Modeling Nutrients and Plankton in the Pacific Ocean

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ROMS-CoSINE Modeling

Pacific Basin Scale

50-km resolution, 1948-present, 60 years simulation

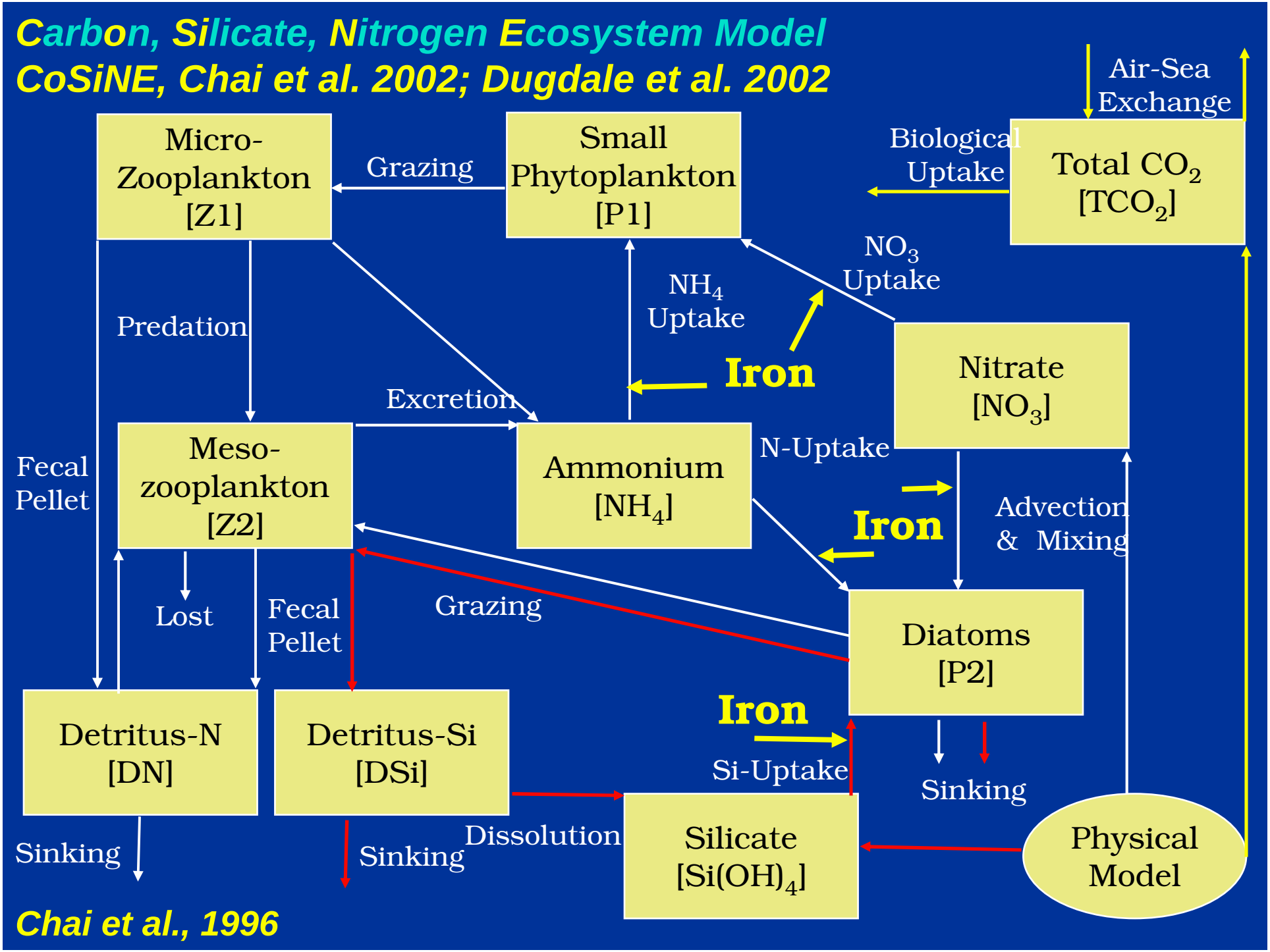
12-km resolution, 1990-present, 18 years simulation

