

Interactive comment on “The design, deployment and testing of Kriging models in GEOframe” by Marialaura Bancheri et al.

Anonymous Referee #2

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Referee Report The design, deployment and testing of Kriging models in GEOframe Bancheri M., et al. The technical paper presents a package for the interpolation of climatological variables using kriging techniques. The structure of the package is described, and the results of the application to two datasets (a rainfall and a temperature one) are presented. The authors also provide a comparison with the R package gstat. The technical paper aims at describing a package that could be of interest for the geoscientific community due to the fact that it is specifically designed for the interpolation of climatological variables and is suitable to be easily merged into hydrological models. The manuscript then would fit the purposes of the journal, if focused on the description of this package. Despite this, the aim of the paper is not clear. On the one hand, reading the abstract, the expected focus is the tool itself: its capability and the novelty it

C1

introduces in comparison with the available software. On the other hand, going through the paper one can realize that just a limited part of the work is focused on the package, and the core of it is focused on the analysis of the results obtained with the different tested kriging methods. Considering that a wide geostatistical literature focused on the assessment of the quality of the interpolation of climatological variables already exists (e.g., Hartkamp et al., 1999, Moral F. J., 2010, etc.), and that the analysis of the performance of the package are limited to sect.6, I think that the authors should adjust the focus of the whole manuscript (or at least clarify their aims) before it can be accepted for publication. A series of major comments follows, all related to this topic, and some minors ones are added, that I think the authors should address before the manuscript is ready for publication. Major comments Most of the manuscript is dedicated to the kriging methodology. The use of kriging methodologies is quite established in the hydrological literature and many studies on the performance of the different kriging methods can be found. The core part of the paper should be the description of the tool and the assessment of its potentialities. In the detail: 1. My opinion is that the authors dedicate too much space at the description of the theoretical basis of the kriging (Sect. 2) while some references and a general outline would be enough. 2. The analysis of the results of the case study turns out to be the core of the paper (Sect. 5 is the longest one with 6 out of 12 figures dedicated). Section 5 should be revised, shortened, and the number of related figures should be reduced. The interest of the case study is in checking the functionality of the package rather than to carry out an analysis of the performances of the various interpolators 3. While the structure of the tool is clearly explained in sect. 3 the analysis of the performance, compared to other software, is not sufficient. As the authors themselves state, it is an important point “to justify the introduction of an alternative software”. The authors just refer to general “way longer” (L.5 P.19) computational time of gstat compared to SIK, and a comparison of the NSE for a single model (figure 12). This does not appears enough for a scientific paper: the authors should provide numbers and figures to support and highlight performances of their package in comparison with other software. Their opinion of “greater ease” (L.8 P.19) is not enough,

C2

considering that gstat turns out to be more versatile under some points of view (e.g., it considers both omnidirectional and directional variograms) and that there are some other kriging packages offering a user-friendly and easy-to-manage interface (e.g., the v.kriging command in GRASS-Gis). Minor comments

4. Abstract: the abstract should be reviewed according to the modification of the structure of the paper. At the moment it does not describe the focus of the work.
5. L.9, P.2 – It must be pointed out that GRASS-GIS is also available as an open-source GIS offering a user-friendly (v.kriging) function for performing kriging
6. Variables should be named always in italic (e.g., “B” L.22, P.3), and measurement units not in italic (e.g., km² L.1, P.9)
7. Figure 1 and 2 can be merged together as they differ only for the last block.
8. APPENDICES: I think the authors make a misuse of the appendices. Appendix A could be merged in the main part of the paper as deal with an important phase of the development of the package and Appendix D is almost useless for the aims of the paper (the table should be provided as supplementary material). Reducing the number of the symbols also Appendix B would be useless, and the meaning of the symbol could be inserted along the main text.
9. Writing style and use of English could be improved: the manuscript would benefit from extensive English editing by a native speaker. The text should also be double-checked for typos and other minor errors (a non-exhaustive list follows):
 - o L.18, P.1. “anong” -> “among”
 - o L. 8, P.2. There is a useless open bracket
 - o L. 4, P. 4. “Appendix A” -> “Appendix C”
 - o L. 17, P. 5 I don’t think “contemporary” is a proper word in this case
 - o L. 10, P. 8 “classes” -> “class”
 - o L. 14, P. 8 “. . .in D” -> “.in Appendix D”
 - o L. 7, P. 10 “where” -> “were”
10. Reference style is not uniform, sometimes brackets include only the year (e.g., L.1, P.2) and sometimes name and year (e.g., L.25, P.2). Please adopt the journal style. References Hartkamp, A. D., De Beurs, K., Stein, A., & White, J. W. (1999). Interpolation techniques for climate variables. *Moral, F. J. (2010). Comparison of different geostatistical approaches to map climate variables: application to precipitation. International Journal of Climatology, 30(4), 620-631.*

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C3

2018.

C4