High-resolution air-sea modeling of the Philippines winter monsoon

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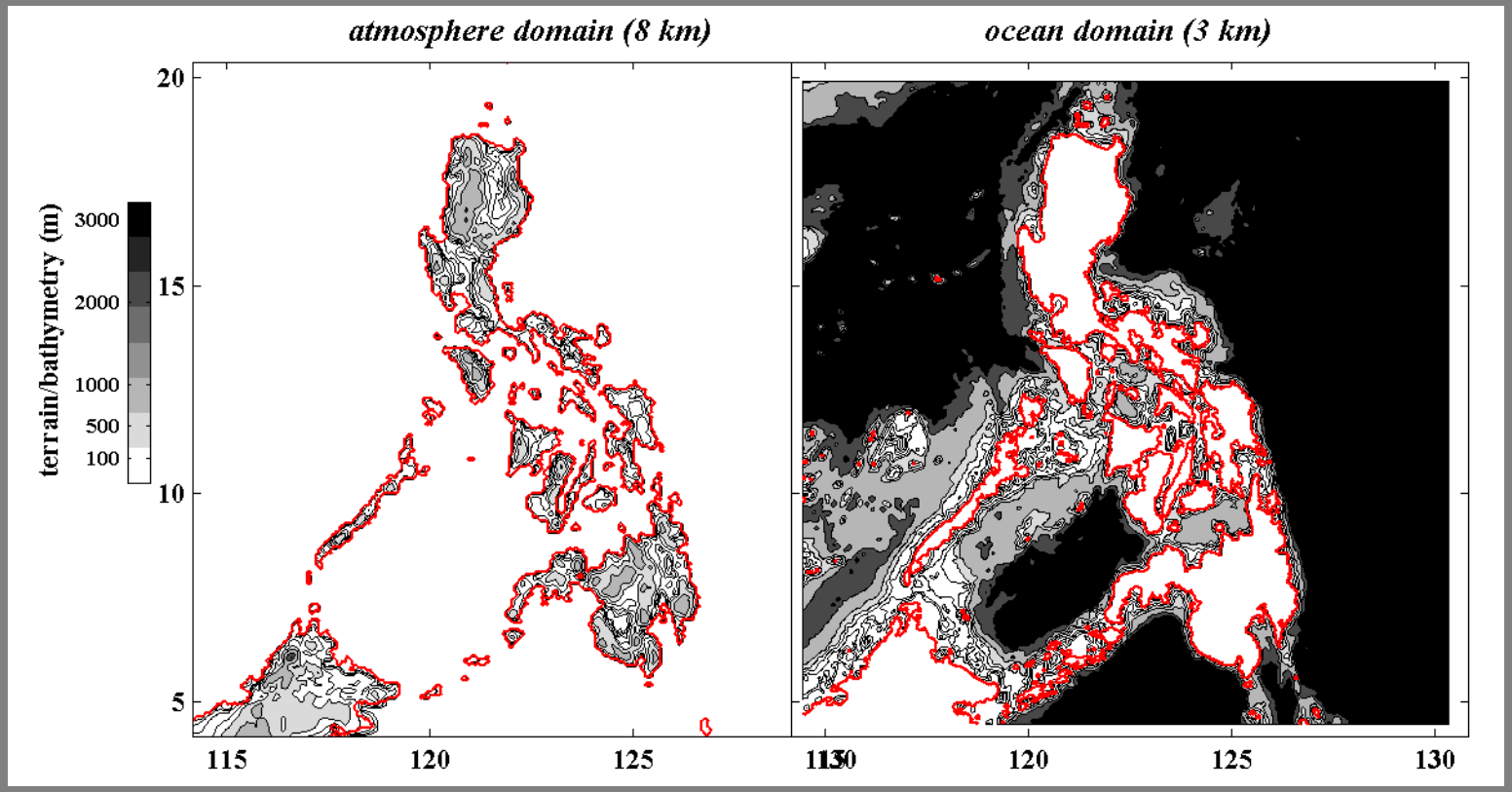
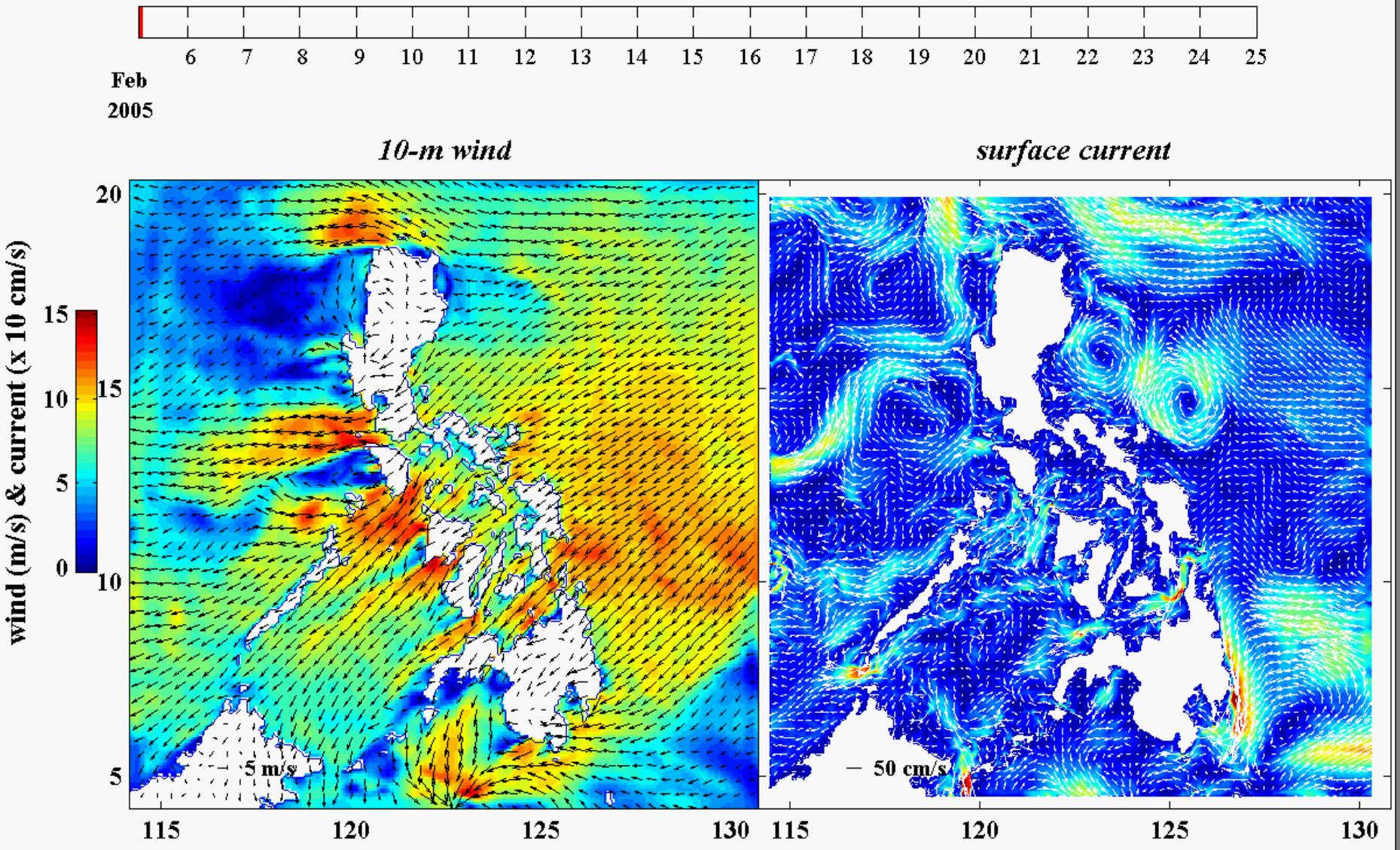
Outline

- Model set-up: COAMPS & NCOM
- Air-sea interaction features during winter monsoon
- COAMPS-QuikSCAT comparison
- COAMPS/NCOM February 2005 statistics
- Global HYCOM & global NCOM error statistics
- Plans

Model domain & features



- COAMPS with 72, 24, 8 km nests
- 3 km NCOM with initial and boundary conditions from 1.) global NCOM & 2.) global HYCOM


6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Feb
2005
10-m wind
surface current
wind (m/s) & current (x 10 cm/s)
0 5 10 15
5 10 15 20
5 m/s
50 cm/s
115 120 125 130
115 120 125 130

