



NWSJEMS Workshop



Scott Condie

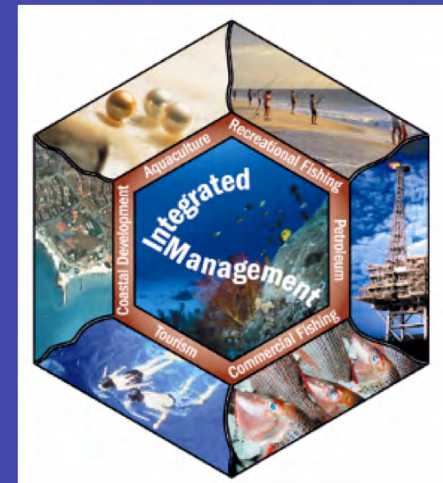
April 2008

CSIRO Marine and Atmospheric Research

CSIRO Wealth from Oceans Flagship

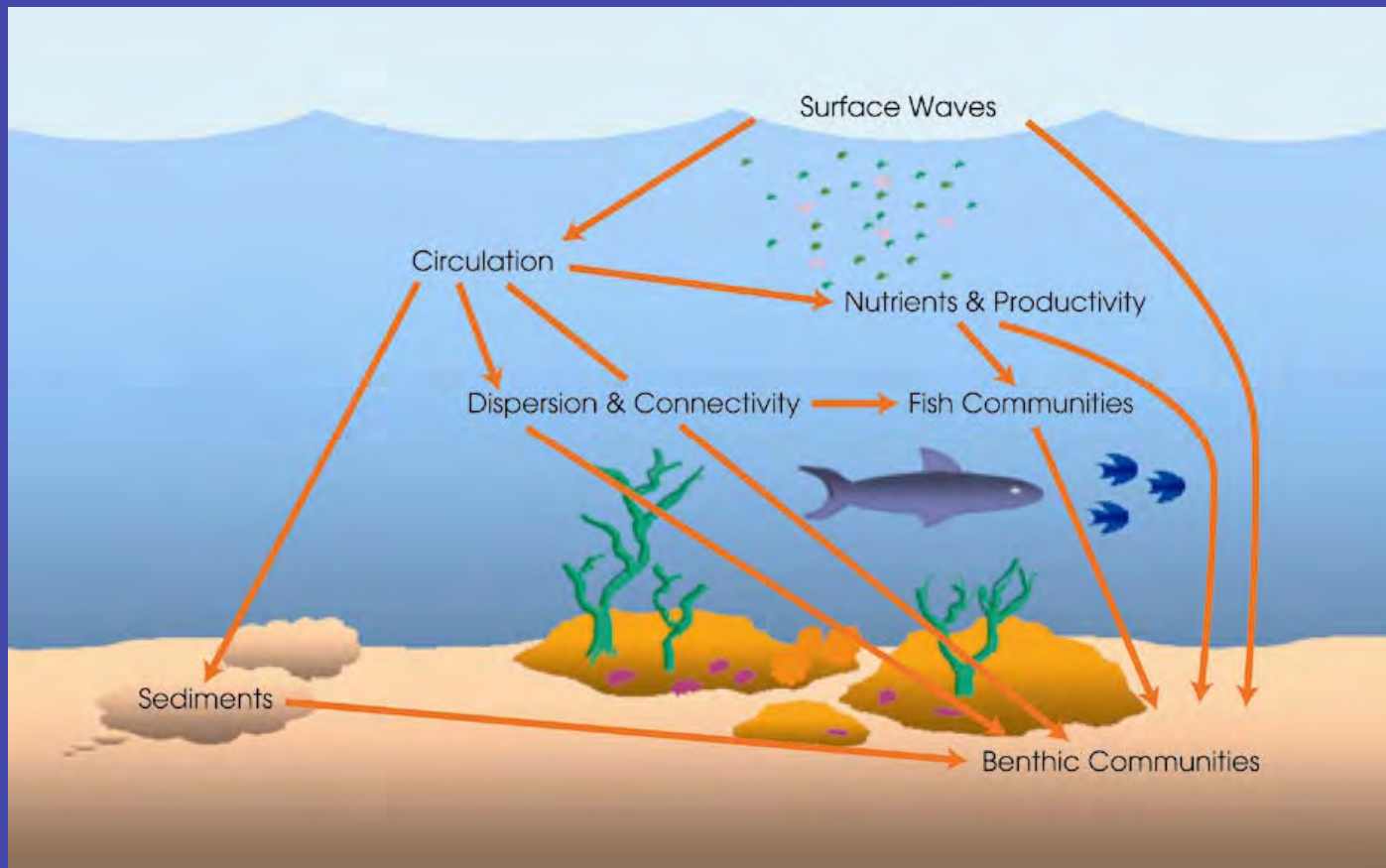
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- Background
- Website
- Information management
- **Physical and biogeochemical environment**
- Habitats
- Food webs
- Management strategy evaluation

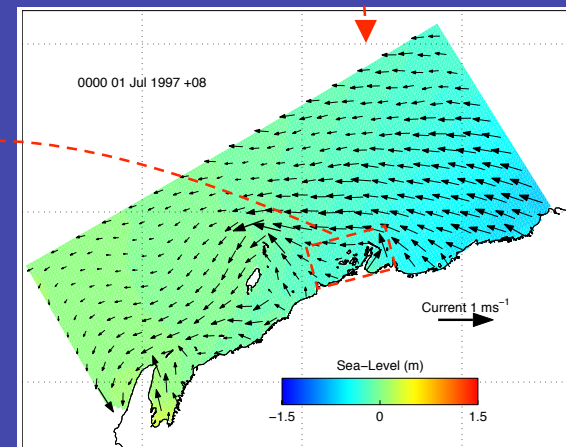
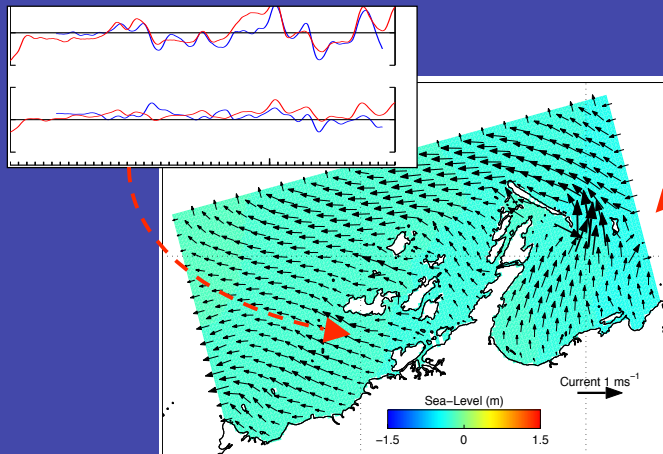
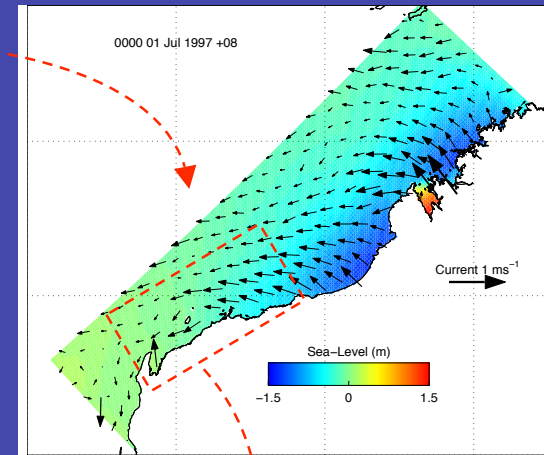
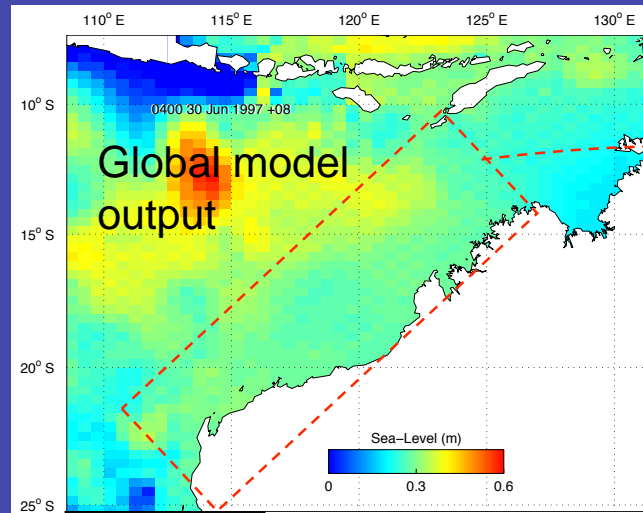




