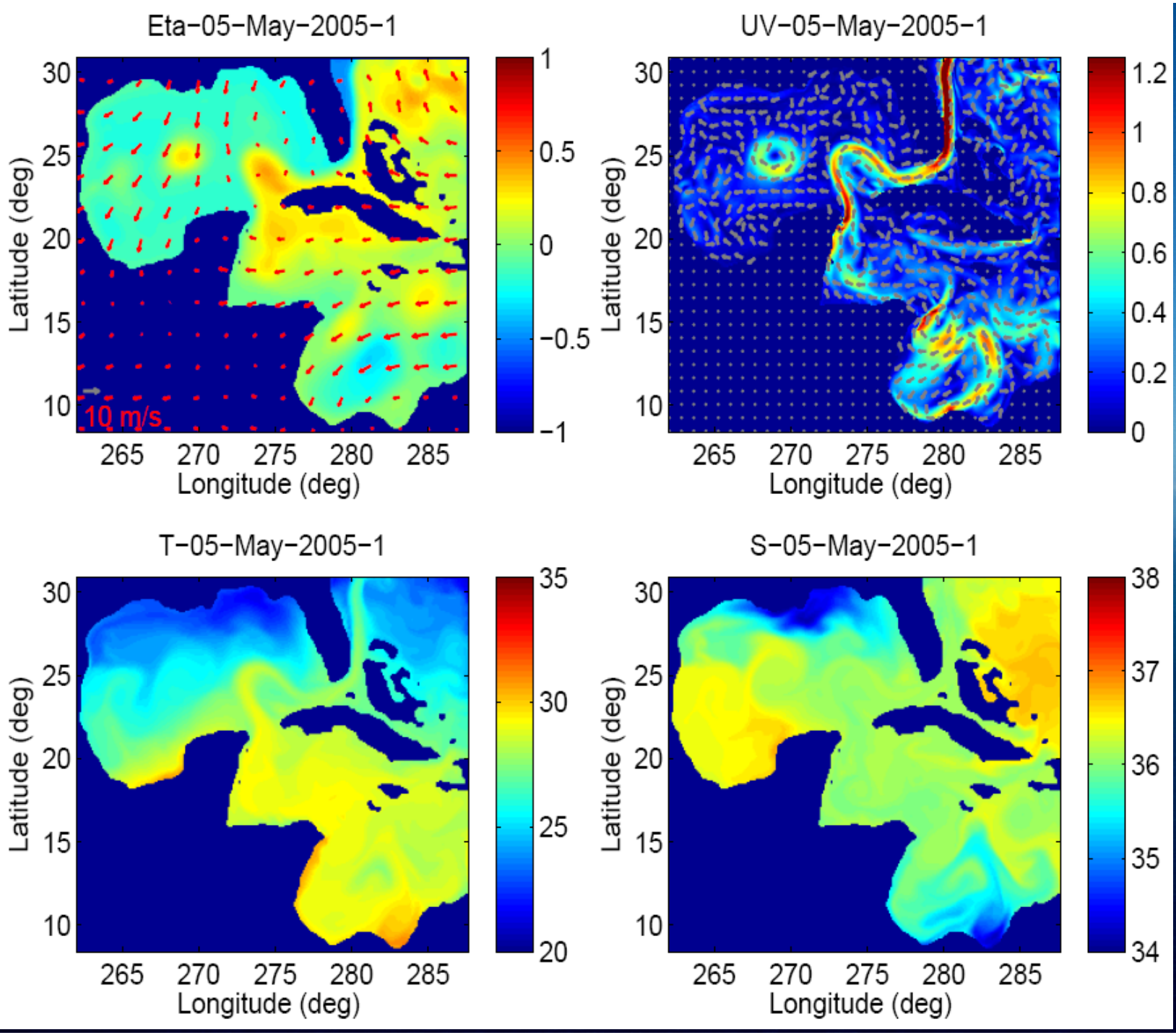
Regional assimilation projects at SIO

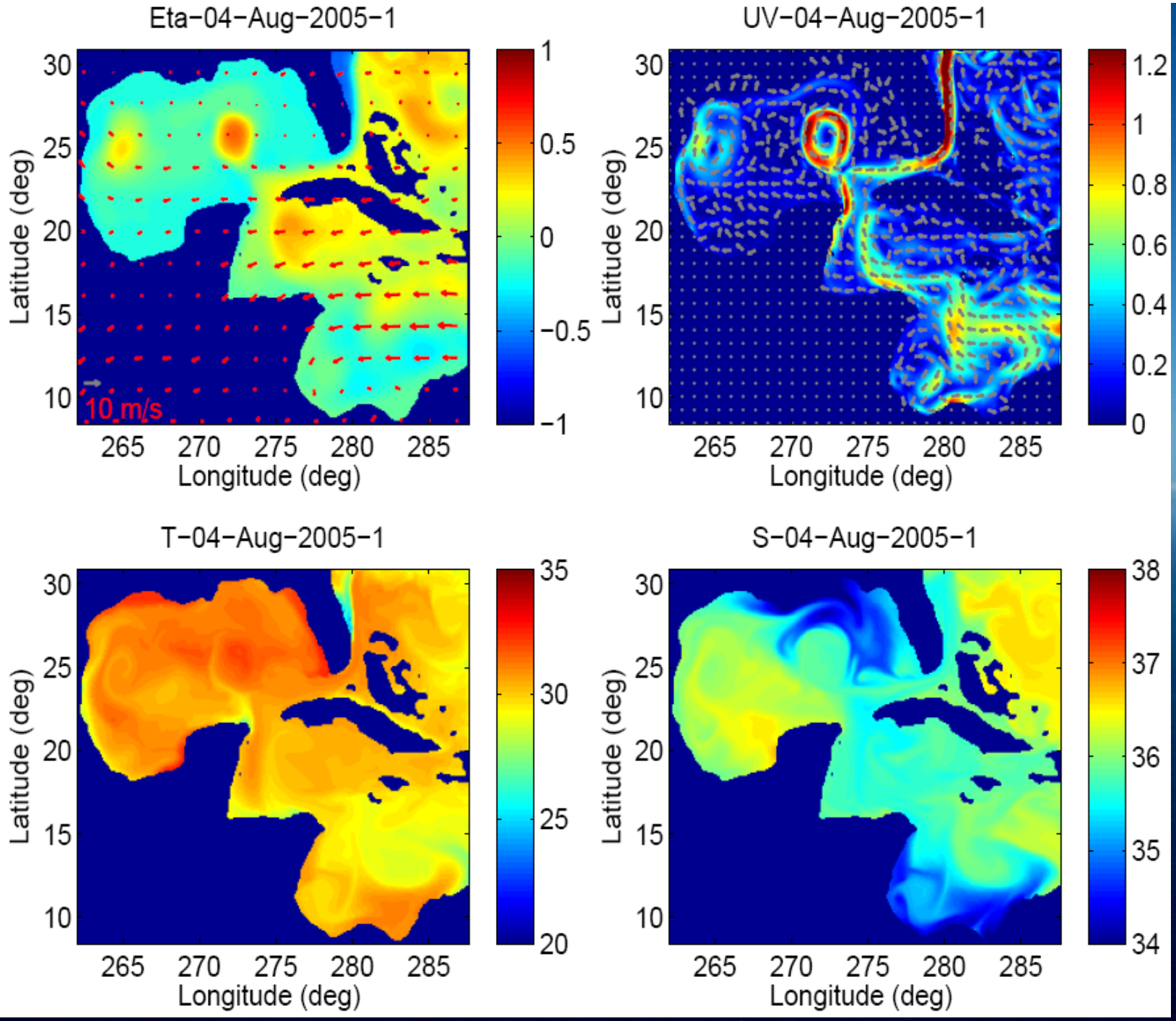
