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Microseismic Imaging at KTB

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We have applied our passive seismic imaging approach to the data obtained from the German Continental Deep Drilling program (KTB project), 2004/2005 experiment. The idea of microseismic imaging is to treat the recorded microseismic wavefield as a common shot gather with the known hypocenters location as an active source position and to construct the images of the reflections within the data. In our case, we have one single 3C geophone and 414 located microearthquakes, therefore it is possible to construct separate images for each of 414 microearthquake geophone pairs and then to merge them. In order to present the seismic data in a standard way and to check its consistency we swap sources and receiver. Thus, we are able to get a single "source" and cloud of spatially distributed "receivers". In this work we demonstrate the imaging results of the part of the 3C traces between P- and S- direct waves which we can interpret as PP reflections. There are complex network of reflectors revealed within microseismicity cloud which belong to SE2 reflector. Obtained result is consistent with surface seismic images by the location and dip and also confirmed by comparison with the borehole lithology data. Furthermore, it provides a more detailed image of fine structure of the fault zone due to the higher frequencies used in our study (60 – 450 Hz).

Web page: <http://www.geophysik.fu-berlin.de/phase>