

EGU23-6683, updated on 28 May 2023

<https://doi.org/10.5194/egusphere-egu23-6683>

EGU General Assembly 2023

© Author(s) 2023. This work is distributed under the Creative Commons Attribution 4.0 License.



SciKit-GStat Uncertainty: A software extension to cope with uncertain geostatistical estimates

Mirko Mälicke¹, Alberto Guadagnini², and Erwin Zehe¹

¹Karlsruhe Institute of Technology (KIT), Institute of Water and River Basin Management, Hydrology, Karlsruhe, Germany (mirko.maelicke@kit.edu)

²Dipartimento di Ingegneria Civile Ambientale, Politecnico di Milano, Milano, Italy.

We provide an extension of a well established geostatistical software to allow for effective and interactive assessment of environmental scenarios in a geostatistical context. The extension comprises a pre-built interface and a freely accessible demo application.

The heat of the approach relies on replacing a sample variogram with its uncertainty bound. Doing so enables one to fully and consistently embed various sources of uncertainties stemming from available datasets and methodological approaches employed for their interpretation. Methodological approaches included in the software include capabilities leading to: i) a statistical estimation of uncertainty bounds from residual point-pair distributions; ii) a statistical robustness test for uncertainty bounds; and iii) a Monte Carlo simulation tool to propagate a variety of aleatory uncertainties.

We illustrate the capabilities of our approach and software through the analysis of two different datasets. We focus on manual variogram estimation to comprehensively illustrate how insights on uncertainty can be used to reject candidate variogram models or model parameter sets.