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Solid Earth Discussions

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

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Dear Referee #2,

thank you for reviewing our manuscript and for your comments that will help improving the manuscript. In the following, we want to answer your questions and respond to your comments.

1: You are asking for a figure showing the amplitude of the signals as a function of frequency to demonstrate the characteristics of the band-pass filter and to give some technical specifications.

a) Unfortunately, the Cerescope does not provide a function to read out the raw data or the filtered time series. It only provides the processed data as explained in the Methods section. Therefore, we cannot include a figure showing the amplitudes of the "real" signal. The only way to show the filters working are their real-time spectrum on the Cerescope display, which adjusts the highest values automatically to the display height, without labelling. Therefore, we decided to show the following photographs only in our reply to your comments (Fig.1). In Fig. 1, the transmission range of the filter is enclosed by the black box. Figures A1 and B1 show the application of a band-pass filter with the cut-off frequencies 5 and 25 kHz. Figures A2 and B2 show a band-pass filter with cut-off frequencies at 25 and 50 kHz. The signal marked in blue at 37.5 kHz originating from the VLF transmitter NRK (Iceland; Fig. A2) remains inside the spectrum of the band-pass from 5 to 25 kHz (Fig. A1). The signal marked in red at 23.4 kHz (DHO38) is the strongest signal of the spectrum (Fig. B1 and B2), independent of the kind of band-pass filter.

b) During the intermission time of DHO38 or when applying a notch filter to exclude its 23.4 kHz signal, the detected signals are caused by another VLF transmitter shown in Fig. 4, 7 and 8 of our manuscript. As evident from Fig. 10 and Fig. 1 of your intercactive comment on our paper, there is a large number of VLF transmitters at the frequency range used by the Cerescope, but its ineffective band-pass filters and the existence of only two notch filters result in measurements of VLF-transmitter signals. Consequently, the Cerescope is not able to eliminate signals received from VLF transmitters and, thus, the weak background signal, which might contain the natural micro-crack induced EMR, cannot be measured with this device.

Unfortunately, there are no detailed technical specifications of the Cerescope filters and the further data-processing algorithms. However, we will add a figure into our manuscript, showing quantitatively the change of the main BEMR direction towards another VLF transmitter, due to the application of a notch filter, as also asked for by referee 1.

2: You recommend to refer to publications describing the results of VLF and RMT measurements above existing fracture zones.

We absolutely agree. We will complement this part with additional references suggested by you.

3: Typo correction “VFL” to “VLF” at page 1009 on line 23.

VFL will be replaced with VLF.

We hope that we could answer your questions and responded to your comments satisfactorily.

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

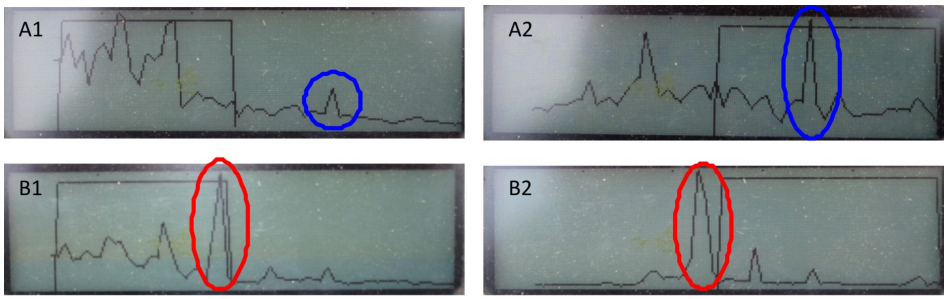

Fig. 1. Cerescope display showing the spectra between 5 and 50 kHz (x axis). Amplitudes cannot be determined, because the y-axis is not labelled and adjusts to the maximum value automatically.