

The GeoStat-Framework

Geo-statistical modeling in Python!

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GSTools

- Geo-statistical Toolbox
- Variography / random fields / Kriging

ogs5py

- OpenGeoSys5 API
- Forward modeling of subsurface processes

welltestpy

- Process/analyse pumping test data
- Focus on statistical parameters of transmissivity

AnaFlow

- Analytical pumping test solutions
- General solver for radial symmetric flow equation



Install

```
pip install gstools ogs5py welltestpy  
conda install gstools ogs5py welltestpy
```

Docs

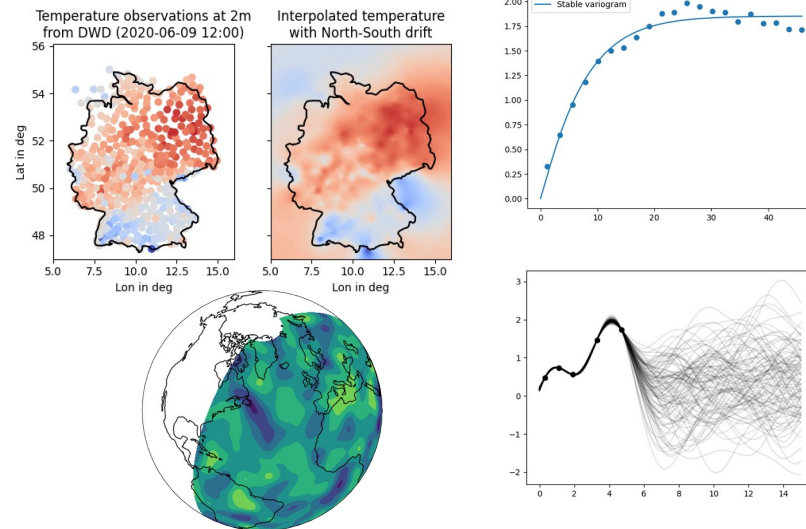
geostat-framework.readthedocs.io

Examples

www.github.com/GeoStat-Examples

GSTools

- Python package for geo-statistics
- Easy-to-use interface
- Variography / covariance models
- Random field generation
- Kriging and conditioned field generation
- Ensemble simulation
- Data normalization and transformation



Paper

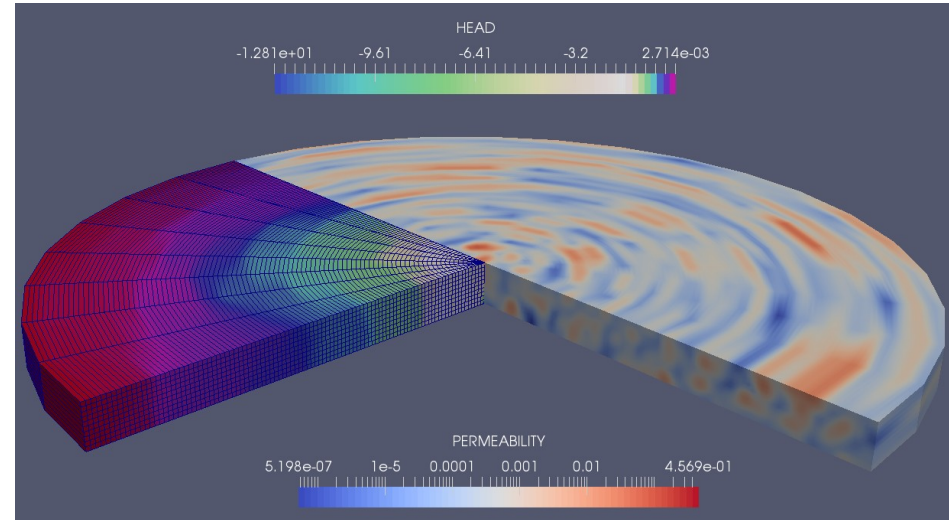
Müller, S., Schüler, L., Zech, A., and Heße, F.:
GSTools v1.3: a toolbox for geostatistical modelling in Python,
Geosci. Model Dev., 15, 3161–3182,
<https://doi.org/10.5194/gmd-15-3161-2022>, 2022.

