

Referee #2

The authors have replied all my comments and I am satisfied. However, for my first comment regarding the use of the recommended WRF-Solar in this study remains. I know it is difficult to couple the new version that integrates all new schemes required in the WRF-Solar with the CHIMERE model. I do not want to open a new discussion on that. I rather recommend the authors to put it as limitation of this study and to expend the study on that direction.

Author's response :

We would like to thank the reviewer for their positive feedback on our responses to the comments. We concur that utilising WRF-Solar would serve to reinforce the findings on the estimation of the solar resource, thereby complementing the results obtained on the impact of desert dust on solar irradiance by comparing WRF alone and WRF-CHIMERE. However, due to technical limitations, we are unable to include simulations with WRF-Solar in this study. As previously mentioned, our team is currently working with this model. Consequently, we have added a note to our article highlighting the use of WRF instead of WRF-Solar as a limitation, and have proposed continuing this research with WRF-Solar in the future. Please see the details below.

Editor comments

Dear Authors,

after considering the reports from two reviewers, and my own evaluation of the manuscript, I am glad to accept your paper for publication in ACP, subject to minor revisions. In particular, please take in consideration the comment by Reviewer #2 and:

- 1) highlight in Section 2.2 the suitability of your modelling set up to the analysis;
- 2) discuss in the Conclusions the limitations in using WRF instead of WRF-Solar.

Best regards,
Marco Gaetani

Author's response :

Dear Editors,

We would like to thank you for accepting our article for publication in ACP. In order to comply with the minor reviews requested, we propose the following changes:

1) *"In order to reproduce a dust event during the dry season in West Africa, the WRF-CHIMERE coupled model is selected as it has previously demonstrated favourable performance in similar studies such as those conducted by Briant et al. (2017) and Menut (2023). The technical details of this coupled model are provided below. "* has been added at the beginning of Section 2.2 (now Line 171), in order to highlight the suitability of the modelling set up employed to the analysis ;

2) *"A further limitation of this study is the use of the WRF meteorological model for the coupling with CHIMERE, rather than the WRF-Solar model (Jimenez et al., 2016), which is an enhanced version of WRF dedicated to solar forecasting. Indeed, WRF-Solar incorporates enhanced algorithms for the computation of solar irradiance, accounting for the direct and indirect effects of aerosols and employing an advanced solar tracking algorithm.*

This makes it the appropriate version of WRF to use for solar energy research. However, no coupling between WRF-Solar and CHIMERE has yet been implemented, representing an important perspective to expend this work.” has been added in the Conclusions section (now Line 928), in order to highlight the limitations in using WRF instead of WRF-Solar and to give the employment of WRF-Solar as a promising perspective.

Please do not hesitate to contact us should you require any further information.

Best regards,

L. Clauzel and co-authors