Supplementary Information for

An evaluation of the Arabian Sea Mini Warm Pool's advancement during its mature phase using a coupled atmosphere-ocean numerical model

5 Sankar Prasad Lahiri[1], Kumar Ravi Prakash[1,2], Vimlesh Pant[1]

[1]Centre for Atmospheric Sciences, Indian Institute of Technology Delhi, India.

[2]Applied Physics Laboratory, University of Washington Seattle, WA, USA.

Correspondence to: Sankar Prasad Lahiri (sankarprasadlahiri2@gmail.com)

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Introduction:

15 The following information are in support for the results shown in the "An evaluation of the Arabian Sea Mini Warm Pool's advancement during its mature phase using a coupled atmosphere-ocean numerical model."

Text S1: Interannual Variation of Mini Warm Pool Area:

The interannual Variation of MWP area is shown in Fig. S1. In recent years, 2013 and 2016, are the years with area of the
20 MWP less and more than 0.25 standard deviation respectively. Besides, in 2018 the area of the MWP was closer to climatology. As a result, these three years have been selected for the simulation in our study.
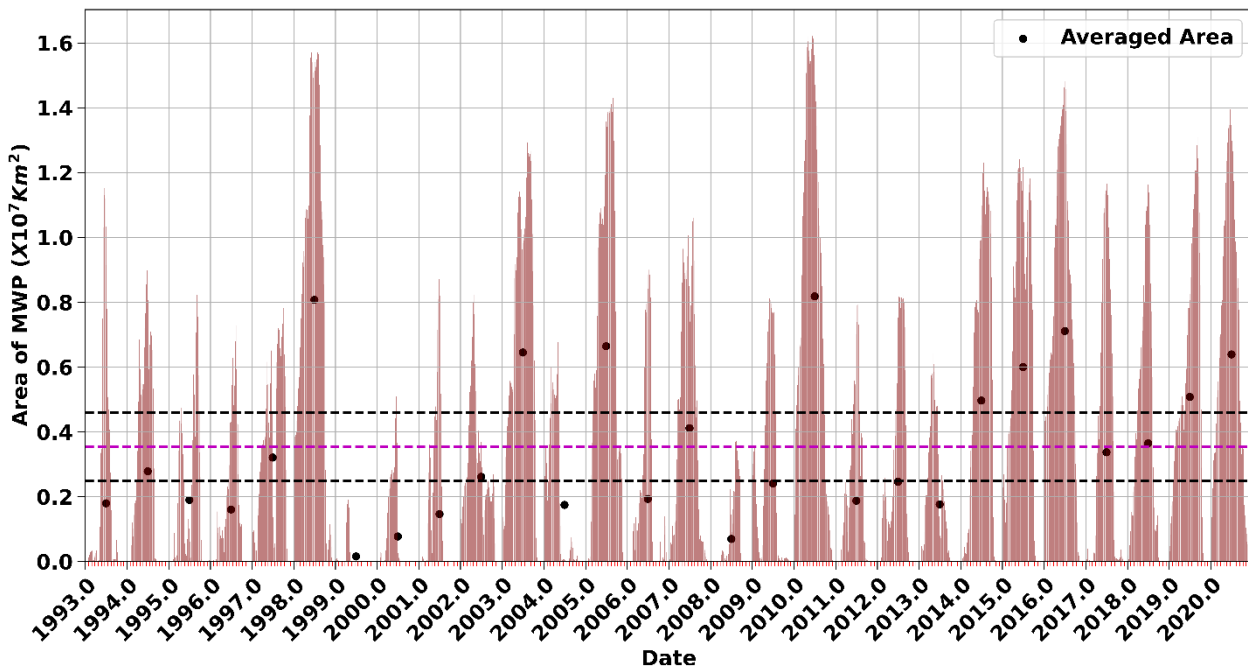
Figure S1: Area MWP area from 1993 to 2020. The black dashed lines suggest the 0.25 standard deviation while the magenta dashed line shows the mean area. The black dot in each years depicts the average MWP area. The area is calculated following the criteria of Li et al. (2023).
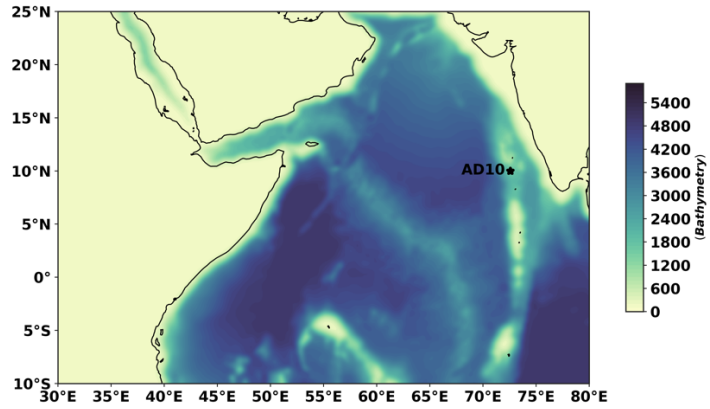
Figure S2: Location of the buoy AD10.