orographically-induced air-sea interaction

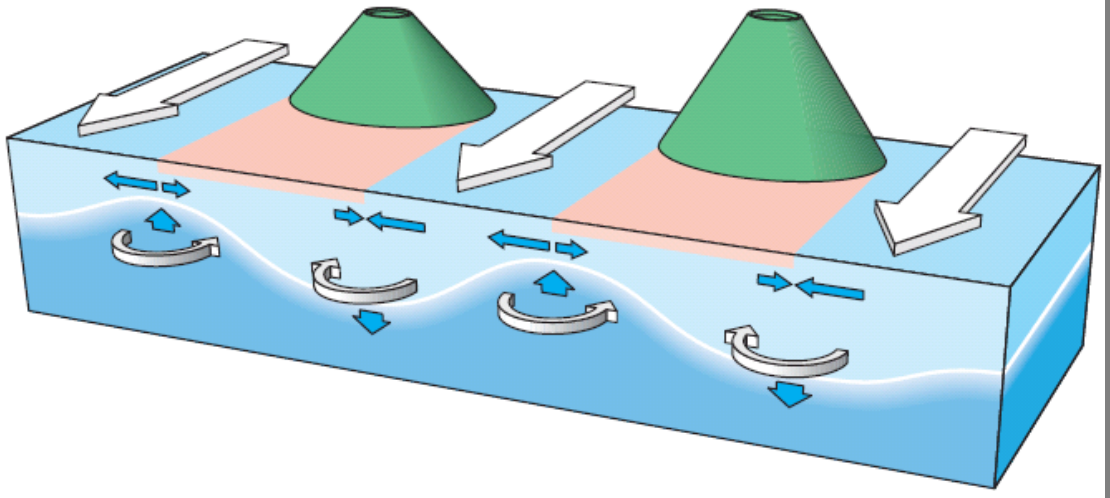
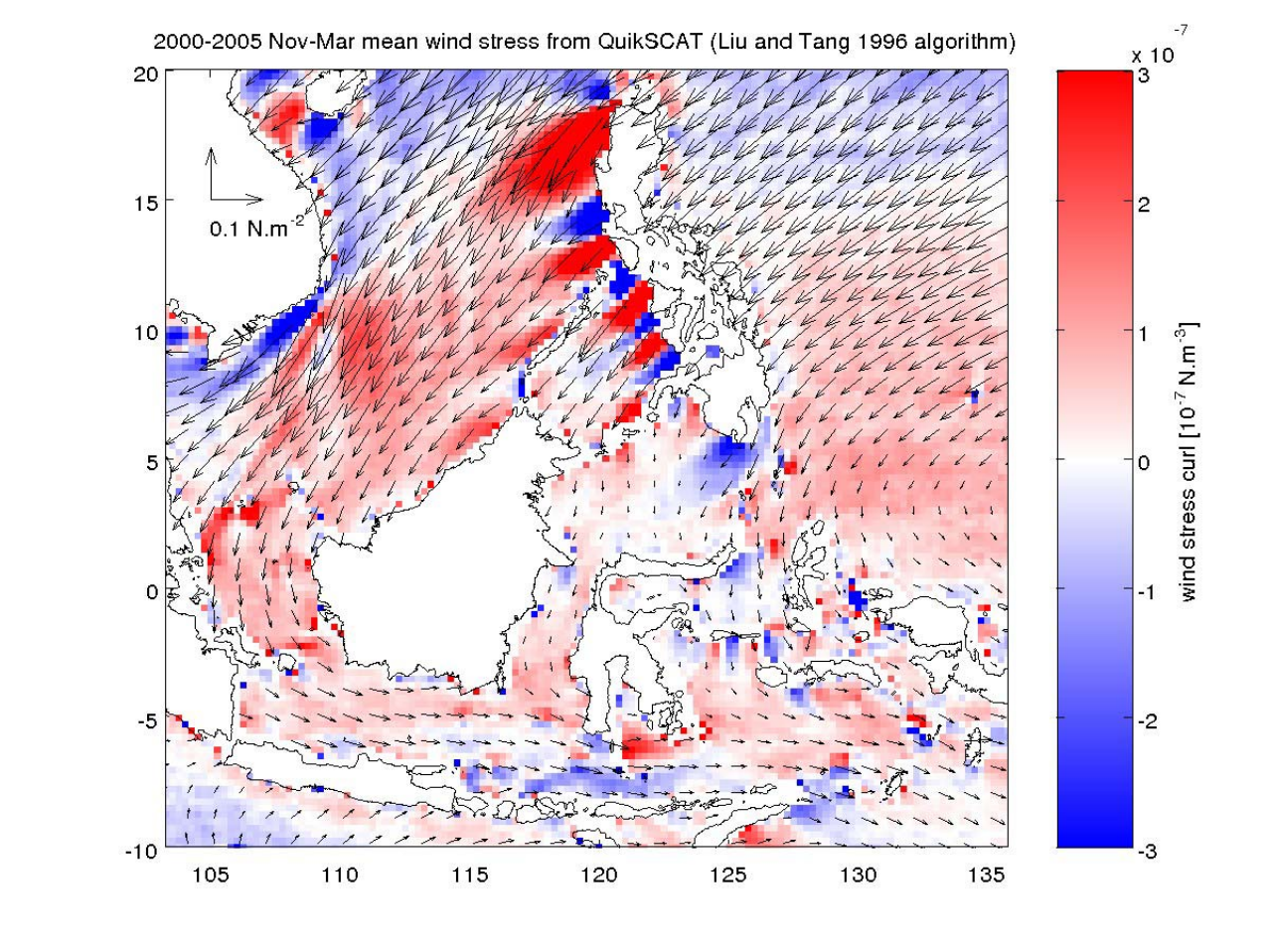


Figure 6. Conceptual diagram showing Ekman pumping in the lee of islands. The large white arrows represent intensified winds in the channels, yielding cooler surface temperatures; in the calm lee, surface temperatures are warmer. These wind speed variations induce divergent and convergent surface currents, which in turn lift or depress the thermocline, forming cyclonic and anticyclonic eddies.

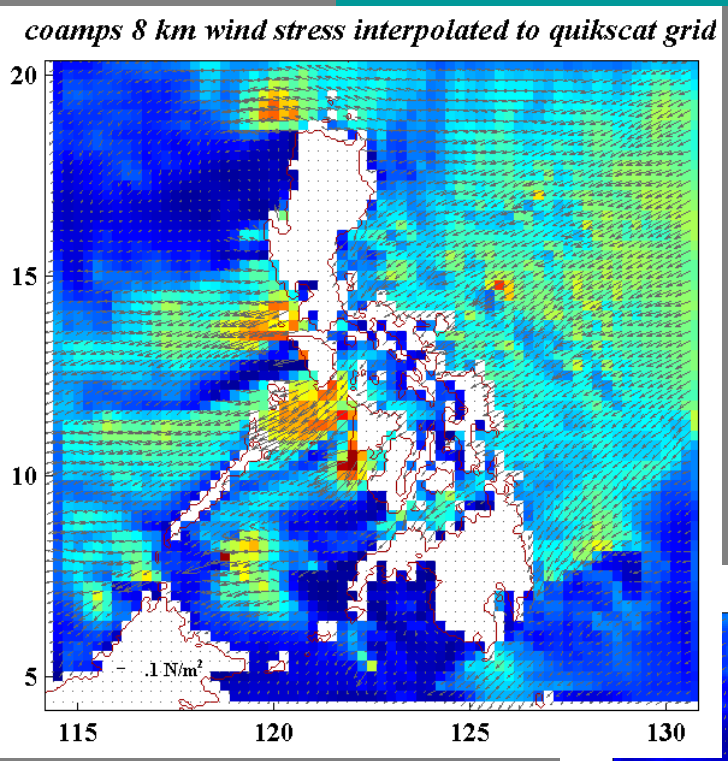
satellite observations

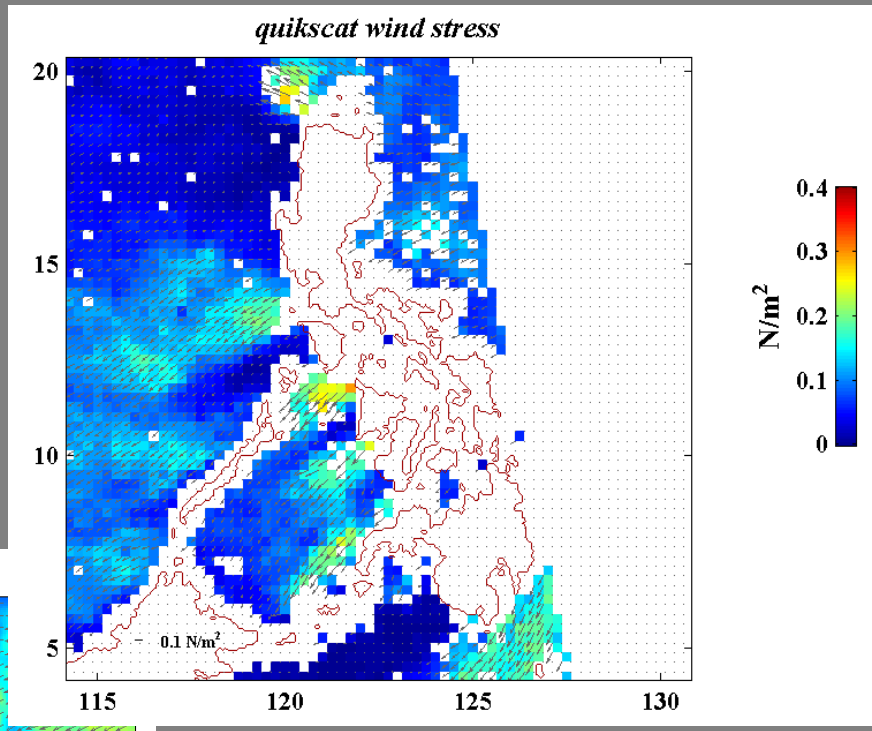


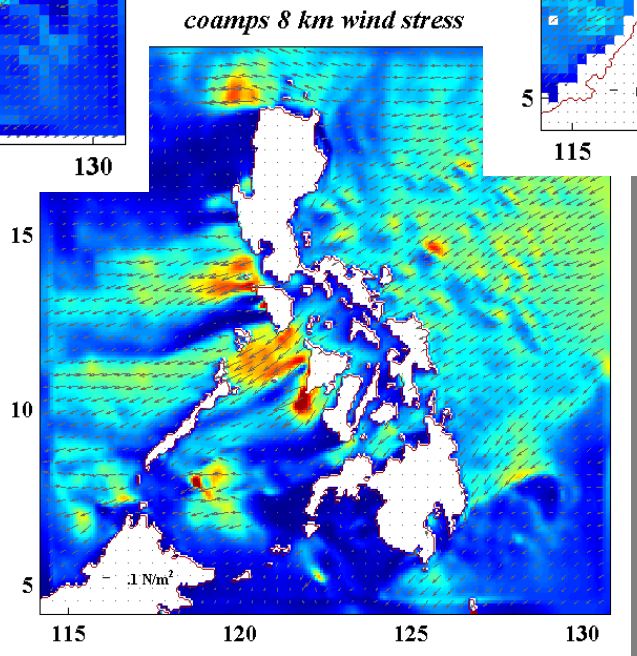
From cedric chavanne & pierre flament,
university of hawaii