Central California Upwelling System

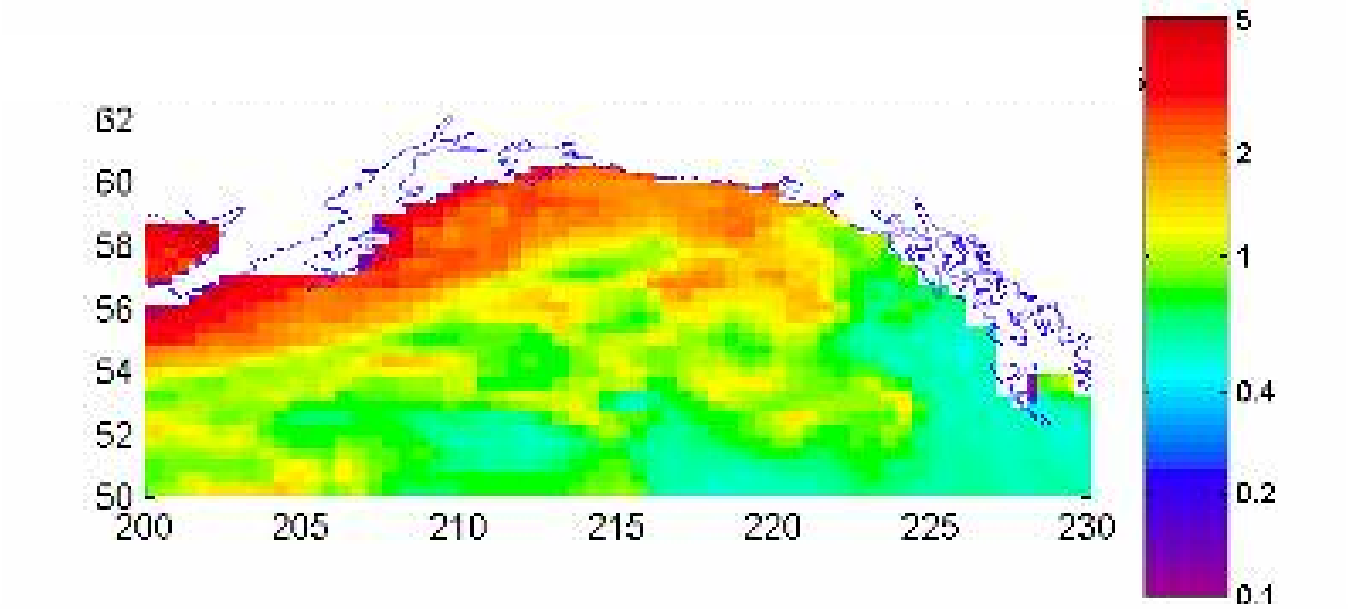
15-5-1.5 km resolution, 1998 - 2003, and 2006

