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Interactive comment on “A critical discussion of the electromagnetic radiation (EMR) method to determine stress orientations within the crust” by M. Krumbholz et al.

Anonymous Referee #3

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Review of the paper " A critical discussion of the electromagnetic radiation (EMR) method to determine the stress orientations" by M. Krumbholz et al.

This is a well written paper about the electromagnetic radiation method (EMR) where the authors give a critical discussion about the results of EMR method. Using an instrument called Cerescope, which was built by a German company, several case studies about different geological targets using the EMR method are published in the literature. However, these papers are mainly published in non-geophysical journals and might be reviewed by non-geophysicists or physicists. All these papers argue that stress orientations in the crust can be derived by EMR data. The paper of Krumbholz et al. critically

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discusses the results of these papers. They state quite convincing that the observed EMR signals are mainly related with the VLF transmitters which are distributed worldwide and that their secondary fields can be received from a large distant. VLF is a well established method of the applied geophysics and it is successfully used to locate lateral conductivity anomalies in the subsurface. This method is working in the frequency range of 10 kHz and 30 kHz and due to the skin effect of the electromagnetic field its penetration depth is limited. The EMR technique is also working in a similar frequency range. Therefore, it is no wonder that EMR signals, which are assumed to be related with stress conditions in the crust, can be influenced by the induction phenomena of the VLF signals. The paper gives convincing examples that the signals measured with the Cerescope device are mainly influenced by the VLF signals. Apparently, the filter built in the Cerescope is not working properly so that the VLF signal influences the assumed EMR signal. As stated by the authors, the frequencies of the VLF signals are well known. Can these frequencies not be filtered out numerically from the measured signal by digital filters? I would like this question to be answered by the authors. In addition, I suggest to give a detailed physical explanation about the basics of the EMR technique, although the authors give all the necessary literature about it. The paper convinces the reader that the previous papers about the EMR method did not take into account the role of the VLF transmitters and their work should be reviewed again. However, I suggest to inform the company, who built the device, or the authors (e.g. Obermeyer), who write case studies about EMR, so that they can also argue scientifically about the criticism given in this paper. As far as I understand, the paper is open for scientific discussion. The publication of this paper would possibly cause an economic disadvantage for the company selling the Cerescope device.

Interactive comment on Solid Earth Discuss., 4, 993, 2012.

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