model/obs comparison

21 UTC 7 february 2005

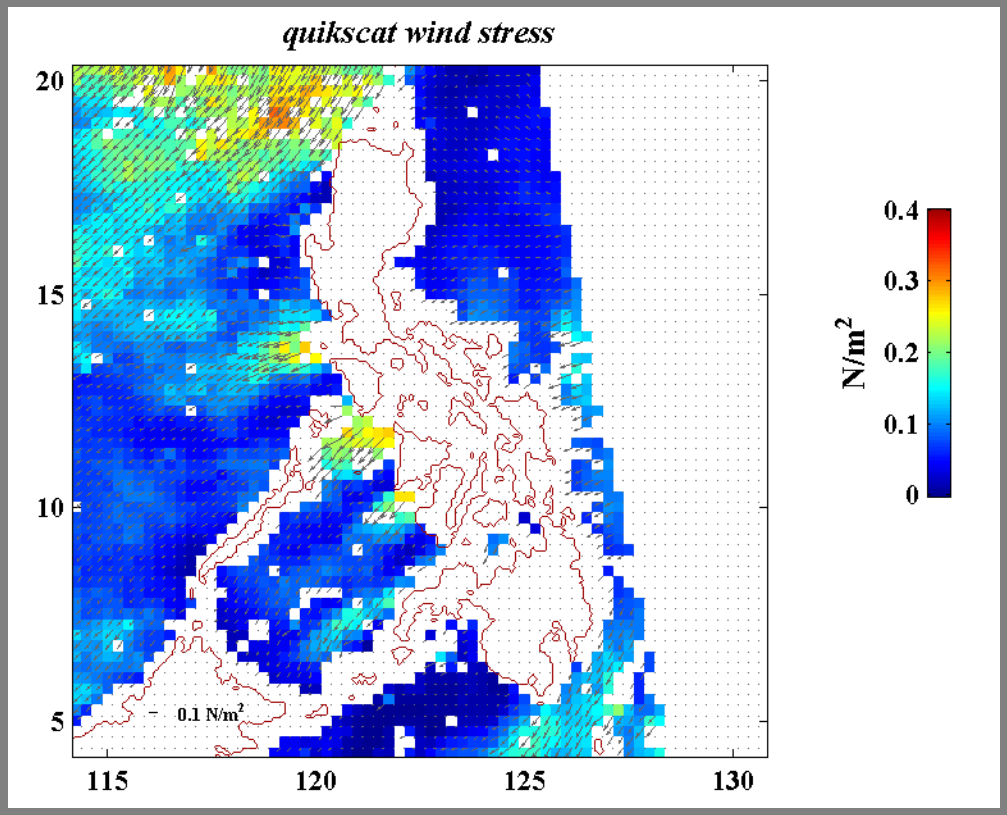


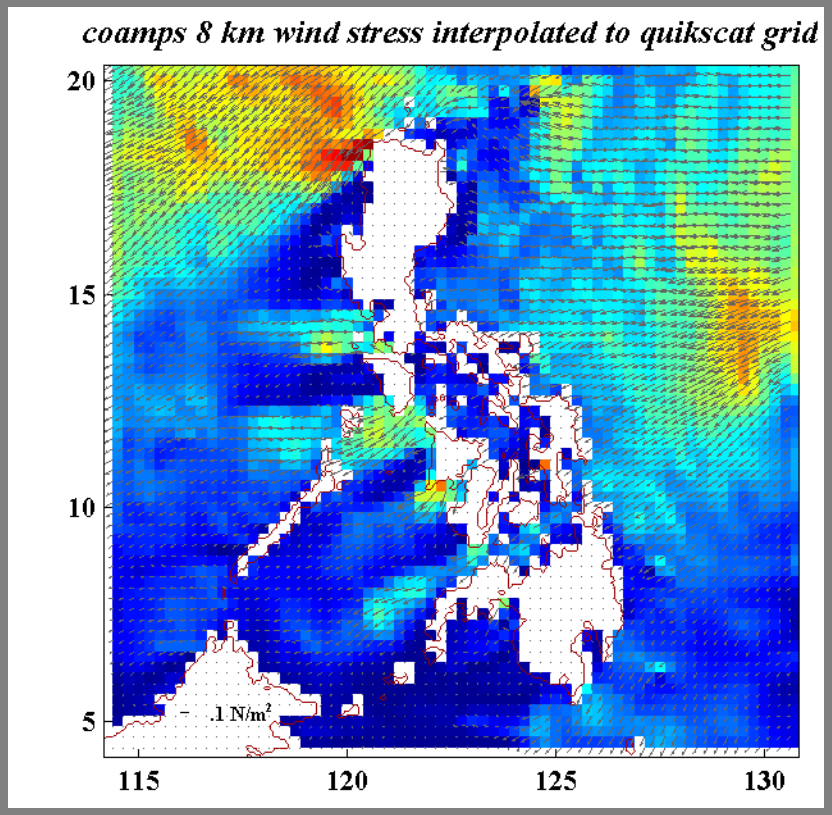




model/obs comparison

21 UTC 11 february 2005

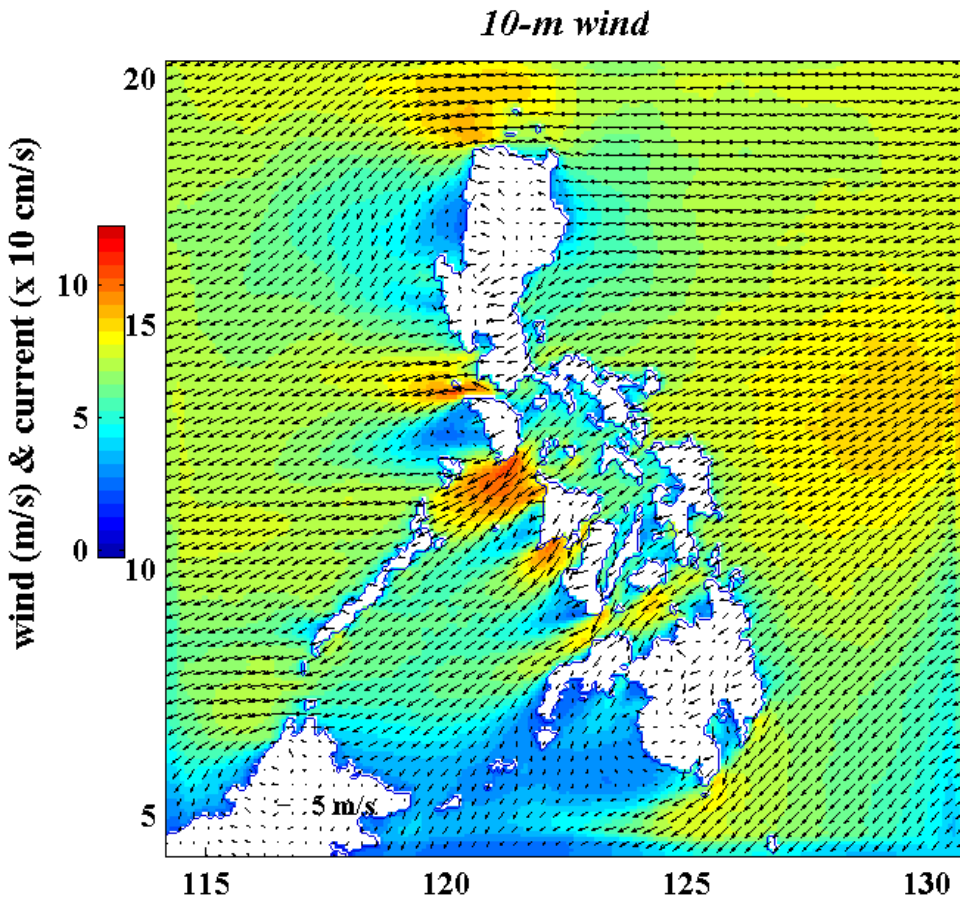




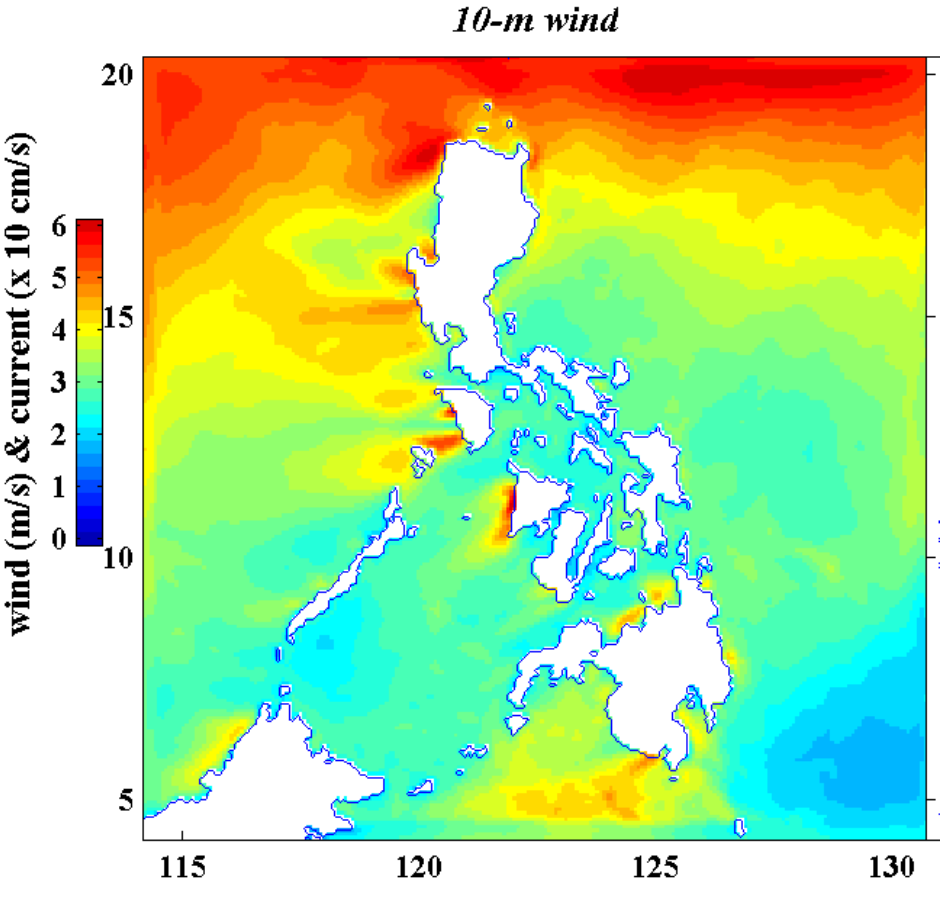
COAMPS 8-km

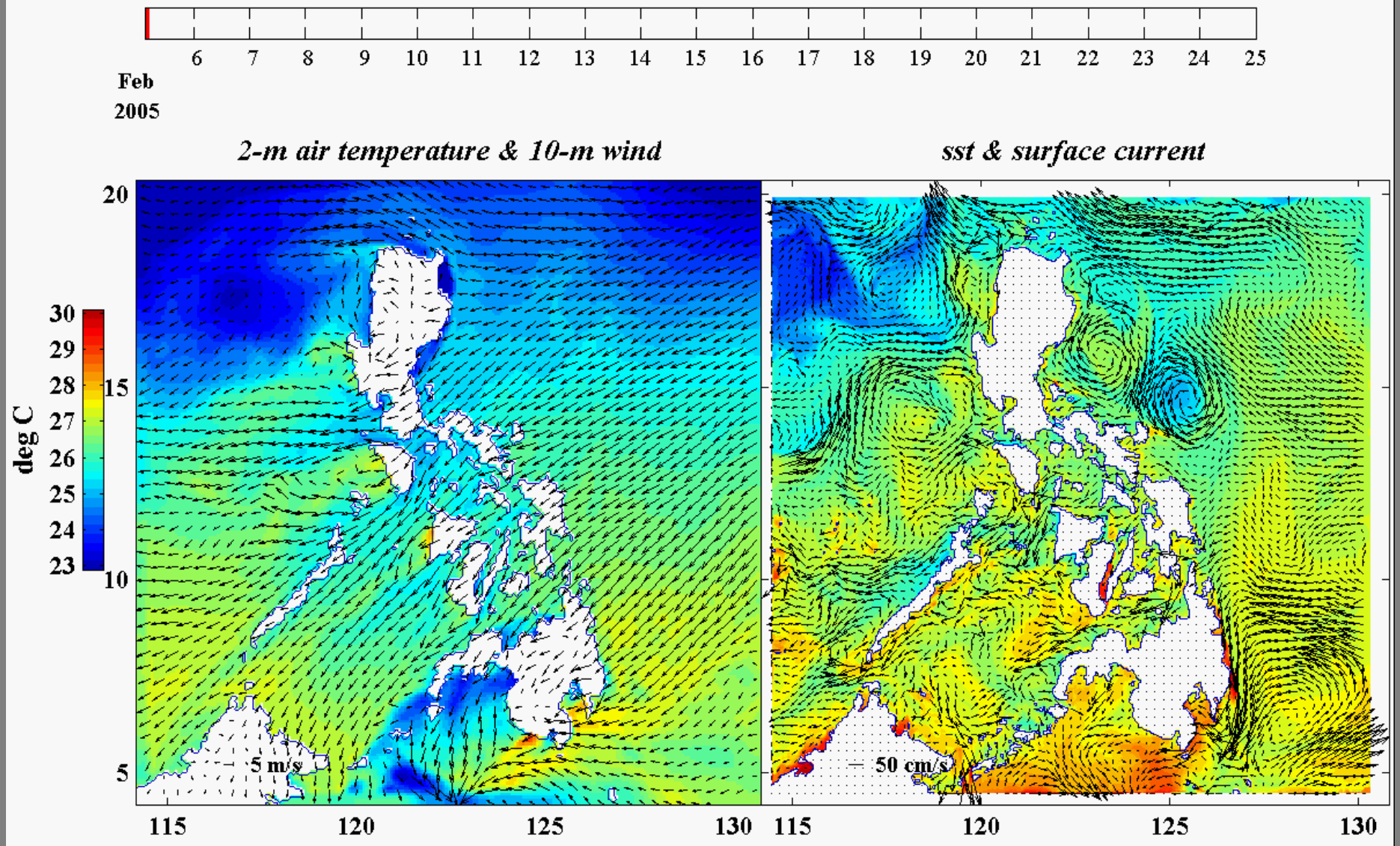
february 2005
(20 days)

