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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Rocket measurements of positive ions during polar mesosphere winter echo conditions" *by* A. Brattli et al.

Anonymous Referee #1

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1. I reaffirm my objections described in points 2. - 5. of my first evaluation of the Brattli et al. manuscript.

2. Perhaps the confusion can be clarified by citing the actual numerical values of the parameters, as shown in the following table:

Radar frequency	f	53.5	MHz
Wavelength	$\lambda = c/f$	5.61	m
Wavenumber	$k = 2\pi/\lambda$	1.12	m^{-1}
Bragg Wavelength	$\lambda_B = \lambda/2$	2.80	m
Bragg Wavenumber	$k_B = 2\pi/\lambda_B$	2.24	m^{-1}
Bragg scale length	$\ell_B = 1/k_B$	0.44	m

3. The authors have used the Bragg wavelength, which is equal to 2.8 m, where they should have used the Bragg scale length, which is equal to 0.44 m. This is NOT a question of convention. This is a question of correct physics and correct mathematics.

4. Since the turbulence dissipation rate depends on the inner scale length elevated to the power of -4 ($\epsilon \propto \ell_0^{-4}$, Eq. (15) of the manuscript), the differences in the results are immensely different when using the wavelength ($\lambda_B = 2\pi/k_B = 2.8$ m) compared to using the scale length ($\ell_B = 1/k_B = 0.44$ m). The scale length of the electron density fluctuations that a radar at 53.5 MHz detects is 0.44 m. The scale length is NOT 2.8 m.

5. See the references:

1. Kelley, M. C., and J. C. Ulwick (1988), Large- and small-scale organization of electrons in the high-latitude mesosphere: Implications of the STATE data, J. Geophys. Res., 93(D6), 7001–7008.

2. La Hoz, C., et al. (2006), Observations and theories of Polar mesospheric Summer Echoes at a Bragg wavelength of 16 cm, J. Geophys. Res., 111(D04203) doi:10.1029/2005JD006044.

These references are also cited in my first evaluation.

6. The main conclusions of the manuscript are based on incorrect values of the scale length, and therefore those conclusions are not correct/true.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 7093, 2006.

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Interactive Comment

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