

Geosci. Model Dev. Discuss., referee comment RC1  
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## Comment on gmd-2021-112

Italo Goncalves (Referee)

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Referee comment on "Modelling of faults in LoopStructural 1.0" by Lachlan Grose et al.,  
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The manuscript presents a new methodology for implicit modeling in the presence of faults that takes into account the fault kinematics. Points in space are translated in order to reverse the effects of faulting prior to interpolation, imparting useful and desirable properties to the interpolated model.

The article is very clear and well-written, and the results represent an important step forward in implicit modeling. I have only a few questions and remarks:

Section 3 explains the methodology's core, so I believe it is important to include a figure showing exactly how  $f_0$ ,  $f_1$ , and  $f_2$  are measured and how the field data is encoded in order to constrain their values (as scalars, displacement vectors, etc.).

When applying the displacement field, is there any risk of generating "knots", i.e. of a point landing on top of another or past it? In other words, is the relative ordering of the points always maintained?

It seems it is necessary to label the faults according to their relative age. What if this information is not available?

Section 4.1: if the coordinates are interpolated sequentially, wouldn't it be possible to obtain coordinate 2 directly from the cross-product  $\square f_0 \times \square f_1$ ?

In Figure 8B the fault displacement vectors appear only on one side of the fault, while in 6A they appear in both sides. Is this correct?

Minor remarks:

Line 161: small typo in "includes".

Line 258: small typo in "frame is coordinates".

Line 352: "The resulting 3D displacement scalar field is shown in Fig. 6A". Do you mean 6B?

Line 364: check "in the reverse".

Line 408: check "the absense of a no hole effect".

Figure 10 does not seem to be referenced in the text. Also, are the titles in A and B supposed to be the same?