Review Manuscript: amt-2020-333.pdf
Title: Improved method of estimating temperatures at meteor peak heights.

The authors apply Errors-in-Variables (EIV) modeling to the temperature-gradient (Hocking et al. [1997] and Hocking [1999]) method of estimating temperatures at meteor peak heights. The application of EIV is shown to improve temperature estimation without the ad-hoc calibration previously used. The authors recognize that the total variance (geophysical and parameter estimation error) needs to be used as the EIV model does not distinguish between the two sources of variability in the model equation.

I am surprised that no-one has done this previously. Thorsen et al [1997 Radio Science, V32, N2, pp707-726] applied total least squares (TLS – Van Huffel and Vandewalle [1991]), an equivalent technique to EIV (see Editorial Computational Statistics & Data Analysis 52 (2007) 1076-1079), to the estimation of the mean wind field in the middle atmosphere using estimates of radial velocity and angle of arrival of echoes in a similar manner to how MR data is analyzed. They came to the same conclusion that the model error included the geophysical variability as well as the parameter estimation error and that the geophysical variability was the larger contributor to the model error.

Line 23:
If the electron line density of the trail is less than 2.4×10^{14} electrons m^{-1} the trail is called 'underdense'….

The value of the electron line density that marks the transition between underdense and overdense meteor trails is frequency dependent.

The authors should either state that: "for frequency 36.9 MHz or for the Sodankylä meteor radar the electron line density of the trail is less than 2.4×10^{14} electrons m^{-1} the trail is called 'underdense'…"

Section 2:
It is not clear in the paper that the author is applying their analysis on underdense echoes only, rather than the underdense and overdense echoes that the SKiYMet system detects as valid meteors. Author only talks about restricting detections due to large radial velocity. Does this analysis include overdense echoes? If so, how does the author justify using an underdense model on an overdense echo?

Line 163
To this date, no such attempt has been made to assess these error variances in MR data.

Although this may be true specifically for MR data, error variances can be calculated theoretically, see Zrnić [1977], Doviak and Zrnić [1993], Woodman and Hagfors [1969] (referenced in Thorsen et. al. [1997]) for comparable calculations. Just because the effort has not been made, does not mean that it can't be made.

However, since the geophysical variability is likely to dominate over the parameter estimation errors this lack is potentially moot. Thorsen et al [1997] performed the comparison between the parameter estimation error and the geophysical variability and found that the geophysical variability dominated at all heights.

Line 290
However, temperatures estimated with any such arbitrary choice of data rejection criteria will lack consistency.

Is this will or do lack consistency? Was this tested or is this statement an assumption? Actually, I'm not sure I understand what is meant by "will lack consistency."