Review of "Revisiting regression methods for estimating long-term trends in sea surface temperature" by Chang et al.

This study is an interesting study that revisits a set of regression methods that can be used to estimate long-term trends in sea surface temperature. Authors methodically investigate these regression methods and identify their pros and cons for estimating trends in sea surface temperature. Overall, this work is important and I find that the work deserves to be published in NHESS and falls within the scope of NHESS. However, before publication, authors should consider multiple revisions that will improve the understanding of the manuscript and background knowledge of the work to readers. Therefore, I suggest the below revisions.

Decision – major revision

Major Comments

1. Literature Review

   L29-31: Authors highlight some background knowledge on how global warming has led to increased warming in the ocean and how warmed oceans can change circulation patterns and provide energy for tropical storms. However, they only mention one reference for this sentence - Lin and Chan (2015) which explains a recent decrease in typhoon destructive potential. Authors need to revisit their literature review and provide a set of references to back their claim on how warming oceans can modify circulation patterns as well as how they can contribute to intense and tropical storms.

   L32-33: Again, one reference is not enough to support the claim on how warming oceans can influence the marine environment.

   In both cases, there are many novel research has been conducted and they have to be credited properly when stating these claims.

2. Explanation of Buoy Data

   The authors state that they have used SST data collected from three coastal buoys. They should provide locations of these buoys using geographical coordinates. I strongly recommend including a map to present the general location of these buoys.

3. Figures

   For figures 1(a) and 2 authors should indicate the numerical values of slopes for each regression method. Preferably using the same colors of regression lines. This will help the readers to compare the regression estimates by examining figures without going back and forth through text and figures. For Raw SST, please use a different color from OLSR1.

4. Methods

   In Figure 1(b), the authors plot the remainder components. However, it is unclear in the methods section how they obtain these remainder components. Please explain this in detail in the methods sections.

5. A summary table.

   The authors do a good job of comparing the outcomes of different regression methods within the text of the manuscript. Since the comparison of these regression methods is the core objective of this paper, the authors should highlight their findings appropriately. For this, I suggest using a table to summarize and compare the findings. This will provide readers the opportunity to go through the findings of this important work at one stop rather than scouring through the text for each regression method.

Minor Comments

1. L59-61: I assume μ is mean. But it will be helpful to readers if you define it properly.
2. L105: (2) should be (b)
3. L162: Recheck figure reference (Fig 3 or 4?)
4. L259-261: It seems the letter “O” is used instead of the number zero (0).
5. L299: change “real-sea” to “observed”