

Interactive comment on “Spectral characteristics of atmospheric pressure and electric field variations under severe weather conditions at high latitudes” by E. A. Kasatkina et al.

Anonymous Referee #1

Received and published: 25 August 2006

General points

The study presents an unusual combination of atmospheric electrical and microbarograph measurements, which show common responses to meteorological changes. There is much originality in this experimental work, however the motivation for the study, as given is weak. This needs to be developed on in any revised manuscript. That having been said, the authors have three clear findings:

(1) In the rain case, the data clearly demonstrates that there are high frequency variations in electric field which occur at around the same time as the precipitation.

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(2) In the thunderstorm case, the dynamic disturbance causes pressure fluctuations and the associated cloud electrification electric field fluctuations. The periods with high frequency variations in both variables coincide.

(3) In the fog case, there is high frequency pressure noise during the fog, and some slight evidence for high frequency noise in the electric field. As suggested, it seems reasonable to attribute this to microscale coherent turbulent structures.

Specific points

The conclusions are hard to understand, beyond repeating the results. A point probably missing is that very different measurement techniques are providing consistent data, which generates confidence in the individual measurements. Secondly, the direction of causality is that the substantial meteorological changes are causing the other more subtle changes which can be detected. The conclusions need to be improved and focussed on specific aspects.

What are the consequences and applications of these findings? Perhaps the presence of high frequency fluctuations in the electric field could be used to identify data in which local meteorological effects are dominating, so that they can be excluded from long term averages ?

Technical points

p6615 L27: The absolute accuracy of $10^{-16} \text{ Ohm}^{-1} \cdot \text{m}^{-1}$ depends on a calibration. How was this carried out? (Perhaps the authors meant resolution rather than accuracy?)

p6616 L2: Is this sensor a field mill?

L23: It is the rain induced E_z changes which are accompanied by the oscillations.

Figure 1 (and figure 5c). Can the the polar conductivities be made absolute given the accuracy stated?

What is the relative value referenced to?. In both cases it would be clearer to use the same axis for both polar conductivities, - rather than the mirror image plot - for example showing the asymmetry between the two conductivities.

p6617 L2: lightning

Figure 3 is not introduced in the text in the order in which the panels are discussed.

Caption for Figure 4 needs to include reference to figure 4b.

Both figures 4 and 6 would benefit from titles of "Pressure" and "Electric field" added to the moving spectra plots.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 6613, 2006.

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