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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The summertime Saharan heat low: Sensitivity of the radiation budget and atmospheric heating to water vapor and dust aerosol" *by* Netsanet K. Alamirew et al.

Anonymous Referee #1

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This paper used field experiment data at BBM in southern Algeria from June 2011 and a radiative transfer model to calculate the effects of dust and water vapor on radiation budget both at the surface and the TOA in order to understand the radiative processes within the SHL during summer. Generally, the manuscript is straightforward and well organized. However my main concern is that some of the input data for the RT model may cause large uncertainties that are helpless to fill the research gaps as the authors mentioned in the introduction. For example, dust can absorb thermal infrared radiation, the night time AOD estimated from the nephelometer, which measures aerosol extinction coefficient near the surface, could induce a large error without an accurate aerosol extinction profile. Reanalysis data generally has poor representations of clouds and

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Discussion paper

their properties. However, the authors selected clouds properties from the reanalysis. These could directly affect the reliability of the model results.

Sections 2 and 3 are a bit long. I would recommend to combine and simplify this part. What the authors concluded cannot be totally supported only from the radiative forcing and heating rate calculations.

The manuscript also need a thorough editing. Some typos and confusing expression make the text difficult to follow at times.

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