Physical and biogeochemical environment



Nested hydrodynamic models



Shelf currents (arrows) dominated by tides

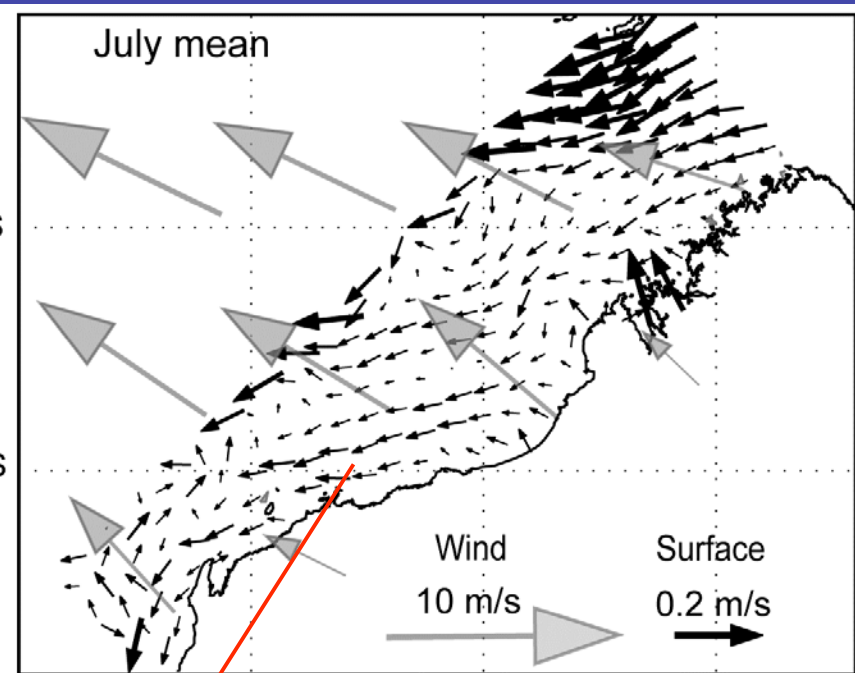
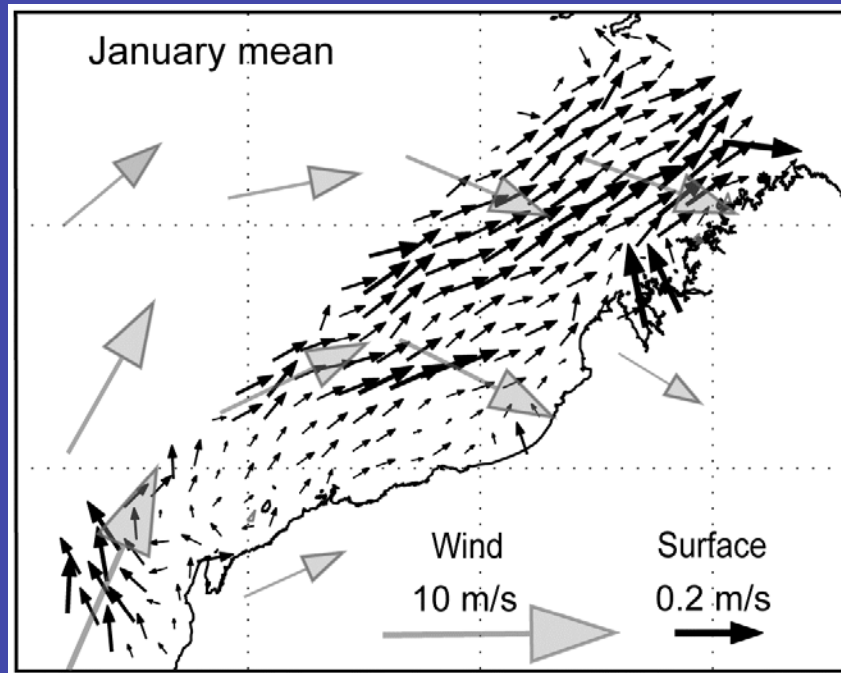


