

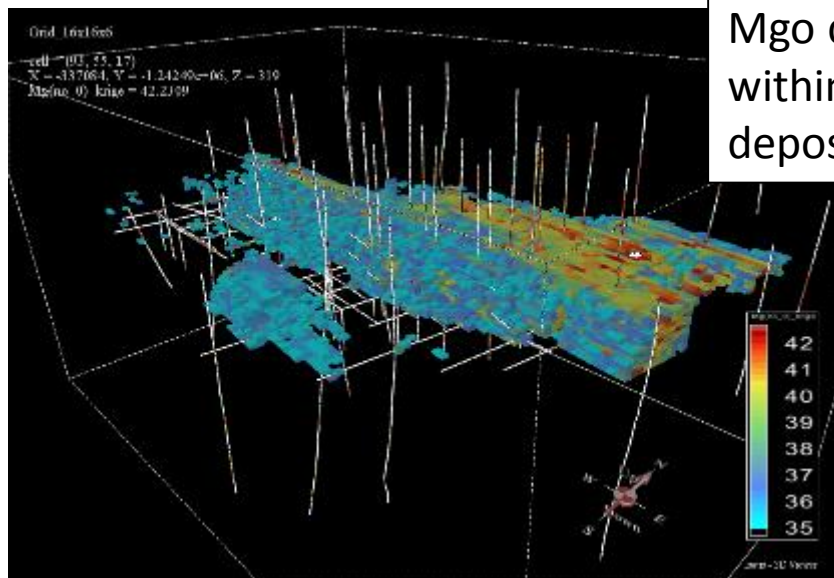


PRELIMINARY RESULTS ON 3D GEOLOGIC MAP OF SLOVAKIA

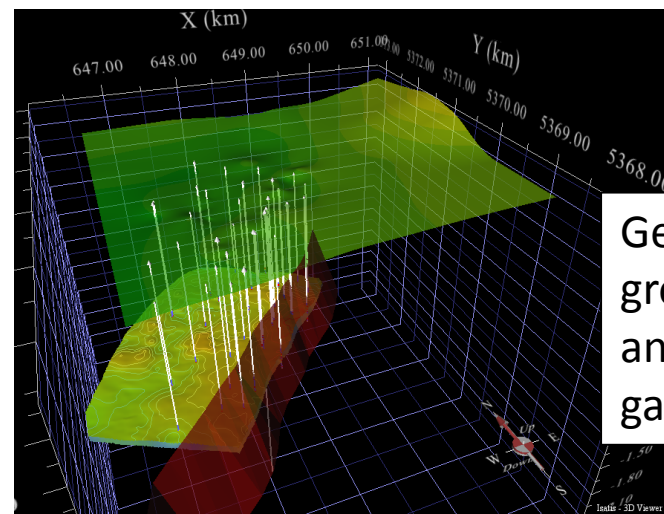
A Case Study on Using the Moving Geostatistics

Ladislav, VIZI; Marián, ZLOCHA; Balász, KRONOME; Martin, SUROVÝ; Jana,
FRIČOVSKÁ; Branislav, FRIČOVSKÝ; Martin, SUROVÝ; Róbert CIBUĽA