mean



standard deviation




6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Feb
2005
2-m air temperature & 10-m wind
sst & surface current
deg C
30 29 28 27 26 25 24 23
20 15 10 5
5 m/s
50 cm/s
115 120 125 130
115 120 125 130

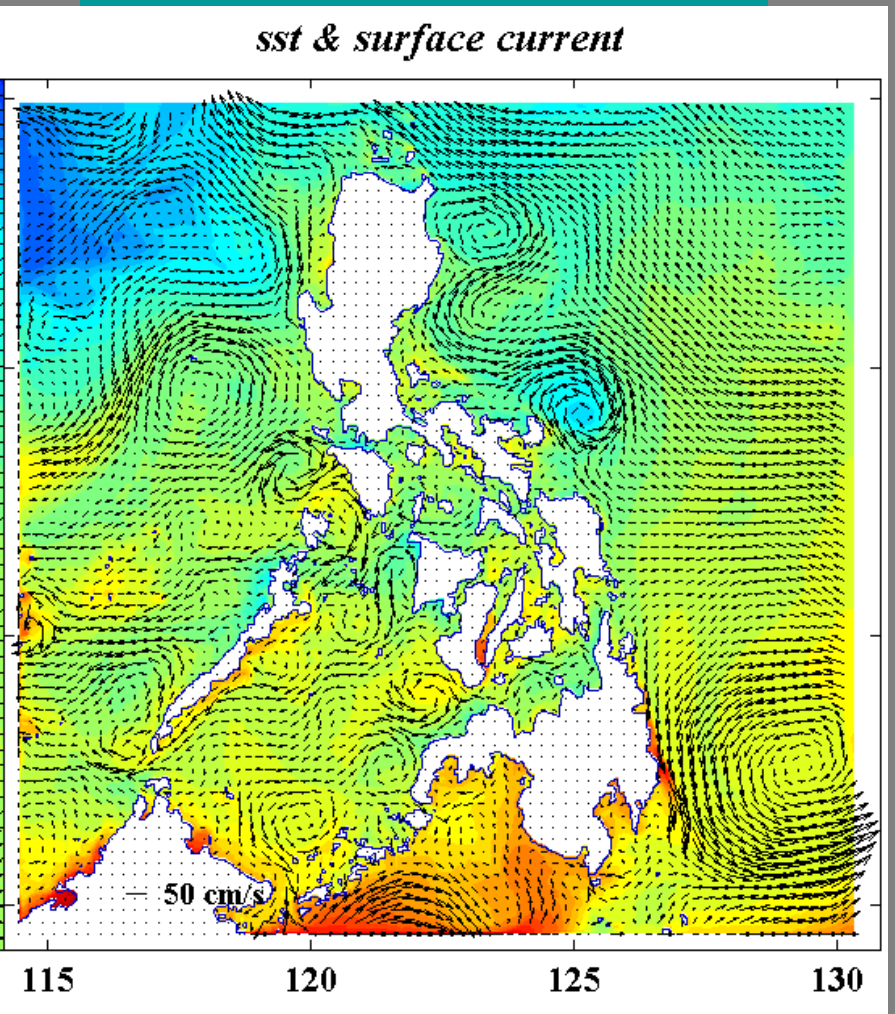
NCOM 3-km

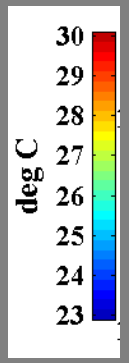
february 2005 (20 days)

