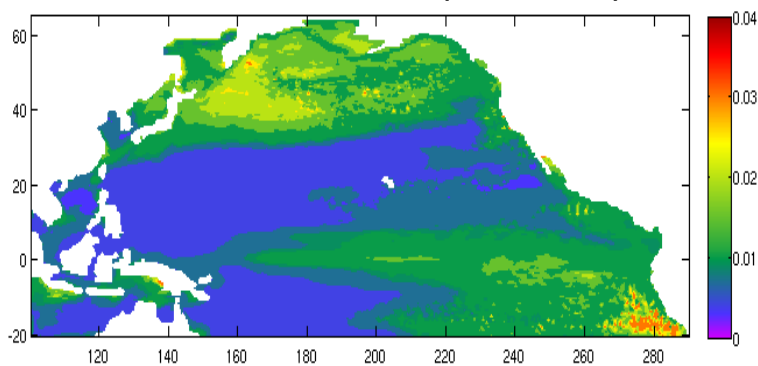


SeaWiFS Phytoplankton Carbon

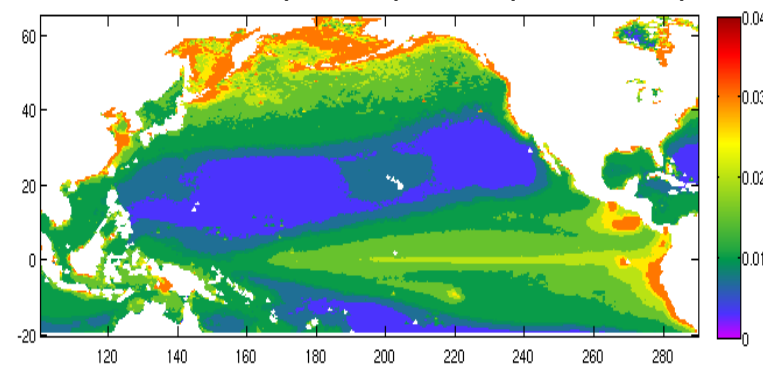


IOPs Comparison (1998-2007)

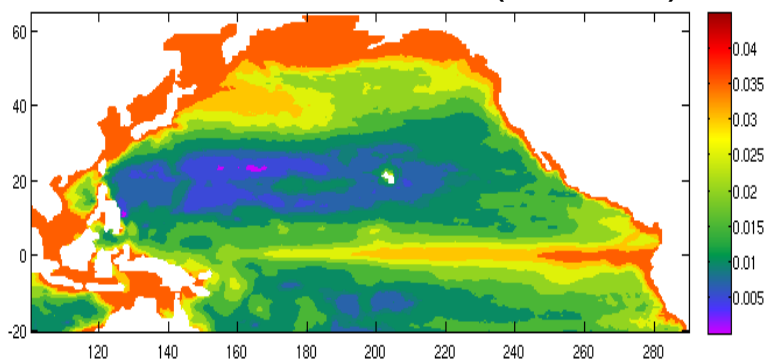
Modeled a_{ph} (440 nm)



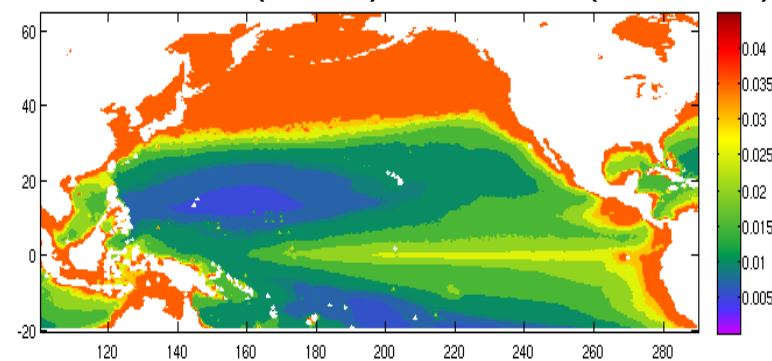
SeaWiFS (QAA) a_{ph} (443 nm)



