

Geosci. Model Dev. Discuss., author comment AC3
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Reply on RC2

Mirko Mälicke

Author comment on "SciKit-GStat 1.0: a SciPy-flavored geostatistical variogram estimation toolbox written in Python" by Mirko Mälicke, Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-174-AC3>, 2022

I thank Anonymous Referee #2 for the positive and constructive review of my work. Please find the *Referee comments* (in *italic*) below, followed by my answer.

1. There are a few writing errors as highlighted in other comments. The explanation of some of the figures is not clear (Fig 3 and 4). Additionally, the accompanying text should also be improved in clarity.

Answer: I thank the referee for pointing out and will carefully revise all figure captions and the accompanying text, with special care for fig. 3 and 4.

2. In section 3.4, the default 3D plot and contour plot of Spatio-temporal variograms are presented. However, the text does not explain the data used for this analysis. Simply mentioning the source paper is not enough.

Answer: I thank the referee for pointing this out. In line with my answer to minor comment #5 of the first referee comment (<https://doi.org/10.5194/gmd-2021-174-AC1>), I will add a describing section for the data source and reference this section accordingly throughout the manuscript.

3. I suggest the authors add variogram analysis' for more complex datasets that better represent the real-world geostatistic analysis as opposed to a simple dataset like pancake.

Answer: I refer to my answer to specific comment #1 in the first referee comment (<https://doi.org/10.5194/gmd-2021-174-AC1>), who pointed this out as well. However, I would like to add, that the pancake is also a real-world dataset that is the product of remote sensing, to which many implications of i.e. satellite products also apply. However, I got the point and will consider adding another geoscientific example.

4. From my understanding, SciKit-GStat comes with four model fitting algorithms (aside from the approach where the user sets the hyperparameters). However, the author compares the four different distance-based weighting functions only with the Trust-Region Reflective fitting procedure. Was there a reason for choosing this specific procedure for the comparison?

Answer: I wanted to illustrate the differences solely due to the weighting functions and thus kept the fitting procedure fixed. Trust-Region Reflective was used as it is the default option in SciKit-GStat.

5. Additionally, why is there no comparison presented between the different fitting procedures?

Answer: There is no specific reason for that. I will consider adding this to the comparison to maximum likelihood fitting (See figure 1 in my second reply to the first referee: <https://doi.org/10.5194/gmd-2021-174-AC2>). That comparison will be added as a tutorial and I will consider adding it into a suitable section of the manuscript, as well.

Thanks again and with best regards,
Mirko Mälicke