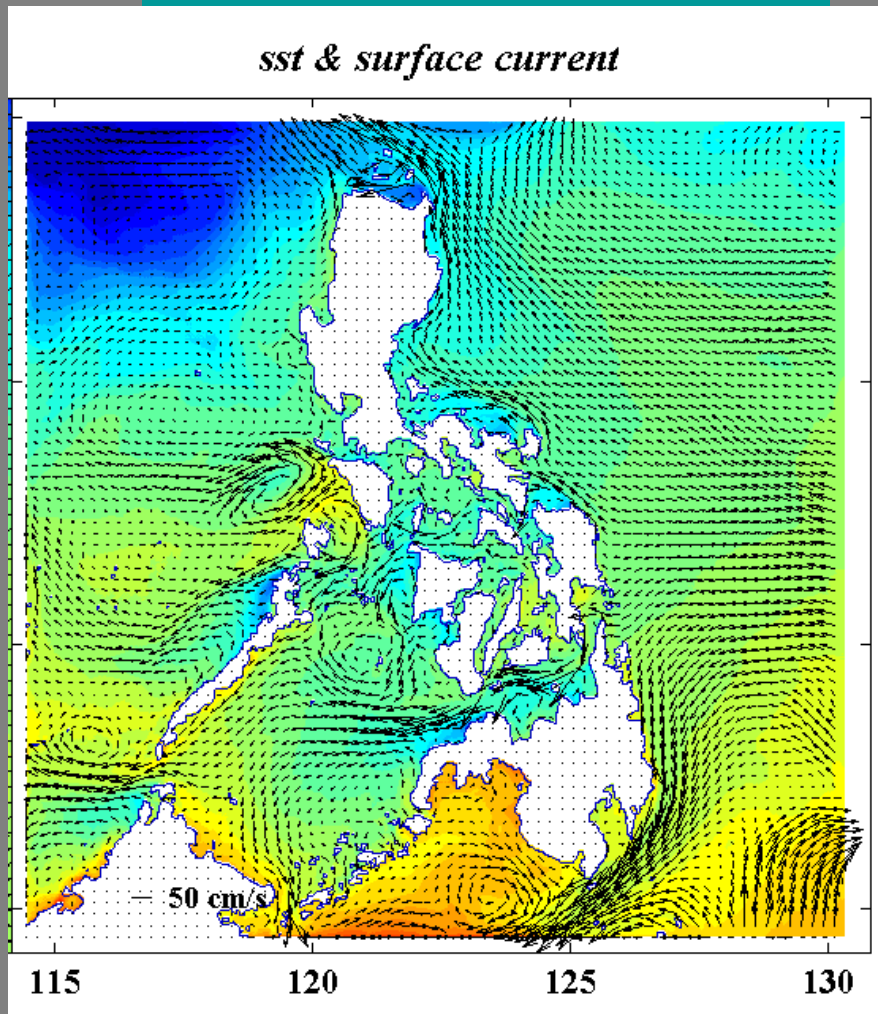
mean

uses global HYCOM

uses global NCOM



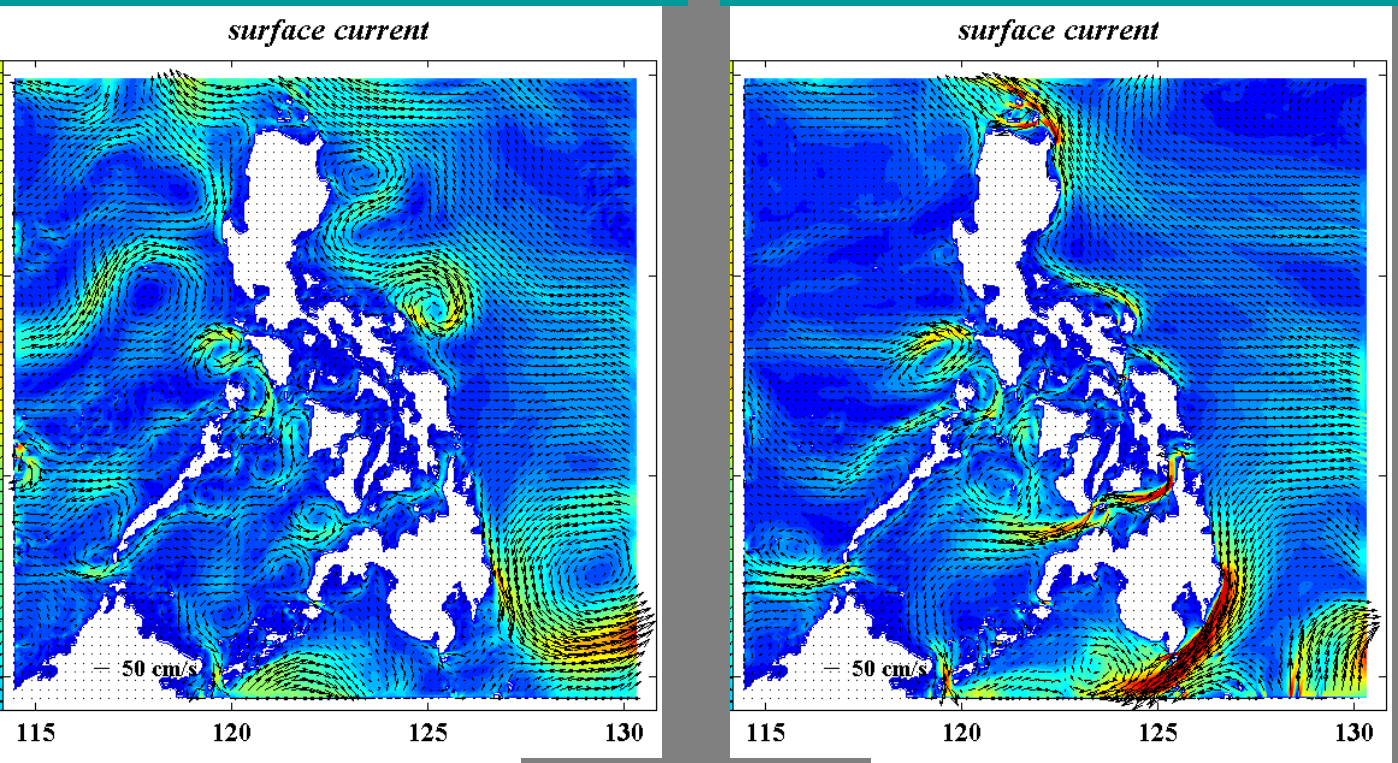




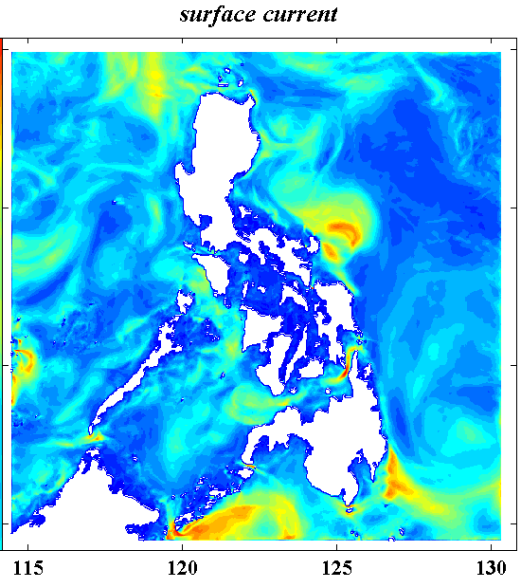
uses global HYCOM

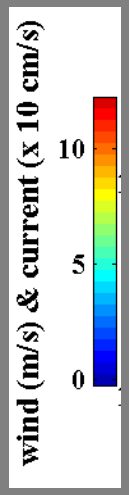
uses global NCOM

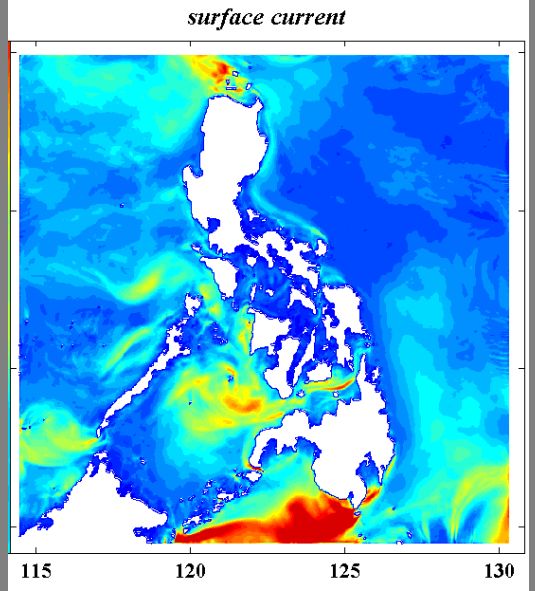
february 2005
(20 days)



