

Reviewer Comment on “Instant and delayed effects of March biomass burning aerosols over the Indochina Peninsula” by Zhu et al.

This paper uses WRF-Chem model to explore the impact of biomass burning (BB) on atmospheric circulation and precipitation during the peak biomass burning season (March) in the Indochina Peninsula (ICP). Authors utilize observations to show that March BB aerosols can reduce precipitation over the ICP in March but increase precipitation from April 1-20, indicating the long-lasting effects of March BB aerosols on precipitation, but with opposite effects in the two months. However, it is hard to determine the causality between BB aerosols over the ICP and atmospheric circulation (and precipitation), just from observations. Therefore, two groups of WRF-Chem experiments: with control (CTRL) and sensitivity (BBER) model scenarios, were performed to discern the mechanisms responsible for these feedbacks of BB aerosols on precipitation. To discern the feedback effects.

The paper is very well-written with brevity and high-quality visualization of all results. The manuscript should be published once the following comments are addressed:

Specific comments:

1) Section 4.1: Evaluation of model results

For comparison of CTRL AOD and Precipitation with MODIS and TRMM observations respectively, if possible, please provide some domain-wide statistical difference metrics (such as mean bias, mean error, RMSE, correlation, etc.). This will be helpful to quantify the predictive capability of the default model for the ICP region in this study period.

- 2) Besides, discerning the direct and indirect effects via sensitivity experiments with and without direct or indirect effects, doing an HYPLIT trajectory analysis to look at BB emissions trajectories in the modeling domain for the March-April period, if possible is encouraged. Trajectories of air mass relative to the black box that outlines the main Indochina Peninsula (ICP; 93°–110°E, 10°–24°N), may aid the authors' current inferences more in explaining the opposite impacts in March vs April.
- 3) Adding maybe a supplemental figure on the BB emissions for the ICP region focusing on the March-April season might be helpful in explaining the instant vs delayed impacts of BB burning aerosols in ICP regions' atmospheric circulation and precipitation patterns.