Bruce Cornuelle
Ganesh Gopalakrishnan
Xuebin Zhang

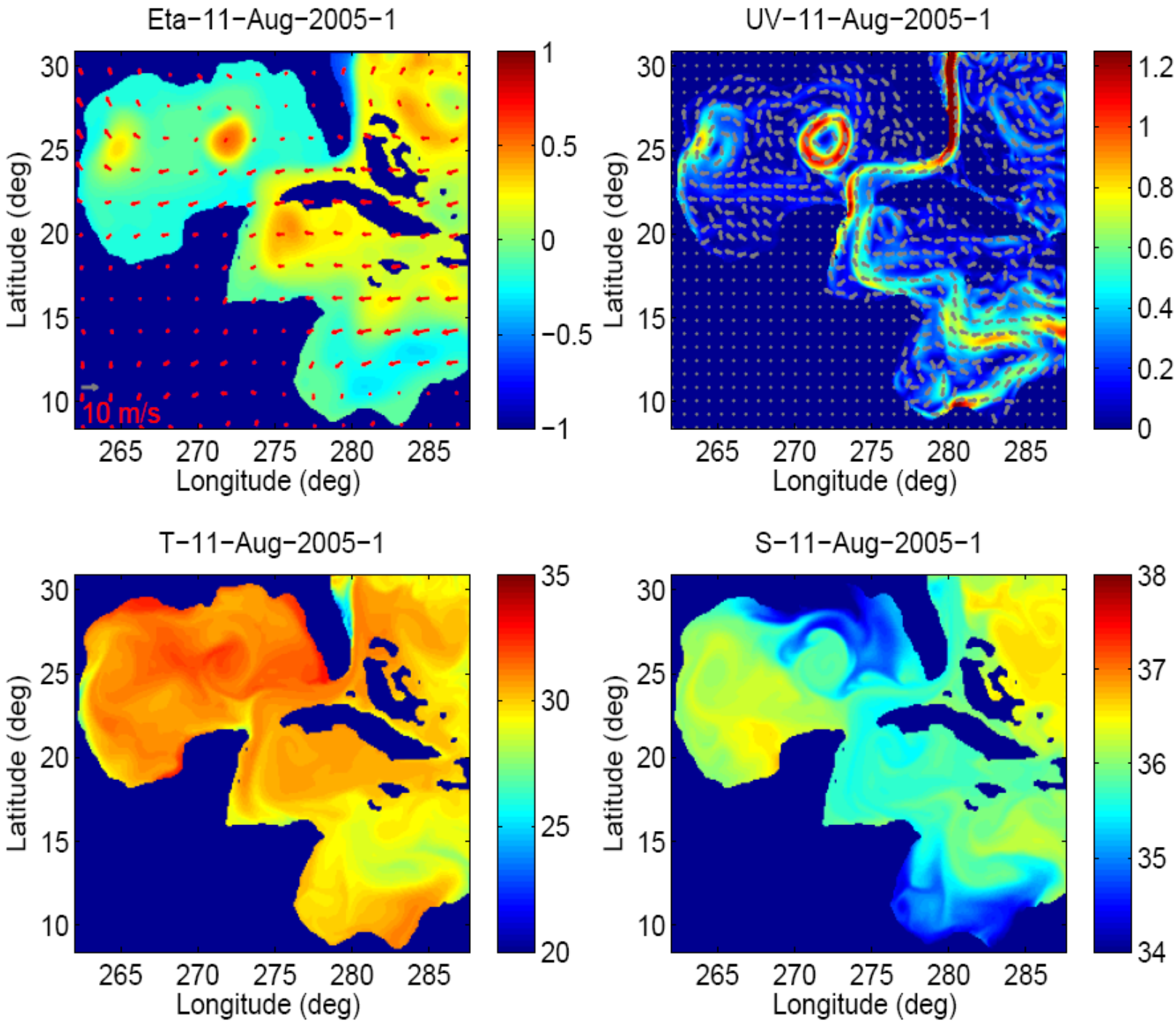
9 Nov 2009

Projects:

- Taiwan region
- Gulf of Mexico
- California Current
- New project: adjusting mixing in tropical pacific
  - Stammer, Koehl, U. of Hawaii

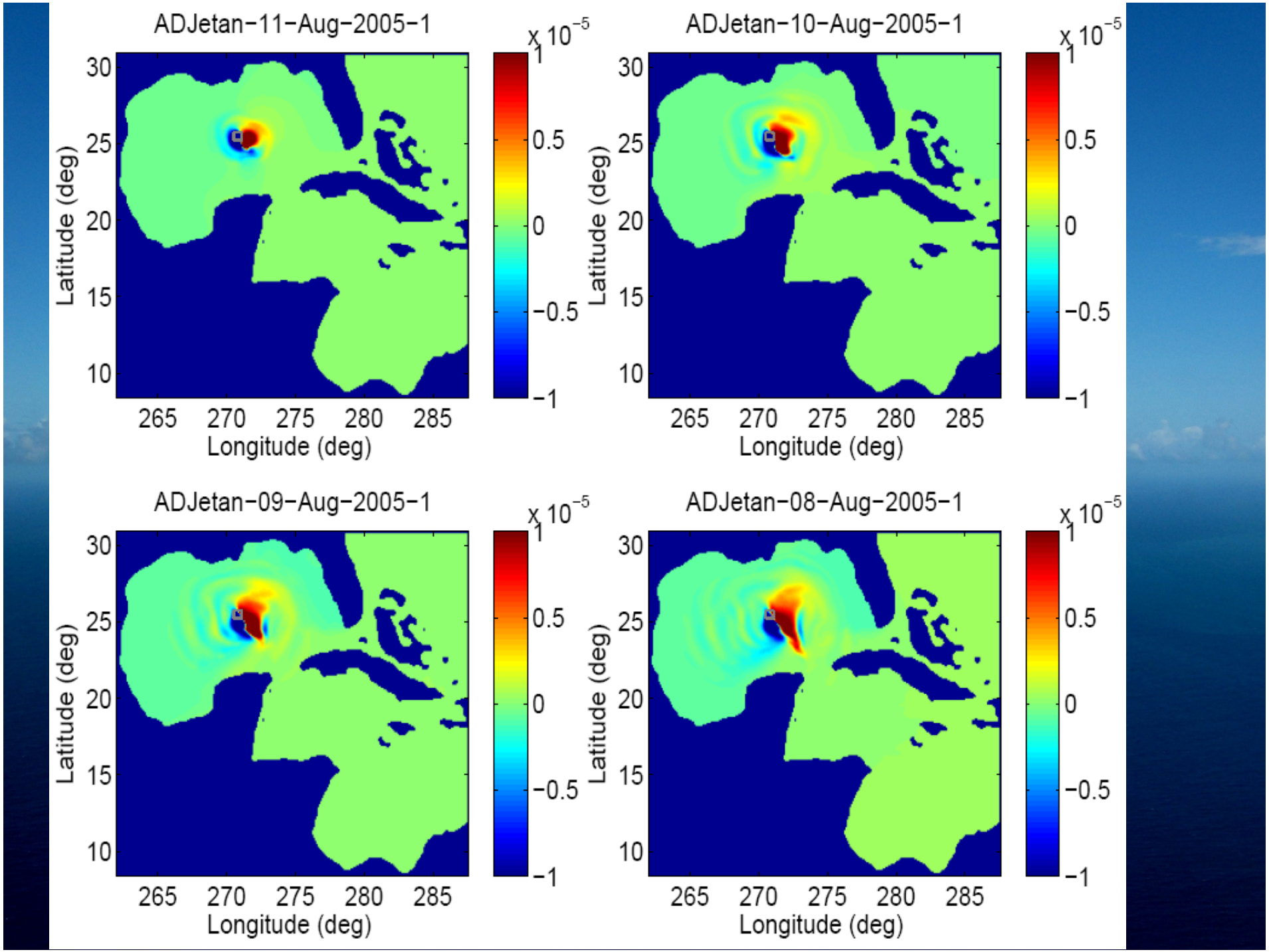

Eta−05−May−2005−1
UV−05−May−2005−1
T−05−May−2005−1
S−05−May−2005−1
Latitude (deg)
Longitude (deg)
10 m/s
30
25
20
15
10
265
270
275
280
285
1
0.5
0
−0.5
−1
1.2
1
0.8
0.6
0.4
0.2
0
35
30
25
20
38
37
36
35
34

