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Interactive comment on “Water masses and zonal current in the Western Tropical Atlantic in October 2007 and January 2008 (AMANDES project)” by A. C. Silva et al.

Anonymous Referee #3

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The manuscript is not well written. There are too many mistakes in English usage. Here, only the scientific concerns will be focused on.

Main concerns:

The current structure in the NE coast of Brazil is complicated by seasonal migration of the NBC retroflection and its associated strong deep reaching eddies-NBC rings. Using data from just two cruises, it is impossible to reach the goal of the paper “investigate the spatial and seasonal variability” as stated on page 1956, line 24. The manuscript misses some important references in this area, such as Schott et al. 1998 and Stramma and Schott 1999, which used more data and offered more complete pic-

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tures of the mean currents and water masses in this region. The manuscript needs to be specific about its new contribution to the scientific progress. The current manuscript is rated poor in all three categories: Scientific Significance and Quality, and Presentation Quality.

Schott, F. A., J. Fischer, and L. Stramma. 1998. Transports and pathways of the upper-layer circulation in the western tropical Atlantic. *J. Phys. Oceanogr.* 28:1904–1928.

Stramma, L. and F. A. Schott. 1999. The mean flow field of the tropical Atlantic Ocean. *Deep-Sea Res.* 46:279–303.

Specific Concerns:

1. Should the Western Boundary Undercurrent (WBUC) be the Guiana Undercurrent as in previous publications?
2. Line 20, page 1955: It is unclear what “These eastward currents” refer to.
3. Line 5, page 1958: “Means of vertical velocity section...” is confusing. The two cruises hardly had any overlap in velocity measurements. In fact the paper only shows current measurement during the 1st cruise. Where does the mean come from? Also “vertical velocity” is easily confused with the upwelling/downwelling.
4. 1st two paragraphs of Section 3.1: It is hard to say from these measurements that whether the WBUC or GUC claimed in the manuscript is just part of the NBC retroflection, or even part of an eddy.
5. The northwestward or southeastward velocity, rotated along the shelf, should be shown in Fig.2, instead of the eastward velocity. What happens to the NBC record below 280m in Fig.2b?
6. Line 18, page 1959: “the thermocline” needs to be defined (20C isotherm?), or better to use the specific isopycnals.
7. The analysis and conclusions in Section 3.2 Water Masses Analysis are not convinc-

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ing. Three “bold lines” –they are still hard to see in Fig.3a– are used to “define typical features of the North Atlantic Water (NAW), South Atlantic Water (SAW) and Eastern Atlantic Water (EAW)”. Comparison of the observed station profiles and these “typical” profiles are used to determine origins of the observed water masses. Where are these “typical” profiles obtained? How “typical” are they? It is unlikely that one single profile can be used to define the typical property for each of the water masses, especially in the upper thermocline including the Central Waters. In fact they are not typical to me in representing the low oxygen of the NACW and SACW.

Similarly, the analysis of AAIW transformation (Section 3.3) also depends on records at single locations to characterize origins of the water masses. Without giving insights on the possible physical processes, the overly simplified mixing model may yield misleading conclusions. The difference in two observation periods may not be due to the impact of seasonal forcing down to intermediate level as claimed in the last paragraph of section 3.3, but more likely due to the differences in station locations and their relative location to migrating NBC retroflection and even NBC rings.

8. Fig.8 is missing.

Interactive comment on Ocean Sci. Discuss., 7, 1953, 2010.

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