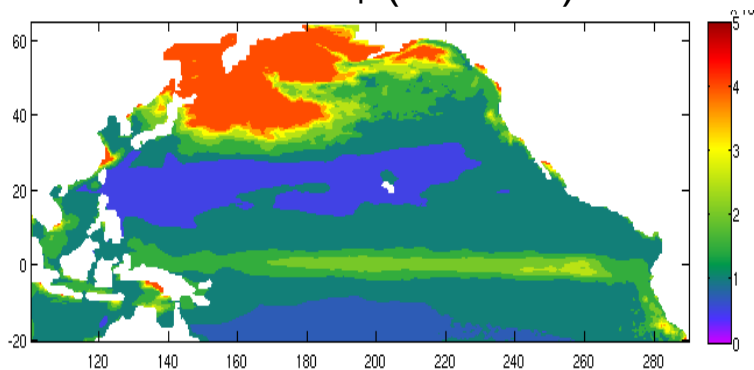
Modeled $a_{cdom+det}$ (410 nm)



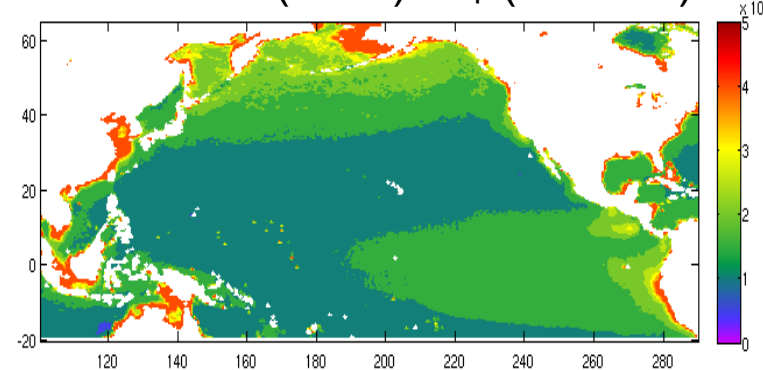
SeaWiFS (QAA) $a_{cdom+det}$ (412 nm)



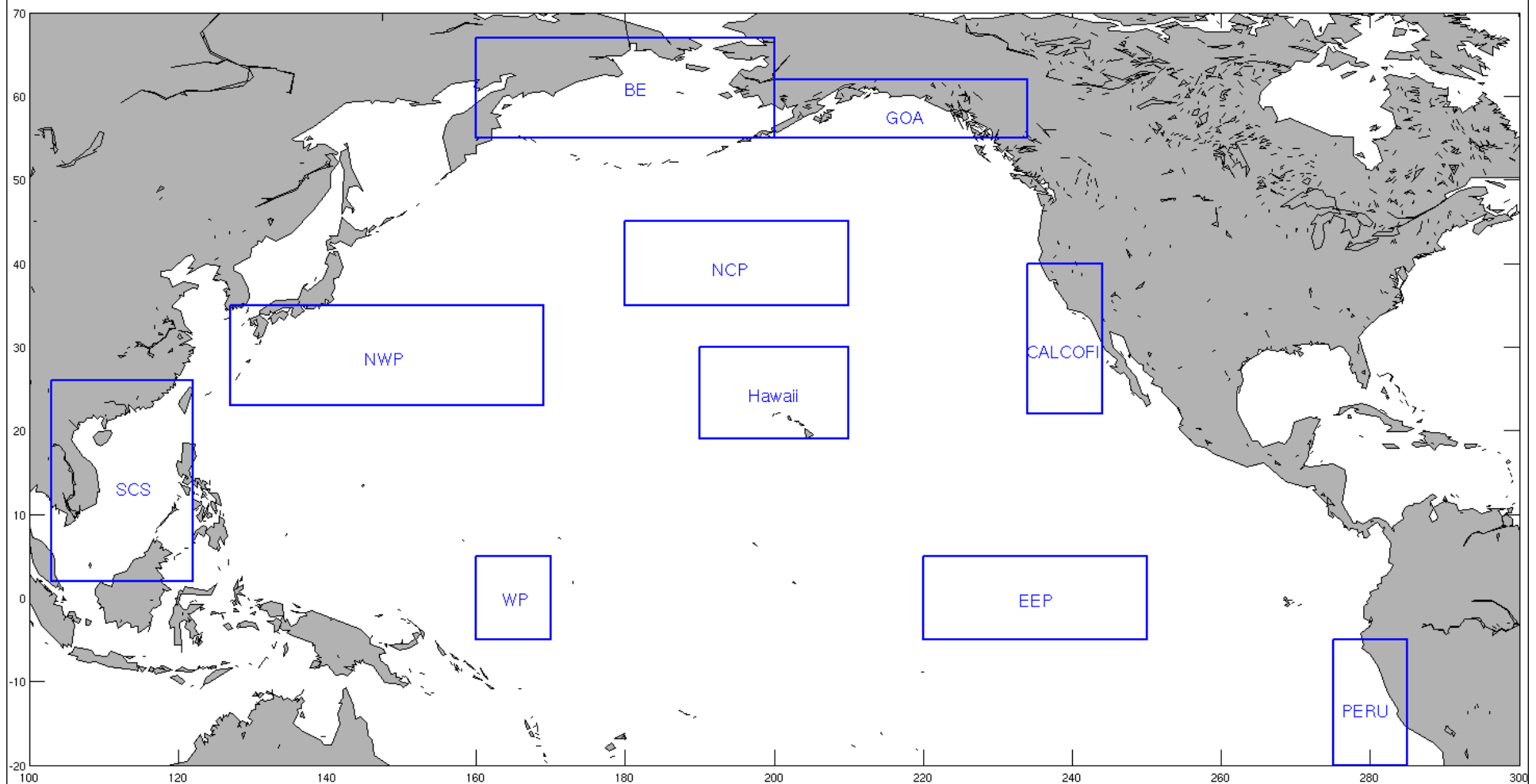
Modeled b_{bp} (550 nm)



