Partial answer to reviews of ACP-2014-688 « Positive feedback of dust aerosol via its impact on atmospheric stability during dust storms in the Eastern Mediterranean »

Dear editor, dear reviewers,

A bug was found in the experiments that were carried out for this study. The experiments have been rerun and gave very different results. As a consequence, the article have been mostly rewritten, the structure revisited and the conclusions are different. Most of the figures have been changed also.

In the process of rewriting the article, some comments from the reviewers have been adressed. The title of the paper has been changed to « Feedbacks of dust via its impact on atmospheric stability during a dust storm in the Eastern Mediterranean »

Thanks in advance for your understanding.

General comment by Anonymous Referee #1 :

Thanks for your suggestions concerning litterature and supplementary experiments. The two papers mentioned, and a few others, have been mentioned and added in the bibliography.

An experiment with no dust aerosols was carried out, and a figure added to compare this experiment against the reference experiment using an aerosol climatology. We chose as a reference this current configuration of the pre-operational MACC-II system, as one of the aim of this study is to assess the impact of switching on interactive aerosol-radiation interaction.

Minor points :

> Title and throughout the paper : ‘dust’ and ‘aerosol’ are redundant terms. Dust is an aerosol, I propose that the authors use either dust, either mineral aerosol throughout the text

This has been corrected, thank you.

> In the following sentence p 28153: “The Baseline Surface Radiation Network (BSRN) (Heimo et al., 1993) maintains two stations in the area of interest: Tamanrasset (Mimouni, 2013 in Southern Algeria and Sede Boqer in Israel, Lyubansky, 2012).”, you need to fix the parenthesis as follows : Ân The Baseline Surface Radiation Network (BSRN) (Heimo et al., 1993) maintains two stations in the area of interest: Tamanrasset (Mimouni, 2013) in Southern Algeria and Sede Boqer in Israel, (Lyubansky, 2012).”

Corrected, thank you.

General comment by S. Nickovic :

This study is a part of an effort to assess the impact of using interactive aerosols to compute aerosol-radiation interaction in the MACC-II system : there is still more work to do on this topic. ECMWF would be better suited than I am to communicate on how close is the system to switch on interactive aerosols-radiation interaction.

There were many studies on the subject I was not aware of ; now I see better how this work fits in a more general framework of dust-radiation modeling articles. The mentioned references and a few more have been added.

Minor points :

lines 10-11 :'the aerosol-clouds interaction or aerosol semi direct and indirect effect, by influencing the concentration, size and chemical composition of the cloud condensation nuclei (CCN) ' Report on recent observation and modelling studies on dust important role in ice nucleation, e.g. Hoose, C. and Möhler, 2012, ACP; Niemand et al, 2012 ACP

References added, thank you.

Pg 28150 lines 18-20 "...Dust aerosol events over the Eastern Atlantic may also impact hurricane activity over the Atlantic and Caribbean areas (Kamal et al., 2012 and S. H. Chen, personal communication, 2014)'... I suggest the statement to be mitigated. The subject is still under research and yet no firm conclusions can be stated

The corresponding sentence has been reworded

Pg 28152lines 18-20 "...Dust sources are then parameterized, following Ginoux (2001), as a function of the cubic power of 10m wind speed... »The sentence is not precise. The emission, not sources is a cubic function of wind.

Corrected, thank you.

Methodology I suggest the authors introduce a table with brief description of experiment types reported.

Added, thank you for the suggestion.

G 28171: '...In the absence of daytime radio-sonde data in Egypt...' Is there a night-time radio-sonde data in Cairo? If yes, I suggest this data to be used to compare results of different simulations, especially for temperature profiles

This sentence is not present anymore in the new version of the article. It seems tha radio-sonde observations are available from Cairo ; unfortunately I couldn't find a way to acquire them.