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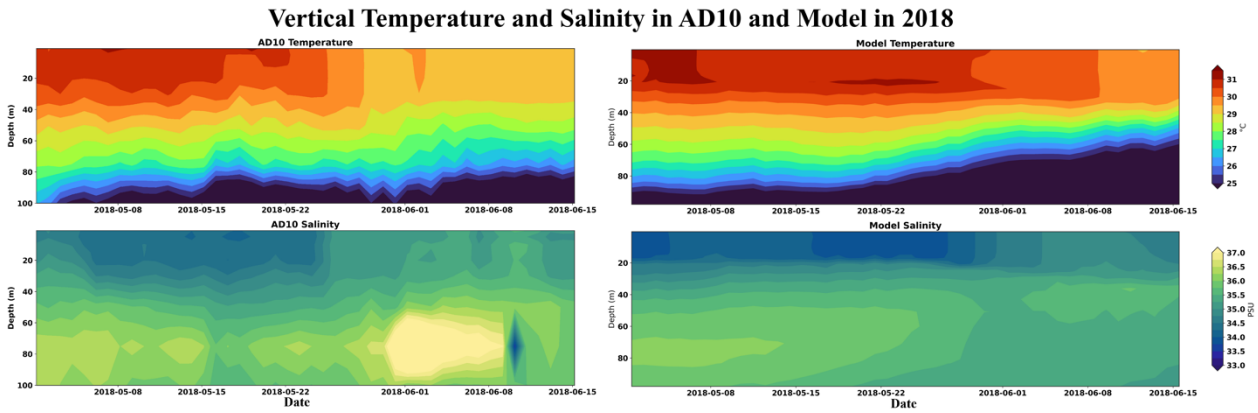


Figure S3: Vertical temperature and salinity profile nearest to the AD10 location in 2018.

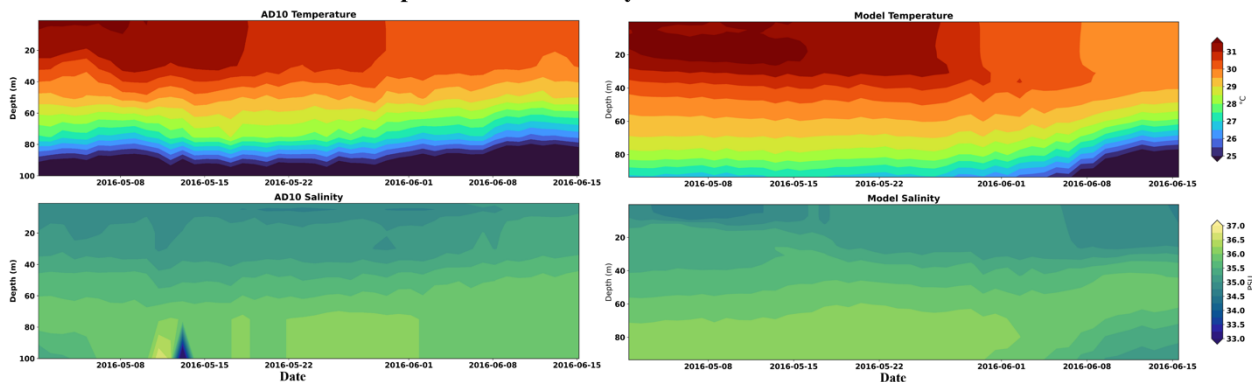
Vertical Temperature and Salinity in AD10 and Model in 2016

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Figure S4: Vertical temperature and salinity profile nearest to the AD10 location in 2016.

