

Interactive comment on “Validating the MYSTIC three-dimensional radiative transfer model with observations from the complex topography of Arizona’s Meteor Crater” by B. Mayer et al.

Anonymous Referee #1

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In my view this is an interesting manuscript about 3D radiative processes over complex terrain. This topic was hardly explored in earlier studies, and the paper represents a new application area for the authors’ rather powerful radiative transfer model. I found the methodology sound and the manuscript well-written. My recommendation is to publish the manuscript after some fairly minor improvements. My specific suggestions are:

Page 13375, line 23: The expression “parametric study” sounds unfamiliar to me. I would replace it with “sensitivity study”.

Page 13376, line 13: The word “classification” should be changed to something like

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“characterization”.

Page 13376, line 28: I recommend describing either in the main text or in an appendix the way coefficients a, b, c, and d are calculated from the set of available $z(x,y)$ values.

Page 13377, line 1: It is not clear to me how this alternative method would work. I suggest either expanding its description or deleting the mention of this alternative method altogether.

Page 13377, line 12: I’d change “polar angles” to “zenith angles”.

Page 13377, line 13: I wonder if measured BRDFs could be extended to zenith angles greater than 90 degrees by simply considering zenith angles not with respect to the vertical direction, but instead with respect to the direction normal (perpendicular) to the local slope.

Page 13379, lines 1-3: Can it be explained why backward Monte Carlo simulations are not affected by the $1/\cosine$ term that creates much of the noise in forward simulations?

Page 13384, line 27: I wonder what the most likely reasons may be for the offsets.

Page 13385, line 7: The word “accordingly” should be changed to “similarly”.

Page 13385, line 15: I suggest replacing “parametric simulations” with something like “sensitivity tests”.

Page 13387, line 17: It would help to clarify what is meant by “surface temperature mask”.

Page 13387, line 25: I suggest replacing “parametric studies” by “sensitivity studies”.

Page 13388, Equation A1: The variables p and q need to be defined somewhere.

Page 13389, line 10: What does selecting the smallest positive value mean physically?

Page 13397, Figure 4 labels: The words “Easting” and “Northing” sound unfamiliar to me; they should be replaced by something like “East-West distance” and “North-South

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distance”.

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