5th European Meeting on 3D Geological Modelling,
Bern, May 22nd – 24th 2019

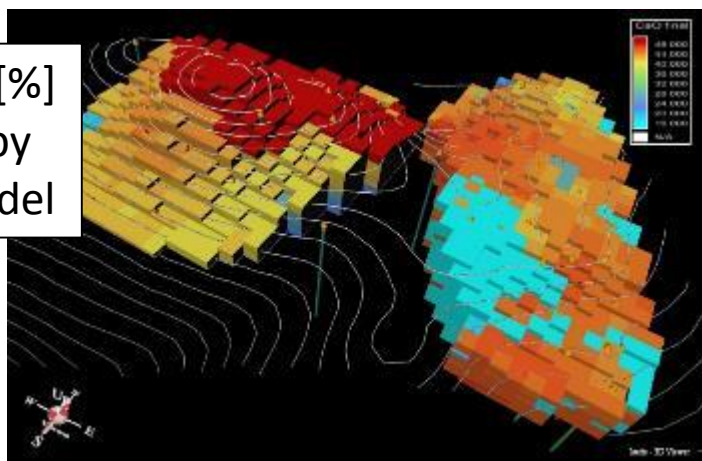


Mgo content [%]
within magnesite
deposit

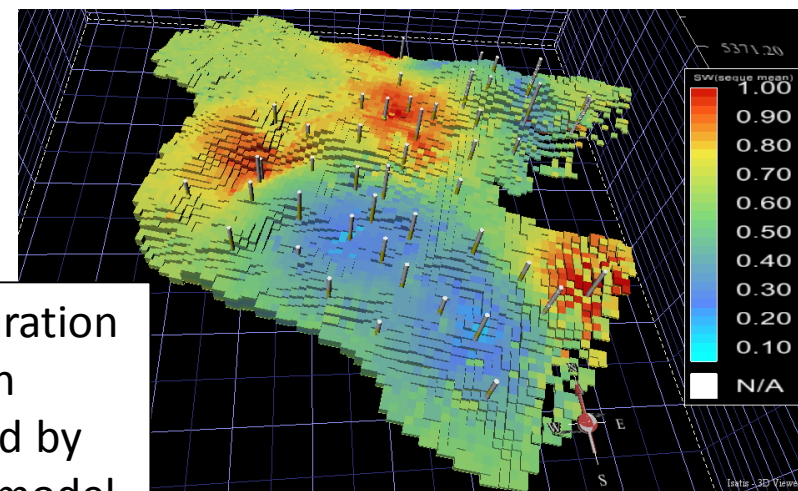


Geometry and
gross volumetric of
an underground
gas storage

CaO content [%]
conditioned by
rock type model

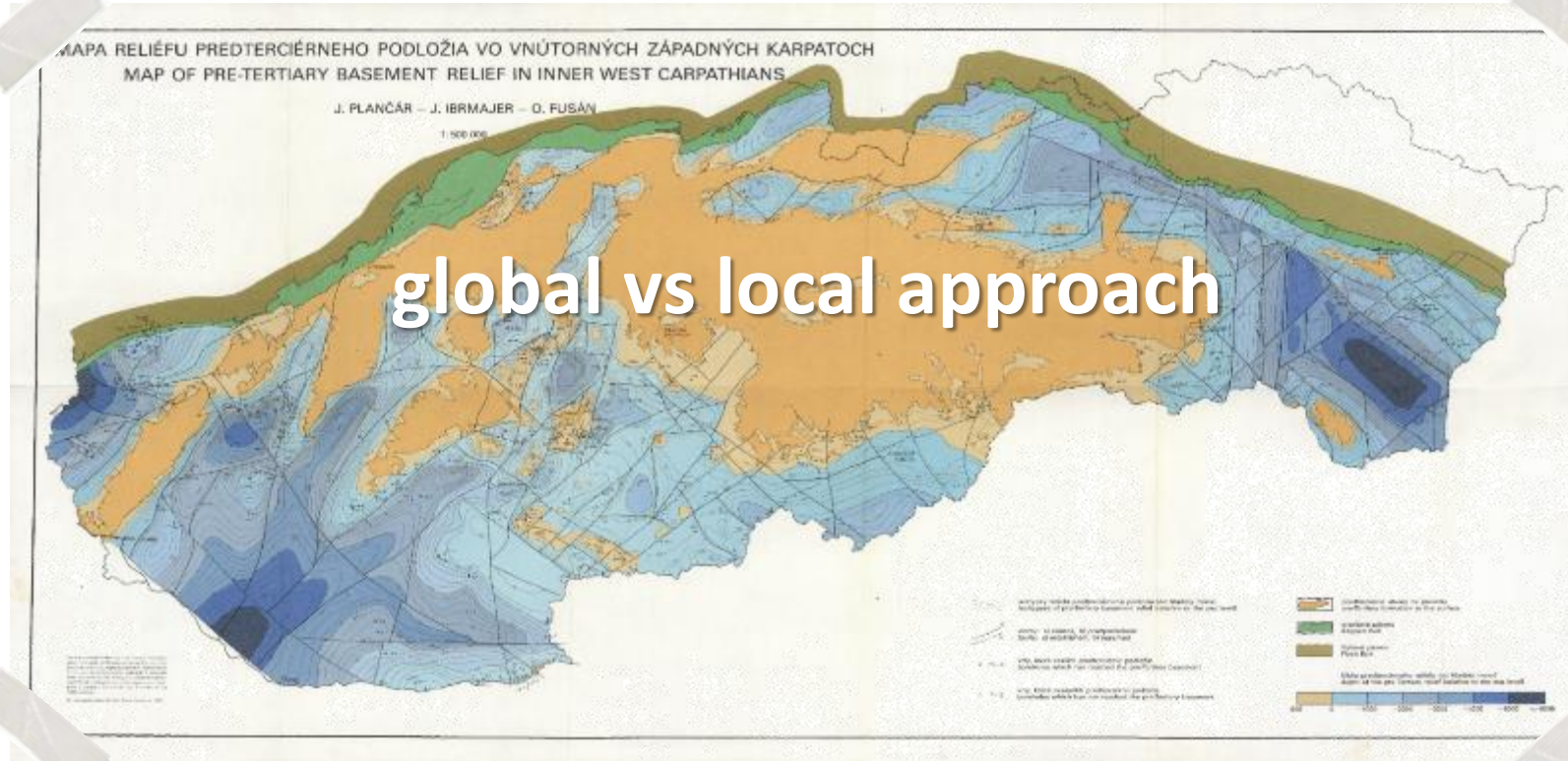


Water saturation
distribution
conditioned by
lithofacial model





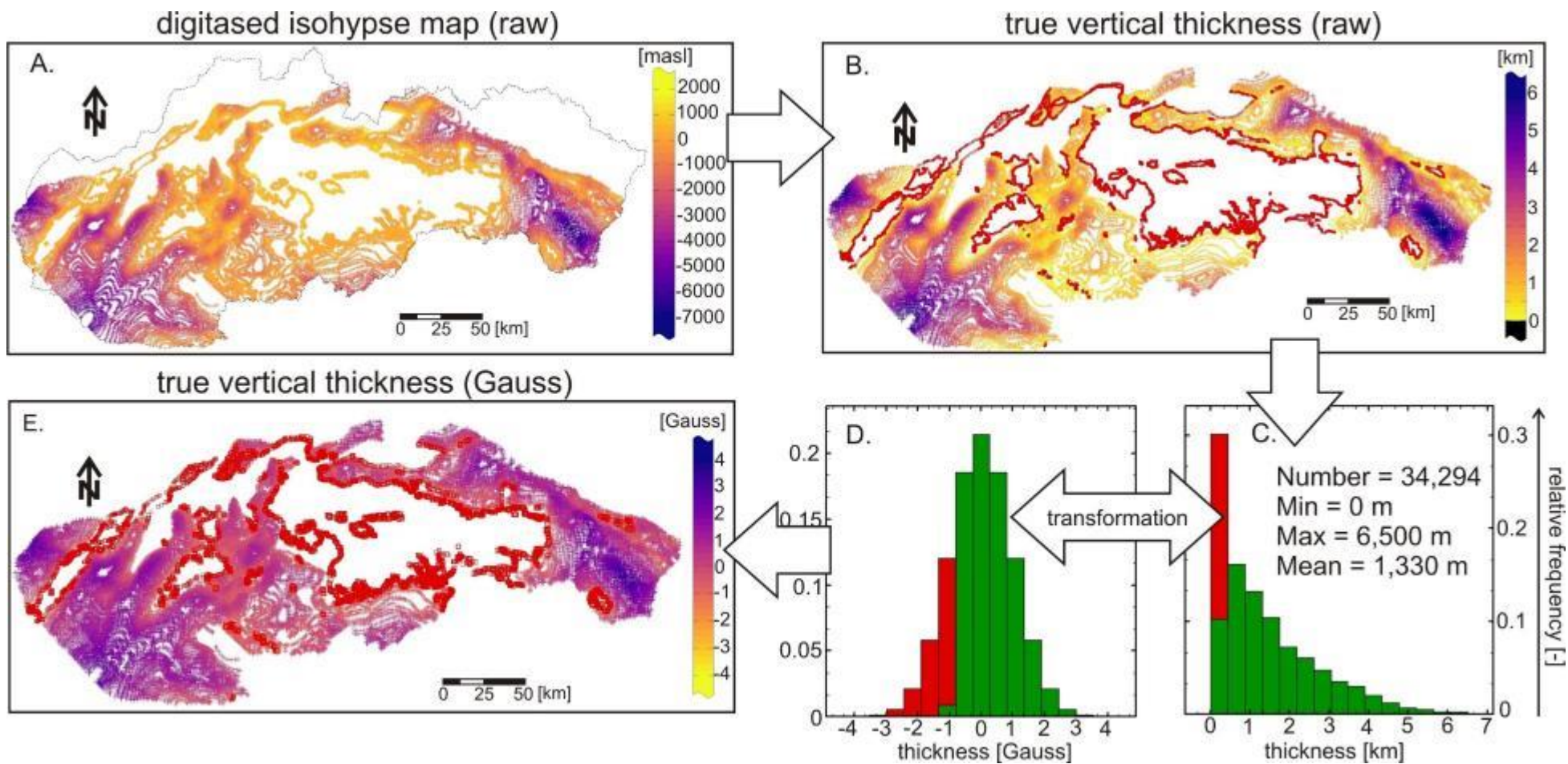
Introduction



Plančár, J., Ibrmajer, J., Fusán, O. (1985) MAP OF PRE-TERTIARY BASEMENT RELIEF IN INNER WEST CARPATHIANS, 1:500 000. Štátny geologický ústav Dionýza Štúra, Bratislava.

