Geosci. Model Dev. Discuss., 8, C2170–C2172, 2015
www.geosci-model-dev-discuss.net/8/C2170/2015/

Geoscientific Model Development Discussions

Interactive comment on "GO2OGS: a versatile workflow to integrate complex geological information with fault data into numerical simulation models" *by* T. Fischer et al.

Anonymous Referee #1

Received and published: 24 September 2015

Dear editor, dear authors: please find following my review of the article: GO2OGS: a versatile workflow to integrate complex geological information with fault data into numerical models

The authors developed a workflow principle to use typical GOCAD geological models into a mesh readable by the FEM software OpenGeoSys and other programs using the open source format of VTU. Thereby the authors develop different strategies and approaches to overcome negative effects in mesh generation such as degenerated elements. Finally, they applied the procedure to a study site where the importance of faults and describable heterogeneity in hydrogeological parameters is highlighted.

Since computational resources have been increased in the last decades regional modeling more and more becomes a tool for regional management for quantitative and qualitative issues. In this context, the article deals with a very important question as easy-to-implement strategies are needed to provide modelers with the ability to include heterogeneous structures into such regional models. Beside the high relevance of the content, also the scientific explanations and language are of high quality.

However, jumping between software description, study sites description as well as approaches and strategies included within the workflow makes the paper more complicated to understand. I recommend to the authors to check the overall structure to help the reader to get easier access to the content. For example, in section 1.2 there is site description which is not needed for the following sections; software description is followed by site description which is again followed by a software and literature study. The authors may check whether an inclusion of the literature study into the introduction is possible. Also section 2.2.2 could be shifted to a later position to differentiate between the explanation of the workflow and the validation set-ups. Rename subtitles may also help to clarify.

In the outlook section a large part is describing possible improvements of the model, but this was only used for showing the applicability of the general workflow. Here the main focus drifts from the workflow into direction of the regional model. Please check if these statements are needed.

The workflow seems primarily thought to be used by OpenGeoSys modelers. How can the workflow be transferred to other software packages. This is discussed shortly in the conclusions and could be more highlighted.

Finally, the paper is of high significance and scientific quality. I recommend accepting of the article after minor technical corrections.

Specific Comments: Page 6310: Line 8: At this position the reader cannot know what is "similar" to the approach used here Page 6311: Line 17: delete "therefore" Line

22: “GOCAD” was mentioned before, explain abbreviation the first time it is used Line 24: “acquire information” is better replaced by “display information” Page 6313: Line 9: Please explain abbreviations or provide references at the first time they are stated Page 6317: Paraview is explained but there is a software section before (sections 1.2 and 1.3) Page 6318: Please see suggestion on the structure, the story of Set-up A ends here and is only in a section titled “description of set-ups”. Line 8: If set-up A remains please refer after “Influins” to the literature study Page 6320: Line 6: This subtitle has no number? Line 21: “a fault” Page 6322: Line 9 to 17: Are these equations really needed as they include widely used flow calculation principles. Line 25: “meshs” Page 6323: Line 12: “were removed” Page 6324: Line 18: delete “generally” and include “identical in this case” Line 24-29: What is the thickness of the high permeable layer compared to the other layers? Page 6326: Line 3: MatGroup is named material group in the previous text or MatG in table 1.

Figures: Fig. 2: Reconstruct = Reconstruction Fig. 3: Why Fig. 3 includes the geological units of Fig. 4 and Fig. 5? Fig. 3 is not mentioned in the text. Fig. 5: Scale and orientation are missing Fig. 6: There are colors on the right-hand side figures but no colored bars? Fig. 8, 9 and 10 and page 6328, line 13-17: Why the difference between S1 and S2 scenarios is described. Intuitively, the importance of heterogeneous structures and faults is better shown when both scenarios are compared to measurements not to each other. Fig. 8: There are single columns of extreme higher thickness? Fig. 9: Increase readability of axes! Fig. 11: Increase resolution and readability of axes!

Interactive comment on Geosci. Model Dev. Discuss., 8, 6309, 2015.