mean

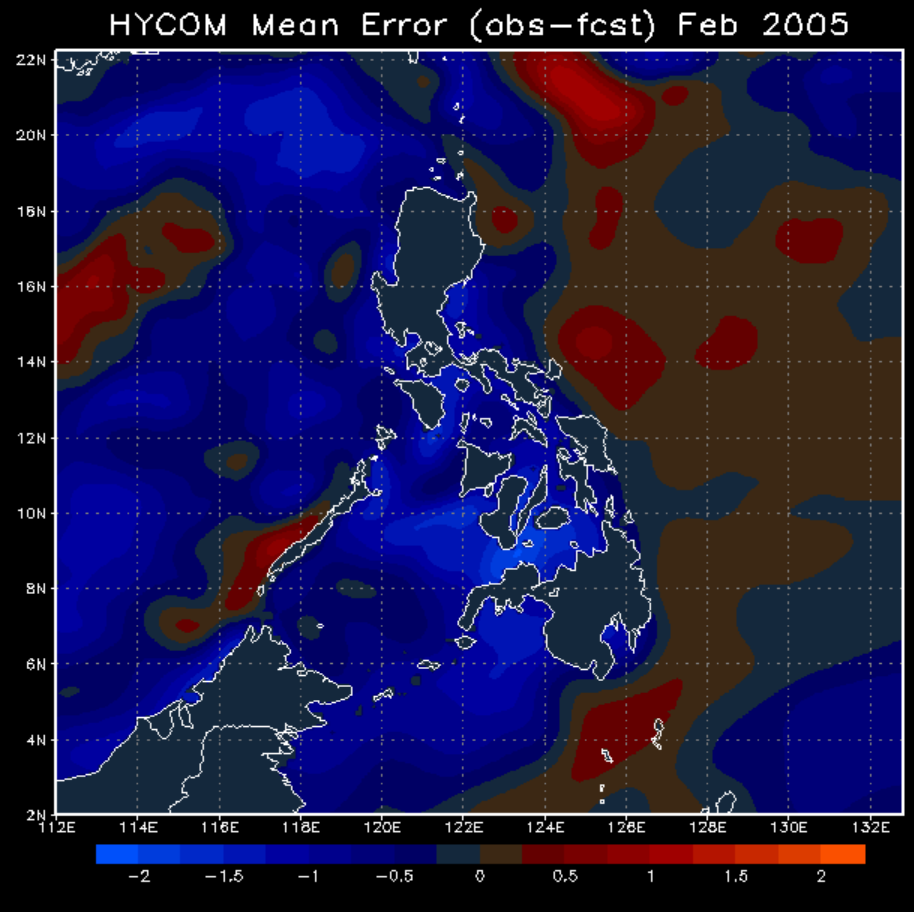


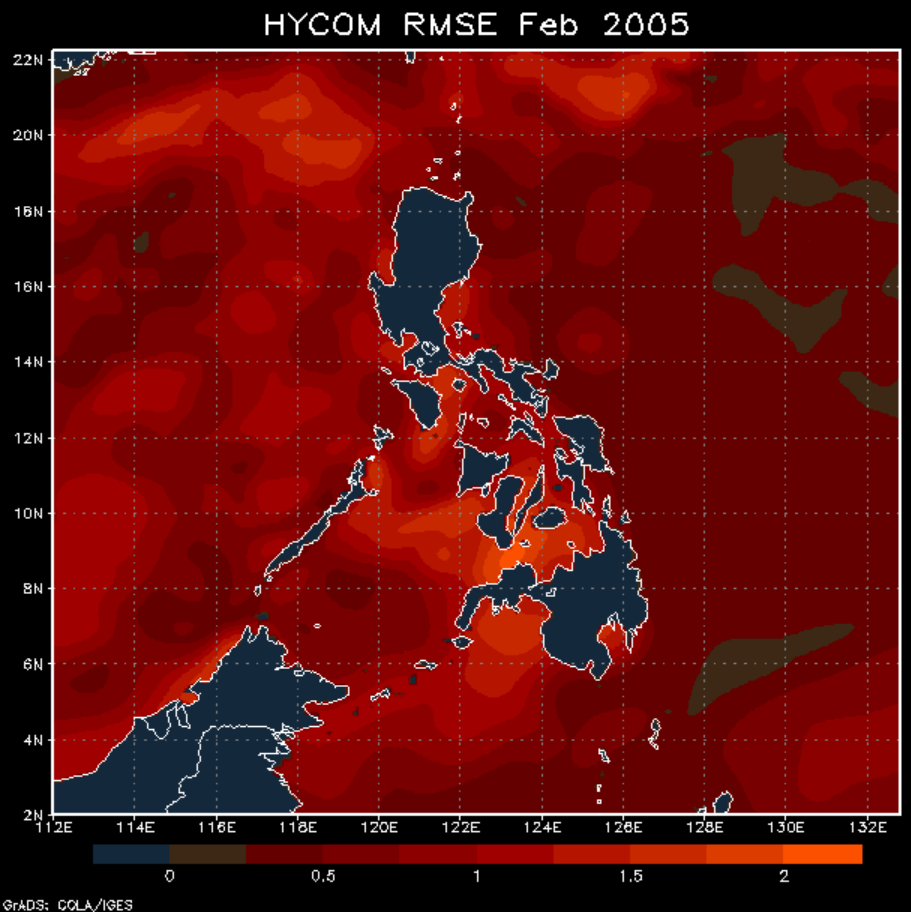




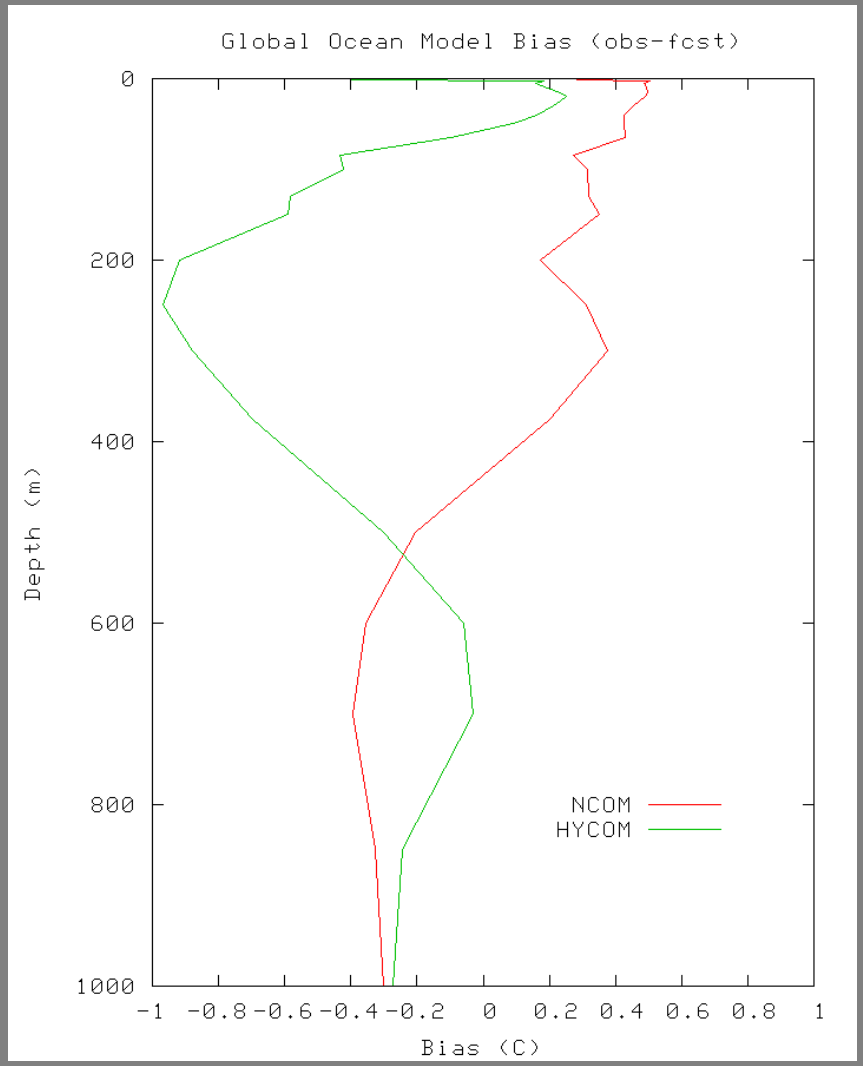
standard
deviation

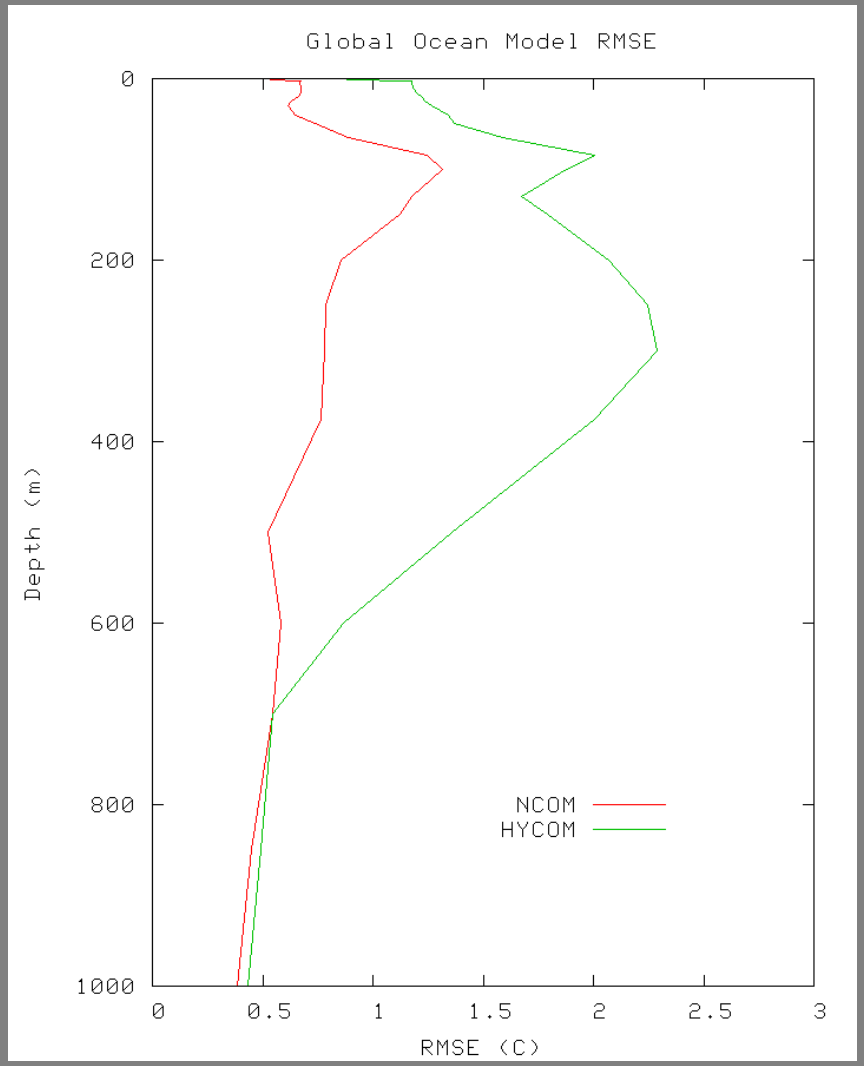
Evaluation of SST from global HYCOM





Comparison of global models for Philippines region





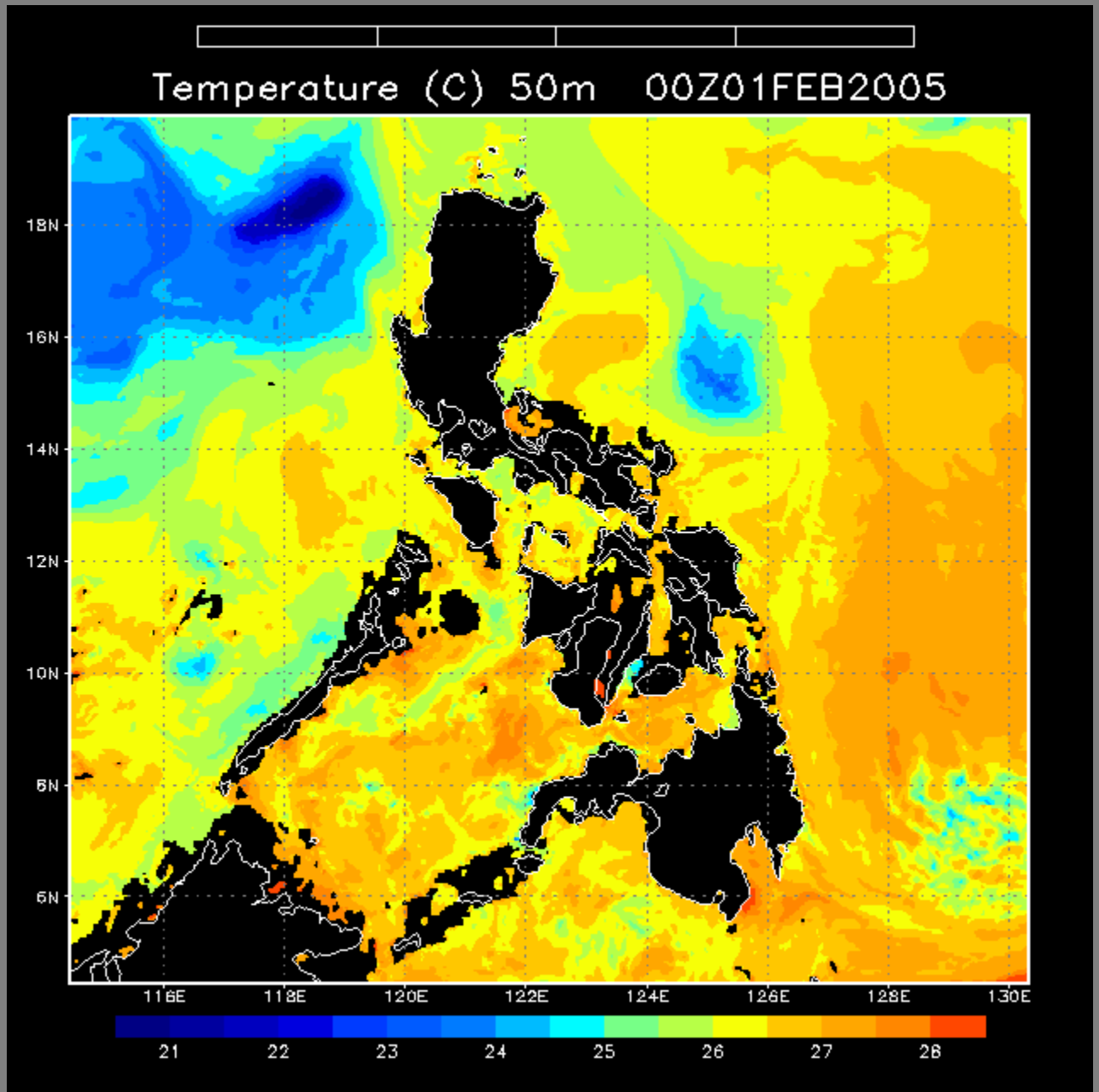
Modeling studies planned

- Evaluate global HYCOM/NCODA as a source of i.c.’s & b.c.’s
- Study gap flow/ocean eddy interactions and tropical dynamics using 2-way coupling with global HYCOM i.c.’s & b.c.’s
