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Geoscientific Model Development Discussions

Interactive comment on "pynoddy 1.0: an experimental platform for automated 3-D kinematic and potential field modelling" *by* J. F. Wellmann et al.

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This paper is presenting a python framework for developing kinematical modeling studies in a light, automated and reproducible way. This platform will be of great interest for the scientific community and I would like to congratulate and thank the authors for their initiative and for sharing this tool.

The paper is well structures and pleasant to read. It goes beyond the technicality of the topic by adding to this paper an interesting discussion about structural modeling approaches, and applications with different purpose and level of complexity.

Besides some technical corrections or suggestions reported in the attached PDF, I have few comments to rise, and they mainly concern the discussion about modeling techniques and the position of kinematical approaches in the depicted panel of approaches:

- There are some approximations or inaccuracies in your description of modeling techniques. In particular, when presenting implicit methods: "Recently developed implicit interpolation methods can also consider commonly observed relationships between geological structures, such as onlapping or erosive contacts (e.g. Calcagno et al., 2008; Hillier et al., 2014)." This sentence suggests (1) that the purpose or specificity of implicit methods are to take onlap or erosive contact into account, (2) that previously referred techniques are not able to account for these geological structures. Both aspects are wrong. Implicit techniques represent a continuous portion of stratigraphy by a continuous scalar field. Fortunately, it is possible to take stratigraphic discontinuity into account but this can not be described as a specificity of the method. On the other side, explicit techniques are able to handle onlapping or erosive contacts.
- Better describe possibilities and limitations in Noddy. Noddy can do a lot, but certainly not everything. While you clearly state that the kinematical equations are kept very simple, you are not discussing the implications. For example, faults are planar objects, which means listric faults would be very difficult to model; folds are similar, which might be quite a simplification for some models. I think your paper should express more clearly Noddy's capabilities and limitations, not to lower the interest of this tool, but to inform more clearly and avoid discouraging potential future users who might come to pynoddy with the idea of rapidly modeling a parallel fold, for example. It is better if they know what to expect. At the same time you can reassure them by referring to papers presenting realistic models of very complex geological dataset modeled with Noddy, e.g. doi:10.1016/j.gr.2011.11.003.

Please also note the supplement to this comment:
http://www.geosci-model-dev-discuss.net/8/C3435/2015/gmdd-8-C3435-2015-supplement.pdf

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