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Interactive comment on “Phytoplankton blooms induced/sustained by cyclonic eddies during the Indian Ocean Dipole event of 1997 along the southern coasts of Java and Sumatra” by P. Rahul Chand Reddy and P. S. Salvekar

Anonymous Referee #2

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General Comments:

Rahul et al. describe a combined satellite and modeling study of the impact of the 1997 IOD on chlorophyll concentrations along the southern coasts of Java and Sumatra. Using SeaWiFs data they show very strong positive chlorophyll anomalies and enhanced chlorophyll variability during the months of November and December of 1997 and to a lesser degree in January 1998. They attribute this enhanced chlorophyll/variability to the development of a series of upwelling cyclonic eddies that develop along the southern coasts of Java and Sumatra.

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The impact of the 1997 IOD on chlorophyll concentrations in this region has been previously reported and the enhanced concentrations attributed to enhanced coastal upwelling. The authors assert that the results from this study add a new dimension to previous studies by identifying the role of cyclonic eddies in driving the upwelling. However, this idea does not seem to be entirely supported by the satellite data shown in this paper. Note that in Figs. 1-3 the strongest chlorophyll anomalies develop very near the coast along Sumatra and Java, i.e., outside of the modeled eddies and where the modeled circulations indicate downwelling. Similarly, Fig. 4 suggests that the modeled circulations, which suggest that there should be offshore minima in SSH in the centers of the eddies, are not consistent with the satellite SSH data which show low SSH that clearly extends all the way to the coast. Thus it seems that the satellite data are consistent with the idea that coastal upwelling (as opposed to eddy-induced offshore upwelling) is driving the elevated chlorophyll concentrations in this region.

The implication is that the circulation patterns generated by the ECCO model are, perhaps, not very realistic near the coast along Sumatra and Java. One obvious question is whether or not the model has sufficiently high resolution to fully resolve the fine scale circulation patterns that typically develop in coastal upwelling regions. The ECCO model telescopes to 1/3 degree latitude resolution, but what about the longitudinal resolution? It is probably much coarser. One way the authors could further investigate the validity of the model results would be to also compare the model-generated SSH and SST anomaly patterns with the observations to see if they agree with one another.

All of these issues beg the question as to whether or not this paper really adds a new dimension to previous studies of the impact of the 1997 IOD on chlorophyll concentrations in this region of the Indian Ocean.

Specific Comments:

Page 3906, lines 20-25: The usage of southeast monsoon and northwest monsoon is confusing because, at least on the western side of the basin, we refer to the southwest

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monsoon and the northeast monsoon (respectively). Perhaps some clarification or explanation of this difference in the names of the difference phases of the monsoon should be included here.

Page 3907, line 27: The ECCO acronym is defined in the previous section. It need not be redefined here.

Page 3908, line 10: The OGCM acronym does not need to be redefined here. Just say MIT OGCM.

Page 3908, line 10: The SSH acronym does not need to be redefined here. Just use SSH.

Page 3908, 1st paragraph: Drop the entire first paragraph of this section. All of this information is already provided in the Figure legends and does not need to be (tediously) reiterated here.

Page 3910, 1st paragraph: Is it really appropriate to refer to the C6 and C8 features as massive eddies? C8, in particular, does not really have a very well defined eddy-like circulation. Rather, it looks more like a major coastal current that flows eastward along the coasts of Sumatra and Java and then reverses and flows westward between 8 and 15 S. Arent these just manifestations of the large scale flow field?

Interactive comment on Biogeosciences Discuss., 5, 3905, 2008.

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