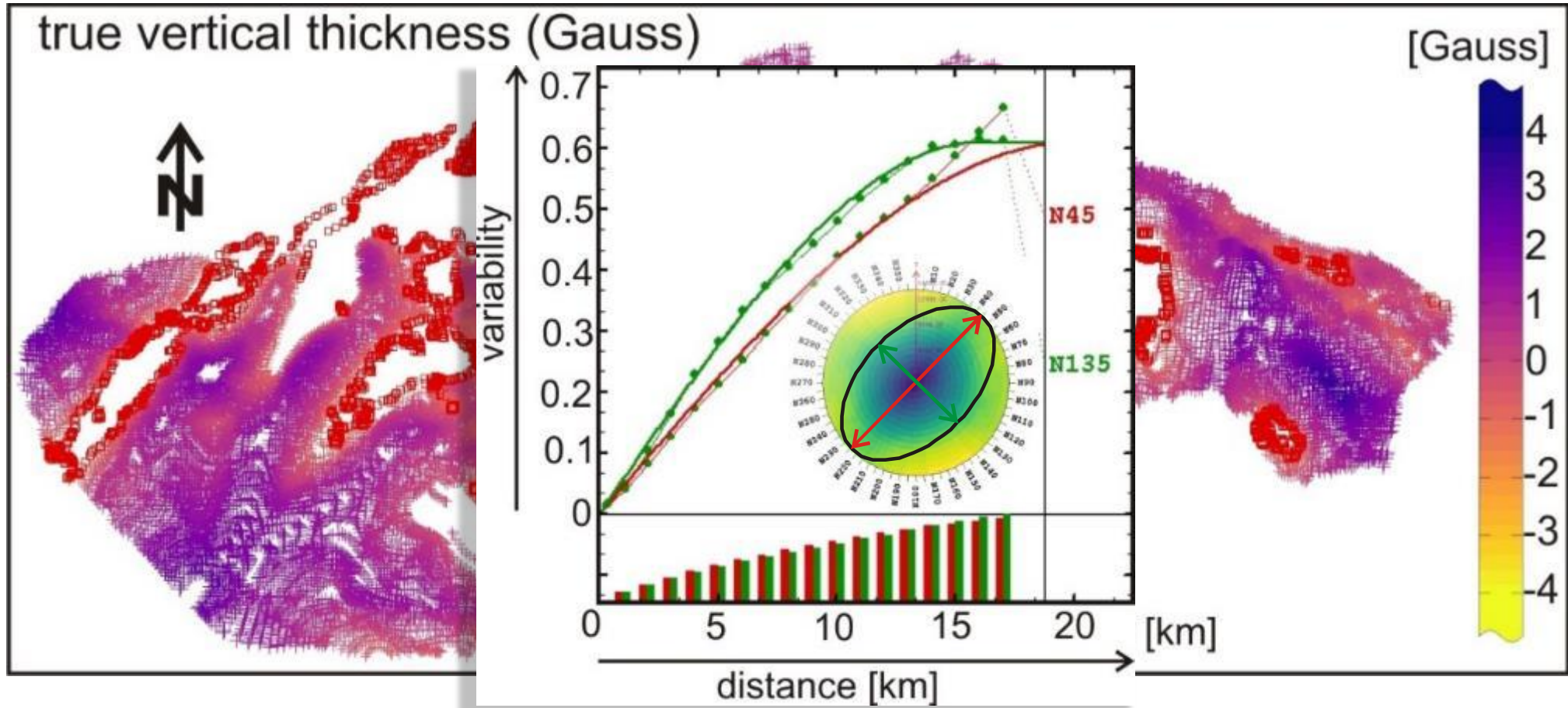


Input data



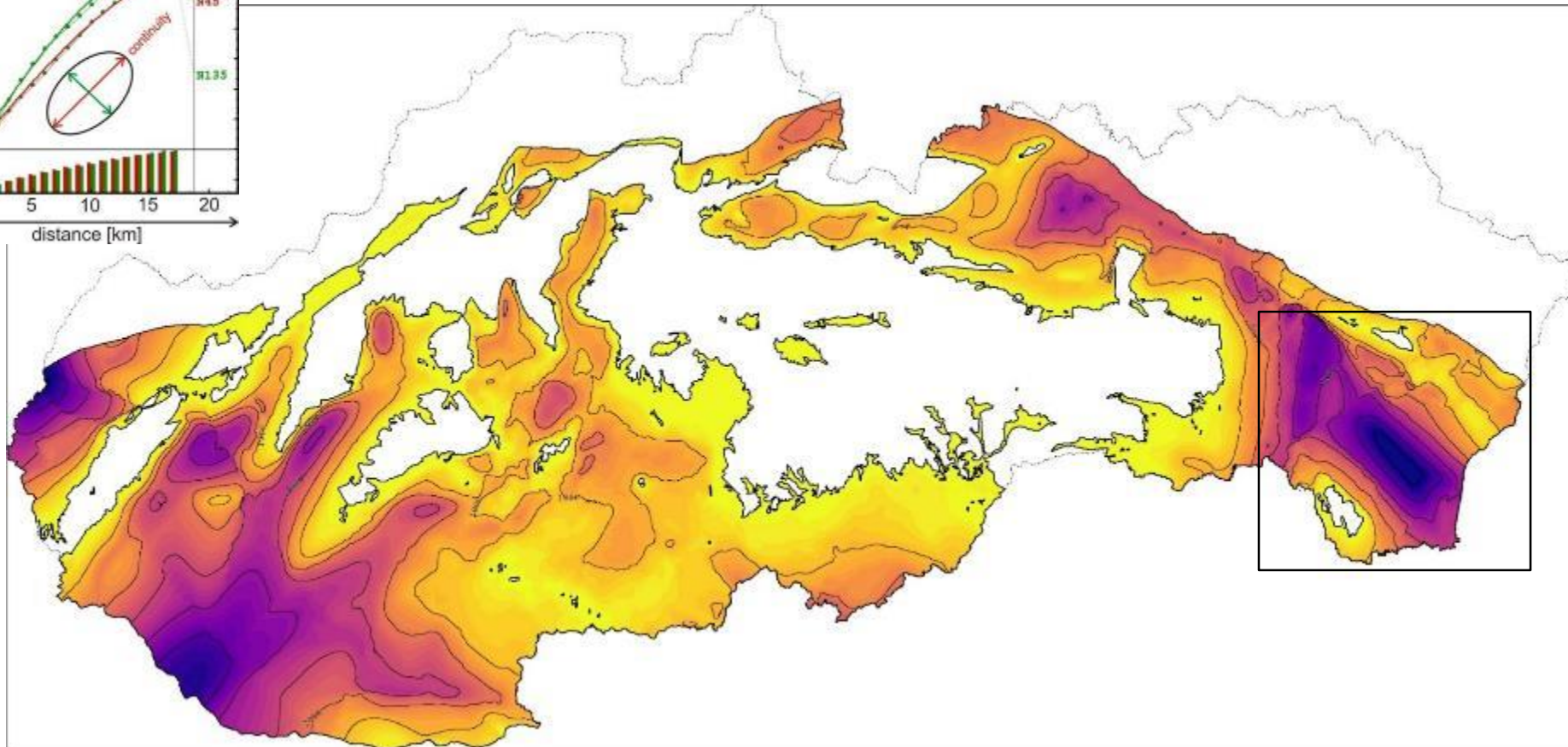
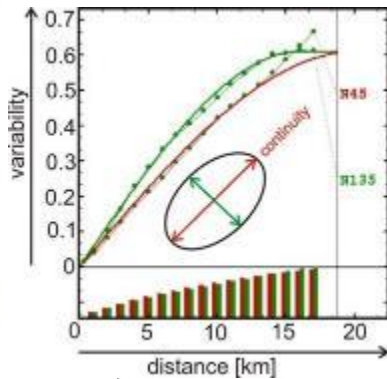


