

# Using HYCOM for a Coupled Bio-Physical Model for the US West Coast

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# Report Documentation Page

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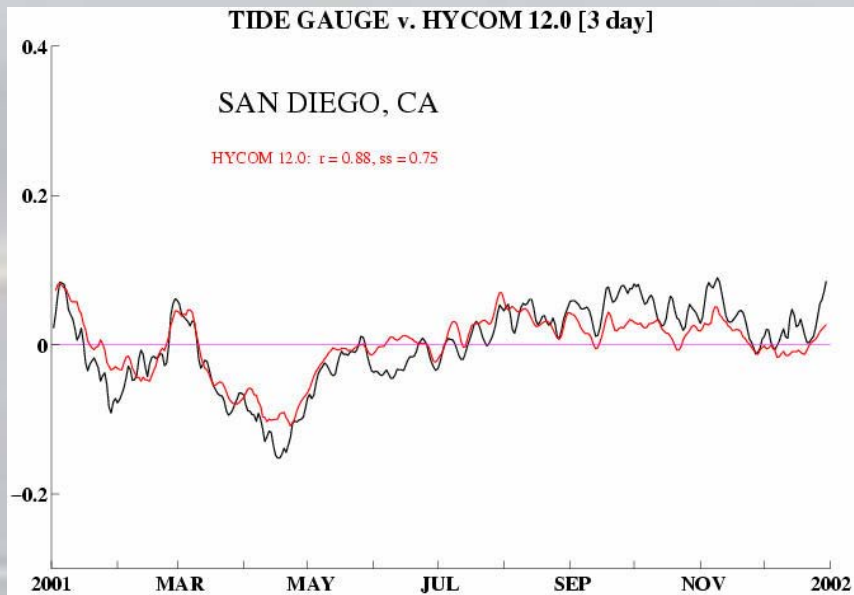
# HYCOM West Coast Modeling

- Utilize Boundary values from Pacific Basin HYCOM Run ( Metzger)
- Focus on period 1999-2002 +
  - Parallels NRL effort with NCOM
  - Uses High Resolution COAMPS Reanalysis Forcing
    - NRL Monterey/ Air-Sea Coupling project
- Leverage results from
  - NRL CoNESTS: West Coast HYCOM
  - PARADIGM NOPP: Ecosystem Model
  - NRL CoBIOPP: NCOM coupled physical-bio-optical
  - NRL Coupled Air-Sea in Coastal Zone: COAMPS
  - Collaborations( HYCOM modeling, Field Programs,++)

