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)?
- the up/down arrow Tdir(arrow_up or arrow_down) should be a superscript to Tdir (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 W m-1 sr -1 \( \mu m^{-1} \) \( \rightarrow \) W m-2 sr-1 \( \mu m^{-1} \)

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