

## ***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***

**A. Revil (Referee)**

arevil@mines.edu

Received and published: 28 October 2014

The papers lacks a fundamental of electrokinetic mechanisms in poroelastic bodies, i.e., the fundamenta coupling between the generation of the electromagnetic phenomena and the connection with the stress / strain tensors. This is sad because such connection has been done in other papers (uncited by the preesnt authors) for instance the effect of the moment tensor of the crack regarding the electromagentic effects (e.g. Mahardika H., A. Revil, and A. Jardani, Waveform joint inversion of seismograms and electrograms for moment tensor characterization of fracking events, *Geophysics*, 77(5), ID23-ID39, doi: 10.1190/GEO2012-0019.1, 2012). For hydrofracking, it was shown by

C2347

Haas et al. (*Geophysics* 2013) that the mechanisms is electrokinetic in nature, the other mechanisms seem negligible. The co-seismic effect, the seismoelectric conversion effect and the source electrokientic effect associated with the electrokientic contribution were known before Nagao et al. (200)) paper. Please cite the fundamental literature on the subject (e.g., Pride,1994 and many others.) Eq. 5 cannot be found in de Groot and Mazur which is a general textbook on cross-coupling phenomena. But it does not deal with electrokinetic effects. Volume averaging theory implies that the formation factor and therefore a tortuosity factor should be generally present in Eq. 5. A lot of the math can be found in Kopytenko and Nikitina. The authors forgot to make the connection with the generation of the cracks (where is the statistics on crack formation and therefor electromagnetic noise?). Therefore I don't think this paper can be consider as new enough to warrant publication.

---

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 6475, 2014.