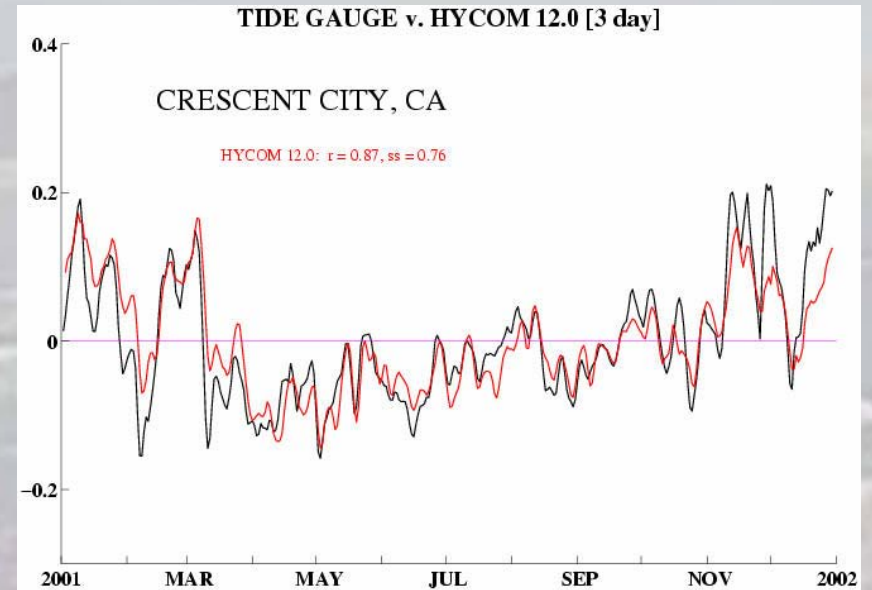


# HYCOM-CCS: Coastal Sea level

## San Diego

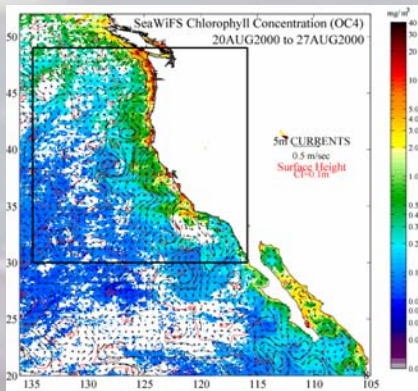


## Crescent City

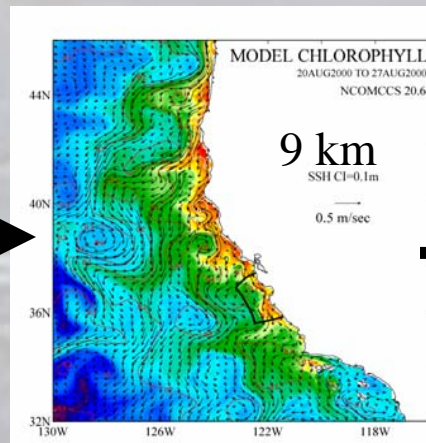


# Modeling Approach

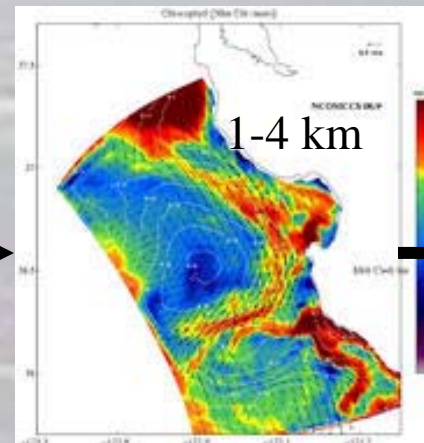
- Utilize NCOM/ HYCOM
  - Couple Across scales
    - Global: Regional: Coastal: Local
  - Embedded Ecosystem Model: COSINE
  - Force with High Resolution COAMPS Fluxes: 81/27/9/3 km grid
  - Run in near real-time



