

## ***Interactive comment on “Radiative effects of desert dust on weather and regional climate” by C. Spyrou et al.***

### **Anonymous Referee #2**

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The manuscript is aimed at modeling the direct radiative effects of desert dust on weather over the large region including North Africa, the Mediterranean Sea, and Europe. The obtained results are based on two sets of daily model simulations during the six-year period from 2002 – 2007: the first set of simulations included dust radiative effects, while simulations in the second set were without these effects. The obtained results are interesting. I recommend the manuscript for publication.

The authors may consider the following critical aspects:

1. As the current study is based on model simulations, the title should be updated in order to represent correctly the obtained results. I recommend the following one: Modelling of radiative effects of desert dust on weather and regional climate.

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2. The important part of this study is the evaluation of the dust impact on modeled air temperature. In particular, using temperature data from approximately 600 stations, the authors discussed a significant improvement in modeled air temperature when the dust-radiation feedback is included. To represent the more convincing proof of the above conclusion, it is essential to show (at least for the dusty spring season) maps of space distributions of model bias, root mean square error (RMSE), and correlation coefficients over the model domain. Such maps will provide the reader with precise information about regions where the improvement in modeled air temperature was more significant (or less significant) after incorporating dust-radiation effects. Just to declare that the improvement is attributed mostly to the stations near dust sources is definitely not enough (see page 1337, lines 11-12).
3. Section 8 (Conclusions): in page 1342, line 5, the authors concluded that "Therefore, variations of dust particle production can have impacts on radiative properties, cloud formation, and water budget". However, the effects of dust on cloud formations and water budget were not studied in the current paper. References are needed.

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