

Atmos. Chem. Phys. Discuss., referee comment RC3
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Comment on acp-2022-164

Anonymous Referee #1

Referee comment on "Effect of dust on rainfall over the Red Sea coast based on WRF-Chem model simulations" by Sagar P. Parajuli et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-164-RC3>, 2022

General comment

The paper reports an analysis of the effects of dust on rainfall over the Red Sea area. The study was performed using WRF-Chem simulations and a focus was given on direct and indirect effects of dust. The paper is interesting and suitable for the Journal. However, there are some limitations not properly discussed and some aspects not very clear (see my specific comments) that need a revision.

Specific comments

Line 21. I would say "important" rather than "the main element".

Lines 37-40. This sentence does not explain at the end of the day what is the effect on average. It is an increase, a decrease or almost zero? This is an important aspect that should be discussed also in the interpretation of results.

Line 44. Why exactly 1.33 mm. It appears to be a strange choice is not explained.

Abstract. The percentages given with two decimal digits as a consequence of a modelling that will certainly have uncertainties seems to be too much. Is 1.02% really different from 1%. Please provide an estimate of the uncertainties on this numbers.

Section 2.3.1. The choice of simulating only the month of August for different years should be better explained. In the other months there is not rain? What is the percentage of cumulative annual rain associated to the month of August? It could have been better to simulate an whole year.

Line 262. What does it mean discarded for spin-up?

Line 290. Driving force for what? For the rain? Because the effects appears quite limited.

Section 3.2. It is not really clear how the accuracy of model predictions is evaluated

considering that no comparison with measured data is reported. It would be better to provide some kind of comparison for this goal. This will also give more information about the uncertainties of model outputs.

Table 3. Again, I see a lot of decimal digits in the prediction of the effects on rainfall arriving at 0.001 mm of H₂O. Is this really a figure obtainable by this simulations with a reasonable accuracy?