Website animations

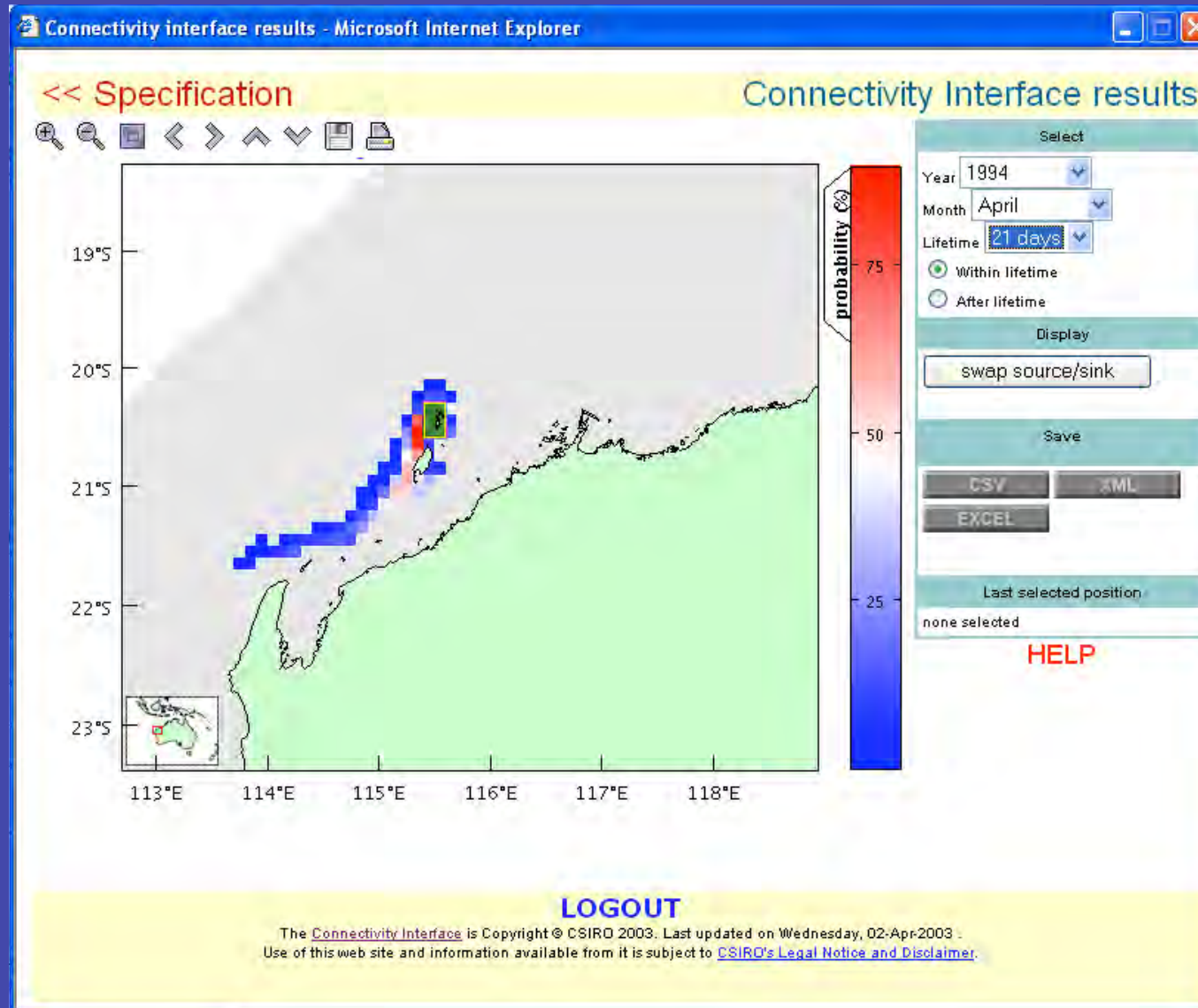


Monsoon: upwelling

Trades: downwelling

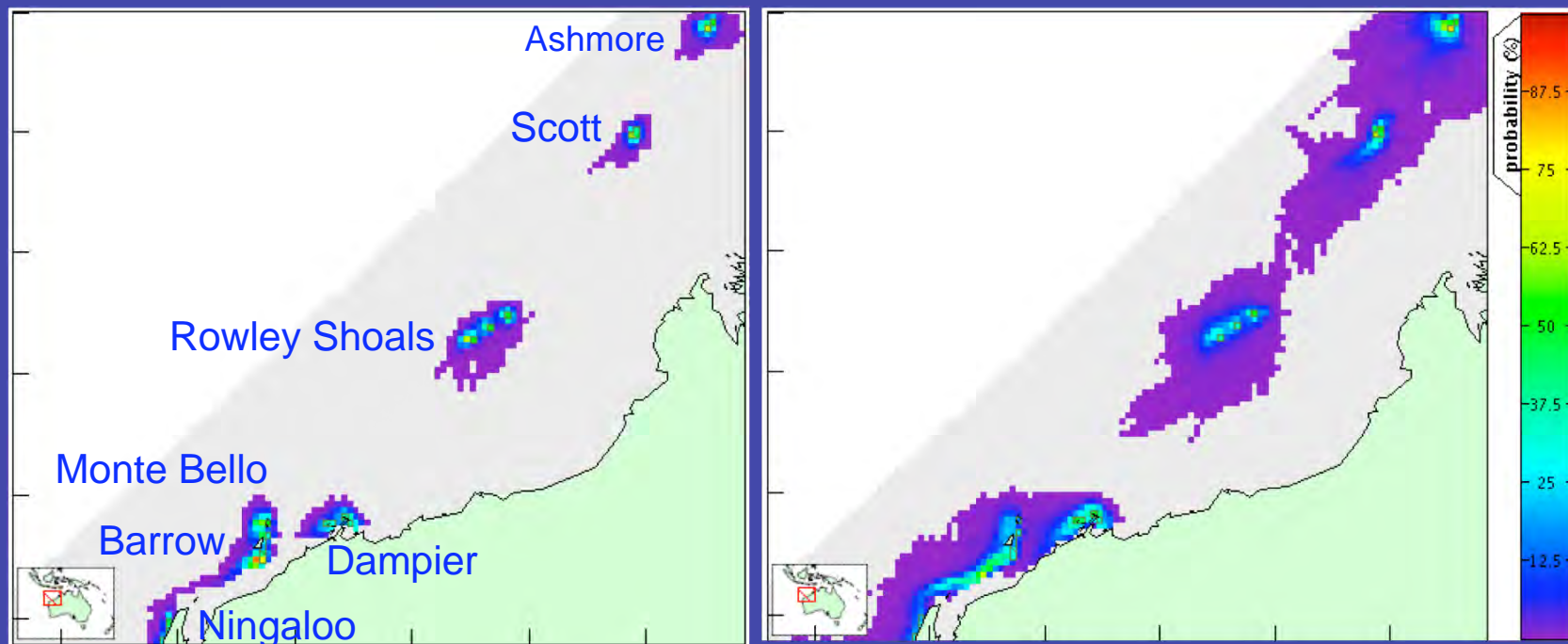


Holloway
Current

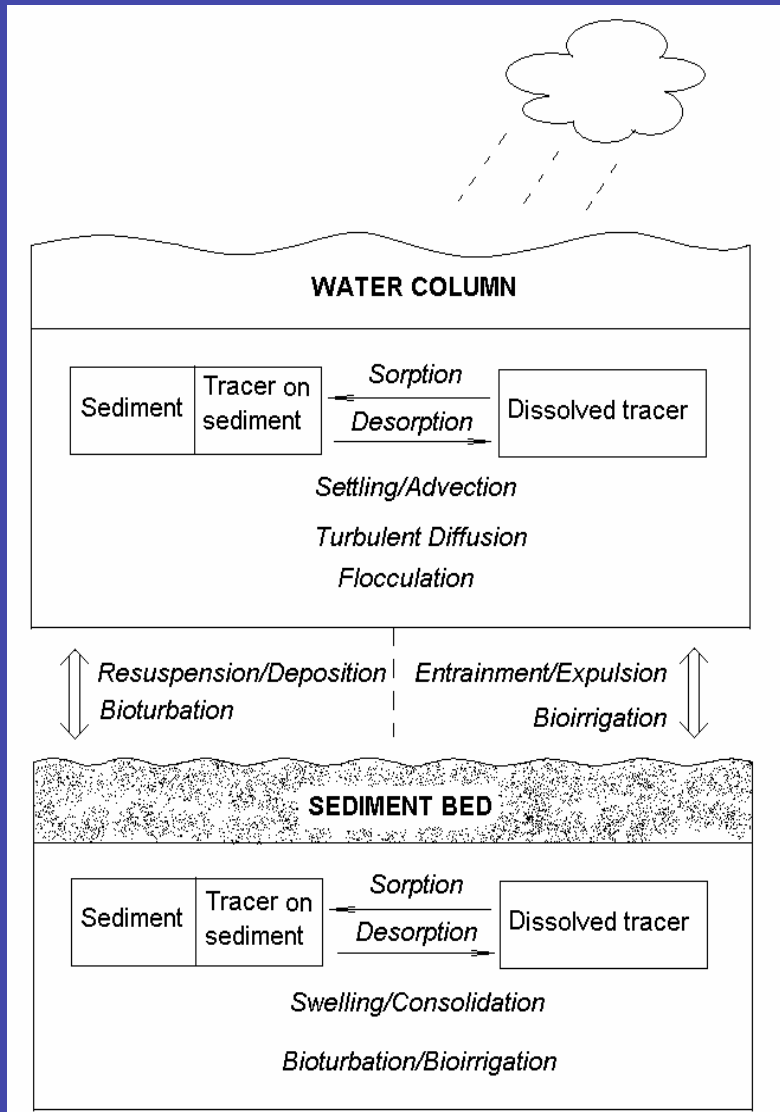


After 7 days

After 28 days

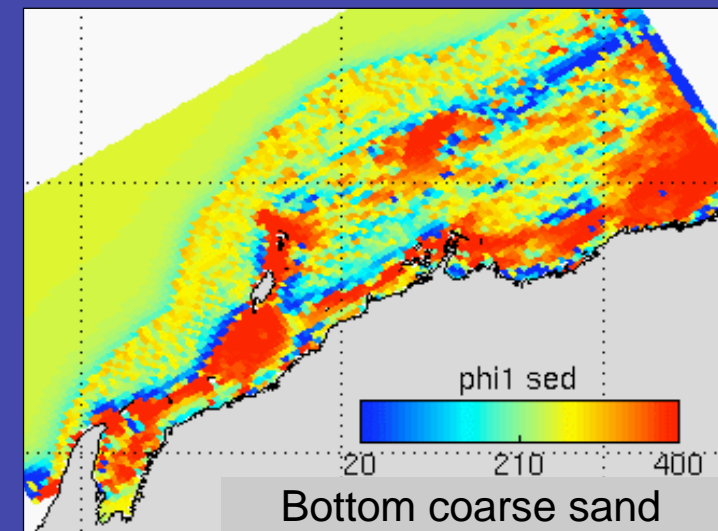
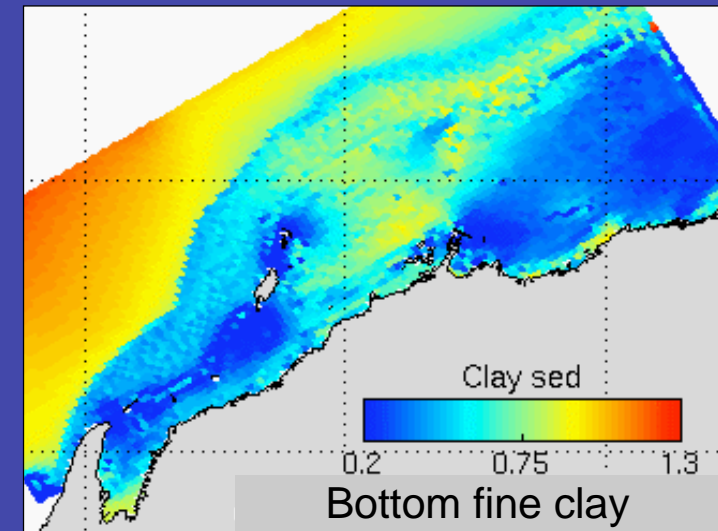
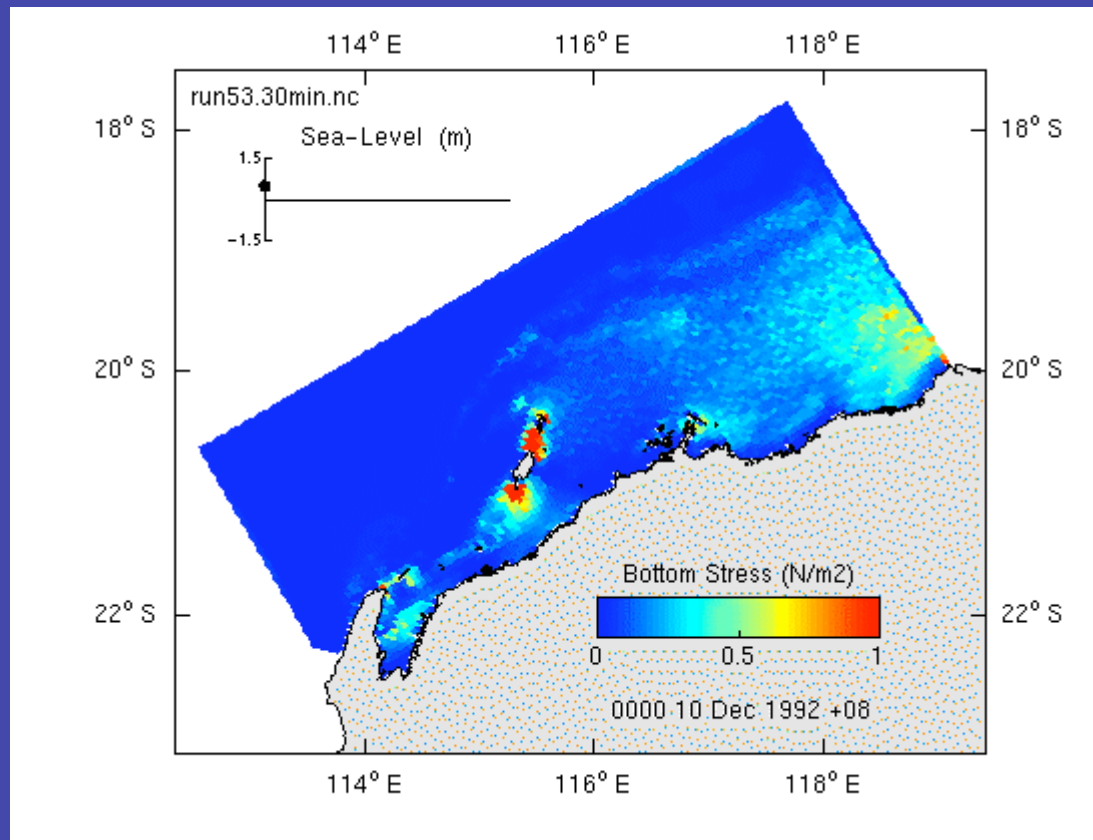


