

Geosci. Model Dev. Discuss., author comment AC2
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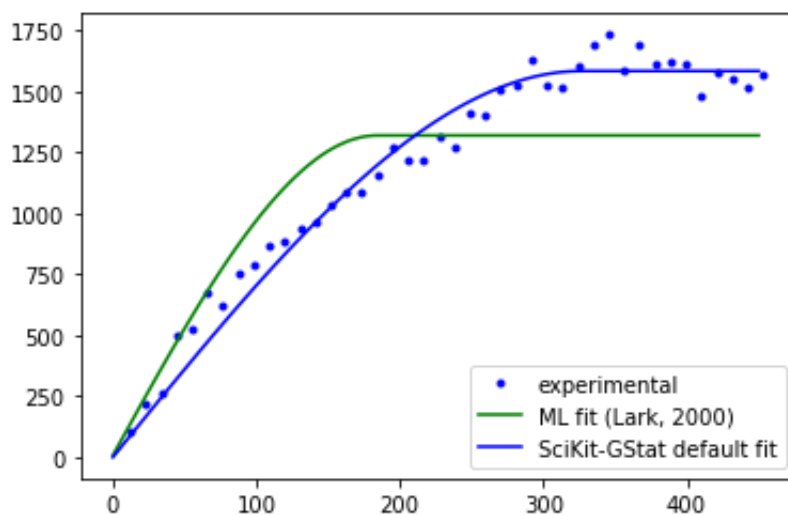
Reply on RC1

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-AC2>, 2021

Dear Referee,

I would like to add to my first reply. Concerning **specific comment #4**, I already mentioned, that a tutorial would be a possible pathway to implement a maximum likelihood approach. Finally, I finished a preliminary script, that now works sufficiently, and I would like to share the findings of this first examination. It is an implementation of Lark (2000), which is also mentioned in my first reply. The image below shows the overall result, the full code is given as a supplement to this comment.



The blue points represent the experimental variogram estimated for a variation of the dataset used in the discussed manuscript. The blue line represents the default fit performed by SciKit-GStat (without applying weighing to the fit) and the green line represents the maximum likelihood (ML) fit following Lark (2000). Turning this into a proper tutorial and ie. into a utility function for SciKit-GStat is from my point of view indeed a valuable addition for the users of the discussed package. Despite, the fact that ML took more than 2 seconds (compared to 14ms for least squares in SciKit-GStat), one can see that the ML fit covers the first few bins quite nicely, although both models are substantially different. To further evaluate both approaches, I will add a cross-validation

to the script to compare the models, before it is turned into a fully documented tutorial. Thus, I would like to thank the referee again for the comment.

Reference

Lark, R. M. "Estimating variograms of soil properties by the method of moments and maximum likelihood." *European Journal of Soil Science* 51.4 (2000): 717-728.

Please also note the supplement to this comment:

<https://gmd.copernicus.org/preprints/gmd-2021-174/gmd-2021-174-AC2-supplement.pdf>