EGUsphere, referee comment RC1
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Comment on egusphere-2022-495

Anonymous Referee #1

Referee comment on "Surface circulation in the Gulf of Thailand from remotely sensed observations: seasonal and interannual timescales" by Arachaporn Anutaliya, EGUsphere, https://doi.org/10.5194/egusphere-2022-495-RC1, 2022

The manuscript describes the seasonal and interannual surface circulation variability in the Gulf of Thailand (GoT) through the analysis of remote sensed data (i.e., SST, SSH, etc.). Complex EOF and complex correlation and other spatio-temporal analysis were taken into consideration. Since this is, I think the first paper that tries to explain the dynamics of surface circulation in the GoT using observation (remote sensing) data, more detail explanation is necessary. I think not only oceanographers want to know the surface circulation in the GoT, but also other scientists (marine biologists, chemical oceanographers, fishery scientists, etc.). So, my comments will be pointed out in the following.

Major comments:

- Line 16: author defined the GoT domain (6-14 N and 98-106 E), but when author begins to analyze the data, why author defined the analyzed area as 8-14 N (Line 73) not 6-14 N. During SW monsoon, northward flow from East Malaysian Peninsula could also play significant role for the circulation in the GoT as is showed the inflow from South China Sea (SCS) during NE monsoon. Please clarify this.
- Line 78-80: when author mentioned that the largest difference between OSCAR and HF Radar is found at UGoT where there are only 6 OSCAR data points. Does author try to conclude that largest difference found at UGoT is because of there are only 6 OSCAR data points? What about other areas in the GoT?
- Line 83-87: Please clarify sea surface level (is it monthly data? And what is the source of ADT data?). Do you think 3 stations situated in the UGoT and western GoT are enough to validate satellite-derived ADT? What about the stations in the eastern GoT? I think there are available data from local authorities that you can request. When author mentioned western boundary, does it include the western side of UGoT (no data for OSCAR).
- Line 99: How to estimate A?
- Line 111-113: Why high variance of ADT indicating the influence of geostatic flow and low variance indicating ageostrophic flow? Could you give a reference for that

statement?

- Line 116: Any references for reader to follow, regarding to CEOF that the author used?
- Line 117: The first 2 modes represent just only 48%. What about other 52%?
- Line 117-119: Without the knowledge background about the GoT dynamics, from fig.3a-c, how do you know that during southwest monsoon, anticyclonic circulation exists at the center of the GoT? Please clarify or give any references.
- Line 125-129: For CEOF2 "Negative phase means southward flow along the western boundary and vice versa for positive phase" How do you know that? What figures tell you that?
- Line 164: Why strong mismatch occurs at UGoT and western boundary?
- Line 239: What is the source of SST? The author didn't mention it in Datasets Section.
- Line 240: Please give the reference of complex correlation that the author mentioned.

Minor comments:

- Line 21 and others: "Buranatheprat" -> "Buranapratheprat"
- Line 26 and others: I'm not sure how to order the citation, first name or year
- Line 160: Better to start new paragraph after (Kubryakov …..)
- Lines 299 & 304: "farther"
- Line 357: "Copernicus Marine Service Information"
- For the Reference, the journal name is full or short name? I found both full and short name (Be consistency).
- Figure 2: unit of Fig.2a is m or m/s?
- Figure 3: Could not see Marron boxes in (a) and (d).
- Figure 4: better to have a title for colorbar in the figure and have colorbar for every row.
- Figure 7: intext, author use r instead of R as shown in the figure. Just curios! When the author shows the comparison between sea surface height at different areas and negative wind stress curl, which clearly show perfect match but why r in the figure is negative not positive?
- Figure 8: Since color scale in the first row and second row are different, how color contour in (a) & (b) differ from the rest? Are they correlation coefficient? Better to have the title for the colorbar and have colorbar for all rows.
- Figure 9: Better to have no. of data legend equal to the no. of variables. For example, 9(a) has 3 lines, so it should have 3 data legend, velocity, Nino3.4 and DMI.