Dear referee:

Thank you for providing these insights. We appreciate the time and effort you and each of the reviewers have dedicated to providing insightful feedback, and we will make the corrections according to the comments in the revised manuscript.

For the technical corrections, we will fix them in the revised manuscript, thank you very much for pointing them out.

The following is our response to the specific comments:

Line 100:

"sunny" does not necessarily imply clear-sky. Therefore, I propose to replace the term "sunny" with the term "cloud-free" or "clear-sky".

RESPONSE: We agreed with your assessment. We will replace the term "sunny" with the term "clear-sky" in the revised manuscript.

Line 137, Table 2:

I assume the "393" in column D refers to the 393 km altitude of the mission orbit? I suggest to add this information in the Table caption or better to add it in Table 1 of the general mission characteristics.

RESPONSE: Yes, the "393" in column D does refer to the 393 km altitude of the mission orbit. We will add this information directly in Table 1.

Line 196, 198, equations (5) and (6):

Add an explanation what S_0, n and g are

Line 209, equation (13):

The unit for FSW is missing. Please add.

RESPONSE: We will add the explanation and the unit for Fsw in the revised manuscript.

Line 336, Figure 15:

There seem to be regions in the error distribution plots (b) and (c) at positions around x=20-100 and y=850-900 as well as x=350 and y=450 where no error is found but clouds are present according to panel (a). Does this mean that these regions are not shallow warm clouds or does that mean that the error is off the scale? A short explanation would be appreciated.

RESPONSE: The region around x=20-100 and y=850-900 is not defined as shallow warm clouds, while the error is off the scale in the region around x=350 and y=450. We will add a short explanation about these two regions.

Line 363-365:

The structure of this sentence is confusing. Please try to reformulate. Also, the statement that delta tau on pix_BND1_min and pix_BND1_max are generally larger than on pix_BND3_min and pix_BND3_max seems contradictory to Tables 3 and 4. From there I read that the error pix_BND1_min > pix_BND3_min but pix_BND1_max < pix_BND3_max and vice versa for re. Please clarify.

RESPONSE: We will reformulate the sentence here according to every case in Table 3 and 4, both for COT error and CDR error.

Line 384:

What does "extreme" error mean here? Please clarify or quantify.

RESPONSE: The extreme error can be found from Table 3 and 4 for both COT error and CDR error, we will add an explanation to clarify the exact value of them in the sentence.

Line 388-389:

I would suggest to add here that this statement is only true for the water surfaces that were analyzed in this study. As indicated later on, the effect for scenes over land are not quantified yet and therefore the statement that an onboard correction is generally not necessary would probably require an analysis of the land cases too.

Line 390-397:

It is very good that the authors have pointed out that the impact of the smile effect for scenes over land might be much more difficult to quantify and will require more work. It should therefore be made clear in the abstract that the basic conclusion, i.e. that the impact of the smile effect is negligible, is true for water surfaces but needs to be investigated further for land surfaces.

RESPONSE: We will add the explanation in both the conclusion part and the abstract part to state that further works are still needed to analysis the land cases.