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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Simultaneous lidar observations of temperatures and waves in the polar middle atmosphere on both sides of the Scandinavian mountains: a case study on 19/20 January 2003" *by* U. Blum et al.

Anonymous Referee #1

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This paper describes some interesting co-located gravity wave observations in Scandinavia and, provided the concerns I have below are met, it should be suitable for publication in ACP. I do note however, that the authors took no notice of the initial comments I made on this paper.

1. Spectral analysis. The paper carefully describes the method of spectral analysis, but does not say why this particular method was chosen. In particular, it does not say why the spectrum was multiplied by the vertical wavenumber to give `the amplitude of a given wave'. Why is this not given directly from the power spectrum? I am sure there is a reason for this but it is not obvious to me, or to several colleagues I have spoken

to who are familiar with this field.

2. 973.10. `the value of GWPED is constant with altitude'. This is not true: GWPED will be constant along a ray path (group trajectory). This, and the fact that the wave source is not constant in time, means that vertical variations in wave amplitude cannot be taken as evidence of dissipation. The statement in 976.25 that `the measurements show unambiguously that that the observed waves deposit energy with increasing altitude in the 30-50 km region' is therefore not substantiated by the data in the paper and should be omitted.

3. 973.20 Given that the horizontal phase speed is zero, what do you mean by a propagation direction? Group propagation?

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 969, 2004.