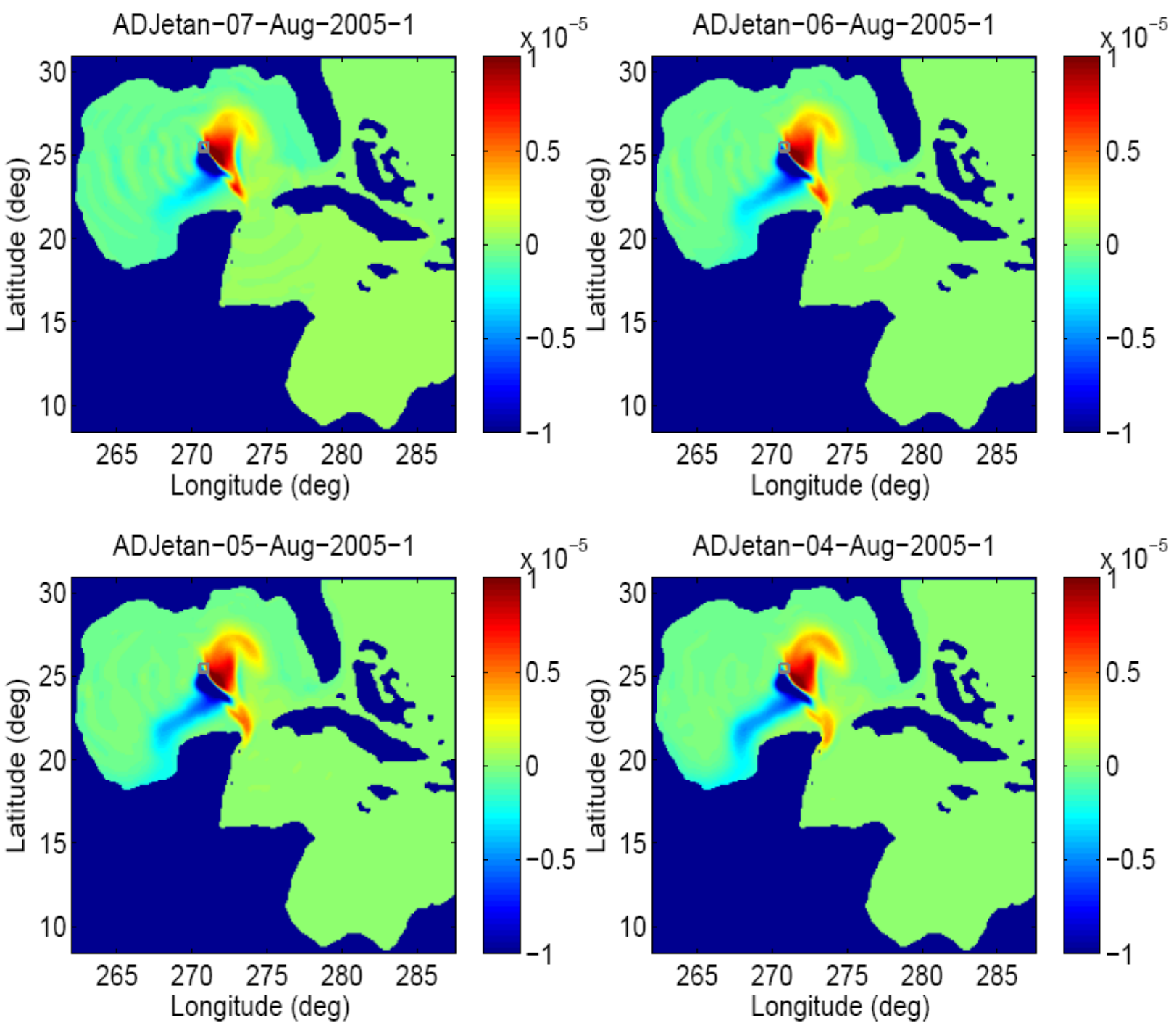

Eta-04-Aug-2005-1
UV-04-Aug-2005-1
T-04-Aug-2005-1
S-04-Aug-2005-1
Latitude (deg)
Longitude (deg)
10 m/s
30
25
20
15
10
265
270
275
280
285
1
0.5
0
-0.5
-1
1.2
1
0.8
0.6
0.4
0.2
0
35
30
25
20
38
37
36
35
34