Dispersion from coral reefs expressed as a probability distributions



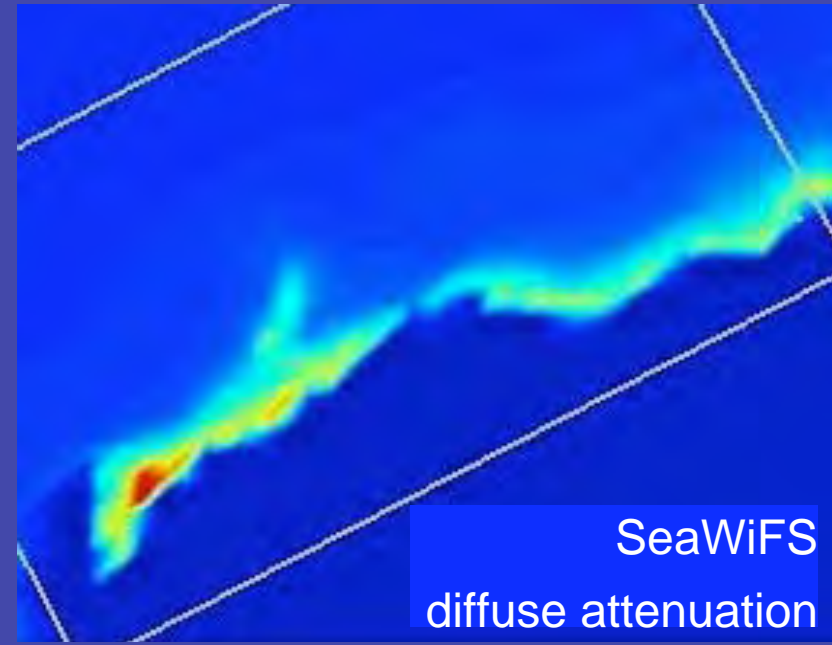
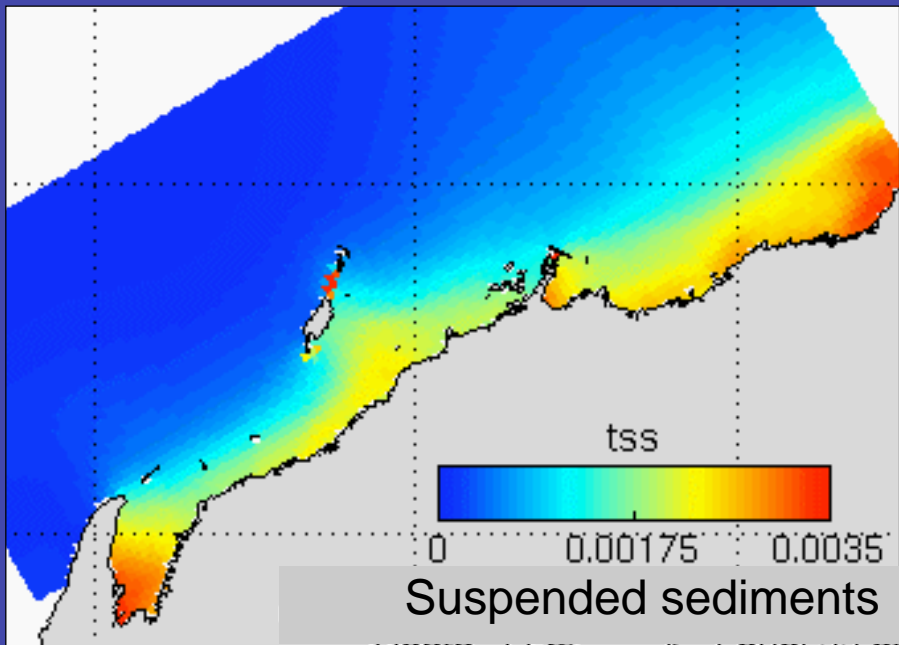
- particle size classes: sand → clay
- advection, diffusion, settling
- wave-current interactions
- deposition & resuspension
- sediment bioturbation/bio-irrigation