Docs

gstools.readthedocs.io

ogs5py

- Python API for OGS 5 (opengeosys.org)
- numerical simulations of thermo-hydro-mechanical-chemical processes
- FEM based
- porous/fractured media
- setup with single python script
- Easily enable ensemble runs



Paper

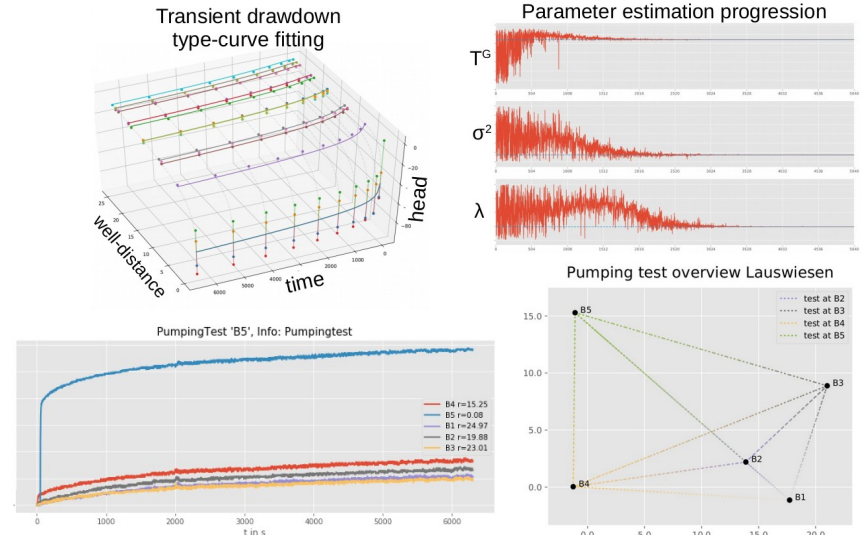
Müller, S., Zech, A. and Heße, F.:
ogs5py: A Python-API for the OpenGeoSys 5
Scientific Modeling Package. Groundwater, 59: 117-122,
<https://doi.org/10.1111/gwat.13017>, 2021.

Docs

ogs5py.readthedocs.io

welltestpy

- Handle well based aquifer test campaigns
- Store / process data
- Plot well-setups / measurements
- Estimate statistical properties of underlying log-transmissivity distribution (mean, variance, correlation length)
- Type-curve fitting (utilizing AnaFlow)



Paper

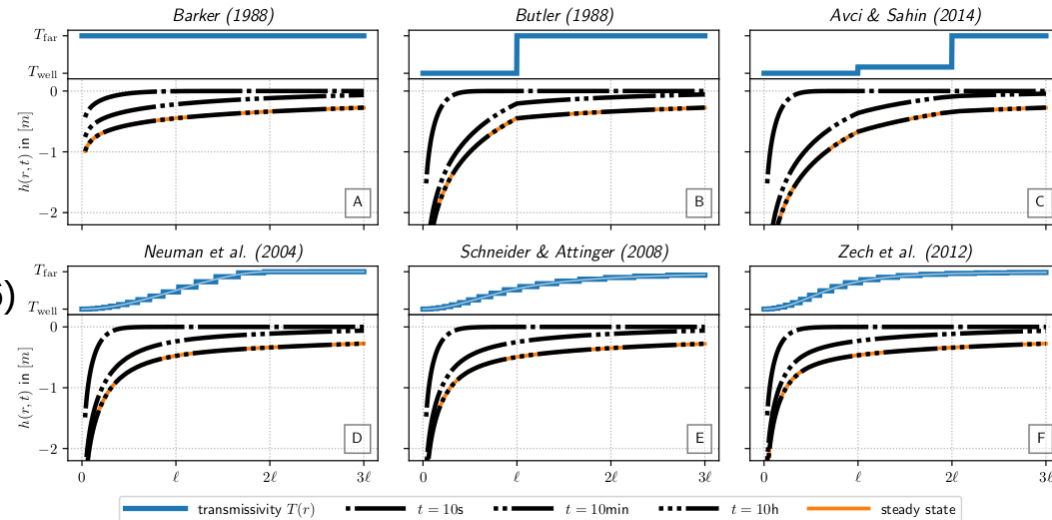
Müller, S., Leven, C., Dietrich, P., Attinger, S. and Zech, A.: How to Find Aquifer Statistics Utilizing Pumping Tests? Two Field Studies Using welltestpy. Groundwater, 60: 137-144, <https://doi.org/10.1111/gwat.13121>, 2021.

Docs

welltestpy.readthedocs.io

AnaFlow

- analytical and semi-analytical solutions for the groundwater-flow equation
- Thiem / Theis
- Extend Thiem / Theis (Zech et al. 2013, 2016)
- Solution for apparent transmissivity (Neuman et al. 2004)
- Generalized radial flow model (Barker 1988)
- Extended generalized radial flow model



Paper

Müller, S., Heße, F., Attinger, S. and Zech, A.:
The extended generalized radial flow model and
effective conductivity for truncated power law variograms.
Adv. Water Resour., 156, 104027,
<https://doi.org/10.1016/j.advwatres.2021.104027>, 2021.

Docs

anaflow.readthedocs.io

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Thank you!

