Review of “Seasonal to interannual variabilities of sea–air CO2 exchange across Tropical Maritime Continent indicated by eddy–permitting coupled OGCM experiment” by Amri et al submitted to Ocean Science

The paper is a long-standing pending issue in addressing the CO2 fluxes of this very important region. It deserves publication in Ocean Science. However, it has missed the following key elements, which need to be addressed.

Valsala et al., (2020) have done, for the first time, analysis of 60-year long record of sotheastern tropical Indian Ocean CO2 flux variability, pCO2 variability associated with the IOD. The study concluded that, “*The IOD leads to a substantial sea-to-air CO_2 flux variability in the southeastern tropical Indian Ocean over a broad region (70–105°E, 0–20°S), with more focus near the coast of Java-Sumatra due to the prevailing upwelling dynamics and associated westward propagating anomalies. The sea-to-air CO_2 fluxes, surface ocean partial pressure of CO_2 (pCO_2), the concentration of dissolved inorganic carbon (DIC), and ocean alkalinity (ALK) range as much as ±1.0 mole m^{-2} $year^{-1}$, ±20 μatm, ±35 μmole kg^{-1}, and ±22 μmole kg^{-1} within 80–105°E, 0–10°S due to IOD. The DIC and ALK are significant drivers of pCO_2 variability associated with IOD. The roles of temperature (T) and biology are found negligible. A relatively warm T and extremely high freshwater forcing make the southeastern tropical Indian Ocean carbon cycle variability submissive to DIC and ALK evolutions in contrast to the tropical eastern Pacific where changes in DIC and T dominate the pCO_2 interannual variability. For the first time, this study provides a most comprehensive and extended analysis for the region while highlighting significant differences in carbon cycle variability of the eastern tropical Indian Ocean compared to that of the other parts of the global oceans.*”

This is an important recent work and needs to be cross-discussed in this paper, especially due to the reason the IOD impacts are revisited in this manuscript, and the results have differences. It is always good to have various modelling comparisons so that the community is benefited from knowing how the model performs and differ from each other. Other papers missed addressing are also added below:

Valsala, V., M. G. Sreeush, and K. Chakraborty, (2020), IOD impacts on Indian the Ocean Carbon Cycle, Journal of Geophysical Research, https://doi.org/10.1029/2020JC016485

Chakraborty K., V. Valsala, T. Bhattacharya, J. Ghosh, (2021), Seasonal cycle of surface ocean pCO2 and pH in the northern Indian Ocean and their controlling factors, Progress in Oceanography, Vol.198, doi.org/10.1016/j.pocean.2021.102683

Valsala V., Sreeush M.G., Anju M., Sreenivas P., Tiwari Y.K., Chakraborty K., Sijikumar S., An observing system simulation experiment for Indian Ocean surface pCO2 measurements,

Progress in Oceanography, 194: 102570, June 2021, DOI: 10.1016/j.pocean.2021.102570, 1-14

Sreeush, M. G., Valsala, V., Pentakota, S., Prasad, K. V. S. R., and Murtugudde, R (2018), Biological production in the Indian Ocean upwelling zones – Part 1: refined estimation via the use of a variable compensation depth in ocean carbon models, Biogeosciences, 15, 1895-1918, https://doi.org/10.5194/bg-15-1895-2018