

Geosci. Model Dev. Discuss., referee comment RC2
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Comment on gmd-2021-301

Anonymous Referee #2

Referee comment on "GSTools v1.3: a toolbox for geostatistical modelling in Python" by
Sebastian Müller et al., Geosci. Model Dev. Discuss.,
<https://doi.org/10.5194/gmd-2021-301-RC2>, 2021

General comments

This study is very straightforward and well-presented. Authors present a Python-based geostatistical tool with a guide to its main features and demonstrate with a wide range of solid examples. The examples illustrated in the paper show how accessible the tool itself is and how compatible it is with other geophysical tools as an integrated framework. In the circumstance where Python is more and more common in scientific computing, this open-source Python package authors propose would be beneficial for the geophysics community. In terms of supporting this work to be appreciated by a more general audience, I would leave some questions:

Specific comments

1) Since other geostatistical tools offer several options for the random field generation (e.g., sequential Gaussian methods), potential users would need proper justification why GSTool uses only one method compared to others. Of course, Line 212 already explains its strength well, but it would be better if there are comparisons with other methods.

2) Although the labels for the x- and y- axes for some figures (e.g., 1, 2, and 4) are obvious, it would be helpful to understand if their labels are included in the figures.

3) In Eq. 4, do you mean that the variables "k" and "r" are vectors? If so, you can have an

underline in the variable "r" in the Hankel transform in the right-hand side. It would be also easy to understand if Eq. 5 has the same variables "k" and "r."

4) In Line 205, the sentence does not start from the capital letter, "the k_i are mutually"

5) In Sec. 2.3.1, for the random velocity field, is it possible to assign boundary conditions?

6) As far as observed in the code-snippets in Figs. 3 and 15, the ways of posing spatial anisotropy and spatio-temporal anisotropy (e.g., `gs.Exponential(dim=, anis=)`) seem the same even though they are described differently in Eqs. 6 and 23. How would you relate a spatio-temporal anisotropy ratio, "kappa," to spatial anisotropy ratio, "e."

7) The caption of Fig. 16 seems to indicate the opposite figures. The middle one is for cell centroids and the right one is for mesh points, respectively, according to each figure's title.

8) In Fig. 21, what does it look like if a cross-section of the regression kriging interpolation at the same longitude is presented together? Is it aligned with the cross-section of the universal kriging interpolation?

9) The unit of Transmissivity in Figs. 24 may be square meter per second instead of meter per second.