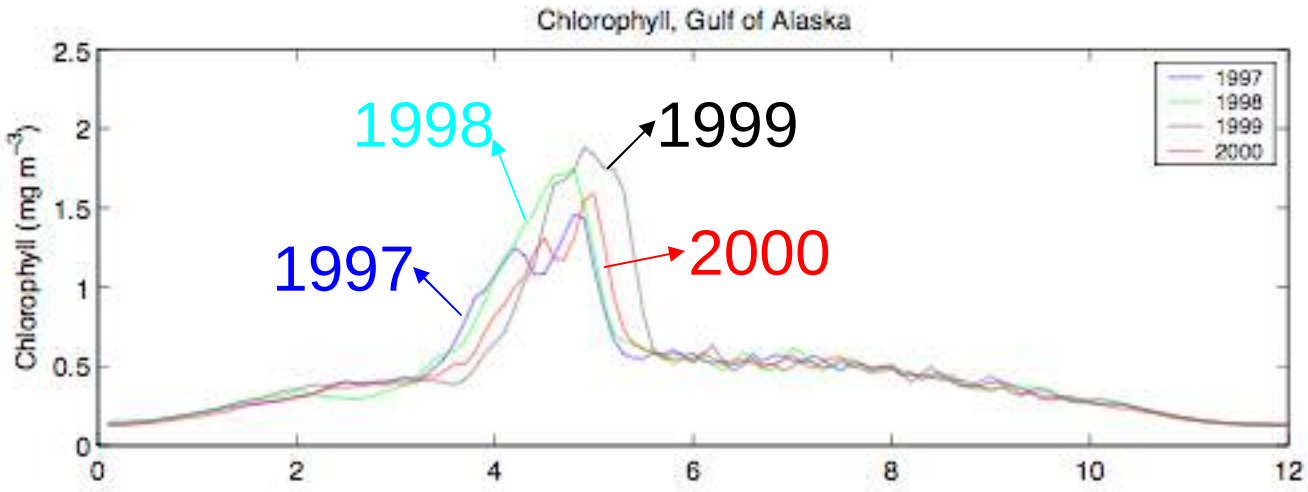
Gulf of Alaska and Prince William Sound

9-3-1 km resolution, testing


Carbon, Silicate, Nitrogen Ecosystem Model
CoSiNE, Chai et al. 2002; Dugdale et al. 2002
Air-Sea Exchange
Micro-Zooplankton [Z1]
Grazing
Small Phytoplankton [P1]
Biological Uptake
Total CO_2 [TCO_2]
NO_3 Uptake
NH_4 Uptake
Predation
Iron
Nitrate [NO_3]
Excretion
Meso-zooplankton [Z2]
Ammonium [NH_4]
N-Uptake
Fecal Pellet
Iron
Advection & Mixing
Lost
Fecal Pellet
Grazing
Diatoms [P2]
Iron
Detritus-N [DN]
Detritus-Si [DSi]
Si-Uptake
Sinking
Sinking
Dissolution
Sinking
Silicate [$Si(OH)_4$]
Physical Model
Chai et al., 1996

ROMS-CoSINE (50-km) Simulated Surface Chlorophyll (mg/m^3)
Gulf of Alaska, averaged 15 May - 15 June (1997-2000)





Jan. April Aug. Dec.