- Assess relative importance of atmospheric forcing, b.c.’s & i.c.’s in modeled ocean dynamics

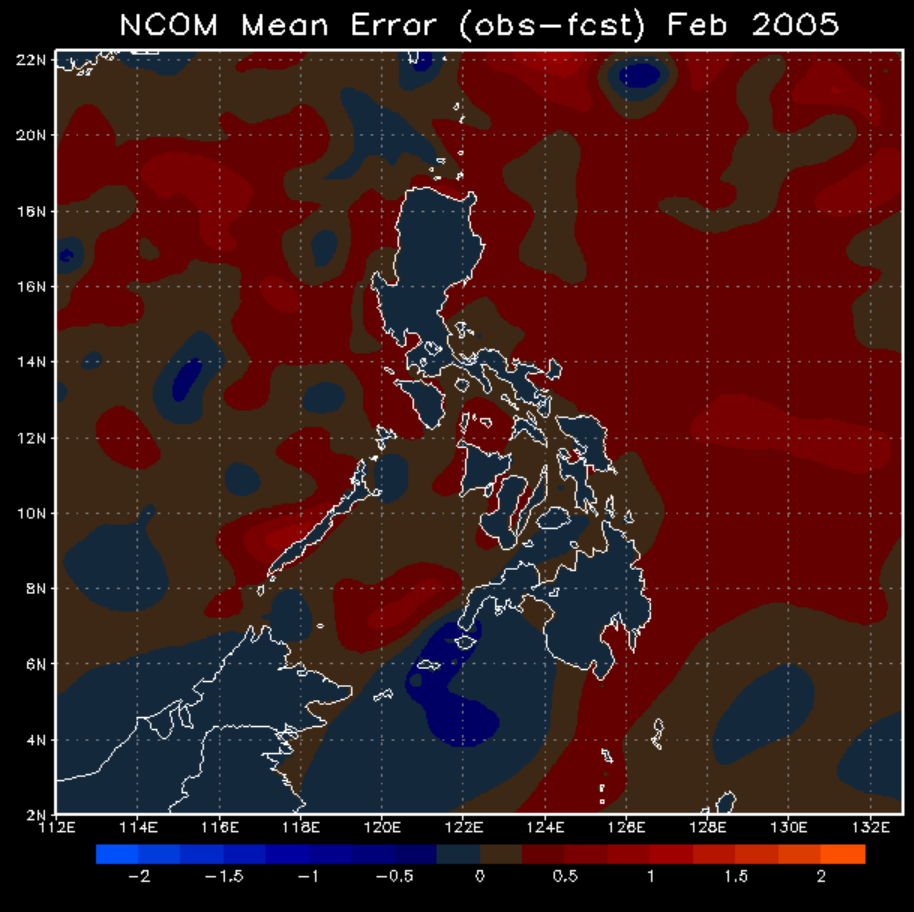
Upcoming Conferences

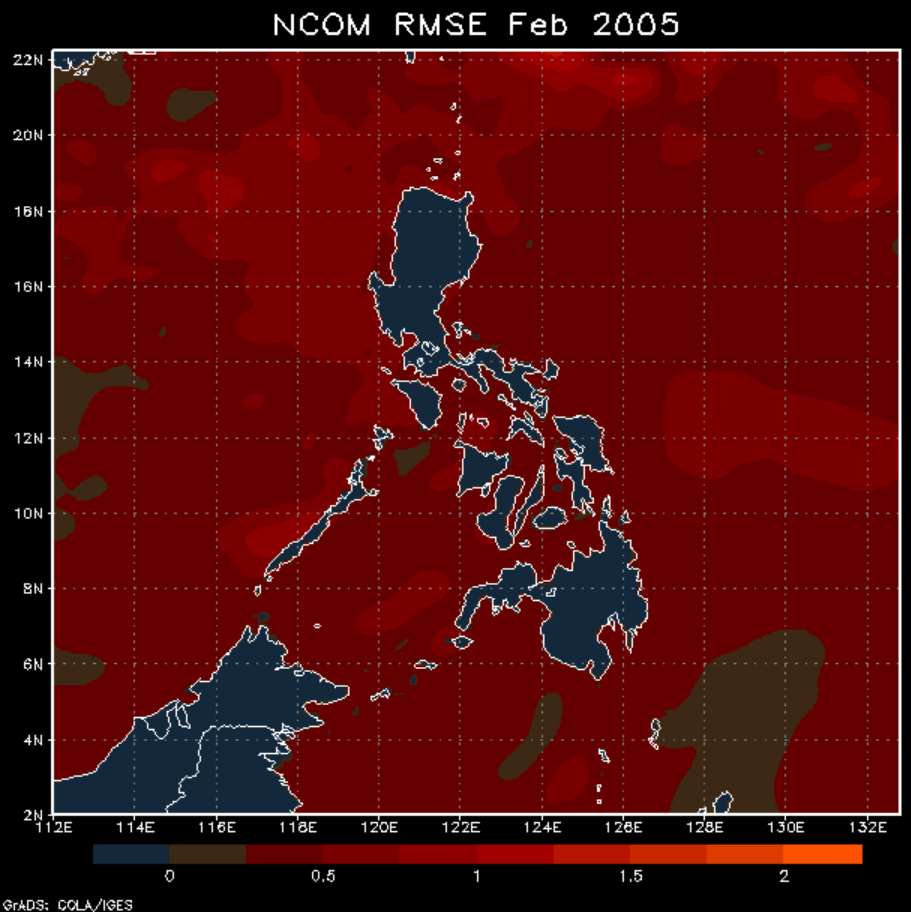
- **Gordon Research Conference on Coastal Ocean Modeling, June 17-22, 2007, New Hampshire (space limited)**

- **7th Conference on Coastal Atmospheric and Oceanic Prediction and Processes, 10-13 September 2007, San Diego** (joint with 7th Symposium on the Urban Environment): abstracts due May 11


Temperature (C) 50m 00Z01FEB2005
18N
16N
14N
12N
10N
6N
6N
116E
118E
120E
122E
124E
126E
128E
130E
21
22
23
24
25
26
27
28