Variography



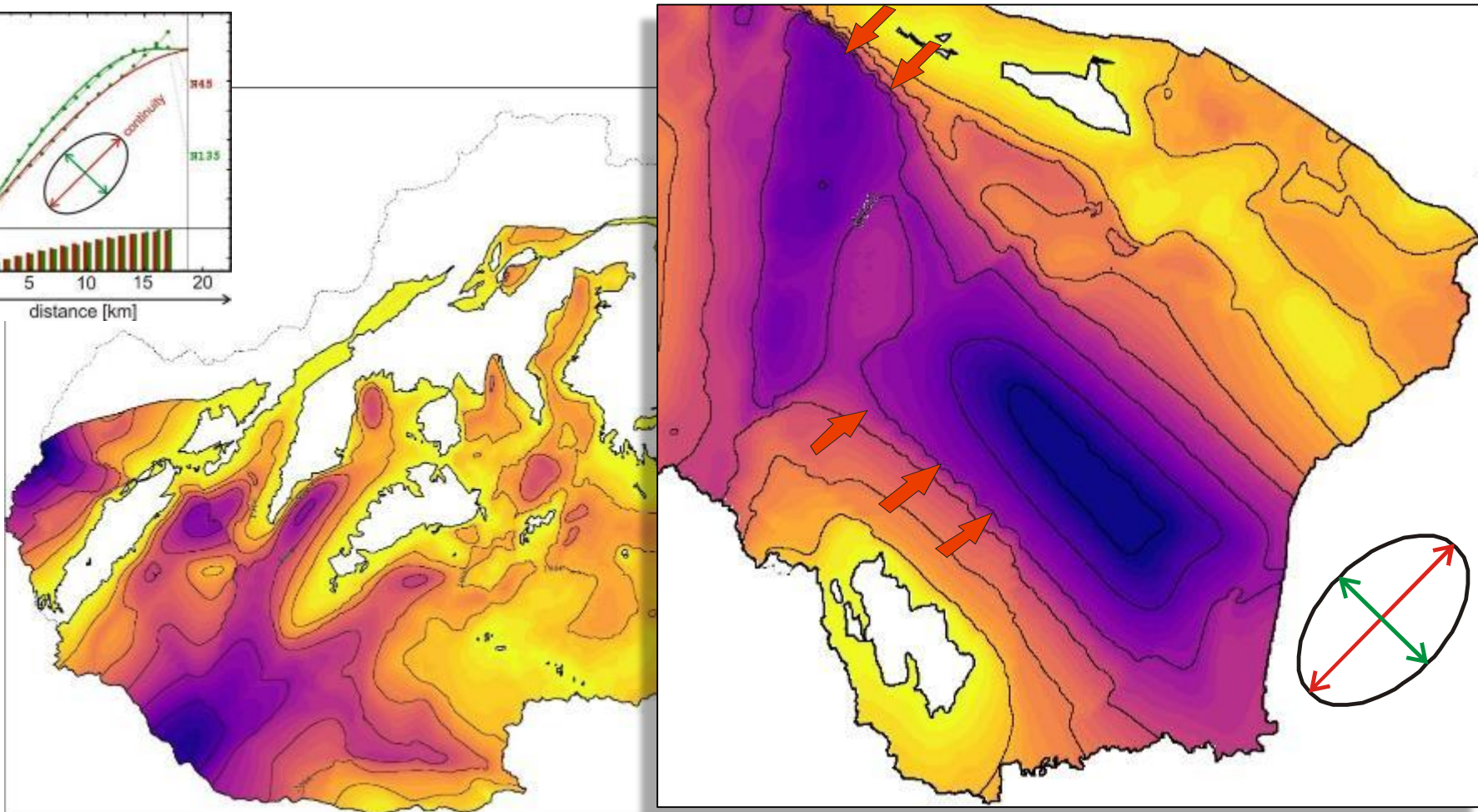
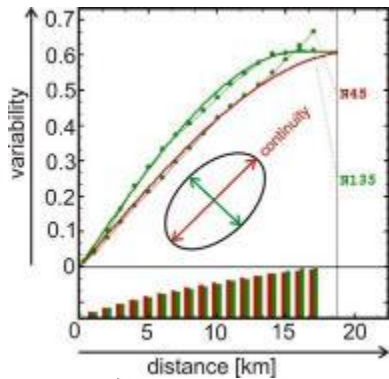


Global approach – anisotropic variogram model



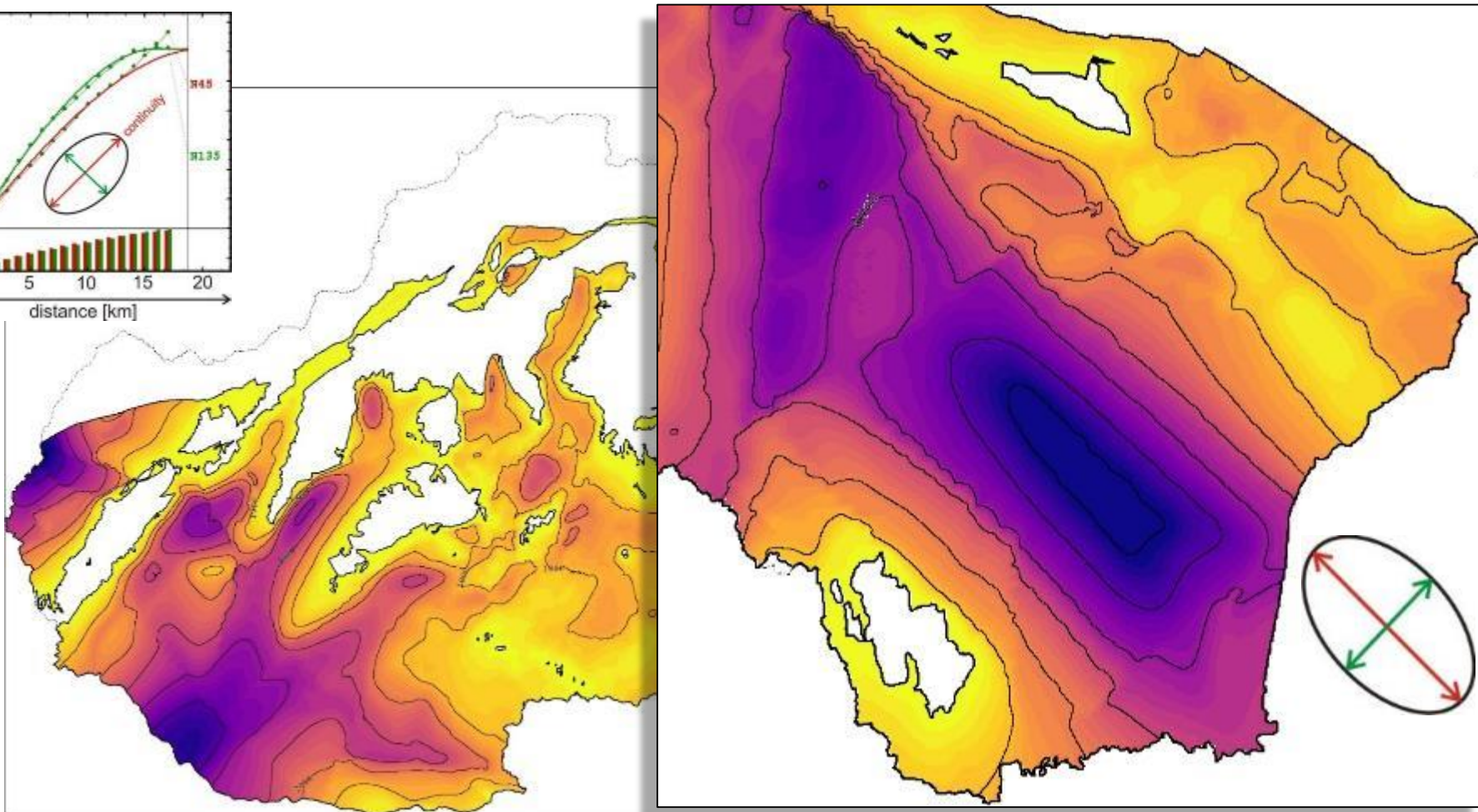
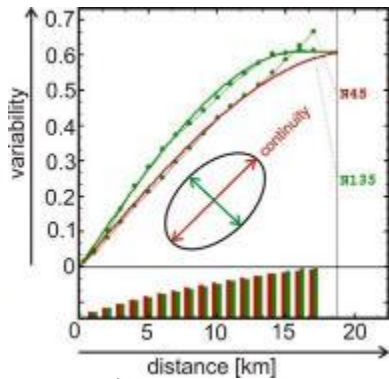