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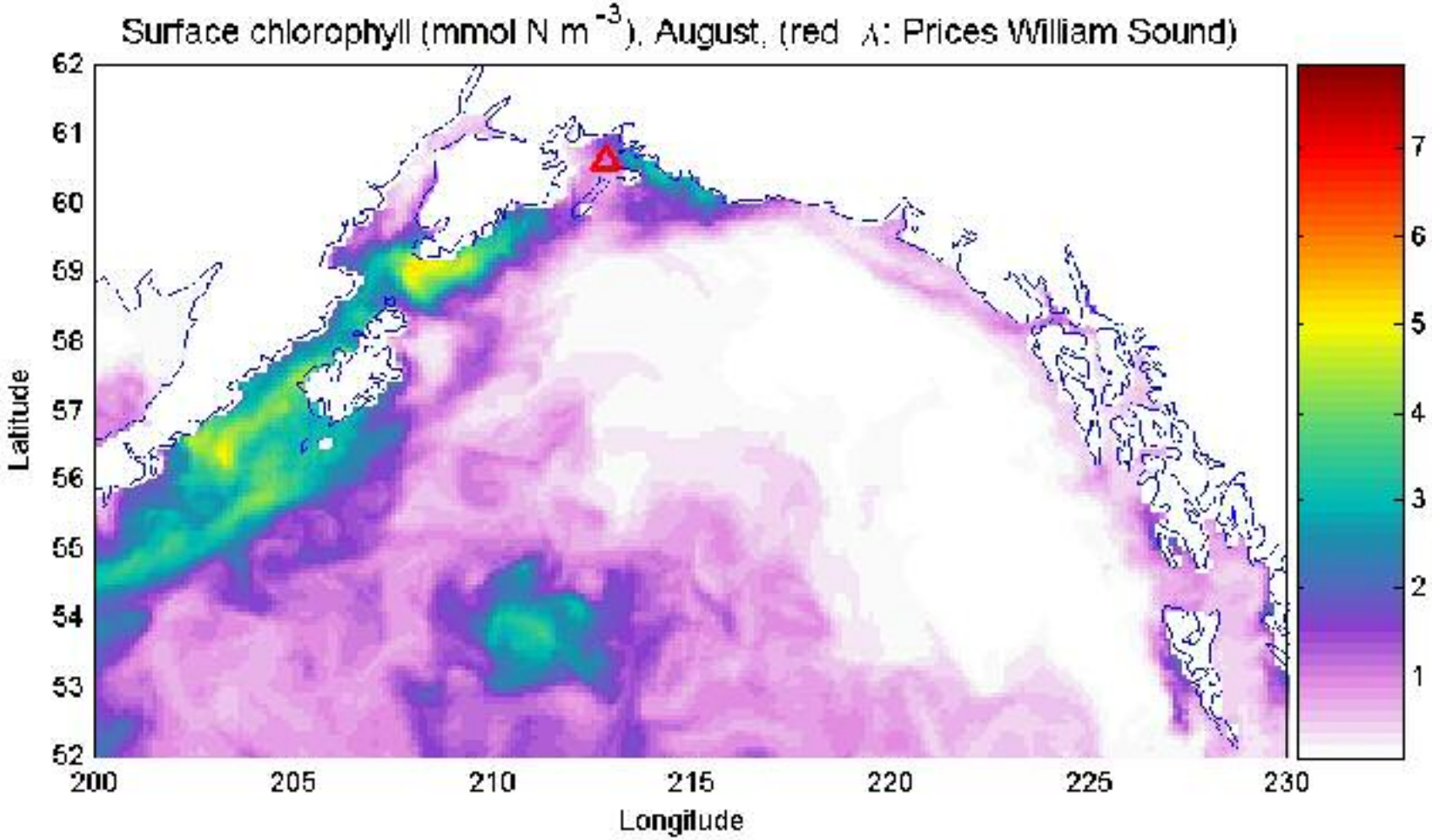
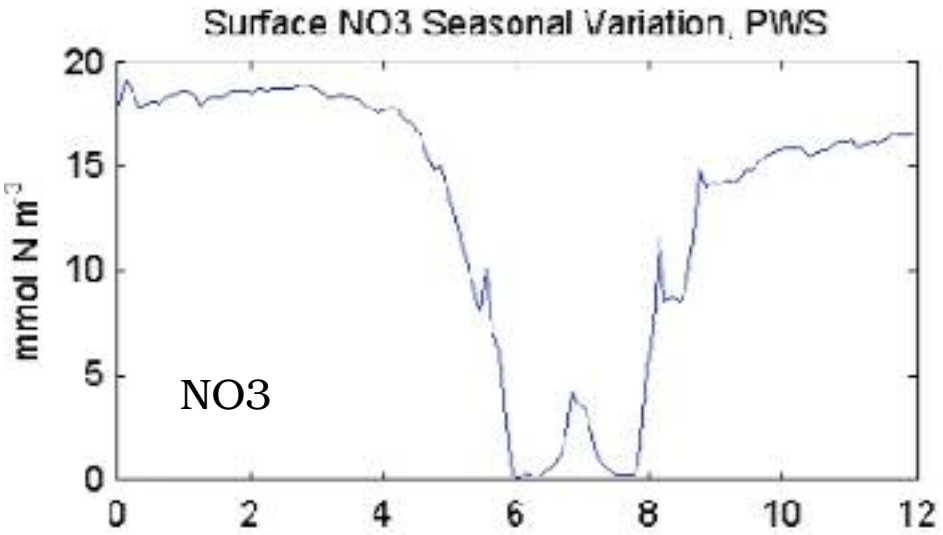
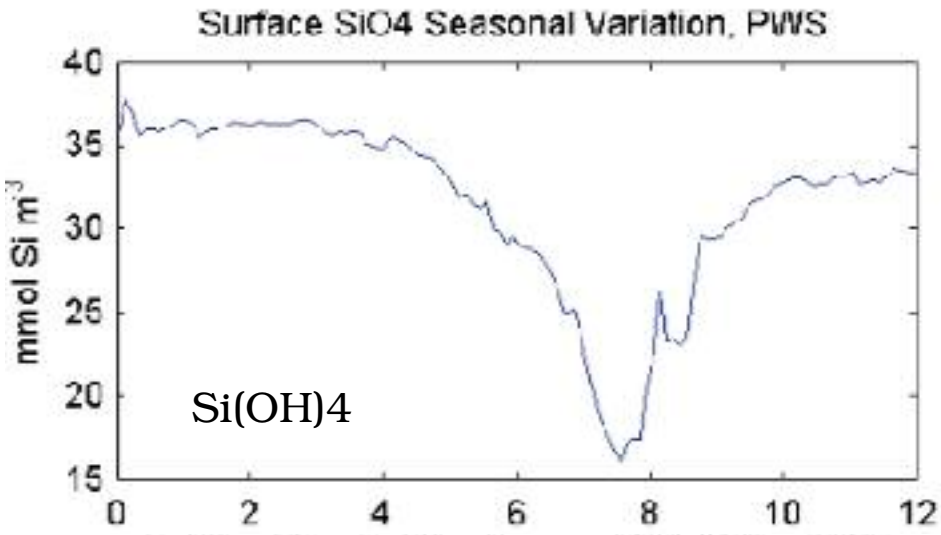
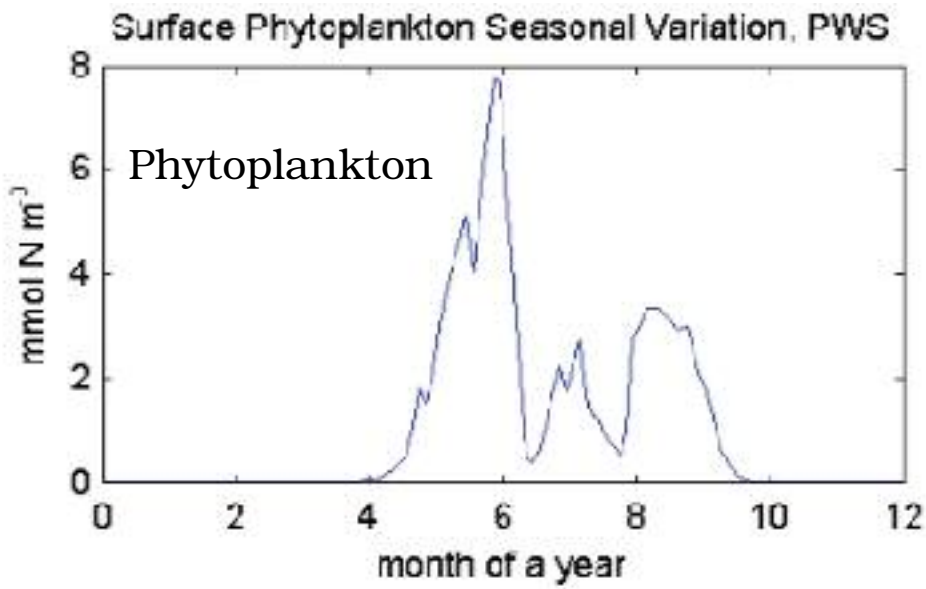
ROMS-CoSINE (12-km) Simulated Surface Chlorophyll
Gulf of Alaska, August 2004

