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Interactive comment on “3-D geomechanical modelling of a gas reservoir in the North German Basin: workflow for model building and calibration” by K. Fischer and A. Henk

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The paper addresses relevant scientific questions within the scope of Solid Earth and presents novel concepts, ideas, tools and interpretations in modeling a general hydrocarbon reservoir. The introductory chapters 1 and 2 are very informative, but in comparison to the case study (chapter 3) and the conclusion they seem to be very extended. The general workflow (chapter 2) obviously is already part of the authors new concept to model stress and strain tensors in 3D for any location of a reservoir. But it is not really clear what is new and what already existed. Especially the conclusions could be more substantial with respect to the the very detailed reservoir model

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descriptions. The scientific methods and assumptions are valid and clearly outlined, the results are more than sufficient to support the interpretations and conclusions. The description of all the calculations are sufficiently complete and precise to understand and perhaps reproduce them. The title does not clearly reflect the contents of the paper, because it refers first to the case study "North German Basin". But most of the paper deals with computing and processing a more general reservoir model, its geometry, the incorporation of faults and of different material parameters. After the very detailed and informative discussion of general work flow with its geometry transfer, the incorporation of faults and material parameters and the final model calibration, the application of all these parameters to the case study North German Basin is somehow superficial. The description of the case study contains a lot of objectives to build a field-scale geochemical reservoir model of the North German Basin, but it does not introduce real field data. It is mentioned that the final geomechanical reservoir model covers an area of more than 400 km², which comprises about 4 mio FE elements, but real data to the presence of faults, to material parameters are lacking. In that sense the abstract provide a concise and complete summary. The overall presentation is well structured and clear, the language is fluent and the number and quality of references is appropriate. Nevertheless the described general 3D geomechanical FE model with incorporated faults and material parameters provide an excellent data base for a better understanding of reservoir geomechanics with respect to fluid flow anisotropies caused by tectonic stresses and improved planning of numerous reservoir applications

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