Global approach – anisotropic variogram model



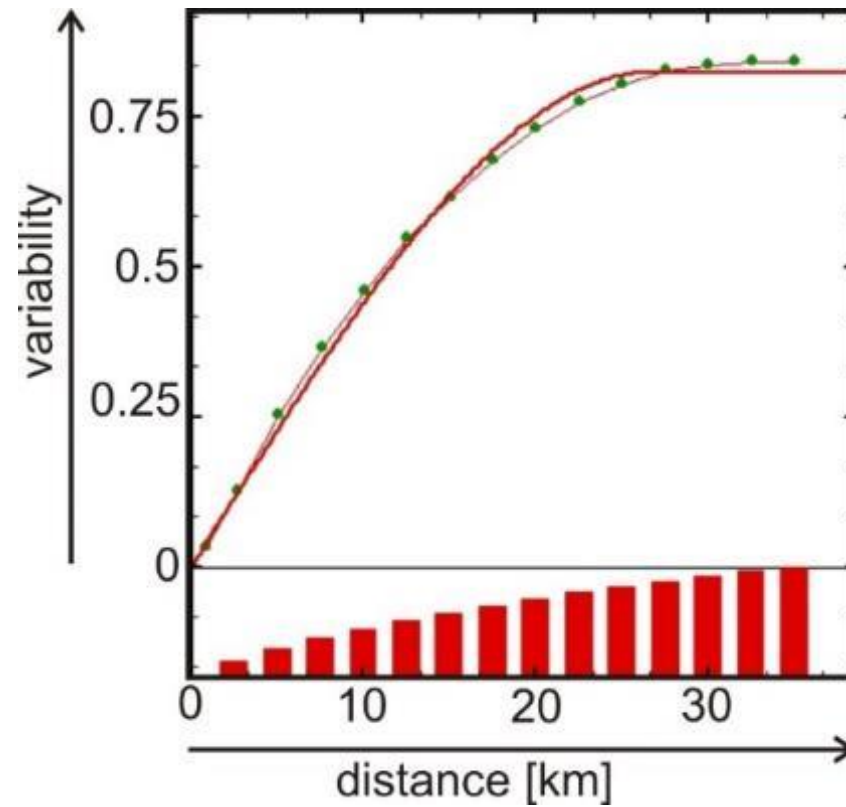


Global approach – anisotropic variogram model



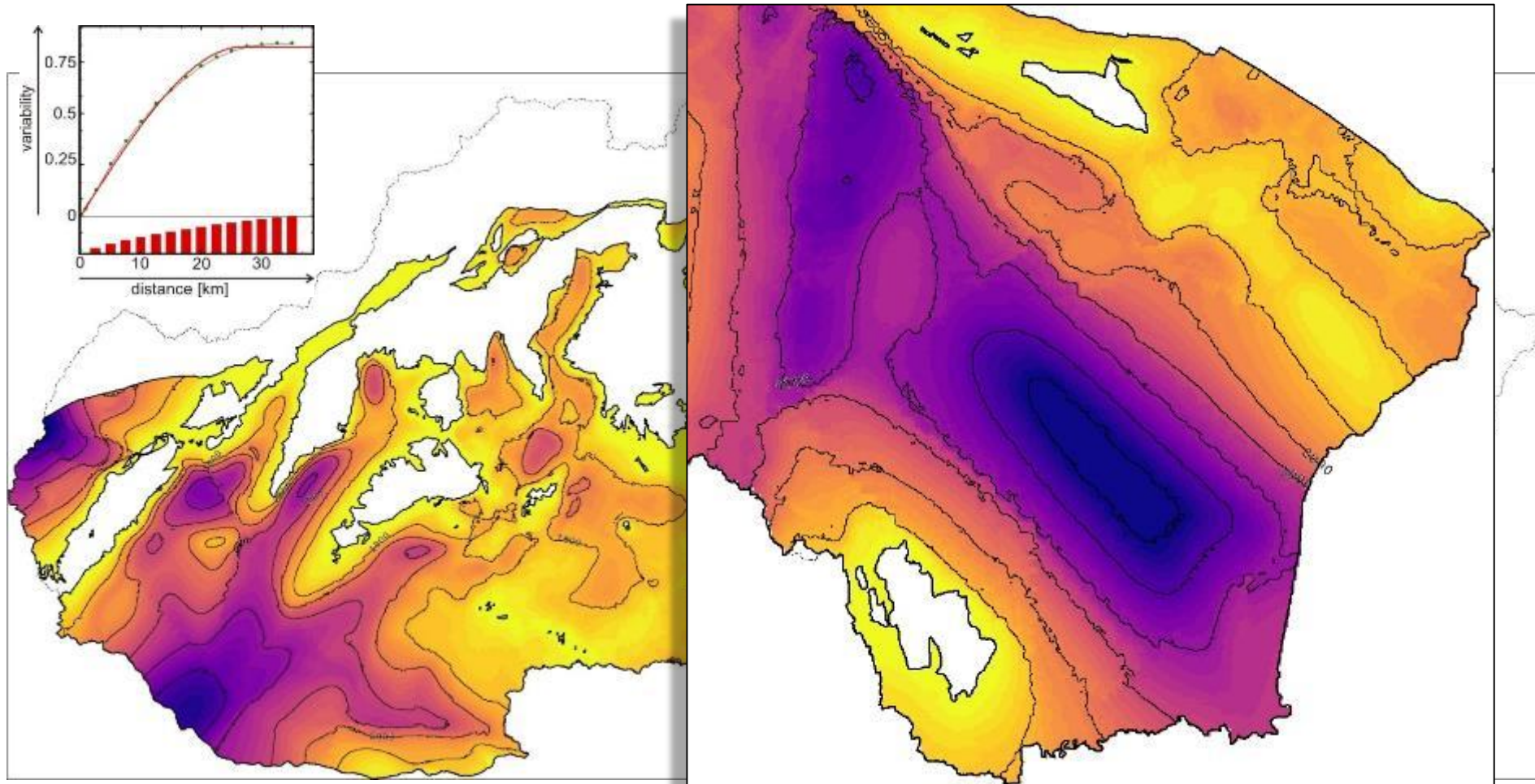


Global approach – isotropic variogram model, ...



