



EGUsphere, editor comment EC1
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Comment on egusphere-2022-164

Elias Lewi (Editor)

Editor comment on "Geophysical analysis of an area affected by subsurface dissolution – case study of an inland salt marsh in northern Thuringia, Germany" by Sonja H. Wadas et al., EGU Sphere, <https://doi.org/10.5194/egusphere-2022-164-EC1>, 2022

An interesting attempt is made to present an integrated geophysical survey. Even though it is common to give less detailed information in data processing in integrated geophysical survey, the comment of reviewer no. 2, especially in relation to SH waves needs to be considered seriously. Similarly, I have some additional comments in relation to the gravity data processing and interpretation that are attached herewith below. The authors should address and accommodate all the comments and resubmit the manuscript to consider it for publication.

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- ETRS89, which is the European Terrestrial Reference System 1989, is an Earth-Centered, Earth-Fixed reference system, which is based on the GRS80 ellipsoid. On the other hand, DHHN92 is a height system above mean sea level ("Höhen über Normalhöhennull, in DHHN2016"). From the first paragraph under section 4.4 it can be understood that the authors used the Somigliana's closed form formula to compute the normal gravity and they have computed the Complete Bouguer Anomaly using the formula given by Hinze et al. (2005). In that case, the effect of the geoid undulation on the data will not be taken care because the normal gravity is computed on GRS80 and the height used to compute the Complete Bouguer Anomaly is an orthometric height. In other words, the effect of the height between the ellipsoid and the geoid is not removed, though it will most probably, shift all data points constantly as your area is small. However, from the computational point of view it is still a mistake, and this constant shift should either be mentioned or the processing should be done using geometric height. This is well explained in the paper which the authors have cited (i.e. Hinze et al., 2005). They should have used height above the ellipsoid not above mean sea level. In that case also they have to remove the EGM96 geoid undulation from the DEM model as most of these models have geoid undulation from EGM96. As they haven't mentioned which DEM model, they have used it is hard to comment on this.
- As height has a deceive influence on gravity data reduction, it will be good if the authors explain how height errors have propagated unto the Bouguer anomaly so that it is possible to appreciate the interpretation.
- Which DEM is being used? As the different DEM models have different accuracies, it will be great if the DEM used is mentioned to appreciate the interpretations.
- The authors have stated that they have used a filtering method in the gravity data processing without mentioning the type of filter. The type of filter and the parameters

used have an impact on the result and it will be good if the authors specify the type of filter and the parameters set for filtering to appreciate the interpretations. What changes has the filtering process has brought.

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- In the model of the gravity data, there are small sharp edges, which I think are directly taken from the controlled source seismic profile. I am sure that this can't be detected and resolved by the surface gravity survey and it would have been good to present what is only detectable and resolvable by gravity method.

General

- As gravity data modeling is highly non-unique, it would have been appreciated if the authors try to describe the methods, they have used to constrain the density of the different layers and their shape. The integrated approach including borehole information can be a very good spring board for this analysis.