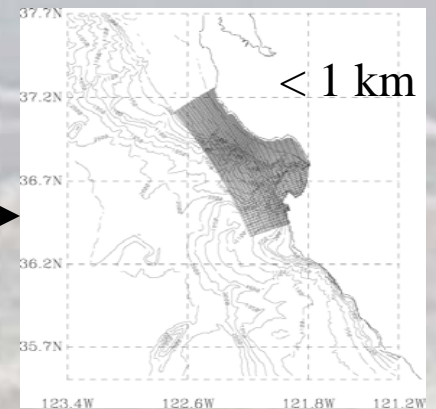
**GLOBAL NCOM  
GLOBAL HYCOM**



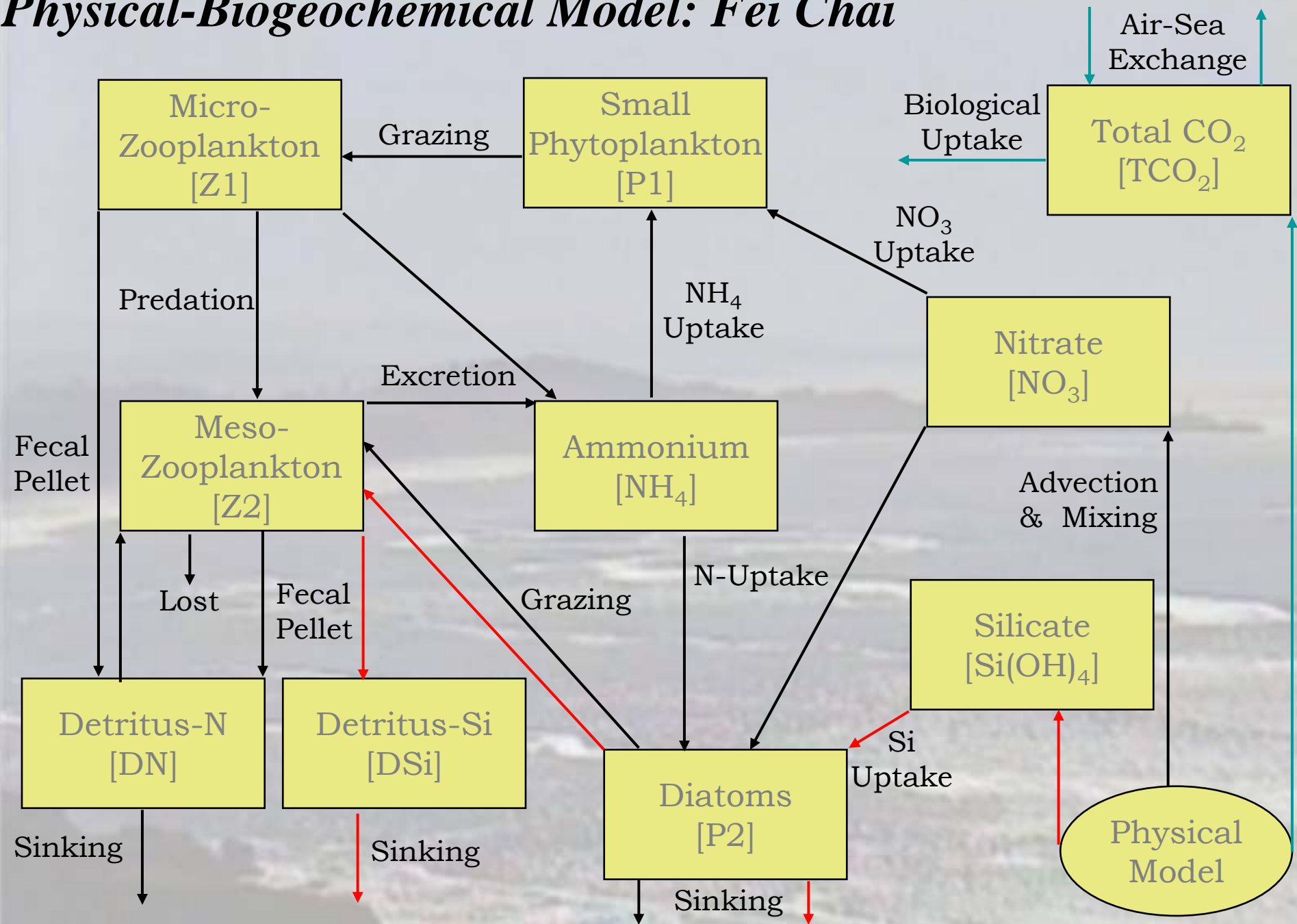
**REGIONAL NCOM CCS  
REGIONAL HYCOM CCS**



