

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2021-462

Anonymous Referee #2

Referee comment on "Impacts of the Saharan air layer on the physical properties of the Atlantic tropical cyclone cloud systems: 2003–2019" by Hao Luo and Yong Han, Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-462-RC2>, 2021

Review of "Impacts of the Saharan air layer on the physical properties of the Atlantic tropical cyclone cloud systems: 2003-2019" by Luo and Han.

General comments:

This is an interesting study that examines the impacts of the Saharan air layer (SAL) on the physical features of the Atlantic tropical cyclone (TC) cloud systems (TCCS) by using co-located satellite-based cloud and aerosol observations. The authors attempt to distinguish the various effects of SAL on different intensities of TCs, and further find out the probable causes of the varied feedback mechanisms. Based on the 70 TC samples during the summertime of 2003-2019, the varying impacts of SAL on different intensities of TCCS are well analyzed and concluded. They find that the various responses of TCCS to SAL are determined by the combined factors of dry air masses, the dust aerosols as ice nuclei, as well as the thermodynamic and moisture conditions. These conclusions may contribute to a better understanding of the physical mechanisms between the SAL and TCs over the Atlantic region. Overall, the manuscript is well written and the data are well analyzed and presented. Therefore, I would recommend its acceptance for publication in ACP after minor revisions.

Specific comments:

Line 22: Please rephrase this sentence. "but the PDF curve becomes flatten for HU" should be "whereas the PDF curve becomes flatter for HU".

Line 60: Please specify what is meant by TCCS macro and micro properties. After reviewing all of the figures and the remainder of the paper, it seems that the macro

properties include the cloud top temperature and the cloud ice water path, while the micro properties refer to the ice cloud effective radius. Since "cloud macro or micro properties" is a rather broad term that could be interpreted in many different ways, please state this clearly at least once.

Line 76: "characteristics" should be "variation characteristics".

Line 224: Related to Line 22.

Figure 9: The units of cloud effective radius should be " μm " to match the units shown in Figure 11.

Line 258: "flatten" should be "flat".

Line 276: The "TC nephsystems" should be "TCCS" to be consistent with the context.

Line 277: Add a comma before "respectively".

Line 282: Related to Line 22.

Line 287: "various feedbacks" should be "various feedback mechanisms". Please modify it throughout the context.

Line 310: Please provide relevant search terms for the public data retrieval in the data availability statement.