

Referee Report on amt-2018-291

Title: Multi-scale Measurements of Mesospheric Aerosols and Electrons During the MAXIDUSTY Campaign

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Content: This paper investigate rocket-borne, multi-scale measurements of mesospheric aerosols and electrons. The measurements are compared to radar echoes of polar mesospheric summer echoes. The main findings are that there is a generally good agreement between spectral power of dust density fluctuations at the radar Bragg scale and the measured radar SNR. The authors state that the edge regions of PMSE are not well correlated with the rocket-borne measurements. In addition, from in-situ measurements derived proxies do not correlate with radar signal strength.

Comments to the authors:

A plot of global wavelet spectrum (~ 100 m height bin) of e.g. the DUSTY-1B would be of great interest. PMSE are thought to be formed by neutral turbulence acting on a dusty plasma. There are spectral models describing the behavior of tracer in such systems (e.g. Driscoll & Kennedy, *"Model for the Spectrum of Passive Scalars in an Isotropic Turbulence Field."*, Phys. Fluids, 1985). Whether or not the presented results support this should be discussed and will gain the impact of the paper.

As radar backscatter in the mesosphere is solely determined by electron density spectral analysis of the electron density measurements would be of interest. Can they reproduce PMSE edges as seen by radar?