**MONTEREY BAY  
ICON Domain**



# Physical-Biogeochemical Model: Fei Chai



# COAMPS Surface Fluxes for US West Coast

COAMPS Reanalysis

COAMPS—AOSN



# Development Issues for HYCOM Coupled Bio-Physical

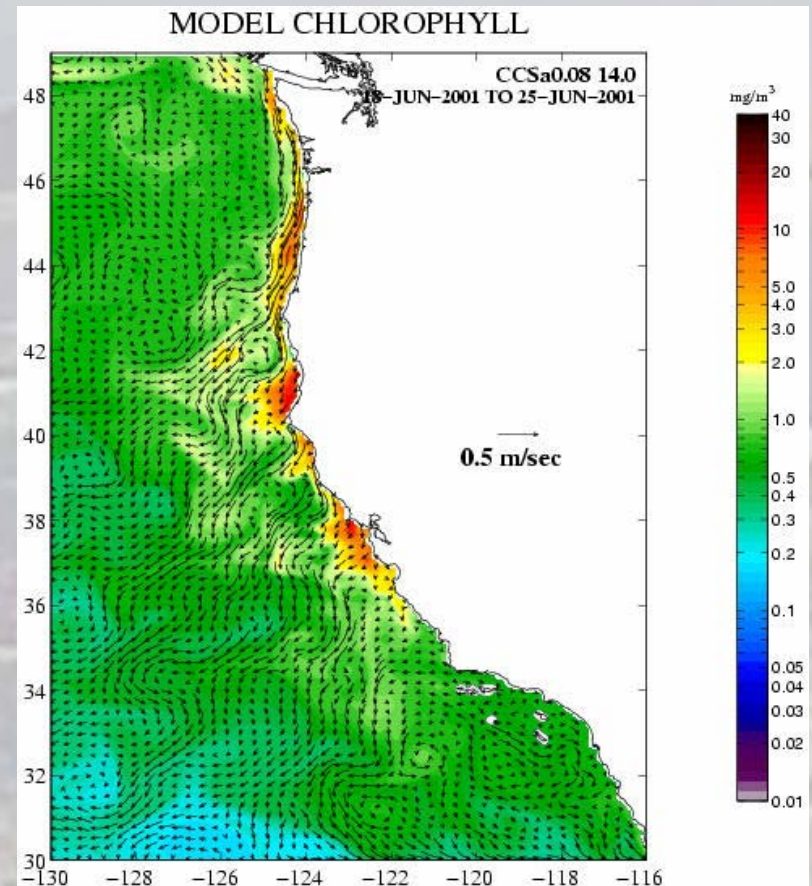
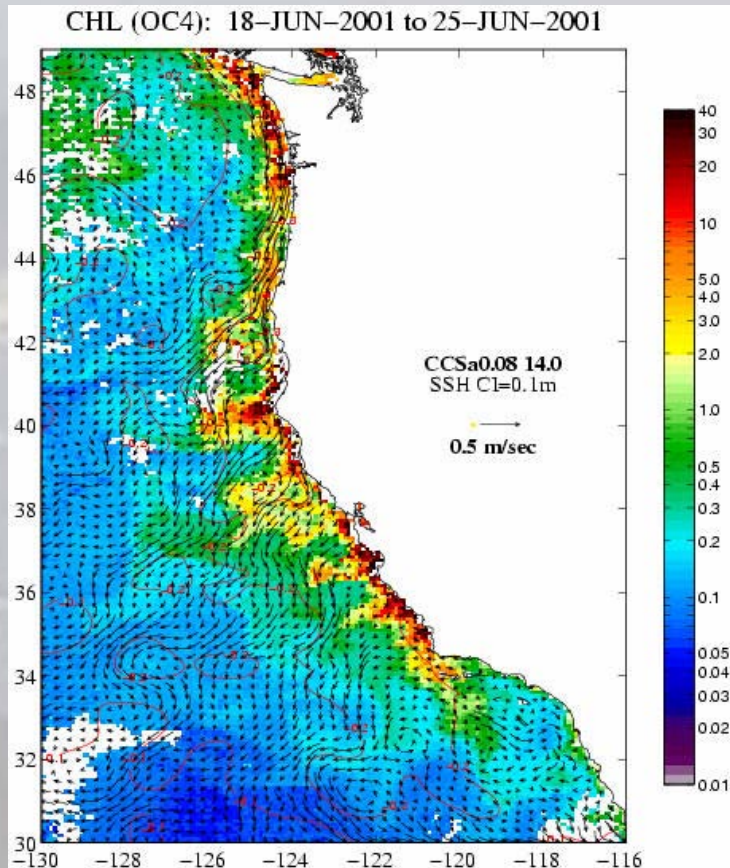
- COAMPS Forcing
  - Force with High resolution Regional fluxes
- Forcing with Prescribed Fluxes
  - Force with “ Total Heat Flux”
- Boundary/ Initial Values for Tracers
  - Provide IC/BC for tracers
    - Regrid Tracer Climatology to HYCOM grid: Regridded to Reference Density Grid
    - Scripts to generate Input files for tracers: Buggy
    - Passive Tracer flag, “ TRCFLG=0” relaxed to climatological surface field.
- Must use Release 34 or greater