Bottom sediment distribution

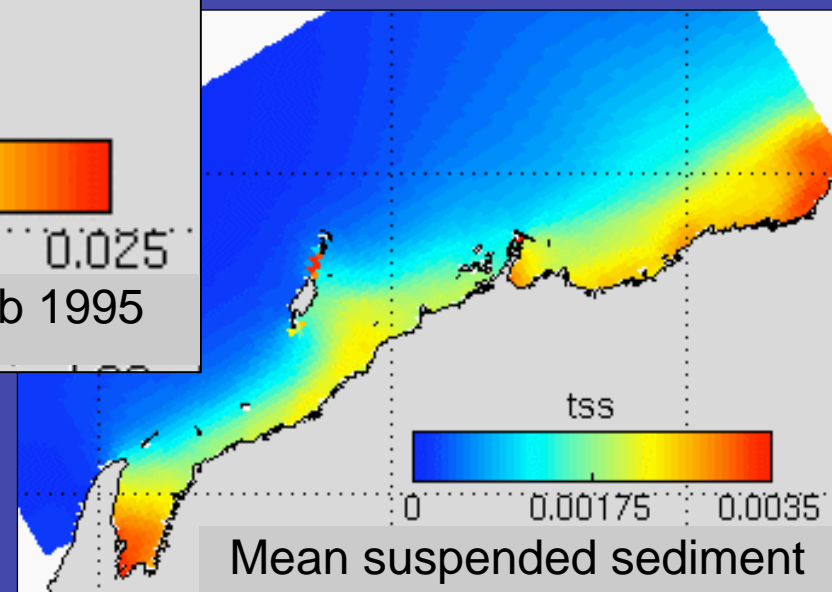
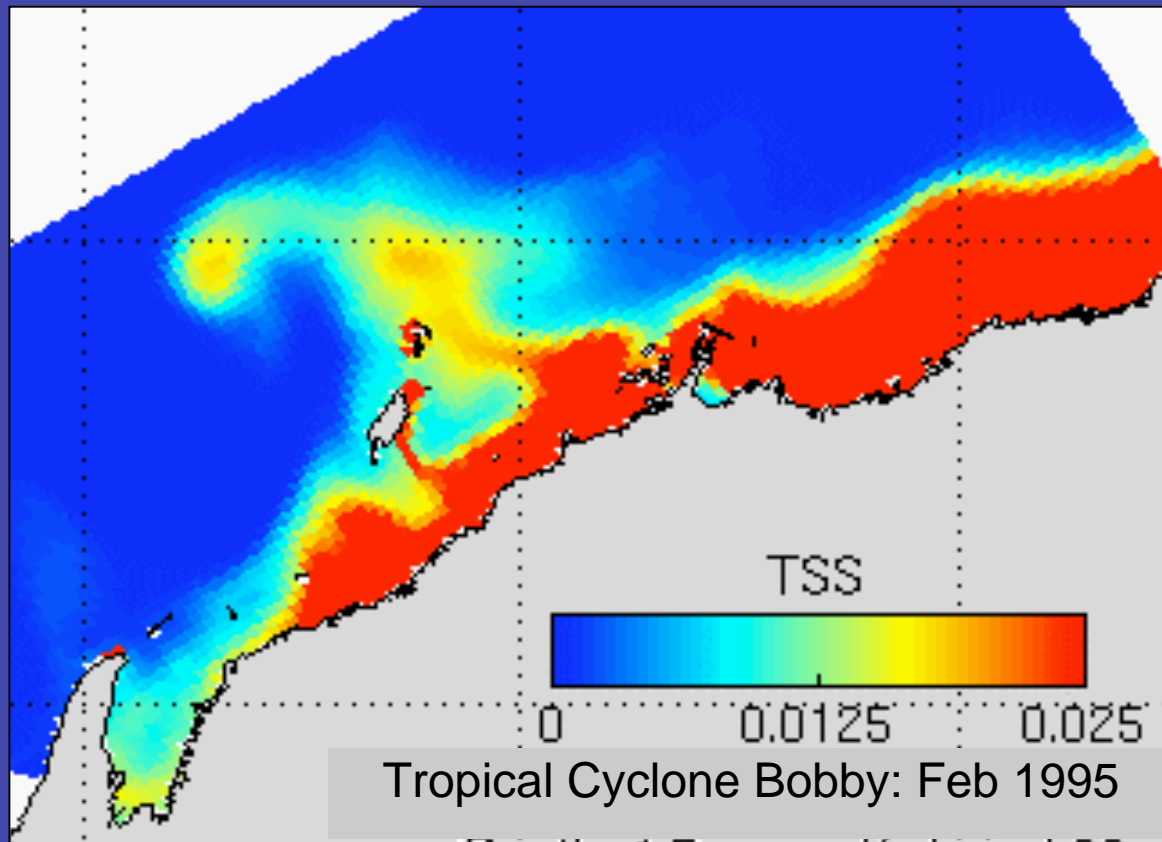




Suspended sediments (mean)



Tropical cyclones

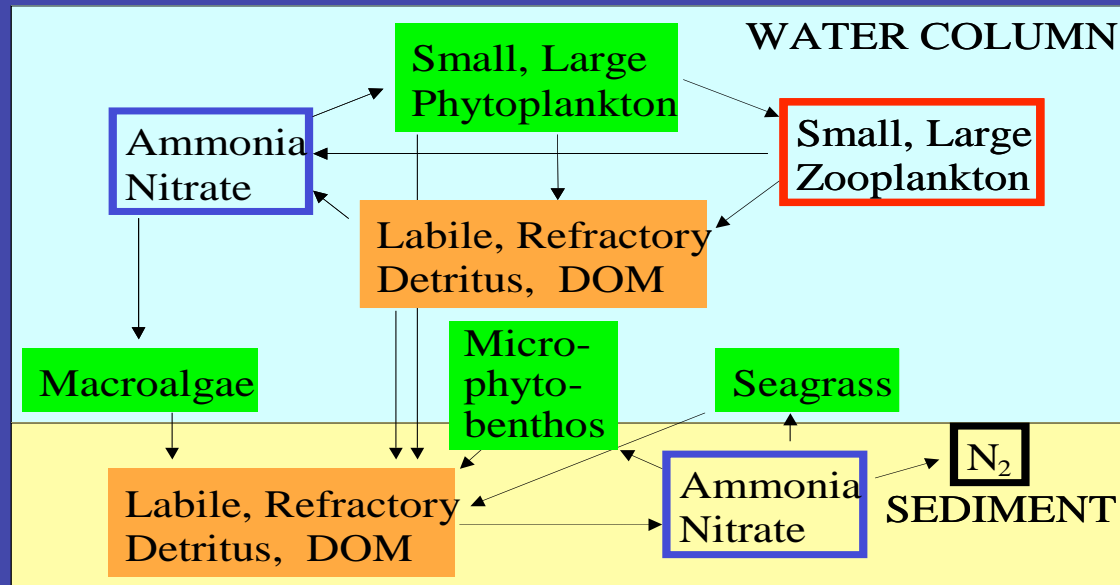




Sediments summary



- Resuspension and deposition is highly correlated with current induced bottom stresses.
- Winnowing and transportation of fine sediment results in high sand fractions in high energy regions.
- Suspended sediments are highest over the inner shelf around spring tide.
- Offshelf transport of sediments is dominated by tropical cyclone events.



