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Interactive comment on "Long-term geochemical and hydraulic measurements in a characteristic confined/unconfined aquifer system of the younger Pleistocene in northeast Germany" *by* C. Merz and J. Steidl

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I grounded my review on the paper available on the Journal website (pages 113-125). I didn't get into the data themselves.

The paper is presenting the acquisition of a data set of hydraulic heads and groundwater analyses (mostly major elements) sampled over a 14 years period in rather shallow geological formations from north-eastern Germany. The paper is presenting more or less the metadata, not the data themselves, nor any interpretation and scientific al-

ready gained from the data set. The authors advocate that these data may be useful for other researchers and are consequently worth to be published.

GENERAL COMMENTS The paper is well written, and the quality of the English is good. Figures are also of good typographical quality, however, as far as their content is to be discussed, they should be improved (see below). The analytical methods seems to be of high quality, and the results from the analyses are surely reliable (duration of pumping for each sampling for analyses must however be checked). It is not said if the automatic piezometric data loggers were calibrated from the manual measurements, but as both were done I hope it was done. It's a pity that piezometric levels were only measured on a daily basis as short term effects like piezometric head variations related to barometric variations, tides, and also and mainly to surface- ground- water relationships will not or hardly be interpretable (a 15 minutes measurement time would have allowed such a monitoring which is of high interest and is usually routinely performed on piezometers). Moreover, such a high frequency monitoring would have been of high interest in this subsurface context to explore surface- ground-water relationships. The qualification of "long term" is not sustained by the data; in fact, in hydrogeological systems, 14 years may be "short term" (see for instance Blavoux et al., 2013, Journal of Hydrology)!

Moreover, to my opinion, the presented data set is far to be enough to allow an interesting research for researchers who would be interested to valorize these data. Some of these data (§2. below) may be accessible, but should be summarized in the paper to favor the interpretation of the presented data set. Some other data (§1. below) are surely not accessible as they were acquired by the authors of the paper. The paper should thus be completed accordingly. Without this, the added value of this data set for the scientific community is difficult to assess particularly if it is compared to other hydrological research observatories. Another point: similar data may be available in this region, particularly those resulting from the Water Framework Directive networks. These other data should be cited and located. Moreover, why these boreholes were

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drilled and monitored is not explained. This should be done, and also which results have already been gained from this survey.

1. Lots of mandatory data are lacking, and moreover these data can surely not be accessed, such as (it is not exhaustive list): - a conceptual hydrogeological model of the site indicating with maps and cross sections the geological structure and hydrogeological functioning of the experimental site, as well as surface- ground-water relationships, and the main water fluxes. The reports or publications supporting this conceptual model should also be accessible; - the detailed geological, hydrogeological and technical logs of each well (written description and figures). A very important point is the location of the permeable layers, the way they were equipped (location of screens; from line 12 of page 118 it seems that the wells were screened without taking into account the geological log), the way the wells were drilled and developed, to avoid clogging risks, and, a very important point to check the validity of the head measurements and sampling, the way the wells were sealed (grouted) and the length of the grouted zone in each well; - results of hydrodynamical characterization of the aquifers, aquitard and aquicludes (hydraulic conductivity, storativity), from pumping tests, slug tests, or even analyses on the cuttings or better on cores; - water level data (to be preferred to discharge data) in the local river, to understand surface- ground- water relationships; - duration of sampling for analyses in each well must be given, to check that the water was renewed enough before each sampling; - etc..

2. Some other data, that may be available from other existing data bases, such as: - rainfall, meteorological parameters to allow to compute potential and real evapotranspiration, for instance on a daily time step; - landuse/landcover over the region; - from regional to local (the site) geological and hydrogeological framework and particularly piezometric maps of the studied aquifers. These piezometric maps will help to delineate the groundwater catchment which will be more useful as a reference than the surface one. Groundwater abstraction wells may also be located on this map; - etc..

This being said, I do not completely agree with the following sentences from the intro-

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duction: “Changing hydraulic boundary conditions and how they influence the observed dynamics of the subsurface water geochemistry are poorly understood (Hansen et al., 2011). The cause-effect chains of different impacts often remain unclear.” With the appropriate data and interpretation, these issues can be tackled. This is the basics of water science.

TECHNICAL CORRECTIONS Figures: on each figure, the legend is missing - Fig 1: a scale is lacking, as well as a legend and, at least, topographic indications. The rivers and the landuse are difficult to identify on the printed document - Fig 2: the legend of the geological profiles is lacking. As stated above, complementary information would be useful such as technical equipment of the wells, hydraulic heads, etc.

Interactive comment on Earth Syst. Sci. Data Discuss., 8, 113, 2015.