

Impact of Convectively Coupled Tropical Waves on the composition and vertical structure of the atmosphere above Cabo Verde in September 2021 during the CADDIWA campaign

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The manuscript analyzes the relative impact of convectively coupled equatorial waves during September 2021 on the atmospheric state over the eastern tropical Atlantic. The analysis is thorough and presented in great detail. The current presentation is fairly dense and it goes to the detriment of clear communication of the main takeaways. It would be helpful for the reader if the authors tried to revise the manuscript with the goal in mind to get the main points communicated very clearly. My recommendation would be minor revision, because the revisions (and possibly restructuring) I'm asking for would not involve any new analysis. Detailed comments are below.

Comments

1. Section 2.1 Data: This section would really benefit from a detailed table that includes all data sources, resolution, variables, time period for the climatology if applicable, etc. It's hard to follow all the details and differences in temporal availability in the text.
2. Page 7, lines 166-167: I'm worried that using a Kelvin filter that includes frequencies higher than 0.3cpd is essentially filtering noise. Figure 1c shows that even for 5 years 2018-2022 there is no coherent signal above 0.3cpd. Taking this together with Figure 3c and 3d, I wonder whether there is actually a Kelvin signal present during this time? Wheeler and Kiladis (1999) cut off the Kelvin wave filter at 0.4cpd and wave number 14 to exclude those regions that don't have a lot of Kelvin wave power. It is not clear what exactly is done here, as the mask in Figure 1a is larger than the region used in Wheeler and Kiladis (1999).

Minor comments

1. Page 2, line 25: "... different structural (Pytharoulis and Thorncroft, 1999; Chen, 2006) and spectral structures..." This is not clear, please rephrase. I assume the sentence is supposed to emphasize the spatial and temporal differences in the structure of the northern and southern tracking AEWs?
2. Page 2, line 29: "TD-AEWs" This acronym has not been defined yet.
3. Page 2, lines 47-48. "... of higher frequency *waves*." and "... convective activity inside such *waves*,..."

4. Page 5, line 133: "... 2 to 5 days and *westward* planetary wave number..."
5. Page 5, line 143: Do you mean a red noise spectrum?
6. Page 7, line 163: "... wave, two-year data series of TCWV are padded..." Which two years? Please specify.
7. Page 7, line 164: "... long *series* of zero..."
8. Page 7, line 174: "In order to study the vertical ..."
9. Page 9, lines 211-212: I don't think this is the case. Figure 7b here (<https://link.springer.com/article/10.1007/s00382-009-0697-2>) shows that Kelvin filtered precipitation variance peaks around 5N in the Atlantic.
10. Page 13, lines 282-283: Figure 5b shows significant Kelvin wave variance over the continent. Or maybe I am misunderstanding something?
11. Page 14, lines 287: "...September 2021 (see Figure 7a), during..." Should this be Figure 7c?
12. Page 15, line 295: "For tropical perturbation Pierre-Henri, ..." I assume this is the same as the AEW labeled PH? This should be mentioned here or above. I see it is mentioned in the figure caption, but I would suggest also mentioning it in the main text. I missed the caption the first time.
13. Page 22, line 475: "... modelisation..." Not sure that this is a word in english, modeling or model development would be more appropriate.
14. Page 22, line 477: "... development Hanks et al. (2015); Duvel (2021); ?." There seems to be a citation missing?

Figures

Figure 1: For panels b and c what are the contours? This needs a colorbar or labels on the contour lines.

Figure 5: The title should have units degrees west instead of negative degrees east. The y-axes need labels.

Figure 11: The caption reads: "The grey zones show where a significant gap in the two profiles is found,..." I'm having a hard time figuring out which of the two greys in the background is the significant one. Also, does this mean significant difference in the temperature or dewpoint soundings? They can't always be both significantly different at the same levels?