

## ***Interactive comment on “Neural Network Radiative Transfer for Imaging Spectroscopy” by Brian D. Bue et al.***

**Anonymous Referee #1**

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This paper is a compact presentation of a novel method of the emulation and use of radiative transfer models in compensating for the effects of illumination and the atmosphere to retrieve surface reflectance from measured radiances collected by an imaging spectrometer. It is quite dense and while it presents an adequate description, the results are just limited examples of the accuracy and a demonstration of its use.

It would be nice to see an expanded treatment of the first part of the article, the development of the forward emulation model, which is the main contribution. Section 2 presents the model with many details presented in a dense manner. It would be nice to expand and include more explicit equations for the various steps involved. More discussion on the selection and justification of the approach would also provide more insight. In Section 3, the rationale behind limited the parameters of Table 1 would be

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good to see.

In Figure 1, is the  $\rho$  in the middle of the figure supposed to  $\rho_{\text{obs}}$ ? If so please label as such. If not, how does it relate to terms defined in the text?

Figure 5 should have a color legend to better interpret the quantitative results. Also, why show mean squared error? Why not root mean square which can be better interpreted? Actually, is this the mean error across the wavelengths? That would mask errors that may be concentrated in the water vapor region. Please clarify.

What was the source for the smoothed reflectance shown in Figure 6? Field spectrometer measurements? A library? Did you also use a dark target for the vicarious procedure?

This work presents an exciting development in the operational use of imaging spectrometers and deserves a more comprehensive presentation. Perhaps this could be the subject of future articles.

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