

Turbulence parameters measured by the Beijing MST radar

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This paper uses data from the Beijing MST radar to compare three methods of correcting the spectral width measured by the radar (at a zenith angle of 15°) for beam and shear broadening. It shows how the choice of method leads to a different likelihood of (apparent) negative turbulent broadening of the spectrum, depending on atmospheric conditions. The study is well constructed, the paper is clear and of value to the wind profiling community so I recommend publication subject to some minor corrections.

There is however a need to re-examine the calculations that have gone into this paper: see my comments on the actual formula for Nastrom and the value of c_1 for DH in the list below.

I.144 explain why specular reflection is a problem for calculating turbulence parameters. Also ‘...such as in a statically...’

Table 1 – explain what is meant by coherent and incoherent averaging (these terms don’t mean much to readers unfamiliar with the MST radar technique)

I.156 How long a period is the data collected for a single observation (that is compared to the sonde)? 50 s?

I.186 broadening not widening

I 206 Equation 7 is wrong – it should read $\dots r \cos \chi + \theta^2/24 \dots$. Also, having introduced the notation $\theta_{\frac{1}{2}}$ earlier, this expression should be used in this equation to avoid any confusion in the mind of the reader.

I.212 Dehghan and Hocking’s model is actually quite different to Nastrom’s – it doesn’t just contain one extra term for example. They derived it from their own 3-D simulations so you should explain more clearly how the two models differ.

General question – Dehghan and Hocking (paragraph leading to their eqn 10) argue that the factor 3 in the first term on the RHS of equation 7 is actually wrong and should be replaced by $4 \ln 2$ (2.77) if σ is the velocity variance, which is where their κ comes from. Could you discuss this point and test what difference it makes to your work?

I.363 Why do you use $c_1 = 0.45$ for the DH model when Dehghan and Hocking themselves use 0.27? (just before their eqn 3)? Saying that you use 0.45 ‘to facilitate comparison’ does not make sense.