# HYCOM Model Simulations vs. SeaWIFS

## Chlorophyll

NRL West Coast HYCOM with  
SeaWIFS Chlorophyll

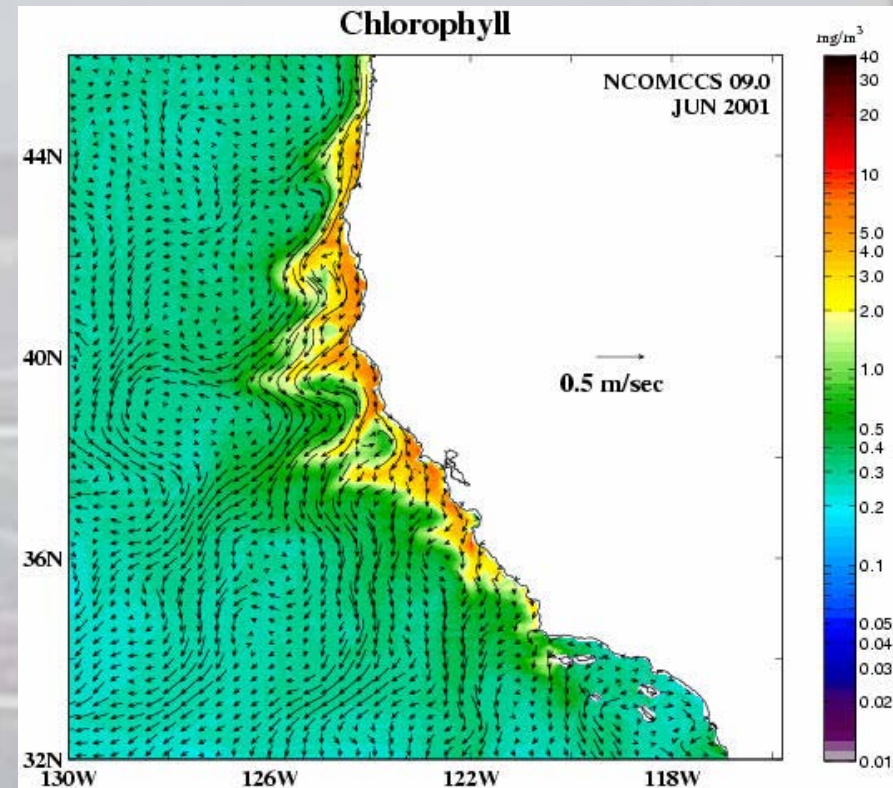
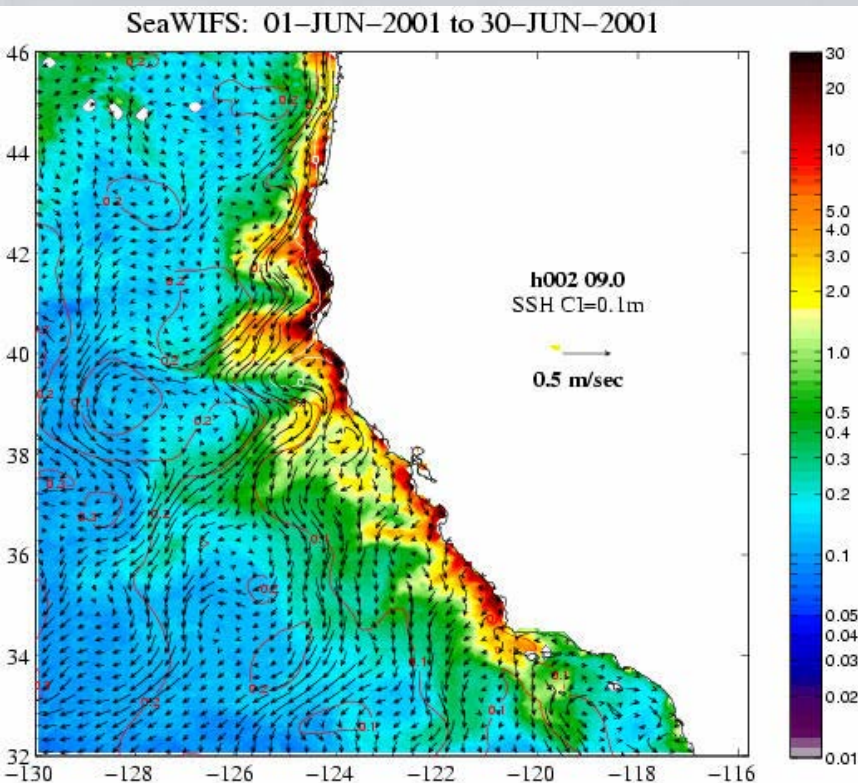
NRL West Coast HYCOM with  
Model Chlorophyll



