Reply to Anonymous Referee #2

We thank the reviewer for their helpful and constructive comments. Please find our answers (black text) to the comments (blue text) in-line below. Respective changes are indicated in the revised manuscript in blue and are stated here in addition when a reviewer's comment leads to a substantial modification of the manuscript along with the updated line number, where necessary.

General comments:

This manuscript discusses the impact of the Spectral Misalignment Effect (SMILE) on the EarthCARE Multi-spectral Imager (MSI) in retrieving aerosol and cloud properties. The paper is well suited to the scope of AMT. I suggest some minor revision considering the potential improvements as follows.

Generally, the colors in some figures are not clear enough to let readers to distinguish one from another. For example, the light-yellow line in Figure 5 is very hard to see, and similarly, the light-yellow lines that represents salt in Figure 6, 7 and 9 are seems easily mixed with other color lines. Besides, lines in Figure 12 and Figure 13 (b) are all in reddish colors, which color arrangement should be considered. Finally, the dark purple color in the bottom area of Figure 10 (c) makes the words "water" almost invisible, you should consider change the color into lighter bluish color, or change the color of the words "water" into white.
Figures 5, 6, 7, 9, 10, 11, 12 and 13 have been updated regarding their color schemes. We checked the figures with colorblindness simulator tools. Hence, colors were chosen in such a way that we avoid using reddish and greenish colors at the same time. Now, figures 12 and 13 show solid and dashed lines in order to make it easier for readers to distinguish them. Additionally, we associate bluish colors for clouds and darker yellow to reddish colors for aerosols throughout all figures to make it easier for the reader to recognize different scatter types by their colors.

Specific comments:

Line 31-35: Please add some reference to support the story of "mitigation strategies have been implemented by ESA and industry".
Reference added. For details, see page 27 therein.

Figure 1: There is no color bar to explain the range of the MSI response functions shown, please add it.
Done.

Line 141-142: You noted the effective radii of both types of cloud droplets, how about the definition of optical thickness? Are they as same as you noted in Line 181-182?
Yes, that is correct. However, since it is only needed for figure 9, we only mention it when describing this figure. Please note that the normalized extinction used here is a relative quantity describing the spectral behavior of the scatterer. We added "normalized" to be more specific.

Line 178: "level2" --> "Level 2", "retrieval" --> "retrievals"
Done.

Line 185-186: Can you provide some references for this?
We added a reference to Seidel and Popp, 2012.

Line 205: I think you should at least add another case with a larger COT for the water cloud, only 10 is not sufficient to represent all water clouds.
We agree that COT=10 is not representative of all water clouds. It was not our intent to represent all clouds. We would and do refer to Wang et al. for higher OTs than 10 since they did a thorough analysis.