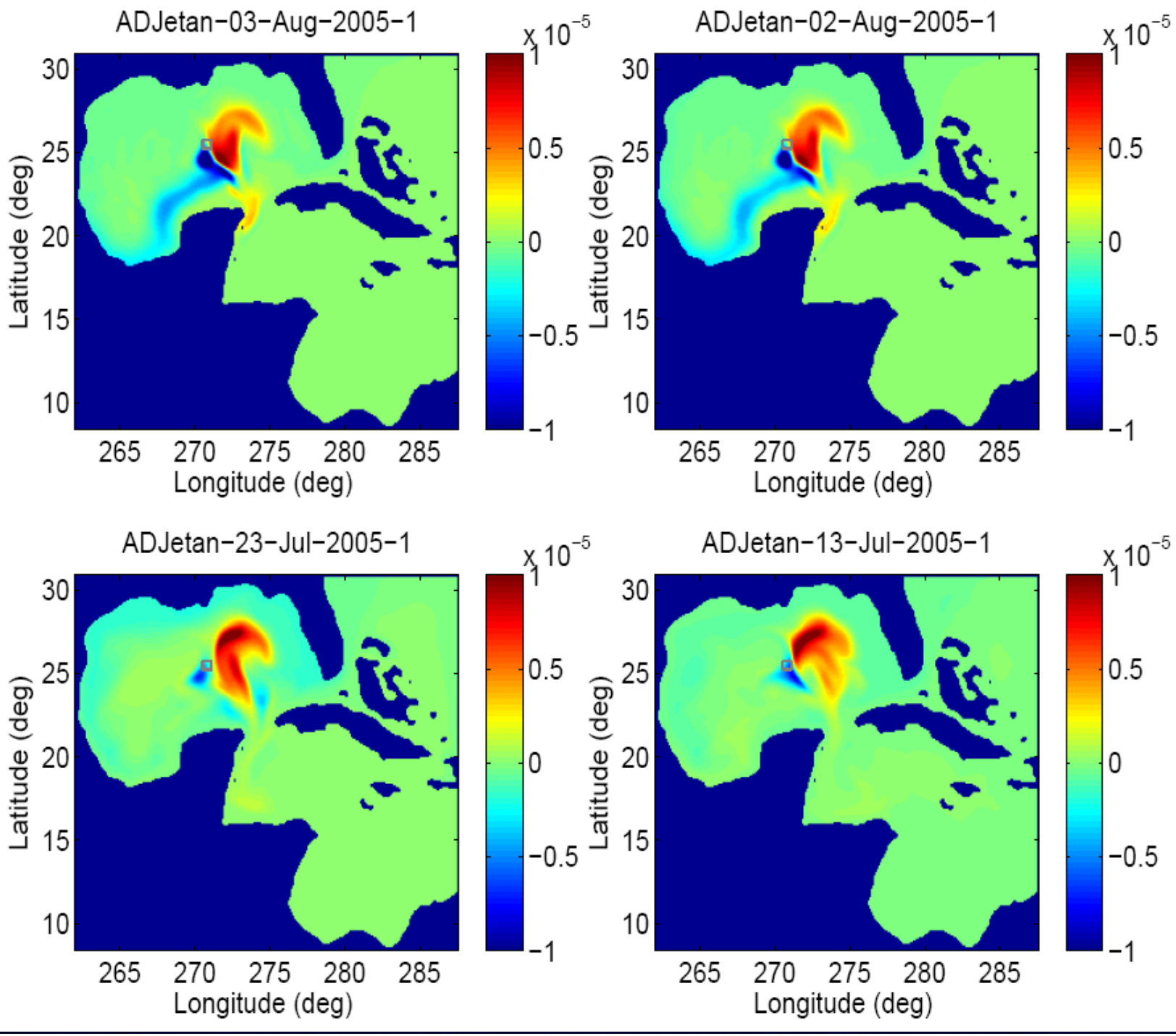

Eta−11−Aug−2005−1
UV−11−Aug−2005−1
T−11−Aug−2005−1
S−11−Aug−2005−1
Latitude (deg)
Longitude (deg)
10 m/s
30
25
20
15
10
265
270
275
280
285
1
0.5
0
−0.5
−1
1.2
1
0.8
0.6
0.4
0.2
0
35
30
25
20
38
37
36
35
34

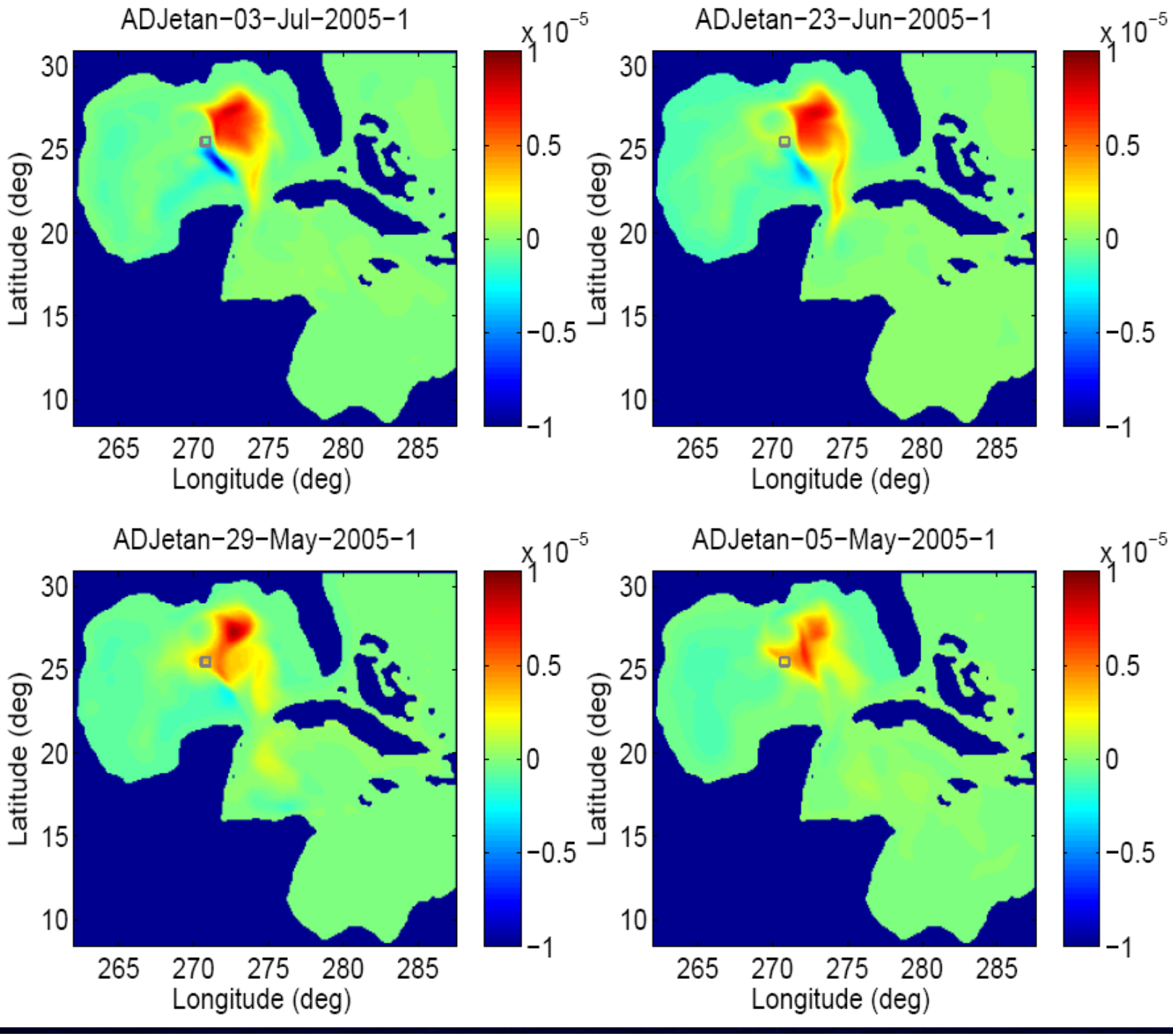
Sensitivity for SSH and v

- Sensitivity calculations for loop current: assess predictability and influences
- Compute sensitivity of v averaged over a region in space-time corresponding to the edge of the loop current.
- Display it backward in time from Aug 12