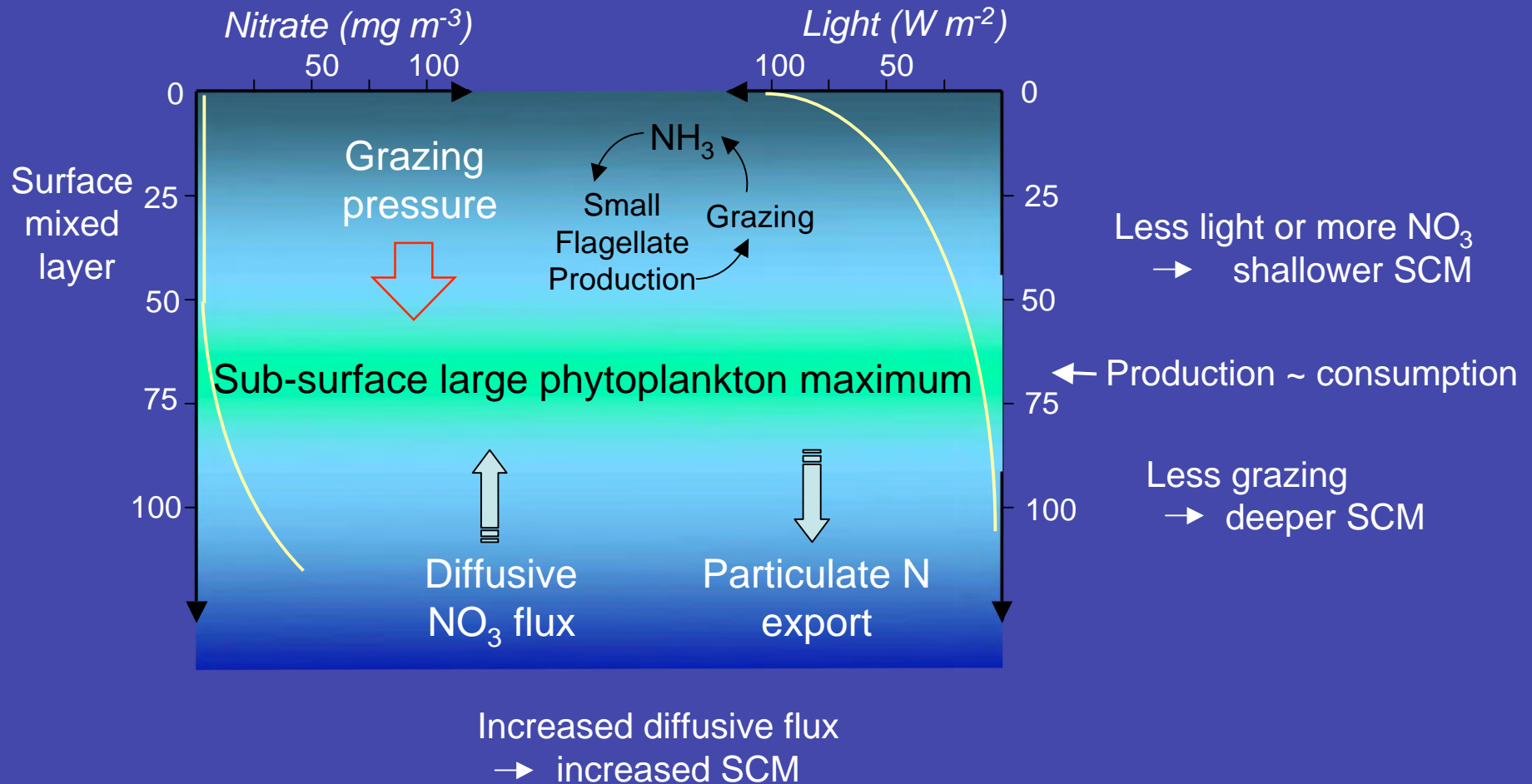
Nutrients (nitrogen limited)

2 phytoplankton classes (5 μm & 20 μm)

2 zooplankton classes

2 macrophyte classes (macroalgae and seagrass)

1-D Conceptual model

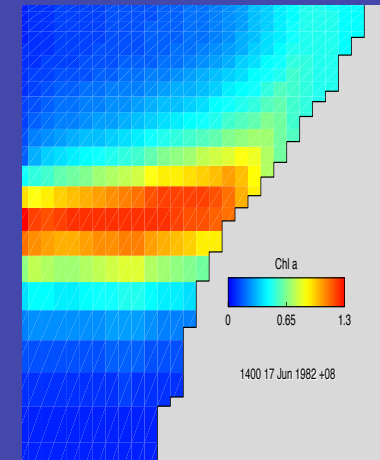
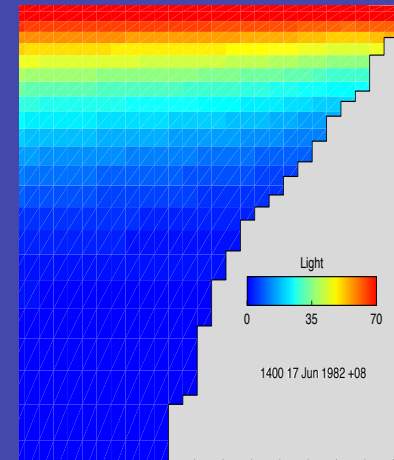
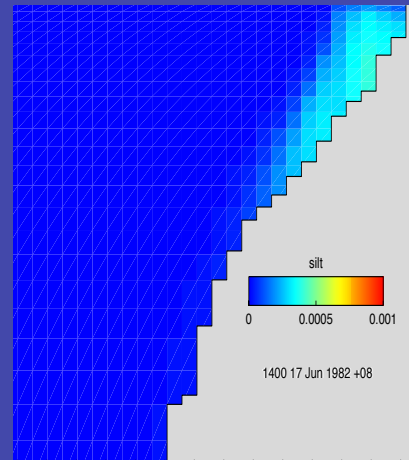
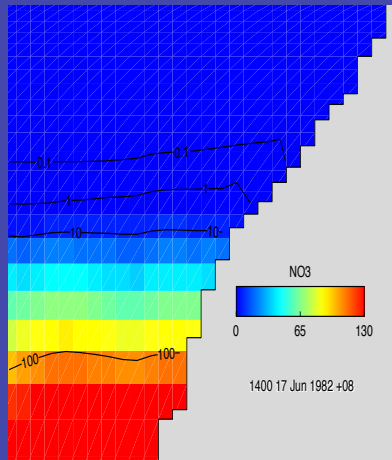




