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Biogeosciences Discussions

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

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I am thankful to the reviewer for raising some important and interesting comments regarding the paper.

First I would like to clarify that the circulation plots that have been plotted may not be very clear since the size has been kept constrained (as per journal requirements). The figures do show an eddy like features (Infact this point of the existence of the eddies has been accepted by the 2nd referee).

In the amazing and extensive review of the waves in the Indian Ocean during the IOD,

Dong Liang Yuan and Hailong Liu have deciphered in detail the nature and properties of these waves (Dong Liang and Liu, JPO, doi: 10.1175/2008JPO3900.1-Reference added in the manuscript). For clarity the following information from their paper is given below.

“The 1997-1998 IOD is a strong anomalous event according to the dipole mode index (Saji et al., 1999; Han et al., 2006) and is coincident with the strongest ENSO event of this century in the Pacific Ocean. Its dynamics are still not fully understood to date. The decomposed wave coefficients suggest that this IOD event begins in early 1997 when the equatorial Indian Ocean is dominated by easterly wind anomalies. However, the negative sea level anomalies in the eastern basin are interrupted by an intraseasonal westerly event in April of 1997. Since May 1997, the entire equatorial Indian Ocean is dominated by easterly wind anomalies, which peak in September in the central basin. The maximum slope of the sea level anomalies, however, is not established until November-December of 1997. Associated with the easterly wind anomalies, upwelling equatorial Kelvin waves and downwelling equatorial Rossby waves propagate to the eastern and western basins, respectively. The Kelvin waves are reflected into upwelling equatorial Rossby waves at the eastern boundary, which propagate across the basin to reach the western boundary in January-February of 1998.”

It is from this point of view that I have proposed the schematic diagram that shows the evolution of eddies. It is true that the 2nd Kelvin wave had terminated the IOD event, but to focus on the present study, it is useful to consider that the interference between the upwelling Kelvin wave and the (reflected) upwelling Rossby wave gives rise to the observed eddies. I was also indicated in Figure the upwelling process that is brought about by the eddy (this is as a part of reply to the referee and the schematic is not added in the main paper).

Infact in an earlier study I had reported an equatorial “Twin Gyre” system that forms as a result of such interference between the Kelvin wave and the re-

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flected Rossby wave (Rahul et al., GRL, 2004).

I have also incorporated the minor changes suggested by you; I once again thank you and hope you would accept the paper for publication.

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