

Interactive comment on “Assessing accuracy of gas-driven permeability measurements: a comparative study of diverse Hassler-cell and probe permeameter devices” by C. M. Filomena et al.

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Thank you very much for your critical and constructive comments. We have addressed all of them in the revised version of our manuscript. Please find some short answers on your comments below.

Kind regards Claudio Filomena

1.) Page 1167, line 7 (same as comment of Haakon Fossen): Additional information on the depositional environment of the sandstone samples is now provided. Petro-

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graphic/mineralogical parameters are discussed at the end of section 2.1. The samples have been selected on purpose, not randomly, to obtain a most uniform sample set, as far as possible. All samples are well sorted with subrounded to rounded quartz grains. The amount of feldspar is <15% (mostly subarkosic). Low-permeability samples contain minor to slightly enhanced amounts of clay minerals (illite and kaolinite), whereas the highly permeable sandstones are clay free. As cementing phases occur quartz and carbonate.

2.) It is correct, that we observed device-specific deviations. This is the main message of our paper. It has to be taken into account that every device has its own aberrations. These aberrations may be significant, when two or more devices are used within one study, or when measuring results from a number of devices shall be compared. It has also been documented, that deviations may occur only at certain permeability intervals. It is essential to be aware of such potential discrepancies and we recommend to perform similar tests as soon as a number of different devices are applied. We definitely agree, that it is difficult to compare permeability data from different entities. According to your suggestions, we discussed the problem of rock heterogeneity and its impact on probe or Hassler cell measurements.

3.) The geometric factor plays an important role in mini (or probe) permeametry. This has exemplarily been shown for the TinyPerm II, where the sample geometry, respectively the size, considerably affects measuring results (with 37% on average). In order to document aberrations of the miniperm, a geometric factor has been applied to match with the Hassler cell. However, in the Darcy equation this factor is linear, with an equal effect on the entire range of permeability. Aberrations which are only effective within a certain permeability interval cannot be corrected this way. This was documented within our study.

4.) Since we have not conducted water-permeability experiments within this study, we have no data for that. But we discussed it with some examples from literature.

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5.) Of course it is acceptable to have a certain degree of uncertainty. We would never expect that such devices have a 100% one-to-one correlation. However, it is still important to be aware of potential discrepancies – some devices have higher ones, others only minor. Whatever the purpose of permeability measurements within a study may be, the application of comparable datasets may be convenient.

Interactive comment on Solid Earth Discuss., 5, 1163, 2013.