Introduction and Motivation

- “Coarse” resolution atmospheric forcing:
  - ECMWF (1.125° × 1.125°)
  - NCEP (1.875° × 1.875°)
  - NOGAPS (1.0° × 1.0°)

- “Fine” resolution HYCOM
  - 1/12° Pacific model
  - 1/25° Black Sea model
  - 1/37.5° Gulf of California

- PROBLEM

  Coarse resolution atmospheric products in forcing much finer OGCMs, such as HYCOM
Specific Issues

- Interpolation to HYCOM domain
- Land/sea boundary near the coastal regions:
  - atmospheric forcing contaminated by land values
  - ocean grid misrepresentation near the coast
- HYCOM needs only over-ocean atmospheric condition
• Model surfaces are divided into sea (0) and land (1) point

• Land: if more than 50% of the grid box is on the land
Wind Forcing

- Elimination of excessive noise and incorrect data
- Use bulk formulation with ERA40 wind speed
Another example: U.S. West Coast

- Strong winds and upwelling near the coast

**WIND STRESS MAGNITUDE (N m⁻²): 1979–93 mean**

- ERA40 PBL model
- Bulk formulation
Wind Speed near the California Coast:

- Scatterometer wind speeds (over ocean only)

WIND SPEED (m s$^{-1}$): 2000–03 mean

Post–processed ERA40

Scatterometer
Correction for Thermal Forcing

“Creeping Land–Fill” to get rid of land–contamination

ERA15 land/sea mask

NOGAPS land/sea mask

ERA15 air temp. (°C) in February

NOGAPS air temp. (°C) in February

After the creeping land–fill

After the creeping land–fill
HYCOM Application

HYCOM versus Pathfinder SST climatology for seasonal cycle

Mean SST bias: $-0.6^\circ$C

RMS SST difference: $1.4^\circ$C

After the correction: $-0.1^\circ$C

After the correction: $1.1^\circ$C