

Author's comment on 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 has been found in the experiments that were carried out for this article. The experiments have been rerun and gave very different results. As a consequence, the article has been mostly rewritten, the structure revisited and the conclusions are different from the previous version.

The bug concerned the optical properties of dust in the long-wave : the interpolation from the look-up tables that are provided for several spectral bands to the spectral bands used by the Rapid Radiative Transfer Model (RRTM) was faulty. Also, for some spectral bands, the extinction and the absorption coefficients were confused. This bug has been here for many years, probably ever since the aerosol-radiation interaction has been coded into the model, and didn't impact the quality of global MACC system output since it concerns only interactive dust-radiation interaction.

The problem has been detected at the beginning of March, and corrected around mid-March. , and the simulations presented in the paper were rerun between mid-March and early April. The very large impact of dust in the long-wave in the first version of the paper was caused by this bug ; you may notice that in the second version, the impact is 2 to 3 times smaller. Because of that, the conclusions reached with the previous version of the paper (a dust-PBL meteorology feedback driven mainly by LW forcing) didn't hold anymore. In the second version of the paper, the feedbacks driven by SW and LW forcings are more balanced. The dynamical feedbacks, driven by horizontal temperature gradients, are also more prominent. To reflect these changed conclusions, the structure of the paper has also been revised. In all, besides the introduction and methodology sections which have been marginally modified, the article has been almost entirely rewritten.

I apologize for the trouble and for the supplementary work for the reviewers. The results we first showed were faulty ; now they stand on firmer ground. The runs have been carried out with two sets of optical properties for dust (from Woodward et al., 2001, and those provided from E. Highwood from Reading University) for SW and LW spectral bands. The results were close using either set.

Kind regards,
Samuel Rémy