

We gratefully thank the reviewer for the careful reading of our revised manuscript and for the constructive comments. Below the reviewer's comments are reproduced in italic bold font. Our responses to these comments are given in roman font and pieces of text added to the manuscript are displayed in blue font.

**Referee :**

*The abstract, introduction and conclusions need to be updated to properly address the comments from Referee#2: "So I still see a problem in the study design: 3d effects are solely analysed with respect to trace gas AMFs, but not on the cloud retrievals. Thus the authors should clearly state this inconsistency in their study in abstract and introduction, and should discuss how far this inconsistency could be resolved in future studies in the discussion/conclusion."*

*The abstract was not updated at all, the changes in the introduction and conclusions (Line 566) do not mention the inconsistency.*

This has been added in the following parts:

Abstract (line 7):

“Although clouds have significant effects on trace gas retrievals, the current cloud correction schemes are based on a simple cloud model, and the retrieved cloud parameters must be interpreted as effective values. Consequently, it is difficult to assess the accuracy of the cloud correction only based on analysis of the accuracy of the cloud retrievals, and this study focuses solely on the impact of the 3D cloud structures on the trace gas retrievals.”

Introduction (line 89):

“The 3D effects affect the cloud retrievals first and then the trace gas retrievals, and in this study, the main focus is on the influence of 3D clouds on the trace gas retrievals.”

Conclusion (line 579):

“Since the cloud correction schemes are based on a simple cloud model, the accuracy of the NO<sub>2</sub> retrieval depends on not only the cloud retrieval, but also on other factors, such as the NO<sub>2</sub> profile. The analysis in the study focused mainly on the error of the NO<sub>2</sub> retrieval due to the 3D cloud effects.”