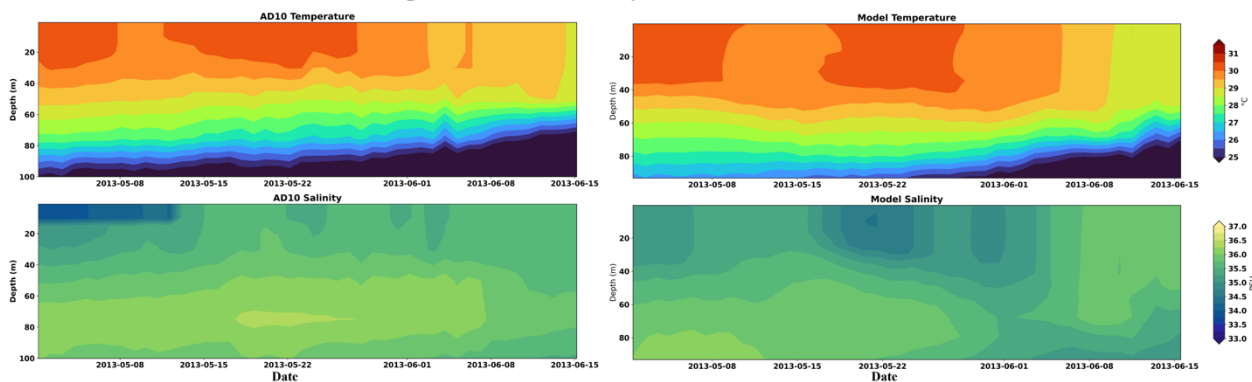
Vertical Temperature and Salinity in AD10 and Model in 2013

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Figure S5: Vertical temperature and salinity profile nearest to the AD10 location in 2013.

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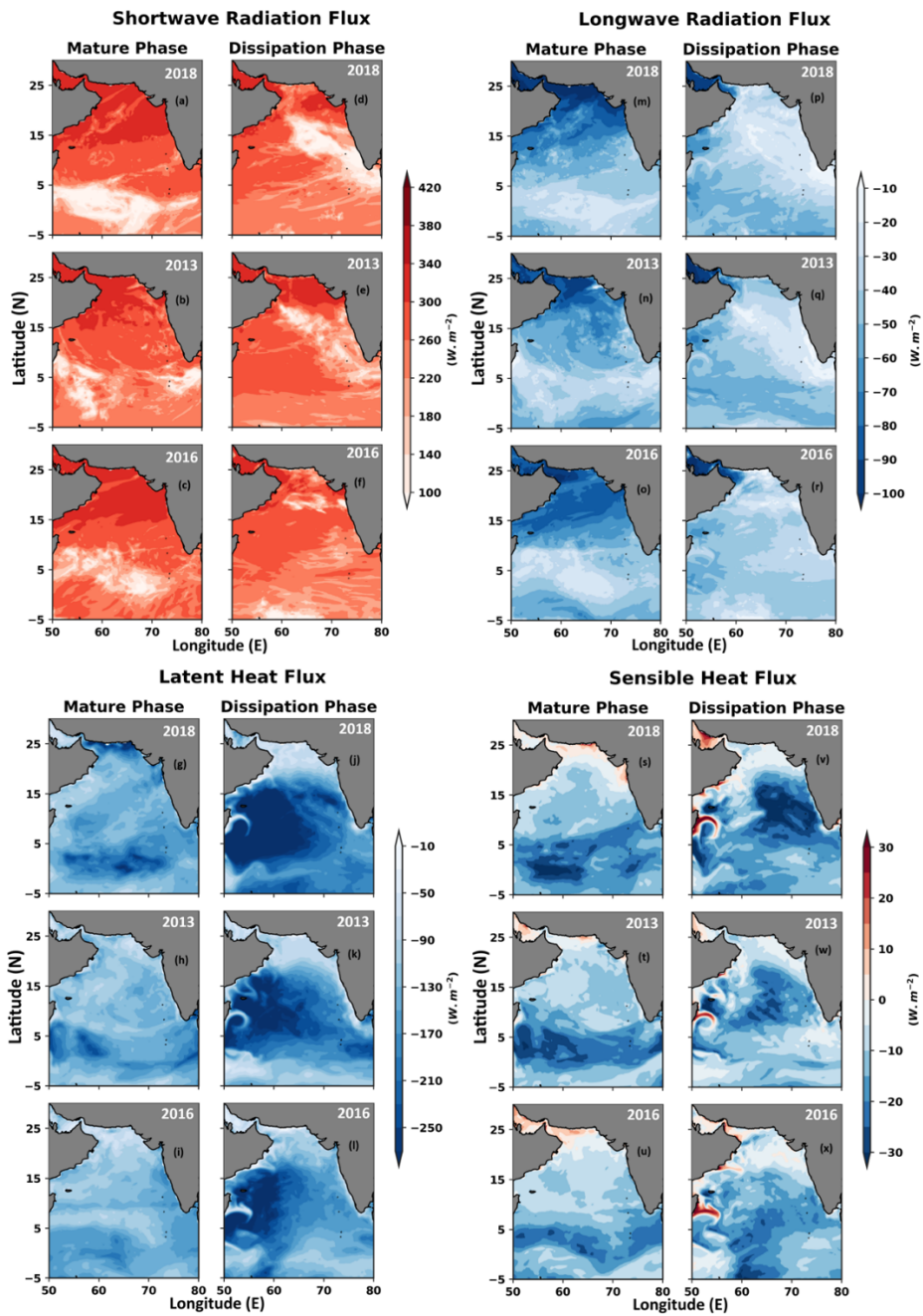
Figure S6: Components of net heat flux i.e., shortwave net heat flux, longwave net heat flux, latent and sensible net heat flux. The mature phase for the mini warm pool is considered on 20th May in 2018 and 2013 and 4th May in 2016. The dissipation phase for the mini warm pool is taken on 8th June in 2018, 2013 and 2016.