SeaWiFS (QAA) b_{bp} (555 nm)

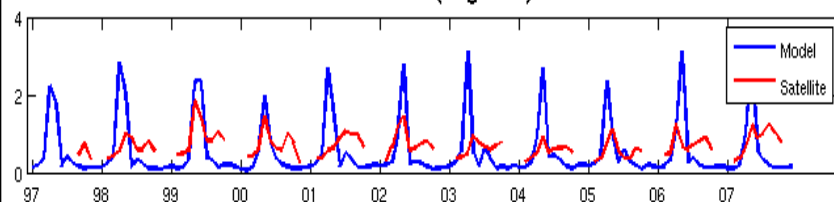


ROMS-CoSiNE-Optics vs. SeaWiFS Chlorophyll and IOPs Time Series Comparisons

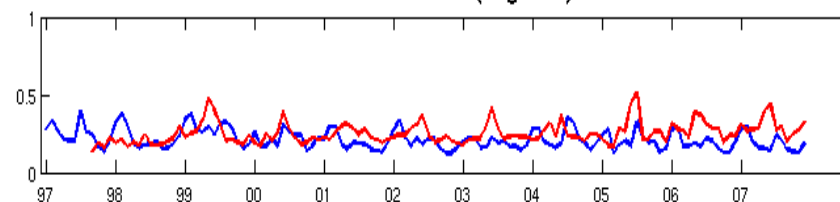


January 1997 to December 2007

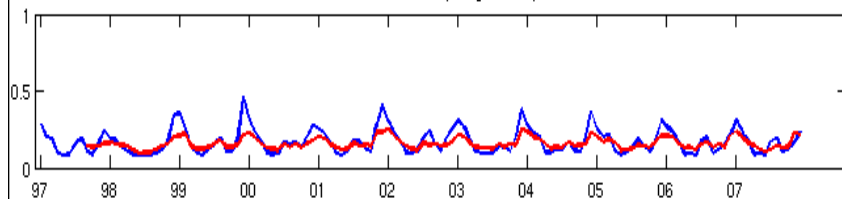
GOA Chl (mg m^{-3})



CALCOFI Chl (mg m^{-3})

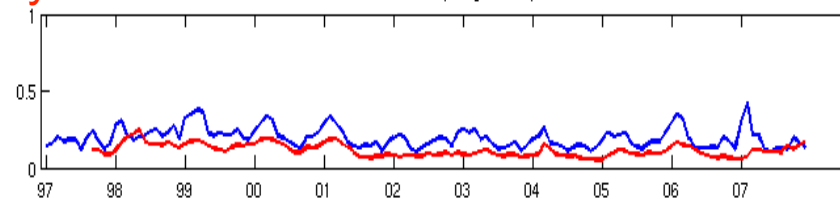


SCS Chl (mg m^{-3})

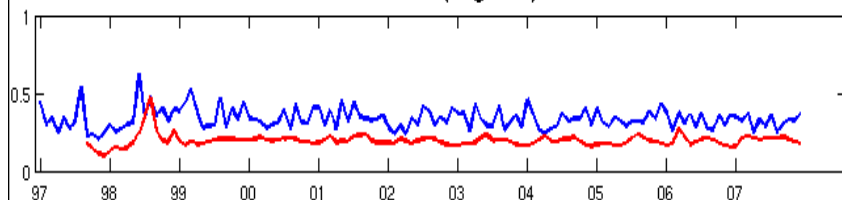


SeaWiFS Chlorophyll - Red

WP Chl (mg m^{-3})

