

Interactive comment on “Hydrogeological characterisation of a glacially affected barrier island – the North Frisian Island of Föhr” by T. Burschil et al.

Anonymous Referee #2

Received and published: 13 June 2012

I have read your paper with great interest. You present a case study where a combination of geophysical investigations and borehole logs were used to improve the geological/hydrological model of the Island of Foehr. Besides the clever integration of different geophysical methods/results in the model building the main scope of the manuscript -hydrogeological characterisation- remains unclear to me.

Therefor I recommend an intensive revision of the manuscript with a much clearer focus/better objectives and a well thought-out plan - major revision.

The following comments are suggestions and I hope you find them useful in improving

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the quality of your manuscript:

General:

The manuscript has a good overall appearance and the gross structure is sufficient. It shows good data quality and the used methods seem to be successful in compiling and/or improving a geological model. For me the manuscript seems to be two-parted with the geophysical data and model building part much more perfected. The whole characterisation objective doesn't seem well-thought-out and feels rushed together.

The manuscript needs much more clearness, better objectives or clarity about the objectives. The initially mentioned points about groundwater situation and climate change as well as water supply for the future are not elaborated throughout the manuscript.

Specific:

Title misleading: characterisation....?

Abstract: needs more "results", not concise, and not conform with Conclusions

Section 1: Introduction lacks references, i.e. where is the work situated in these days research The little intro paragraphs of each section seem to fit more into the general introduction of the whole manuscript. Introduction needs more objective or better definition of aim of the manuscript.

Section 3: I think you should either describe the geophysical data processing in greater detail or give a reference to another publication.

Section 3.4 and 3.5: Combined analysis and 3-D model should be much more explanatory, how are the data exactly used to build or improve the model, what part of the data is incorporated into the model? How is dealt with small scale bodies or uncertainties?

Section 4: Results chapter hard to follow, partly not understandable what the main focus is.

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I'm missing comments about other relationships, such as Poisson's ration or at least Vp/Vs ratios.

For the characterisation topic velocity and resistivity cross plots of different layers would be indispensable.

What happens to the petrophysical relationships with different water content (if layers bear more or less water, fluctuating groundwater table)?

Section 5: Discussion needs a more general discussion about the results and not just data quality. On the other site data quality discussion should include some quantitative statements about resolution (limited?, but how good or bad is it , horizontal, vertical, quantitative) Error/Uncertainties discussion, what about interpolation of TEM data and small scale bodies, how can the 3D model be consistent if your are using line and point data?

The discussion is partly in contradictions with the Abstract (use for groundwater modeling?).

Section 6: Conclusions need to state more clearly what the improved model is used for.

Please make sure that all listed references are also in the text or remove from References. There could be a supplementary set of data (TEM, seismic)

Fig 3: needs better caption and/or explanation in text

Technical Corrections:

Please be consistent in either British or American English (e.g. analysed vs analyzed, pg 5086 line 21 or characterise vs characterize, pg 5086 line 2 and pg 5087 line11)

Check punctuation throughout the manuscript especially with long sentences.

Page 5086 line 23: island -> Island Page 5089 line 17: yr -> yrs Page 5091 line 22:

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good data quality -> good quality Page 5092 line 20: acquisition parameter -> acquisition parameters

A few of the figures lack in quality e.g. resolution, annotation size, e.g. Fig 1: annotation too small, Fig 2: resolution of map, etc.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 5085, 2012.

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