ADJetan−11−Aug−2005−1
ADJetan−10−Aug−2005−1
ADJetan−09−Aug−2005−1
ADJetan−08−Aug−2005−1
Latitude (deg)
Longitude (deg)
30
25
20
15
10
265
270
275
280
285
x 10^−5
1
0.5
0
−0.5
−1


ADJetan−07−Aug−2005−1
ADJetan−06−Aug−2005−1
ADJetan−05−Aug−2005−1
ADJetan−04−Aug−2005−1
Latitude (deg)
Longitude (deg)
30
25
20
15
10
265
270
275
280
285
x 10^−5
1
0.5
0
−0.5
−1


ADJetan−03−Aug−2005−1
ADJetan−02−Aug−2005−1
ADJetan−23−Jul−2005−1
ADJetan−13−Jul−2005−1
Latitude (deg)
Longitude (deg)
30
25
20
15
10
265
270
275
280
285
x 10^−5
1
0.5
0
−0.5
−1


ADJetan−03−Jul−2005−1
ADJetan−23−Jun−2005−1
ADJetan−29−May−2005−1
ADJetan−05−May−2005−1
Latitude (deg)
Longitude (deg)
30
25
20
15
10
265
270
275
280
285
x 10^−5
1
0.5
0
−0.5
−1

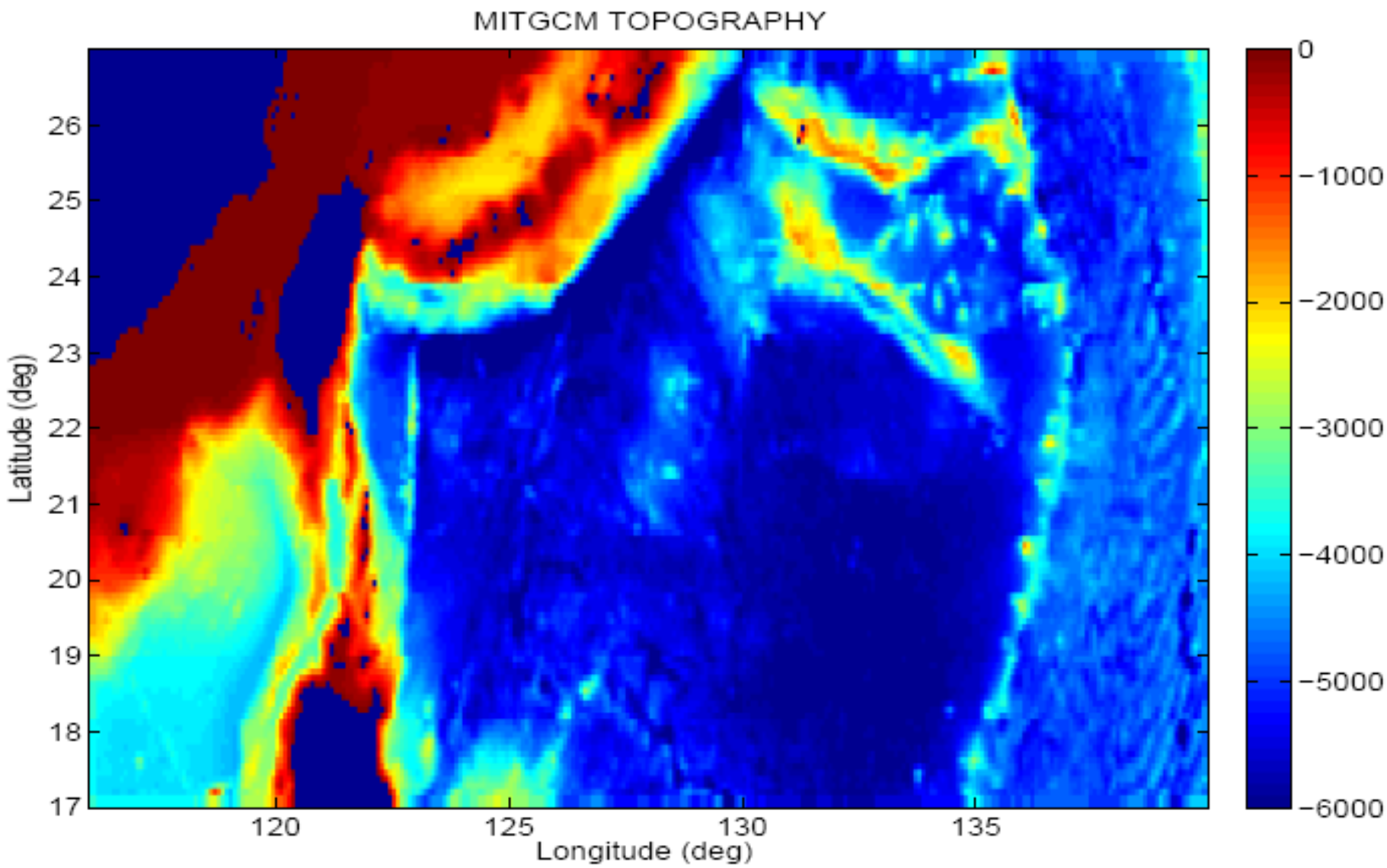


FIG. 1. MITgcm topography for full region.

