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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Received and published: 5 February 2016

First of all, thank you very much for the positive criticism and feedback! Please find below a list of comments and our responses. Changes are incorporated into a revised version of the manuscript.

(1) Comment from Referees: 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 de- scribed as a specificity of the method. On the other side, explicit techniques are able to handle onlapping or erosive contacts.

(2) Author's response: We agree that this is potentially misleading and adjusted the document.

(3) Author's changes in manuscript: Removed any specific reference to implicit or explicit interpolation methods (as this distinction is not relevant to the presented work) to avoid potential misunderstanding.

(1) Comment from Referees: 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 fu- ture 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.

(2) Author's response: It is certainly true that Noddy can not model everything - and we agree that the functionality should be transparent to a potential user. We therefore extended the discussion on limitations. However, Noddy is actually capable of computing listric faults (and, generally, faults with non-planar shapes), as specified in the man-

ual (referenced in the manuscript). We included a simple example in the pynoddy documentation for completeness (and because several researchers may be interested in it) - see also here for a quick look: http://pynoddy.readthedocs.org/en/latest/notebooks/10-Fault-Shapes.html

(3) Author's changes in manuscript: Extended discussion on limitations, added example of listric fault to pynoddy notebooks and documentation.

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

(2) Author's response: The annotated manuscript contains further valuable points and suggestions:

- Reference to additional publications with relevant context;

- Atlas of Structural Geophysics: reference missing;

- Comments on text clarity.

(3) Author's changes in manuscript:

- References added where appropriate;

- Atlas of Structural Geophysics: reference to section in appendix included;

- Adjusted text where required for clarification.

Interactive comment on Geosci. Model Dev. Discuss., 8, 10011, 2015.

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