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Interactive comment on “Brief communication “Earthquake–cloud coupling through the global atmospheric electric circuit”” by R. G. Harrison et al.

Anonymous Referee #2

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The brief communication of Harrison et al. “Earthquake–cloud coupling through the global atmospheric electric circuit” is an interesting attempt to explain the possible connection of linear cloud structure formation with possible ground level ionization associated with the earthquake preparation process. First of all I would like to mark that the “Charge exchange” contradistinction to the transport of ionization to the cloud level mentioned in the conclusion is a kind of slyness because there are no publications proposing such ideas as ionization source transport to the level of cloud formation.

The basic numbers and ideas taken for calculation in the paper are very far from reality. For example, the radon rates before earthquakes usually reach values near 2000

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Bqm–3 See, for example Āřnan, S., Akgöl, T., Seyis, C., SaatçĀşlar, R., Baykut, S., Ergintav, S., Baş, M., Geochemical monitoring in the Marmara region (NW Turkey): A search for precursors of seismic activity, J. Geophys. Res., 2008, 113, B03401, doi:10.1029/2007JB005206

Segovia N., Pulinets S.A., Leyva A., Mena M., Monnin M., Camacho M.E., Ponciano M.G., Fernandez V., Ground radon exhalation, an electrostatic contribution for upper atmospheric layers processes, Radiation Measurements, 40, 670-672, 2005

So the ionization rate is much more strong than taken for calculation.

The attributing of IIN to the Wilson supersaturated camera has nothing common with reality. It is was shown that ions are very good centers of water vapor condensation in the normal atmospheric conditions

Svensmark H., Pedersen J. O. P., Marsh N. D., Enghoff M. B., Uggerhoj U. I.: Experimental evidence for the role of ions in particle nucleation under atmospheric conditions. Proc. R. Soc. A. 2006, doi:10.1098/rspa.2006.1773

Sekimoto and Takayama, Observations of different core water cluster ions Y–(H₂O)_n (Y = O₂, HO_x, NO_x, CO_x) and magic number in atmospheric pressure negative corona discharge mass spectrometry, J. Mass. Spectrom. 2011, 46, 50–60

In the second paper it is demonstrated that the formation of cluster ions takes place under any level of relative humidity.

Just the IIN leads to formation of ion clusters of the aerosol size what was demonstrated in the paper of Pulinets and Ouzounov, 2011. And these ions are seeds for the earthquake clouds formation.

The paper also does not take into account the bipolarity of the earthquake cloud effect which is formation of linear cloud structures, and also formation of linear translucidity in the cloudiness.

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And finally the oversimplified presentation of the Global electric circuit which does not take into account the conductivity anisotropy at the altitude higher than 60 km regardless this task was resolved as early as in 1998:

Pulinets S.A., Khegai V.V., Boyarchuk K.A., Lomonosov A.M., The atmospheric electric field as a source of variability in the ionosphere, Physics-Uspekhi, 41, 1998, No 5, pp. 515-522

Taking all this arguments into account It seems that the paper should be deeply reconsidered under the major revision process.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 7271, 2013.

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