Domain to 140 E

MITgcm; 1/12, HYCOM Bathy, IC, BC

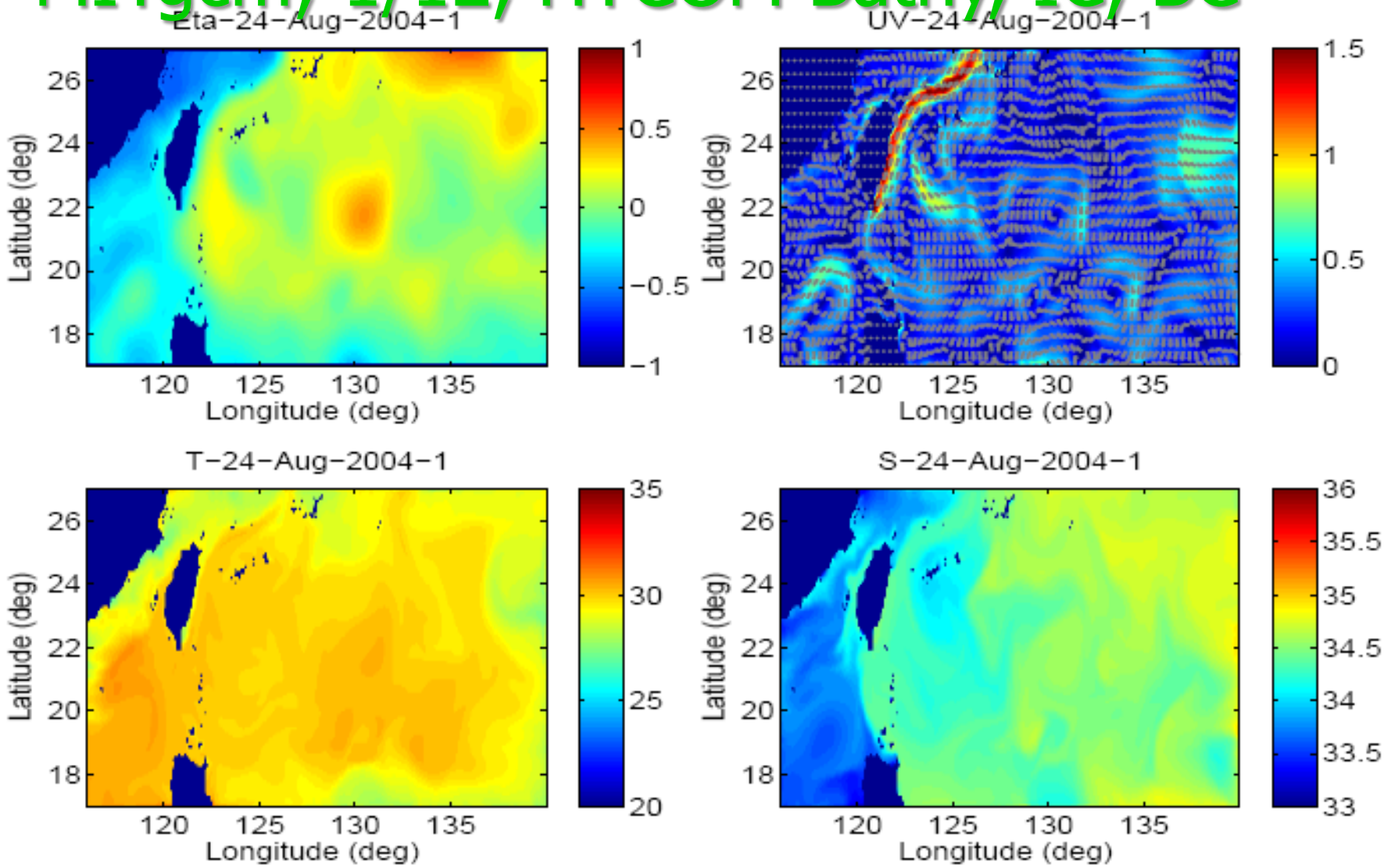
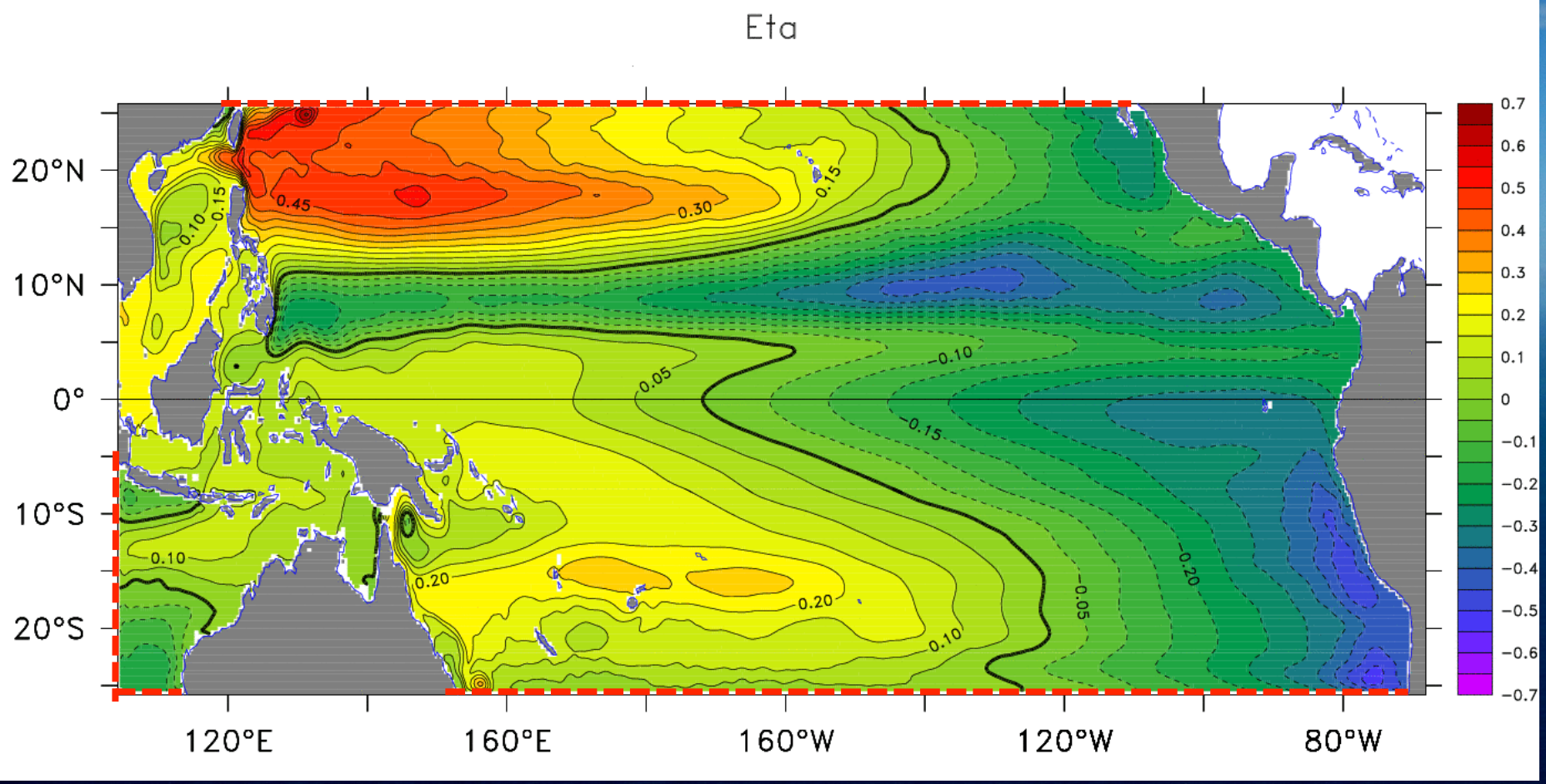
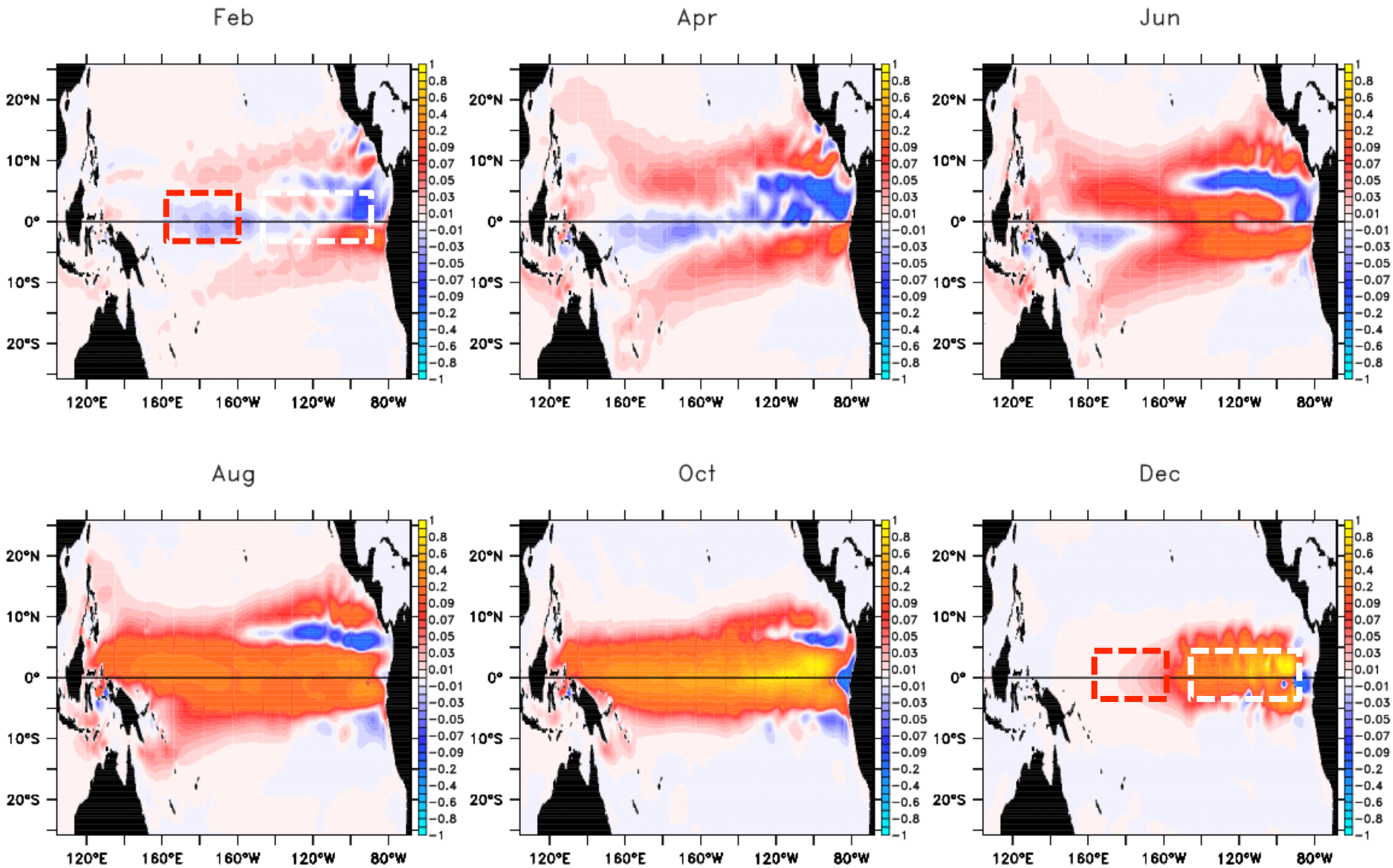


FIG. 10. MITgcm run with HYCOM topography, HYCOM IC and BC. Full domain SSH, surface velocity, SST, SSS.

Mean Eta in the tropical Pacific



Adjoint Sensitivity of Nino3 SST to zonal wind stress



Wish List

- Balanced IC and BC using Weaver or displacement
- Nuisance parameters in adjoint
- Mixing parameterizations
- IES travel times, long range travel times

End