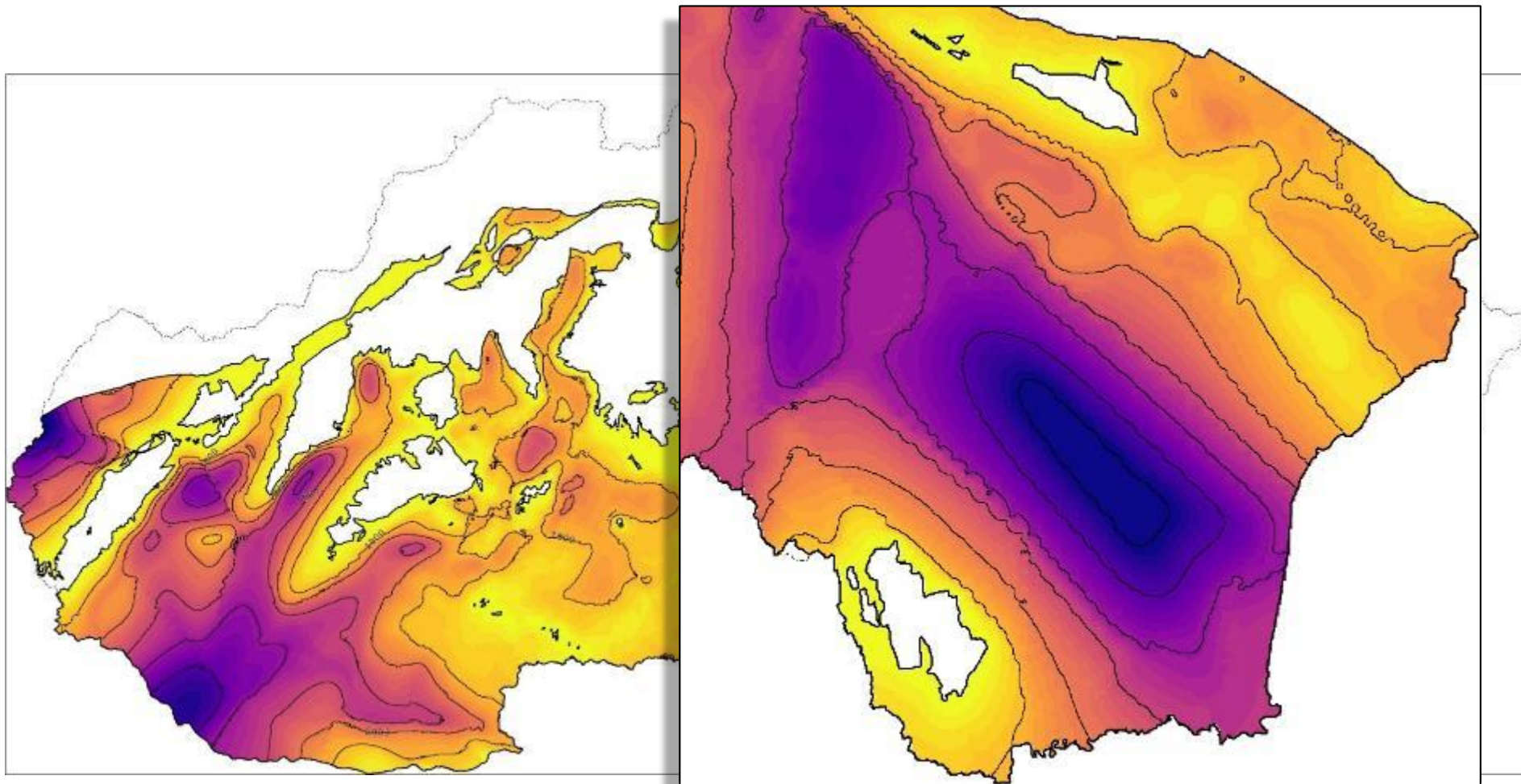


Global approach – isotropic variogram model, ...



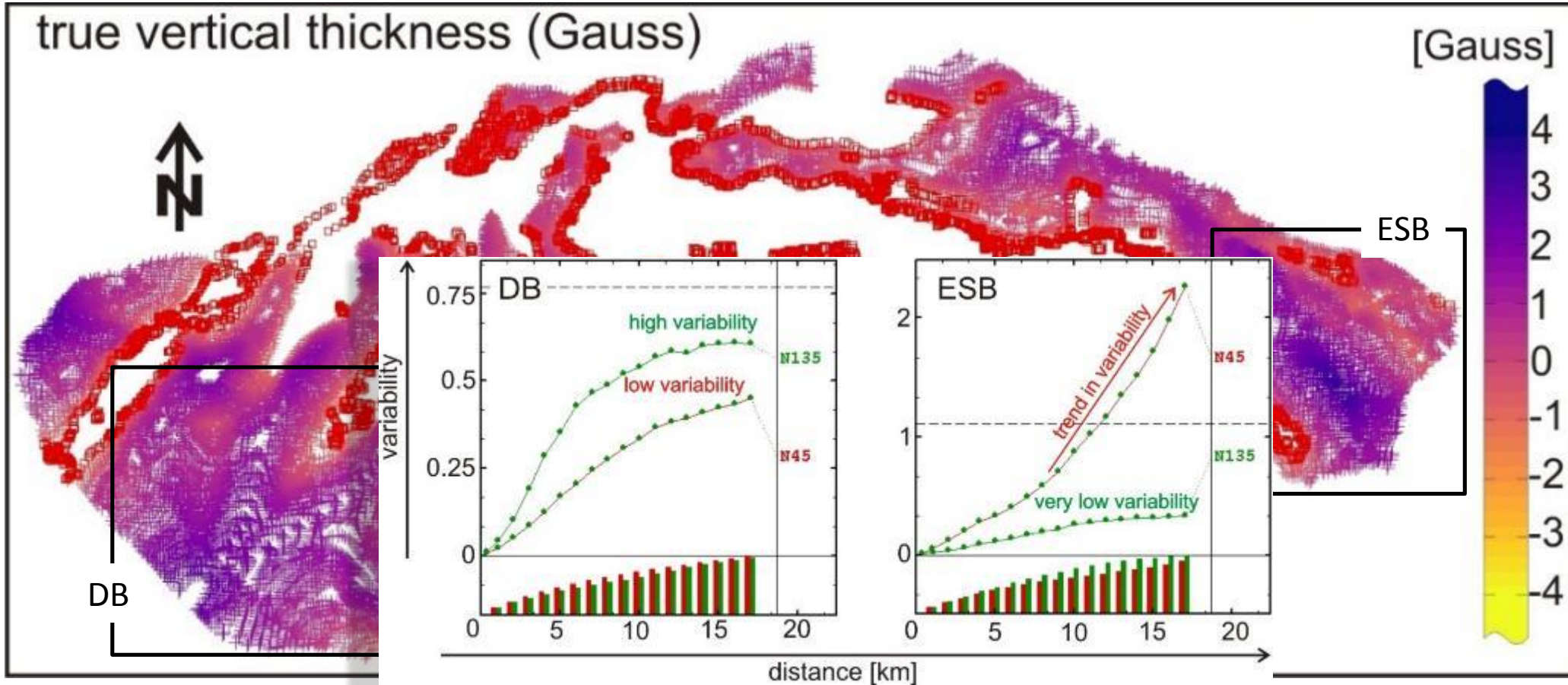


Global approach – ???...