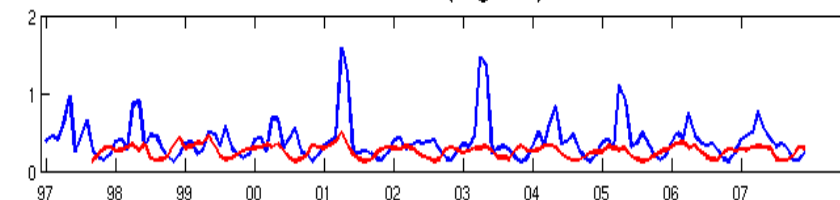


EEP Chl (mg m^{-3})

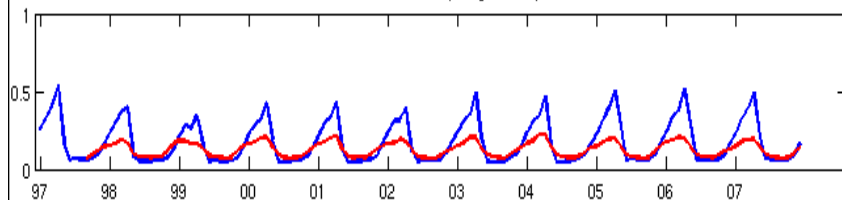


Modeled Chlorophyll - Blue

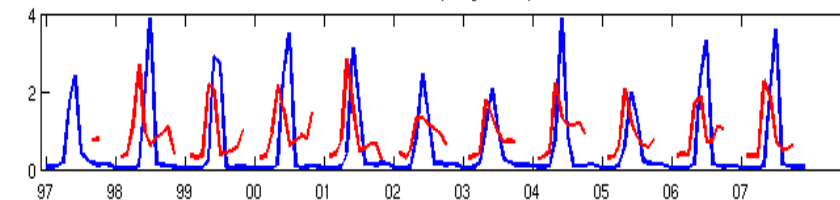
NCP Chl (mg m^{-3})



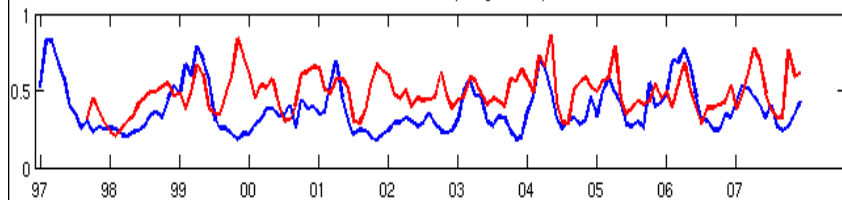
NWP Chl (mg m^{-3})



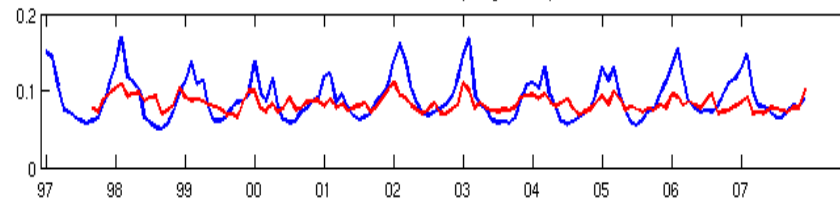
BE Chl (mg m^{-3})



PERU Chl (mg m^{-3})



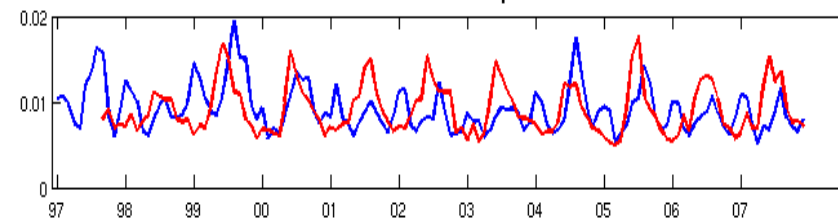
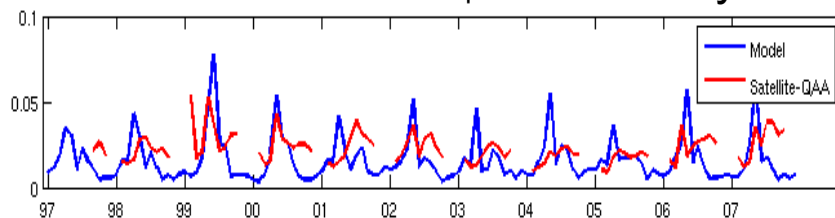
Hawaii Chl (mg m^{-3})



