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# *Interactive comment on* "Generation of Rossby waves off the Cape Verde peninsula; role of the coastline" *by* Jérôme Sirven et al.

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General comments

The manuscript presents a verification study of the role of wind stress and of the coastline geometry in the generation of mesoscale anomalies offshore. For this purpose, it uses chlorophyll observations along the west African coast between 10° and 22° N, a reduced gravity shallow water model with a single active layer on the sphere and a theoretical analysis of the wave dynamics in the vicinity of a cover. The study is of interest for the scientific community. However, the generation of Rossby and Kelvin waves, at different frequencies, on the eastern ocean boundaries, considering the geometry of the coastline, has been studied for years. Therefore, I suggest that the authors perform



Printer-friendly version

Discussion paper

a major revision in the manuscript, indicating what results are numerically or theoretically new. The objective of the study needs to be properly highlighted and justified. Scientific findings and conclusions should also be presented more clearly.

Specific comments

Wave observation. I had difficulty seeing wave patterns and their basic characteristics (Figure 1) from the chlorophyll observations. This way, I suggest that plots of longitude (latitude) versus time, at particular latitude (longitude), would help viewing the zonal (meridional) propagation of Rossby and Kelvin waves, at a given latitude (longitude). The phase velocity of the waves would also be easily verified. If possible, I would like to see the observed mean wind field that generated the chlorophyll pattern shown in Figure 1.

Numerical model

- It is not clear, for me, if this is the first use of the numerical model described in the article. If it is not, please include reference of previous work. If it is the first use, detail how the calibration was performed; the model was able to reproduce properly the observations? How was this tested? Why did not you use a model already established by the scientific community?

- Please explain the value used for the dissipation coefficient and the effects that viscosity can have on baroclinic waves in shallow water numerical models.

- Boundary conditions: discuss the use of no-slip boundary condition. It is shown in the literature that the wave properties, particularly the longshore wave velocity, are much less dependent on the dissipation coefficient when the free-slip rather than no-slip conditions are used. At the open boundaries, what were the conditions used?

- The numerical model used in this work is simple and omits some potentially important factors which may influence poleward wave propagation, such as higher baroclinic modes, continental shelf topography and poleward variation of the thermocline. What

is the importance/impact of not considering such factors?

Analytical study and conclusion

- Section 4, “Analytical study”, is hardly useful in its current form. I do not know if the way chosen to present the theoretical development along with the application of the theory is the most appropriate.

- Most of the theoretical development could be placed in the appendix. I suggest that only the essential expressions be left in section 4.

- The analytical study or its application is new?

- Please, in the “Conclusions” section emphasize novelty, what is different from others. Substantiate the novelty with comparison, analysis and/or applications.

Other comments

- Abstract, line 2; replace “kms” with km.

- Page 5, line 20-25: Please name the waves you are referring to.

- The current presentation of figures containing more than one panel (all figures except 7 and 12) is confusing. Please put an identification [(a), (b), etc or analogous] in the figure panels and describe it in the figure caption. I suggest that no result be discussed in the caption of the figures.

- Please, number within the text the coordinate system referenced in figure 8 and quote that number in the caption of the figure.

- Figure 10: It is difficult to understand and distinguish the lines and colors used.

- Figures 11 to 14: Very difficult to distinguish the values, especially the negative values of the positive ones.

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