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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Estimate of ULF electromagnetic noise caused by a fluid flow during seismic or volcano activity" *by* V. V. Surkov and V. A. Pilipenko

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Specific comments (1) The reviewer 2 wrote: "Is it better to use ULF electromagnetic field or ULF electromagnetic signal instead of ULF electromagnetic noise?" We believe that this point is not so important because the signals due to groundwater/magma motion are random in character; that is, noise-like signals. The term "ULF electromagnetic noise" seems to be a more appropriate term in describing this effect although one may use "ULF electromagnetic signals" instead.

(2) The reviewer 2 wrote: "The authors compared the Hall current and EK current. . ."

This remark is positive in character and thus it does need any replies.

(3) The reviewer 2 wrote: ". . .They only evaluated the EM field caused by volcano magma motion. Moreover, the author didn't estimate the EM signal resulting from the EK effect. . .It will be better for the read if the author can estimate the fluid-flow-induced EM field due the EK effect by choosing typical and realistic values for the variables in Eq. (5). The estimation of the EM response can be made in a way like they did for the case of the volcano magma motion in Eqs. (15) and (17)." We cannot estimate reliably the EK effect by using Eq. (5) since it should be averaged over the cross section of porous medium before applying this equation to the actual rock. Similarly, Eqs. (15) and (17) cannot be used with this aim in mind because they are valid for a single channel but not for the randomly distributed channels. However, such kind of estimates of the EK effect has been published (e.g., see Surkov and Pilipenko, [1999]) despite the lack of information about permeability, porosity and other actual rock parameters at higher depth.

(4) The reviewer 2 wrote: ". . .The EM responses caused by volcano activity are in principle similar to the EM variations induced by tsunami and similar to the motion-induction effect. . . The authors are suggested to read these related articles which study other mechanisms for the EM disturbances." Despite the similarity of these effects, the perturbations of the geomagnetic field due to the motion-induction effect are referred to as the class of co-seismic phenomena associated with the moment of the seismic waves/tsunamis arrival to the observation point (e.g., see [Surkov and Pilipenko, 1999; Surkov and Hayakawa, 2014]). In our present study we cannot come close to the exploring of these transient phenomena. The detailed discussion of this specific problem can be found in the above-mentioned publications. âĂČ

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