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Comment

# ***Interactive comment on “Effect of surface BRDF of various land cover types on the geostationary observations of tropospheric NO<sub>2</sub>” by K. Noguchi et al.***

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We would like to thank Y. Govaerts for giving us short comments on the definitions related to BRDF. We took into account these comments for the revised manuscript. We describe our responses to the comments below.

1. When authors refer to BRDF, they actually mean BRF as the quantity they are referring is actually unit less. So the BRDF acronym needs to be replaced by BRF. I acknowledge that this confusion comes from erroneous naming convention in MODIS official NASA product. Table 1 contains misleading uses of the BRDF and BRF acronyms.

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BRDF has unit  $\text{sr}^{-1}$  while BRF, as albedo, are unit less. So the only difference between BRDF and BRF is the factor  $\pi$  with  $\text{BRF} = \pi * \text{BRDF}$ .

Reply: We would like to thank Y. Govaerts for bringing this to our attention. Following his suggestion, we divide the right side of equation (1) by  $\pi$  and keep the left side as BRDF.

The usage of the word “BRDF” cannot be replaced by “BRF” in the text, because the  $\text{AMF\_BRDF}$  considers the full effect of BRDF but  $\text{AMF\_BRF}$  is used as LER approximation and is not a full treatment of BRDF.

2. The label of the first column is also misleading, as the first line contains the reference cases, i.e., full coupling between atmosphere and surface scattering, while the last three lines proposed three different LER estimation based on the BRF and its angular integral.

Reply: We deleted the first line for BRDF from Table 1 as suggested.

3. I would strongly suggest the authors to clarify Table 1 column labels and to use Nicodemus reflectance naming definition and associated acronym.

Reply: According the comment, we add the new column for the description of Nicodemus reflectance naming definition in Table 1. In the text, we added the Nicodemus reflectance naming definition and also left the MODIS naming definition for the convenience of readers who use the MODIS data.

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