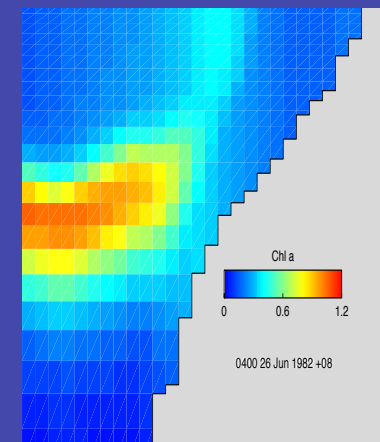
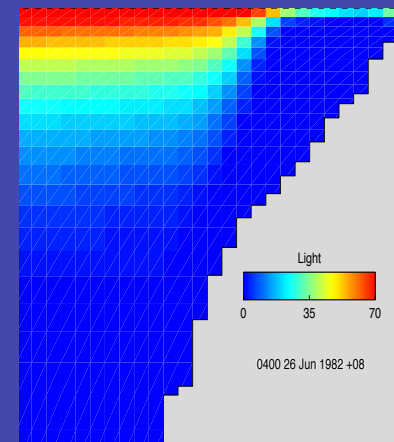
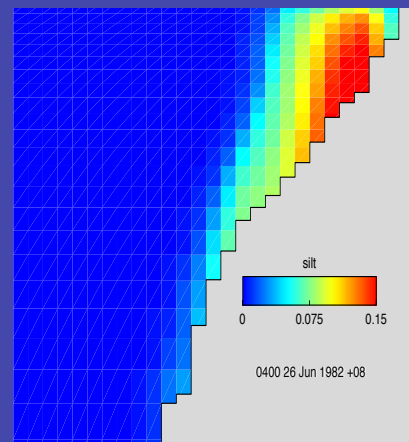
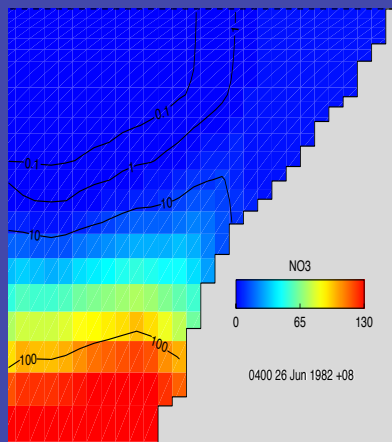
Water column productivity



Neap tide



Spring tide



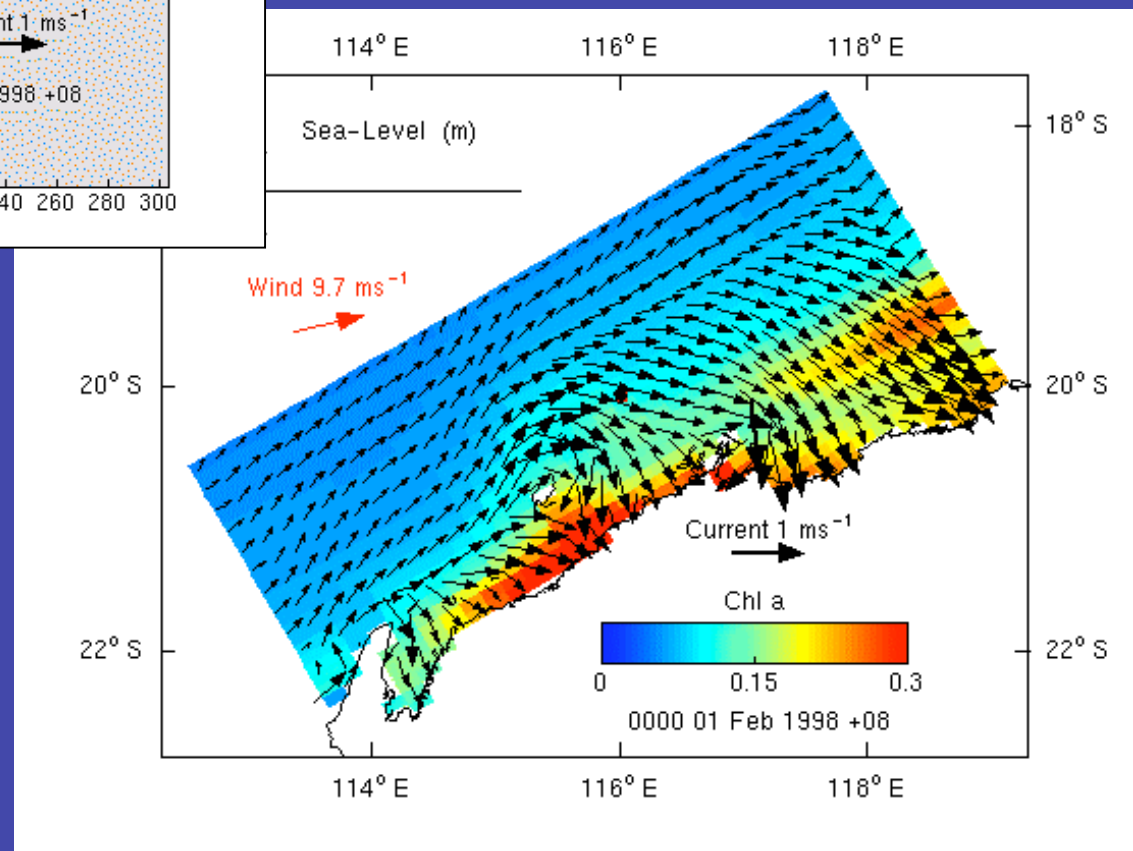
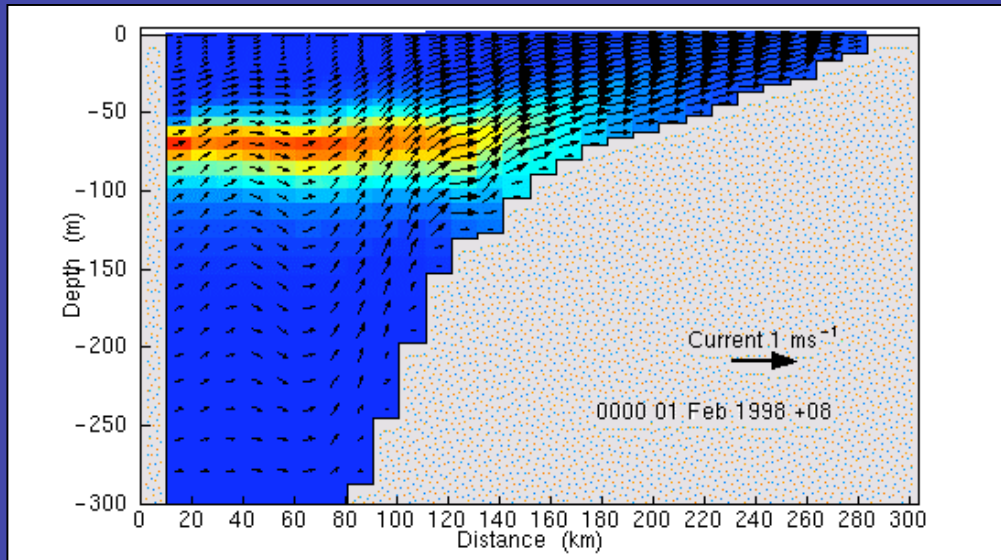
Nitrate

