

## ***Interactive comment on “Simulating Optical Top-Of-Atmosphere Radiance Satellite Images over Snow-Covered Rugged Terrain” by Maxim Lamare et al.***

### **Anonymous Referee #2**

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In my opinion the manuscript is outstanding: it contains a sound description of the theoretical background, a description of the parameters (snow, atmosphere, topography) and a sensitivity analysis.

The field measurements (SSA along transects) during the Sentinel-3 overpass are particularly valuable, since they are used to compare simulated results with scene observations.

I have only a few suggestions to improve the manuscript:

- line 148: E0 extraterrestrial solar irradiance: which model is used (Thuillier 2003) ?

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- the up/down arrow  $T_{dir}(\text{arrow\_up or arrow\_down})$  should be a superscript to  $T_{dir}$  (arrow not standing alone) (concerns all equations and in the running text)

- line 328: inferior to 2 days better: less than 2 days

- Fig. 4: right side: the Radiance unit  $\text{W m}^{-1} \text{sr}^{-1} \mu\text{m}^{-1} \rightarrow \text{W m}^{-2} \text{sr}^{-1} \mu\text{m}^{-1}$

Question concerning the visual appearance: the study area is 14 km x 18 km, i.e. 46 x 60 pixels, so I would expect more blocky structures. Was a certain histogram-stretch applied to make it look smoother?

- Fig. 5 and 6: use of the radiance unit  $[\text{mW m}^{-2} \text{sr}^{-1} \text{nm}^{-1}]$  (plot ordinate and left scatterplot), which is correct, but I suggest to use  $[\text{W m}^{-2} \text{sr}^{-1} \mu\text{m}^{-1}]$  as done in the text and in the right plot of the histogram.

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Interactive comment on The Cryosphere Discuss., https://doi.org/10.5194/tc-2020-104, 2020.

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