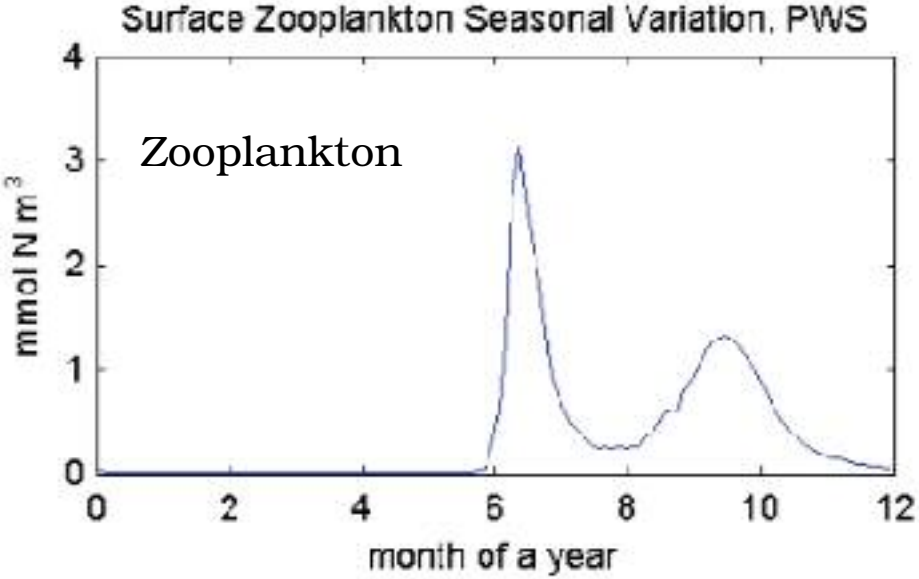


ROMS-CoSINE (12-km) Surface Nutrients and Plankton Biomass neat the Prince William Sound, Jan. to Dec. 2004









