Response to the reviewer

Thank you very much for providing the valuable feedback again on our manuscript. All the technical corrections below have been addressed. In the following are the point-to-point responses to the remaining comments.

Major comments:

1) Thanks for mentioning and referring to the quality check that has been carried out by the CMEMS team. I agree that the mean currents seem to be represented when compared to vertical mean profiles from moored observations. However, my concern was not so much about the representation of the mean currents, but mainly about the variability of the currents which is a considerably bigger challenge for reanalysis products (Tuchen et al., 2022). At least some discussion on the uncertainty of velocity variability on Kelvin wave time scales is needed here.

Thank you very much for this comment. By carefully reading the paper by Tuchen et al., 2022, we agree that a short discussion about the reliability of reanalysis dataset is necessary, which we think should be put in the Summary section (line 261-265) as one limitation of our diagnosis scheme.

2) Thanks for explaining the difference between AGC flux from a climatological and from an anomalous perspective. I think what was confusing to me were the lines of theoretical RW and KW propagation in Fig. 8 (which still do not fit very good, neither are easily to detect as the authors write). Why do all KW lines start at the beginning of the year? Should this not be fitted to the actual flux pattern?

Thank you for the comment. In 2019, the KW train does start at the year beginning, which indeed has been presented with linear ocean models by Song et. al (2023). In their models, the KW is likely to be reflection-induced by RWs rather than local winds. As we have mentioned in the last response letter, the real problem in Fig. 8 is the mixture of KW signals at multiple frequencies. We think a low-pass filter should be helpful to improve the figure presentation especially for RWs, however in this study, we do not want to manipulate the extracted signals too much.

Song, Q., Tang, Y., & Aiki, H. (2023). Dual Wave Energy Sources for the Atlantic Niño Events Identified by Wave Energy Flux in Case Studies. *Journal of Geophysical Research: Oceans*, *128*(7), e2023JC01997

Remaining technical corrections and minor comments:

- Lines 13-14: Atlantic Nino is associated with positive SST anomalies, while Atlantic Nina is associated with negative SST anomalies. Here, it should be made clear that only positive SST anomalies are referred to Atlantic Nino events (as part of the Atlantic zonal mode with its negative and positive phases). (HAS NOT BEEN ADDRESSED IN THE REVISED VERSION)

Thank you for the comment. We have clarify this in Lines 13- 14 as " The equatorial Atlantic Ocean is known for exhibiting pronounced anomalies of sea surface temperature (SST) on interannual time scales, of which the events with positive anomalies are often referred to as Atlantic Ninos"

- Line 113: What is the motivation for mentioning tropical instability waves here without any further explanation? Is the near-equatorial wind-forced wave signal considerably disturbed by TIWs?

Thank you for the comment. The reason we mentioned TIW is to emphasize that the extracted variability will not only include the wave signal due to wind forcing. However we agree that putting TIW here may confuse readers. In the revised manuscript, we have removed this sentence.

- Line 135: Gravity waves instead of inertial waves on the equator? (HAS NOT BEEN ADDRESSED IN THE REVISED VERSION)

Thank you for the comment. We have changed “inertial waves” to “gravity waves”.

- Lines 222: “All” instead of “all”.

Thank you for the comment. We have corrected the typo.

- Line 260: This statement requires a reference. Which study concludes that equatorial waves provide great potential to predict Atlantic Ninos? (HAS NOT BEEN ADDRESSED IN THE REVISED VERSION)

Thank you for the comment. We have added three references, of which (Imbol Koungue et. al 2017) proposed to implement a linear ocean model to simulate equatorial waves for warning Atlantic Nino and Benguela Nino, and (Song et. al 2023b) and (Richter et. al, 2022) presented how equatorial waves are working on the onset of the 2019 event.

Imbol Koungue, R. A., Illig, S., & Rouault, M. (2017). Role of interannual K elvin wave propagations in the equatorial A tlantic on the A ngola B enguela C urrent system. *Journal of Geophysical Research: Oceans*, *122*(6), 4685-4703.

Song, Q., Tang, Y., & Aiki, H. (2023). Dual Wave Energy Sources for the Atlantic Niño Events Identified by Wave Energy Flux in Case Studies. *Journal of Geophysical Research: Oceans*, *128*(7), e2023JC01997

Richter, I., Tokinaga, H., & Okumura, Y. M. (2022). The extraordinary equatorial Atlantic warming in late 2019. *Geophysical Research Letters*, *49*(4), e2021GL095918.