

Interactive comment on “Zonal Current Characteristics in the Southeastern Tropical Indian Ocean (SETIO)” by Nining Sari Ningsih et al.

Anonymous Referee #1

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This study investigate the variability of zonal current in the Southeastern Tropical Indian Ocean using HYCOM simulations. The authors described the simulated features of zonal currents in the SJC and ITF/SEC region and examined the intraseasonal to interannual variability of zonal currents in this region. Some interesting results are reported, but a major revision is needed. The major problem with this manuscript is the methodology the authors used. Please see my following comments for details.

Major comments: 1. The authors described the simulated “Vertical structure of zonal current” along transects A, B and C in sections 3.2.1, 3.2.2 and 3.2.3. However, it does not make sense to discuss the “zonal current” along a southeast-northwest section like transects A and B, and especially when there is no clear mean currents along the transects. The meridional components of velocity in the transects A and B are

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obviously important as shown in Figures 1a and 2. I suggest that the authors use meridional sections (e.g., AEJ-BEJ-CEJ).

2. The authors used EOF analysis to the zonal velocity at selected points, e.g., AWJ, to investigate the variability of zonal currents SJC, ITF and SEC. But unfortunately, the zonal component of velocity at a selected point is obviously not the currents they aimed to study, just considering that the zonal currents are not steady and usually swing horizontally and that the meridional components of the velocity are non-negligible for these coastal currents. As I said, it might be good to examine the EOF modes of zonal currents across the meridional sections.

3. The authors used EEMD analysis to the EOF1 (PC1) as well, but I do not understand why the authors did this. The EOF1 itself represents a mode, which means an eigenmode with an eigenperiod. Then, why an eigenmode could be further decomposed into various modes with various periods?

Minor comments: This study investigates the variability of zonal current in the South-eastern Tropical Indian Ocean using HYCOM simulations. Hence, the characteristics described in the manuscript might be depended on the model. The authors may moderately change the title, for example, “Simulated Zonal Current Characteristics in the Southeastern Tropical Indian Ocean (SETIO)”

Line 40-45: I do not understand the logical relationship here between previous studies and what you said after “Hence”. What is the scientific question that is not understood in previous studies and what is your purpose? That should specified clearly and unambiguously.

Line 47: “have been carried out by previous investigators” -> have been investigated

Lines 65-70: The authors may also review the salinity effect in the inter-annual and decadal variability of ITF. For example, Hu and Sprintall 2016, JGR; 2017, GRL; Jyoti et al., 2019. The salinity effect mechanism is an important component of ITF dynamics

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different from the wind forcing mechanism.

Line 100: Does the HYCOM assimilate surface observations? Lines 132-133: No necessary to repeat the references of EEMD here Section 3.1: A longitude-depth plot of mean zonal currents along the three sections should be presented.

Please also note the supplement to this comment:

<https://os.copernicus.org/preprints/os-2020-91/os-2020-91-RC1-supplement.pdf>

Interactive comment on Ocean Sci. Discuss., <https://doi.org/10.5194/os-2020-91>, 2020.

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