

Ocean Sci. Discuss., referee comment RC2
<https://doi.org/10.5194/os-2021-52-RC2>, 2021
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Comment on os-2021-52

Anonymous Referee #2

Referee comment on "Marine heatwaves in the Arabian Sea" by Abhisek Chatterjee et al.,
Ocean Sci. Discuss., <https://doi.org/10.5194/os-2021-52-RC2>, 2021

This article examines the history of marine heatwaves (MWHs) in the Arabian Sea over approximately the past 40 years. The authors are motivated by the fact that few studies of MWHs in the Arabian Sea have been carried out, yet they have significant impacts on marine ecosystems and fisheries. The paper is well organized, interesting and informative. It may be worthy of publication subject to revision, especially with regard to the first three points below.

1) I don't get a sense of what a marine heat wave looks like in the Arabian Sea. Statistics are presented in terms of trends, correlations, and time series. For the three stated metrics (frequency, duration, amplitude), please make a table that compares these for the period before and after 2000. Also, provide a description of one exemplary heat wave after 2000 (spatial structure, time history, etc).

2) The heat balance analysis is misleading because it is only an analysis of MWHs when they last an entire season, which is rare (only 2016 according to Figure 2). It is an analysis of the background conditions on which MWHs develop, but the MHW itself may arise through different processes that are not same as occur in a seasonal mean heat balance. This point needs to be clearly articulated.

3) Line 109-110. The model has been validated for other purposes than the study of MWHs. Please quantify the level of agreement between observed and modeled SSTs in Figures 7 and 8. Also, how sensitive are results to use of different flux forcing products?

Other:

*Abstract, line 10. "The Indian Ocean received almost no attention..." This statement is

not correct. The term "marine heatwave" was coined to describe the Ningaloo Nino that occurred off Western Australia in 2011. More appropriately, the Arabian Sea has not received much attention.

*Related to the comment above, somewhere in the discussion in lines 34-52, Ningaloo Ninos, and the mechanisms responsible for them, should be mentioned (Feng et al, 2013).

*Line 177. "...coincide with the El-Niño year or the year next to the El-Niño year..." This is confusing. El Nino events typically span two calendar years, e.g. 2015-16. So it is not clear what El Nino year (singular) means. Likewise, the second year of an El Nino is part of the same El Nino.

*Lines 260-62. It needs to be mentioned here that the IOBM is often forced by ENSO via the atmospheric bridge, so that the results for the IOBM automatically contain ENSO effects.

*Lines 270-74. Same point as immediately above: the IOD is often forced remotely by ENSO.

*Figure 1. Say over what period the trends are computed.

*Figure 9. Identify in some way (different color?) the track of the storm in panel (a) that is highlighted in panel (b).

*There is need for editing. For example, "makes this regions remained unexplained" (line 331), "wracked" (line 376), "stapling" (Figure 1 and 6 captions) are incorrect words or grammar.

Reference

Feng, M., M. J. McPhaden, S.-P. Xie, and J. Hafner, 2013: La Niña forces unprecedented Leeuwin Current warming in 2011. *Nature Sci. Repts.*, 3, 1277, doi 10.1038/srep01277.