Vertical Temperature
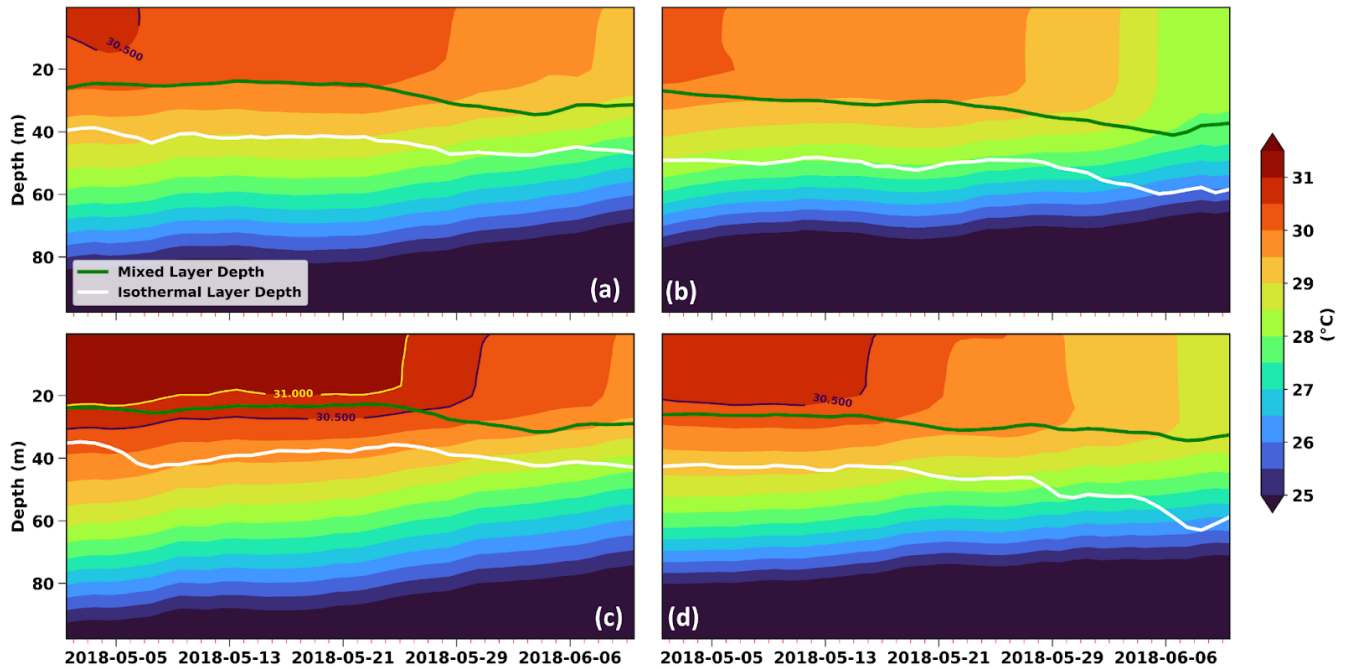
Figure S7: Area averaged (72- 76ºE and 7-13ºN, i.e., the white box shown in Fig. 1) vertical temperature for four sensitivity experiments, i.e., (a) $S_{ocean2013}$, (b) $S_{atmos2013}$, (c) $S_{ocean2016}$, and (d) $S_{atmos2016}$ respectively. As the sensitivity experiments are conducted on the 2018 control experiment, the time reference in the x-axis is similar to that of the 2018 control experiment.

References

Li, N., Zhu, X., Wang, H., Zhang, S., & Wang, X. (2023). Intraseasonal and interannual variability of sea temperature in the Arabian Sea Warm Pool. *Ocean Science*, *19*(5), 1437–1451. https://doi.org/10.5194/os-19-1437-2023