GOA aph

January 1997 to December 2007

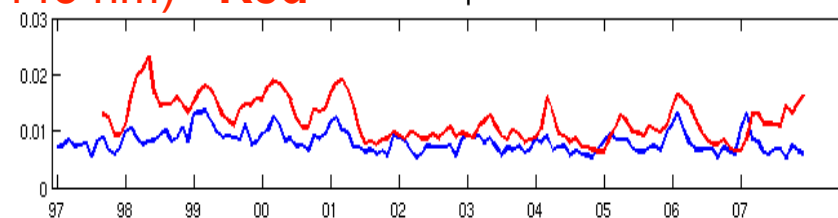
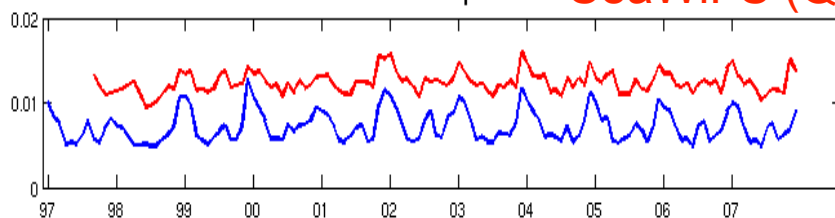
CALCOFI aph



SCS aph

SeaWiFS (QAA) a_{ph} (443 nm) - Red

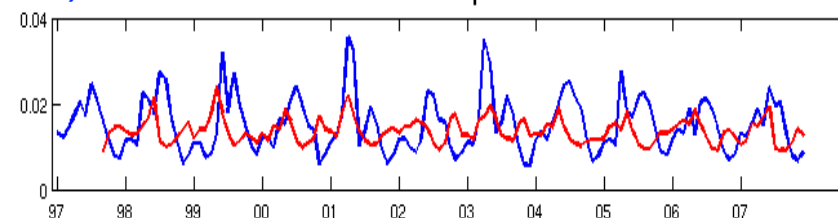
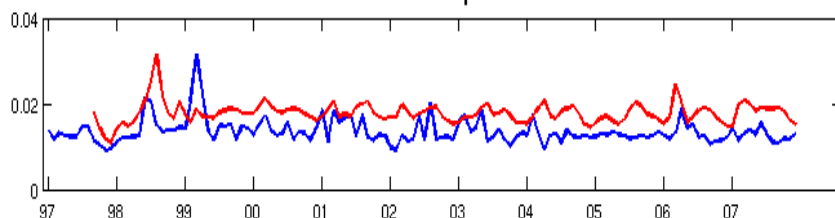
WP aph



EEP aph

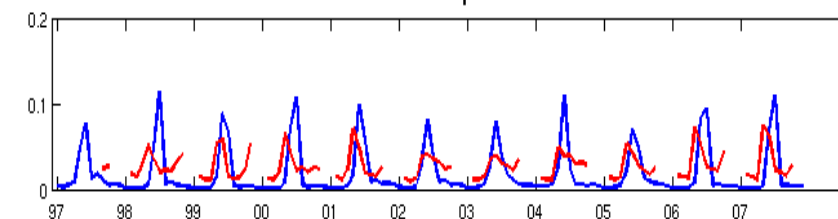
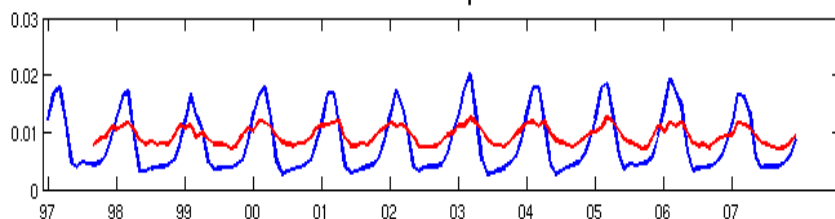
Modeled a_{ph} (440 nm) - Blue

NCP aph



NWP aph

BE aph



PERU aph

Hawaii aph

