Response to reviewers on: The Regional Climate-Chemistry-Ecology Coupling Model RegCM-Chem (v4.6)-YIBs (v1.0): Development and Application

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We are grateful to the referees for their time and energy in providing helpful comments and guidance that have improved the manuscript. In this document, we describe how we have addressed the reviewer's comments. Review comments in black, responses in blue and text added/modified in manuscript in red.

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RC1: 'Comment on egusphere-2023-1733', Anonymous Referee #1, 03 Jan 2024

General comments:

In my opinion, it is valuable to investigate coupled interactions between the terrestrial carbon cycle, atmospheric chemistry, and climate change in regional scale. The manuscript entitled: "The Regional Climate-Chemistry-Ecology Coupling Model RegCM-Chem (v4.6)-YIBs (v1.0): Development and Application" presents valuable results which merit publication in egusphere after minor corrections.

Response: Thank you for your positive evaluations. We have carefully considered your suggestions and revised the paper accordingly.

Specific comments:

There are comments I suggest the authors should take into account: In 3.2 Climate simulations

in East Asian, the representativeness of statistical indicators for comparison between model simulation results and reanalysis data is not clear. The author did not provide the temporal resolution of statistical indicators such as Correlation coefficients (R), mean biases (MB), and root mean square error (RMSE).

Response: Thank you for your valuable feedback. We calculated statistical indicators such as correlation coefficient (R), mean bias (MB), and root mean square error (RMSE) using daily mean data. Although the meteorological variables temperature, wind speed and specific humidity in our coupled model simulation results are hourly, the reanalysis data ERA-Interim used for validation, are at 6-hour resolution (there are four times of data every day, which are 00,06,12 and 18 o'clock). To ensure consistency in the validation process between simulated results and reanalysis data, we first aggregated the data to daily mean values and then computed the corresponding statistical indicators (R, MB, RMSE). In the revised manuscript, additional clarification regarding the temporal resolution of these statistical indicators has been included in Section 3.2 (lines 334-337).

Revised version: "We first calculated the daily average of the meteorological variables, such as temperature, wind speed, and specific humidity, from the model simulation and reanalysis data, respectively. Then we calculate the corresponding statistical indicator correlation coefficient (R), mean deviation (MB), and root mean square error (RMSE) based on the daily averages. Table 1 reports a number of statistical metrics of comparison between simulated and reanalysis meteorological variables at different heights. Correlation coefficients (R) range from 0.95 to 0.98 for temperature, 0.71 to 0.97 for longitudinal wind, 0.81 to 0.92 for latitudinal wind, and 0.91-0.92 for specific humidity …"