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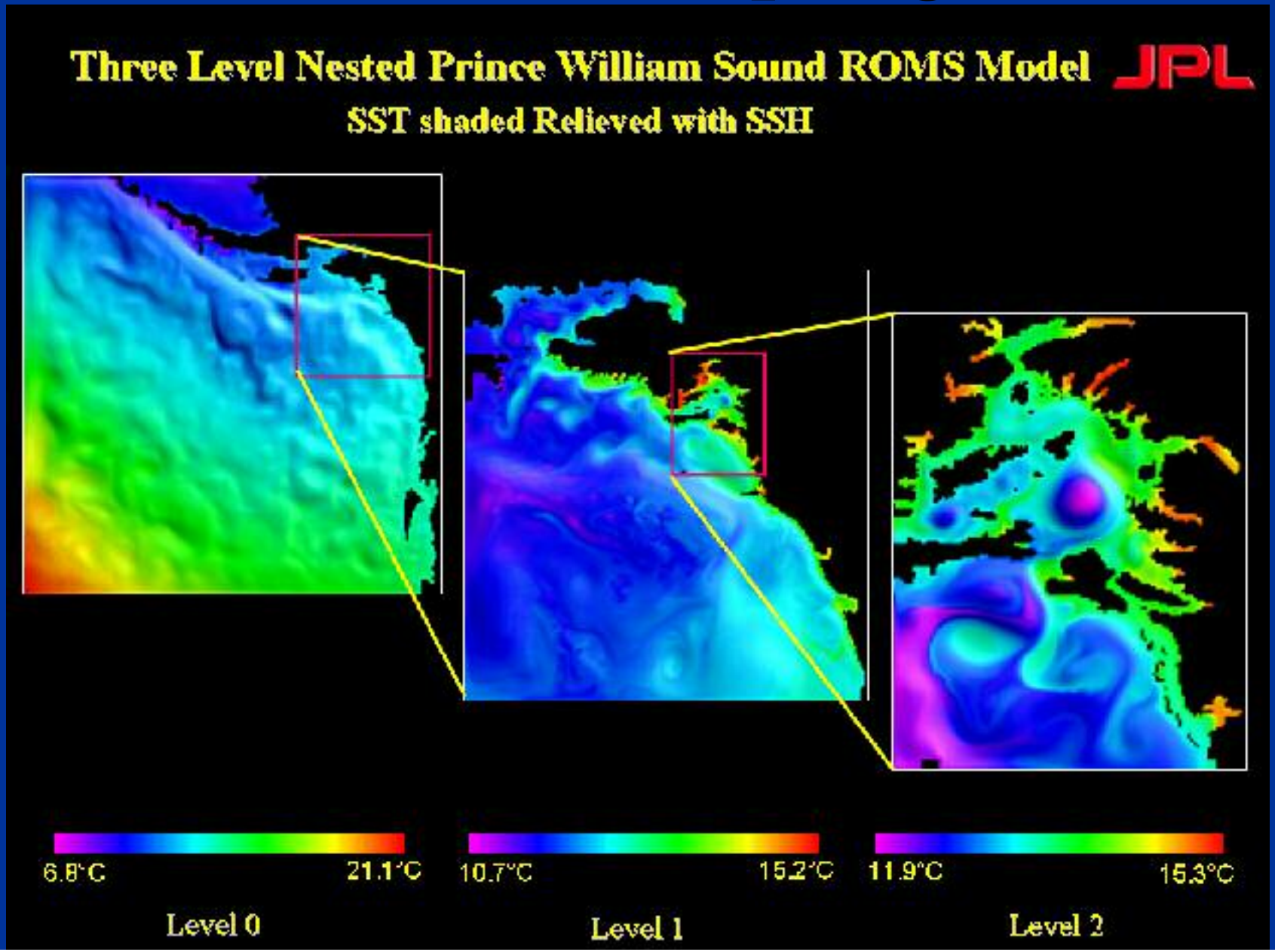
ROMS-CoSINE Coupling in PWS



More Results to come……

Questions:

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