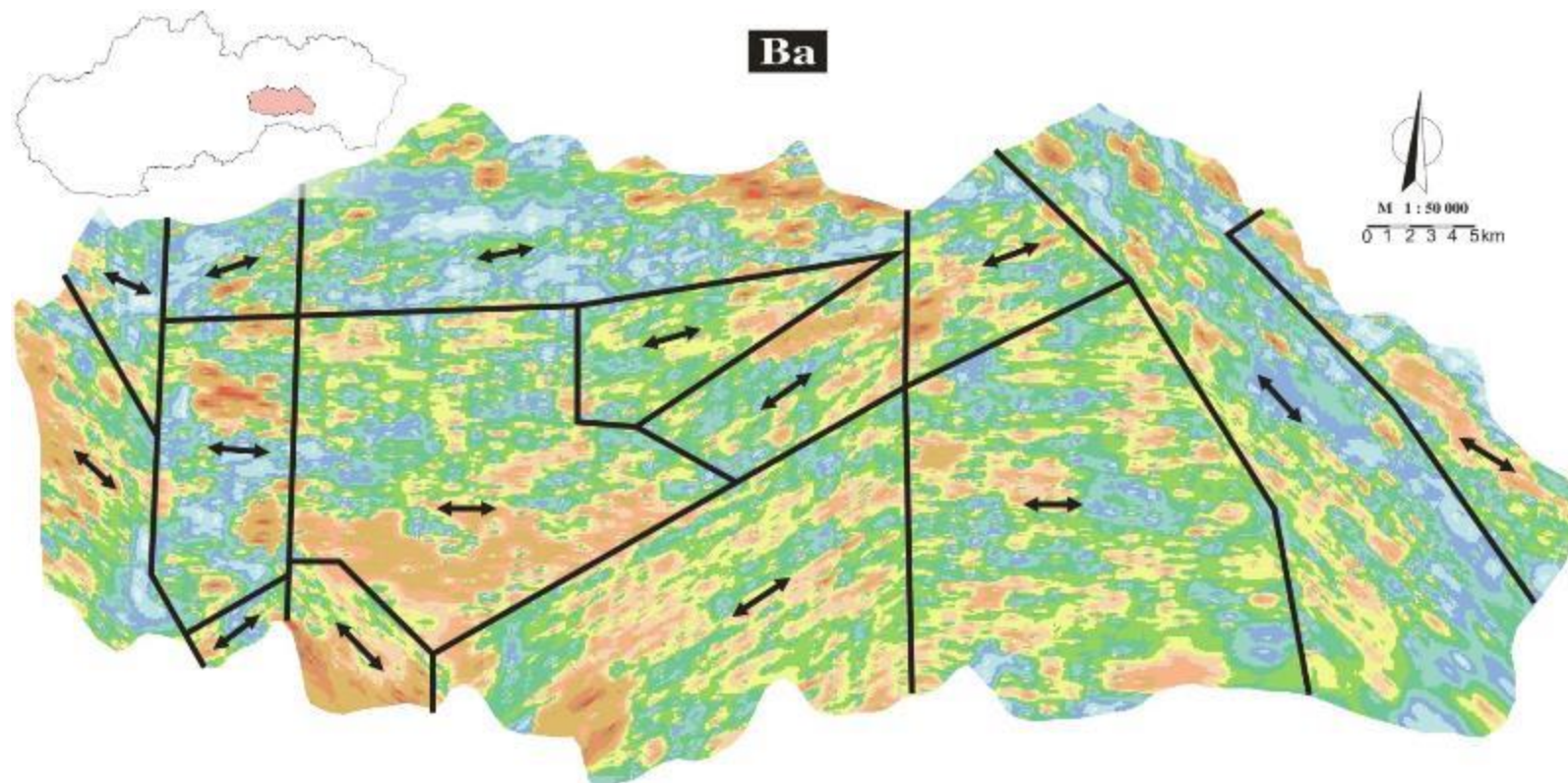


Local variography





Searching for solution



Kobulský, J., Gazdačko, Ľ., Grecula, P., Hojnoš, M., Kandrík, M., Kováčik, M., Németh, Z., Pramuka, S., Radvanec, M., Szalaiová, V., Tréger, M. (2001) Atlas of Geological Maps of the Spiš-Gemer Ore Mts. – Final report. State Geological Institute of Dionýz Štúr. Bratislava.



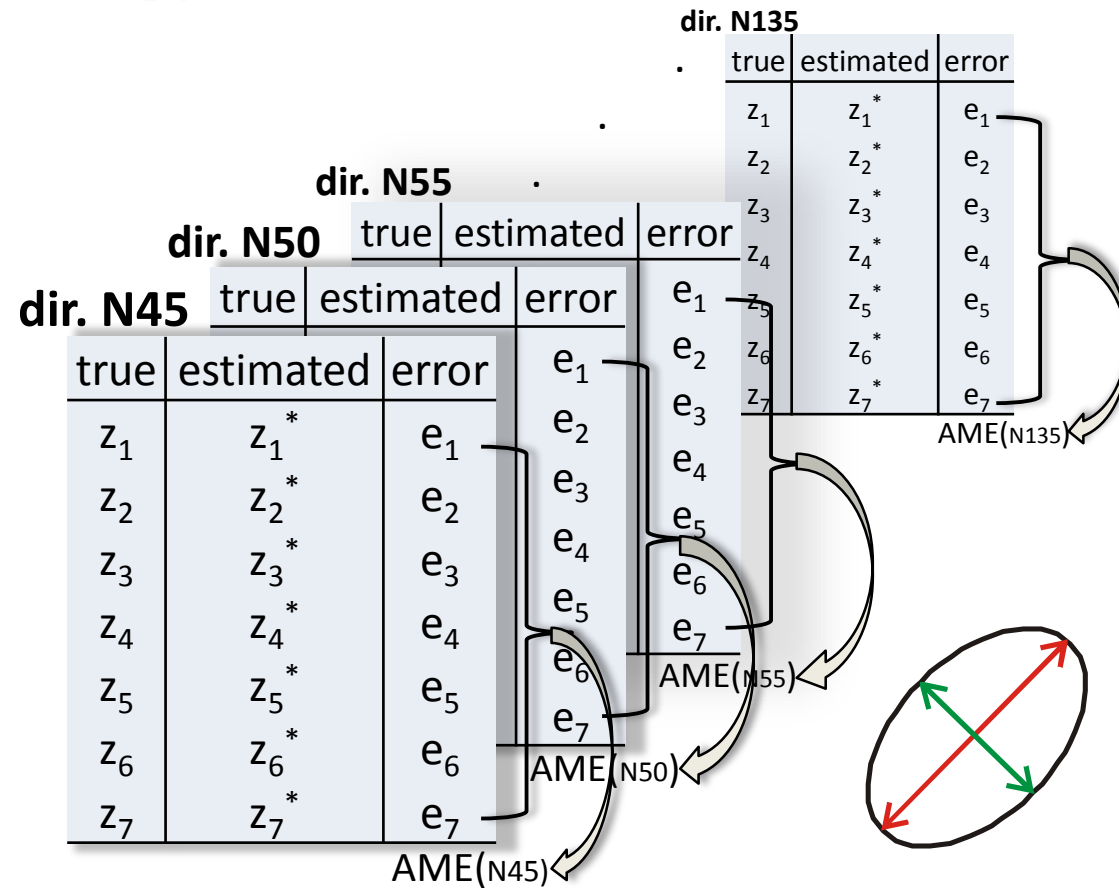
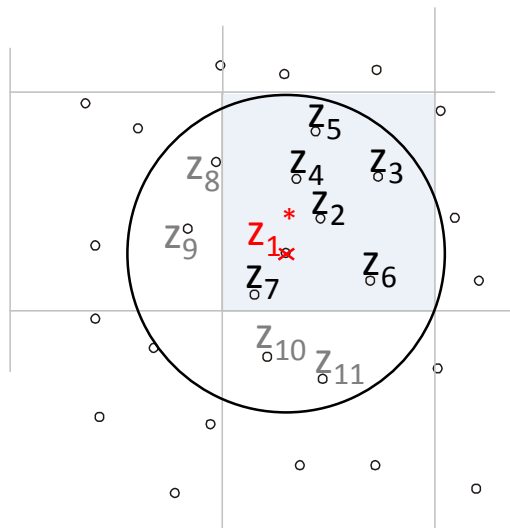
Searching for solution

Magneron, C., Jeannee, N., Le Moine, O., Bourillet, J.-F. (2010) Integrating Prior Knowledge and **Locally Varying Parameters** with Moving-GeoStatistics: Methodology and Application to Bathymetric Mapping, In: Atkinson, P.M., Lloyd, Ch.D. (eds.) 7th International Conference on Geostatistics for Environmental Applications, Southampton, UK, September, Springer, pp. 405–415.