# NCOM Results

NRL West Coast NCOM with  
SeaWIFS Chlorophyll

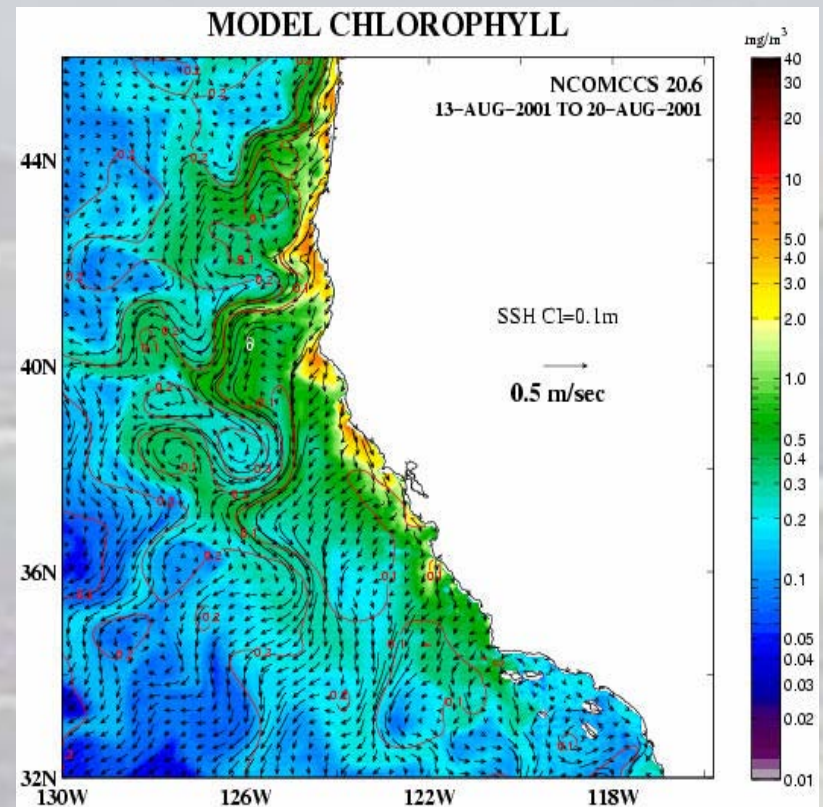
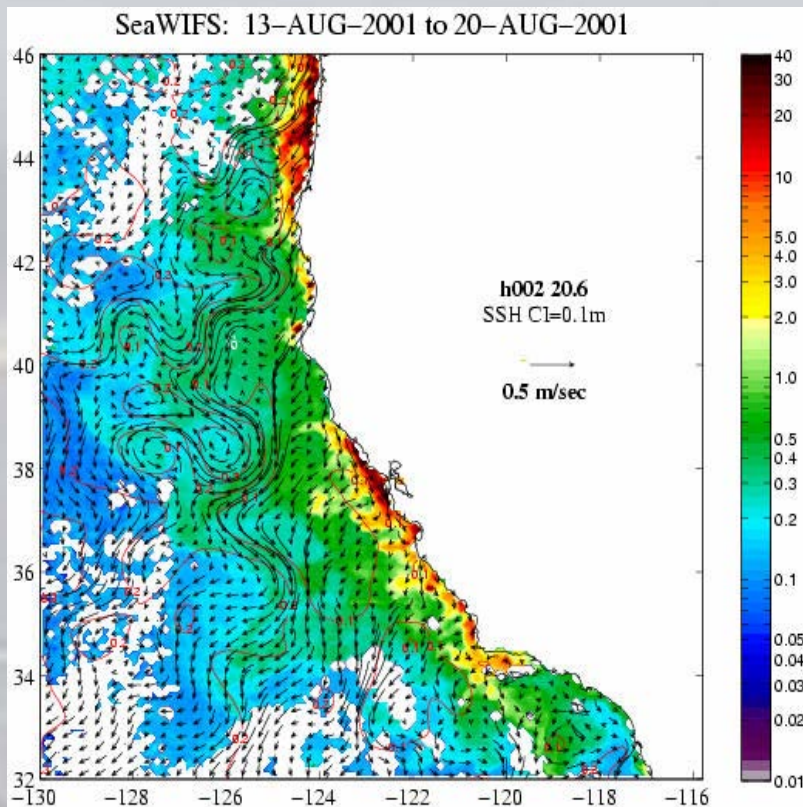
NRL West Coast NCOM with  
Model Chlorophyll



# Model Simulations vs. SeaWIFS

NRL West Coast NCOM with  
SeaWIFS Chlorophyll

NRL West Coast NCOM with  
Model Chlorophyll



# PLANS

- Non-Assimilative Runs
  - Complete Development
  - Parameter studies/ comparisons with NCOM
- Nest to Monterey Bay Sub-domain
  - Curvilinear Coord. Implementation
  - Force with Archive files for Tracers
- Data Assimilative runs
  - Data Assimilation for Pacific & Regional HYCOM
- Real-time implementation
  - HYCOM CCS & Monterey Bay Domains
- Sensitivity of Coupled Model to Vertical Coordinate,..