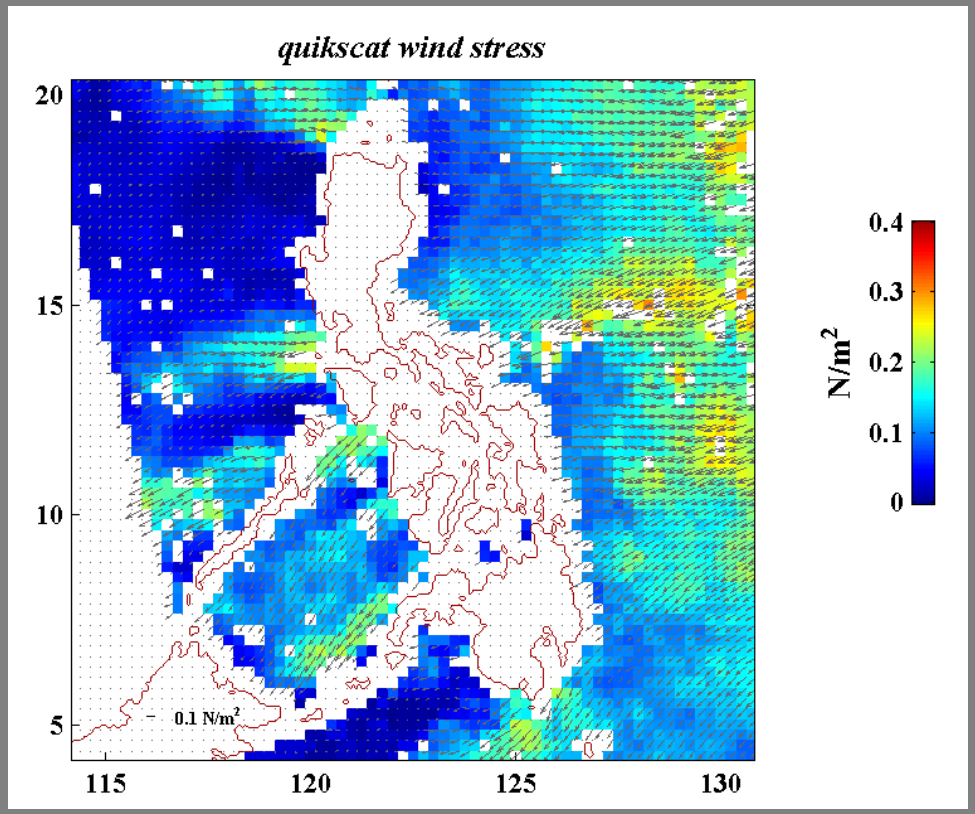
Evaluation of SST for global NCOM

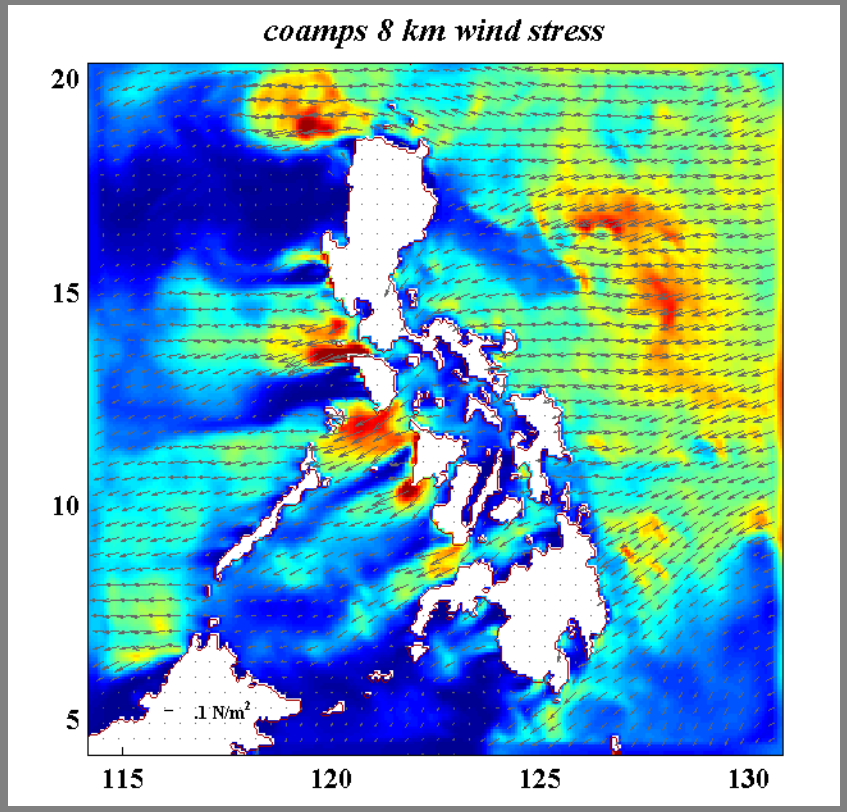


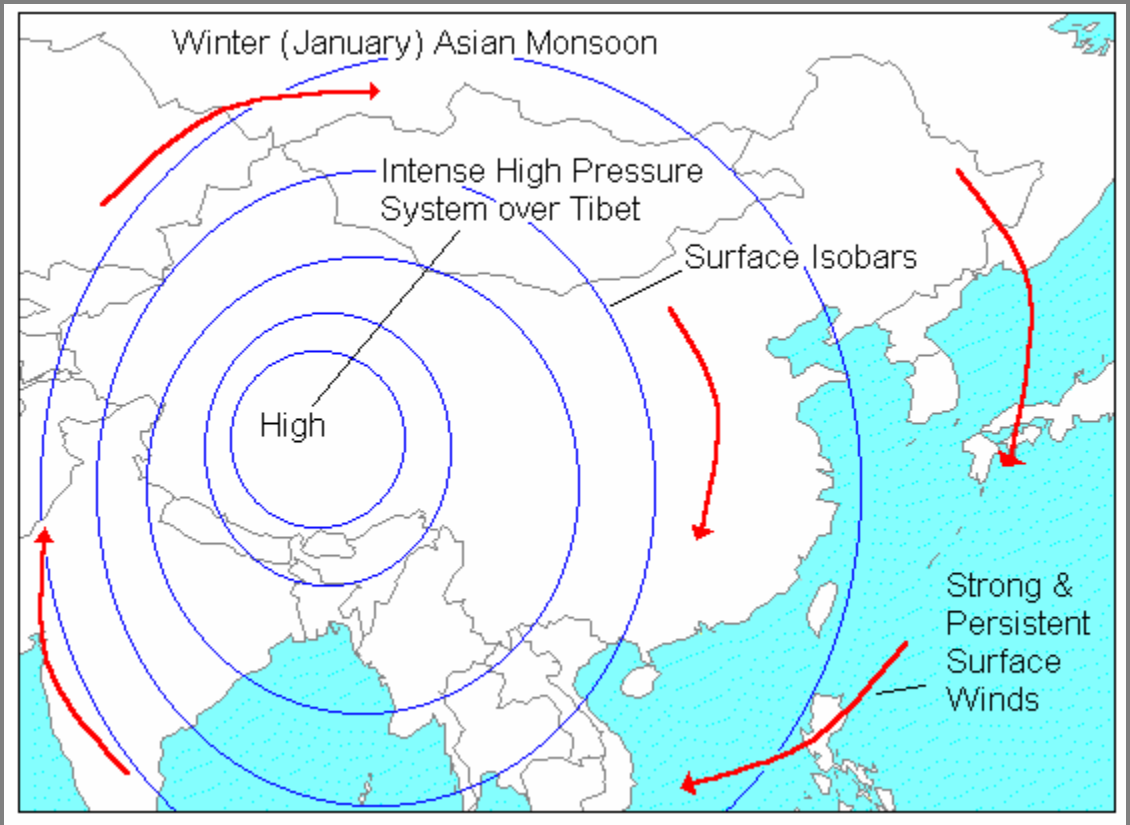


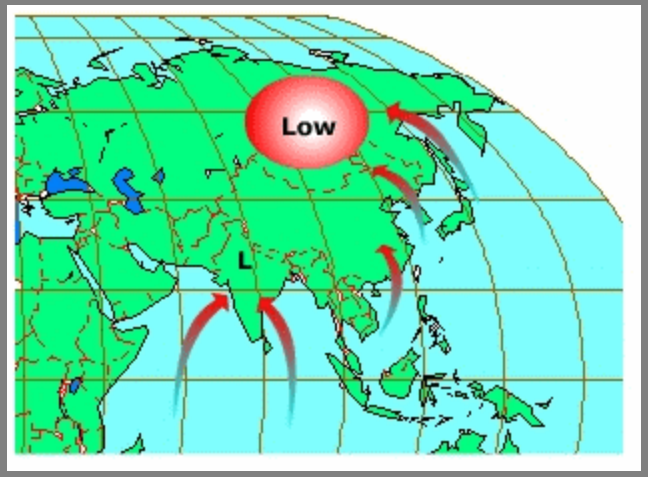
model/obs comparison

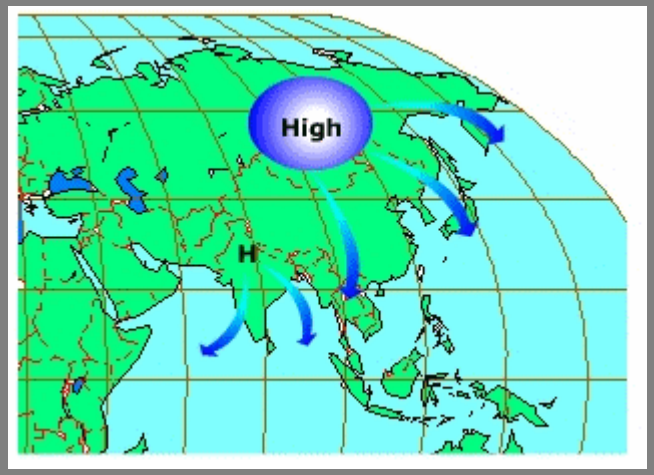
21 UTC 8 february 2005






Winter (January) Asian Monsoon
Intense High Pressure System over Tibet
Surface Isobars
High
Strong & Persistent Surface Winds


Low
L


High
H