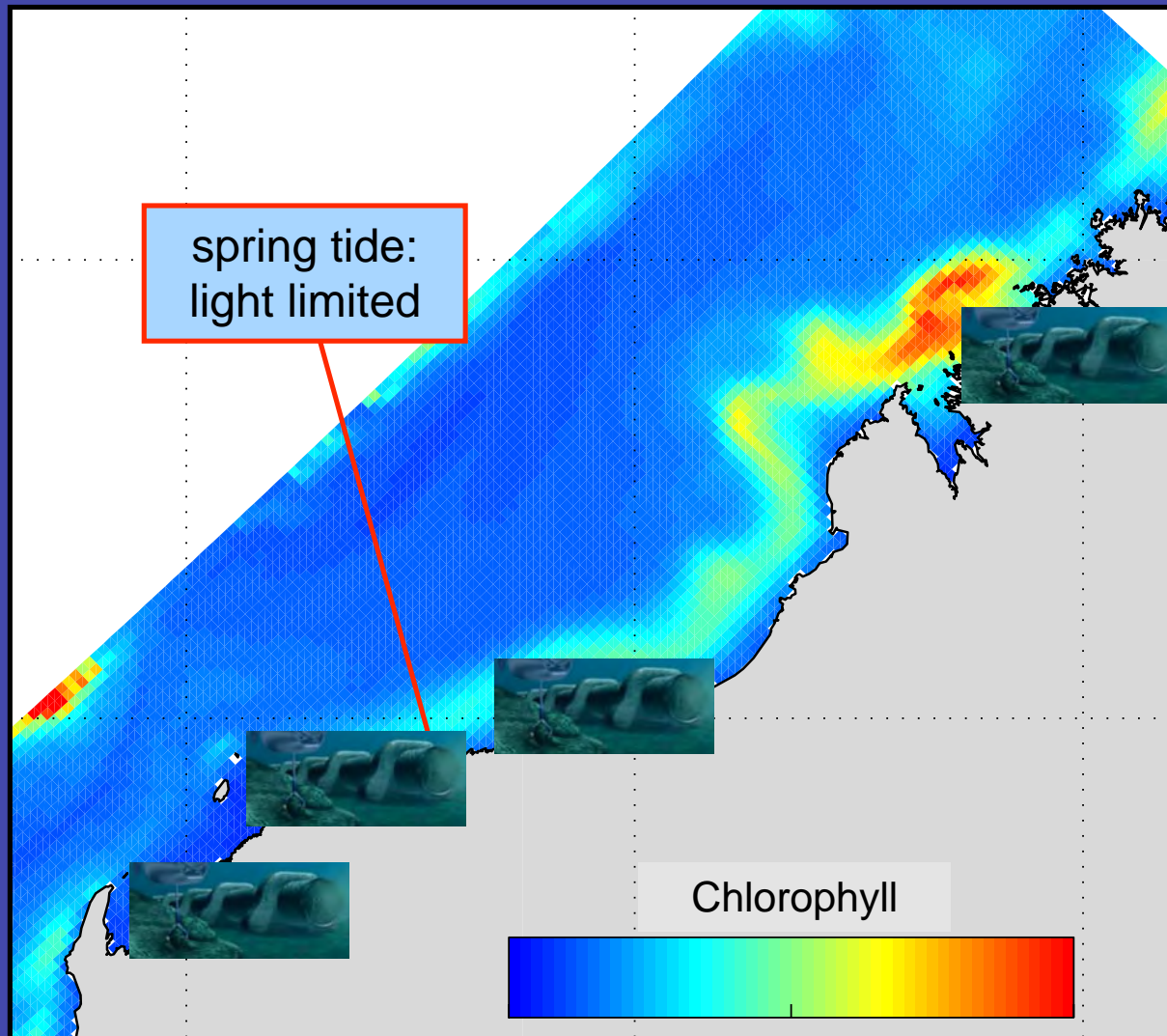
Silt

Light

Chlorophyll

Water column productivity

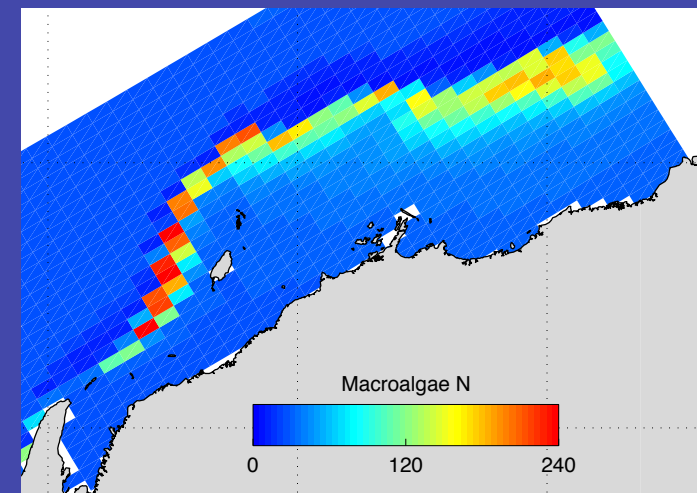
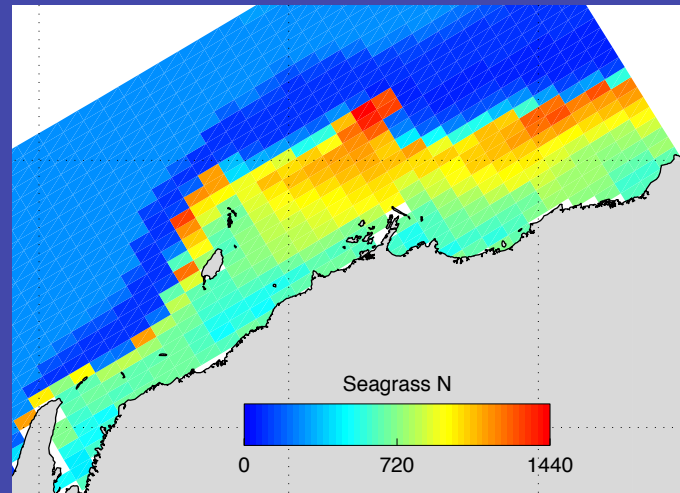




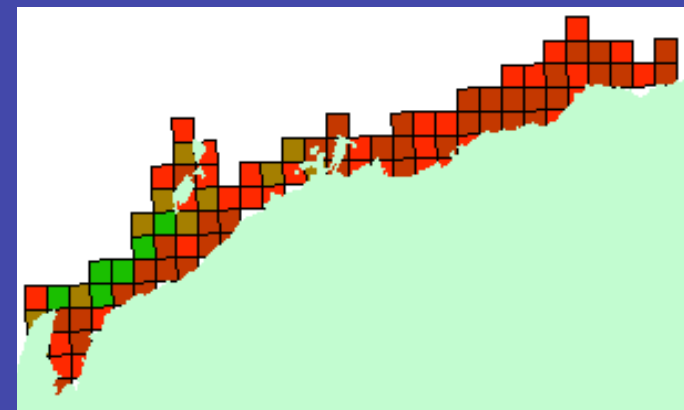
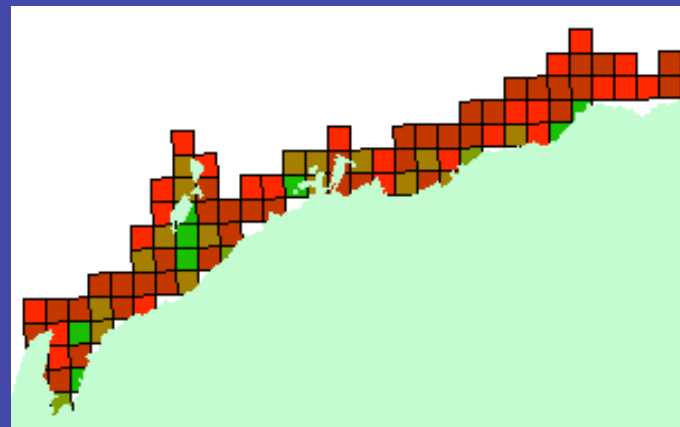
Seagrass

Macroalgae

*Biogeo-
chemical
model*



*Habitat
dynamics
model*



Contact

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Thank You

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