Second review (by reviewer 2) of **Burmeister et al.**

Dependency of simulated tropical Atlantic current variability on the wind forcing

submitted to Ocean Sciences

The paper has been very substantially revised. It has been significantly improved in many ways (e..g the abstract and summary are better; much of the discussion of results is more quantitative and precise; the qualifications/uncertainties are summarised; there are some interesting additional results). Nearly all the responses to my suggestions are satisfactory. My opinion is that the paper should be accepted for publication following some relatively minor further revisions.

Given the number of substantial changes made, it's not surprising that some further iteration is likely to be worthwhile. I've made a number of suggestions below, nearly all of them quite minor, which could help to improve the paper's presentation. I start by commenting on the response to one of my main comments on the earlier draft.

Responses to my comments

Thank you for taking the trouble to include as part of your responses some additional figures. From the additional figure 1, I can see that the Ekman pumping fields are more or less what one might naively expect from those for the wind stress curl. The meridional Ekman transport fields for CORE and JRA are interesting (and at present the time-mean zonal wind fields which give rather similar information are not displayed in any of the figures) though again the differences between them, in the right hand plot, don't look large. As the various fields play different roles in the dynamics I still think there is a case for including more of those of figure 1 within one of the figures of the paper. But it is quite late in the day to do that, to get the most out of the figures showing the differences between fields one would probably need to use a more discerning scale, and the discussion now mentions these fields in an appropriate way. So I leave this to the authors' discretion.

Main suggestions

There are some new results quoted in the abstract about interannual to decadal variations in the nSEC and NECC. These seem to be genuinely interesting results but they are not presented until the very end of the results section (subsections 3.3.5 and 3.3.6), only one of them is illustrated by a figure, and that figure is in the appendix. Could a figure illustrating these results be included in the main body of the paper? Might sub-sections 3.3.5 and 3.3.6 come earlier in section 3.3?

Additional suggestions

1. Some aspects of the wording could be improved. In particular:
   - the word "both" still appears 58 times. In many (but not all) cases it should be replaced by "the two" (e.g. lines 6 and 16)
   - the subject and the verb need to agree (both should either be singular or plural) (e.g. line 8)
   - the tense of the verbs should be checked – the past tense is over-used

   Perhaps Mark Inall as a native English speaker could review these aspects of the text.
2. Line 20: commonplace is one word. I can see that this sentence is trying to say something important but in my view it still doesn't quite work.
3. Line 27: ecosystem should be plural here

4. Lines 63-64. Later you say that the Sverdrup transport also influences the EUC (which agrees with the description of the EUC in Vallis' textbook 2017 section 22.3) . I suppose you are not implying here that the wind on the equator is the only factor driving the EUC but it could be read that way.
5. Figure 1: Are the tiny black arrows on figures 1a, 1b and 1c surface wind stress vectors? I don't see any mention of them in the text or figure caption. If you keep the arrows would it be possible to make them slightly larger (at least in figure 1c) ?
6. Line 104: replace "having additionally" by "with"
7. Line 124: described -> describe
8. Line 306: do you mean the near-equatorial currents? Geostrophy of course does not hold at the equator.
9. Line 309: change "this section" to "the 23oW section" and delete "along 23oW section" later in sentence
10. Line 338: The Angola Dome region is rather narrow in longitude; is the Ekman pumping of the SEUC really confined to this region? Also my impression from Fig 1 is that this region is somewhat south of the core of the SEUC.
11. Line 348: U_Ψ is the zonal transport between the N and S "bounds". It is strange to call it "the meridional divergence of the meridional Sverdrup flow"
12. Line 409 – incoherence isn't the right word
13. Line 469: "boundary conditions" -> "parameters"
14. Line 482 is -> it
15. Line 519: delete "meridional"
16. Figure 8 caption: "annual mean zonal wind stress anomalies with respect to the seasonal cycle" – is that what you mean to say?
17. Figure 9 caption (b-g) should be (b-f)
18. Line 555: "The transitioned" is "AMV" missing ?
19. Lines 572-573: This sounds quite a significant result (R=0.75). It would be nice to see a figure illustrating it (somewhat similar to Fig A5) so that the reader can better judge its significance.
20. Line 583: delete second "on"
21. Figure 10: The labels for CORE and JRA are really very small
22. Line 661: "meridional Sverdrup" I think should be "zonal Sverdrup"
23. Line 617 & Figure A5: This is one of rather few results that is highlighted in the abstract. Figure A5 looks very convincing. Shouldn't it be one of the figures in the main text rather than the appendix? (see main suggestion above)
24. Line 623-624: This result is highlighted in the abstract. It would be good if it could be illustrated in a figure.
25. Line 638-639: "However…" please check this sentence.
26. Line 648: Figs 2 and 9 do not show wind stress fields?
27. Line 651: please check the position of "across the entire basin" in this sentence
28. Line 665: "Both" -> "The two"
29. Line 669: "are" -> "can be"
30. Line 673: "a strong" -> "an overly strong"
31. Line 675: I find this difficult to see. Was it highlighted earlier?
32. Line 684: omit "meridional"
33. Line 698-700: refer to Fig A5?
34. Line 719: "both" -> "the two"
35. Line 734: "onto" -> "on"