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Interactive comment on “Influence of a single lightning on the intensity of an air electric field and acoustic emission of near surface rocks” by S. E. Smirnov and Y. V. Marapulets

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General comments. The paper describes the experimental study in the field of geophysics, and more precisely in the field of atmospheric electricity. This is a typical case study. The authors focused attention on the unique event at the specific weather conditions in Kamchatka. It should be noted with satisfaction the desire of authors to obtain fundamentally new results. In particular, the paper contains a description of the high frequency acoustic emission which associates with the electric discharge. Further, authors orient to the quantitative analysis of phenomenon (I mean their precise evaluation of “tau”). I have noted some shortcomings of this work (see below). However my overall

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conclusion is that the paper may be published after some corrections.

Specific comments. The question naturally arises: What is the sign and the magnitude of the charge, which was transported on the ground? I think that authors have a possibility to answer on this important question. In this relation I recommend the book “The theory of atmospheric electricity” by Ya. Frenkel. (It is strange that this excellent book is absent in the References).

It is not clear what is the reason to believe that “From a cloud . . . a single lightning discharge occurred”. Is it a hypothesis, or may be this conclusion is based on an optical observation? If it is a hypothesis, then I do not understand what is the reason to believe that some “lightning discharge from a cloud” is the prime cause of the electric and acoustic phenomenon which were observed by authors. With all the caution I will present the following assumption. It is not excluded that some mechanical destructions of the rocks are a cause of electric phenomenon. Such sort of “triboelectric shocks” we with Dr. Anatol Kamshilin observed from time to time at the polygon “Abuzi”.

Minor remarks and technical corrections. Spelling of formula (1) is not very good. The authors must use *MathType* or some other editor. “ $E_z(t)$ ” is not the “electric field potential gradient”. It is the vertical component of the electric field, etc.

I suggest to reject the formula (2). Instead, just give numerical values ??for the coefficients referred to in (1). Of course, with an indication of the physical dimensions. Lack of dimensionalities in (2) makes a bad impression.

I strongly disagree with the fact that the authors were able to estimate the size of the source. The most that they could do is to estimate the wavelength, and it is quite another matter.

It is rather strange to read that “energy fall occurs according to the law of $1/r^2$ ”. Firstly, the energy is conserved. Secondly, it is not clear, what kind of energy (electrical, magnetic, mechanical, thermal). And why $1/r^2$? This piece requires processing.

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Interactive comment on Solid Earth Discuss., 4, 627, 2012.

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