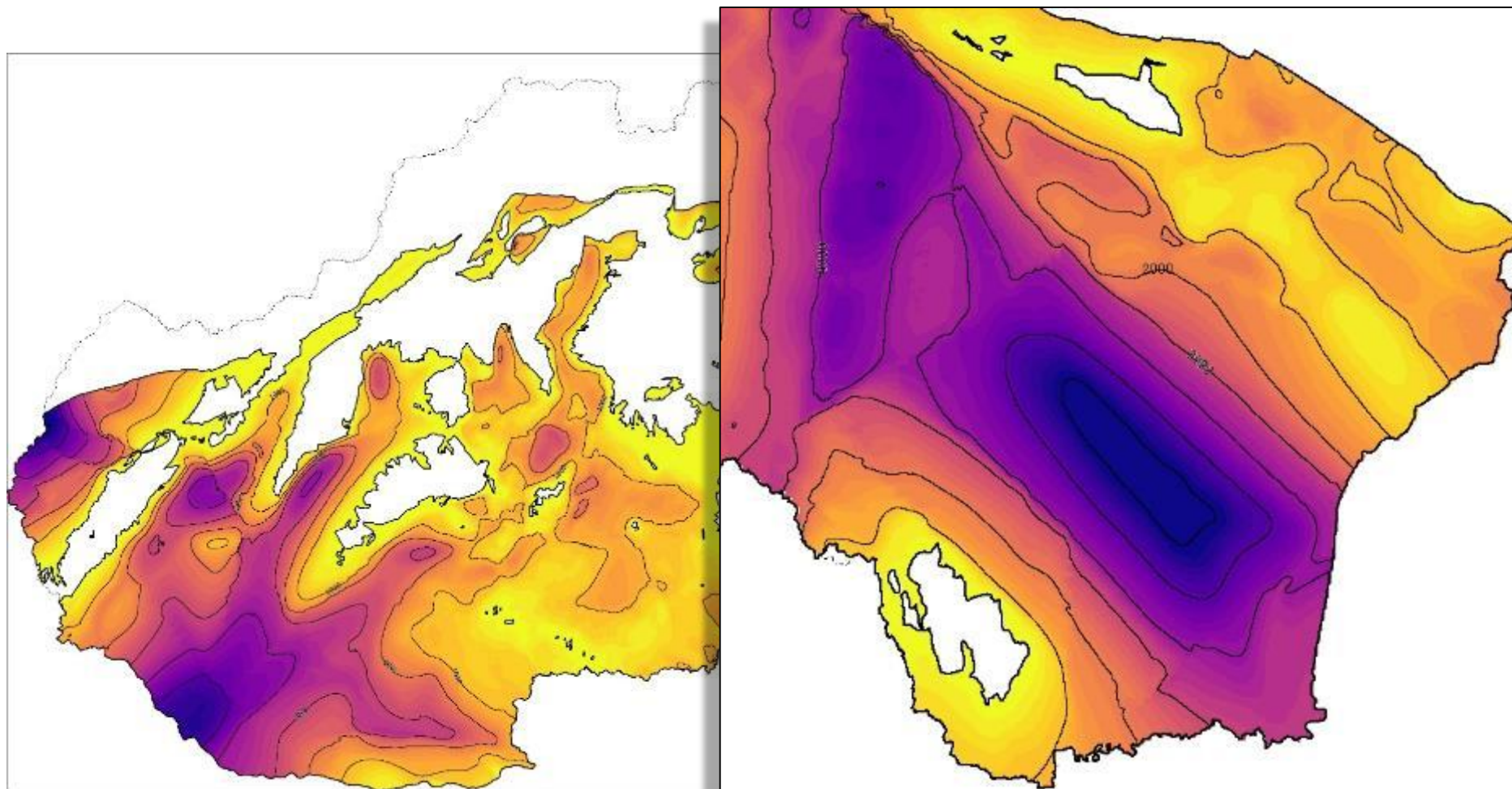
Methodology

- based on cross-validation procedure
- coarse grid 10x10 km
- locally varying anisotropy:
 - from NE-SW to NW-SE
 - step 5 degrees
 - 18 C-V score per cell



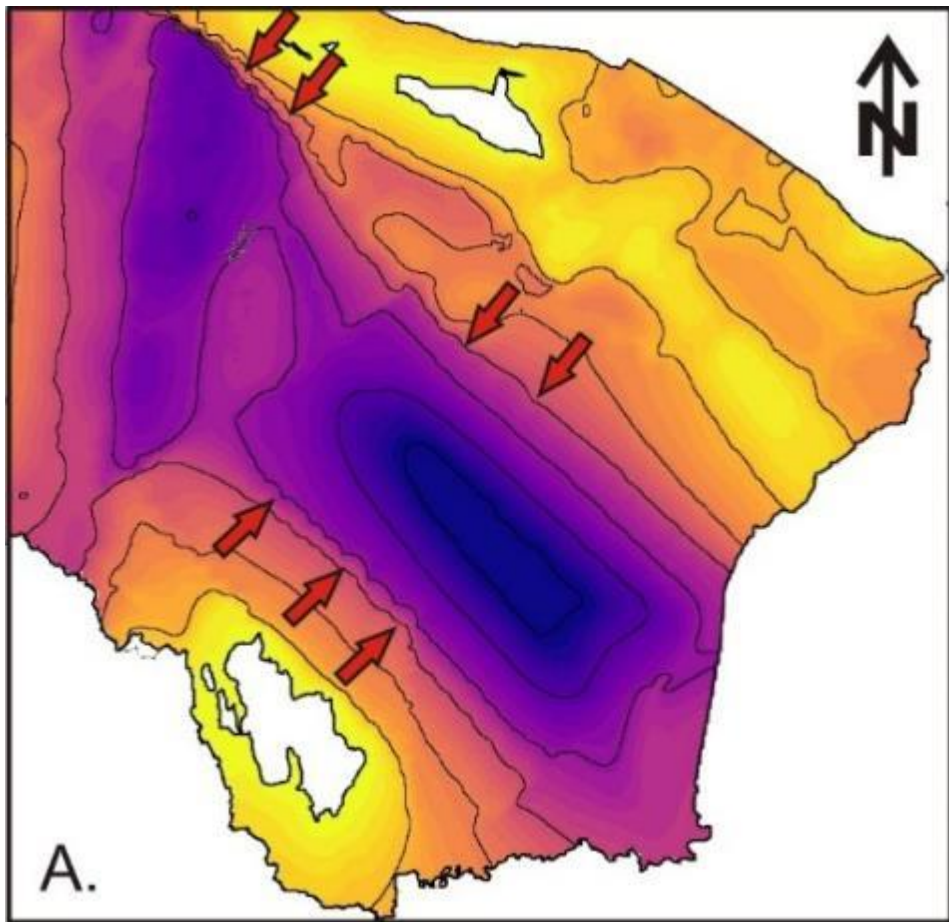


Local approach – rotation of anisotropy ellipse

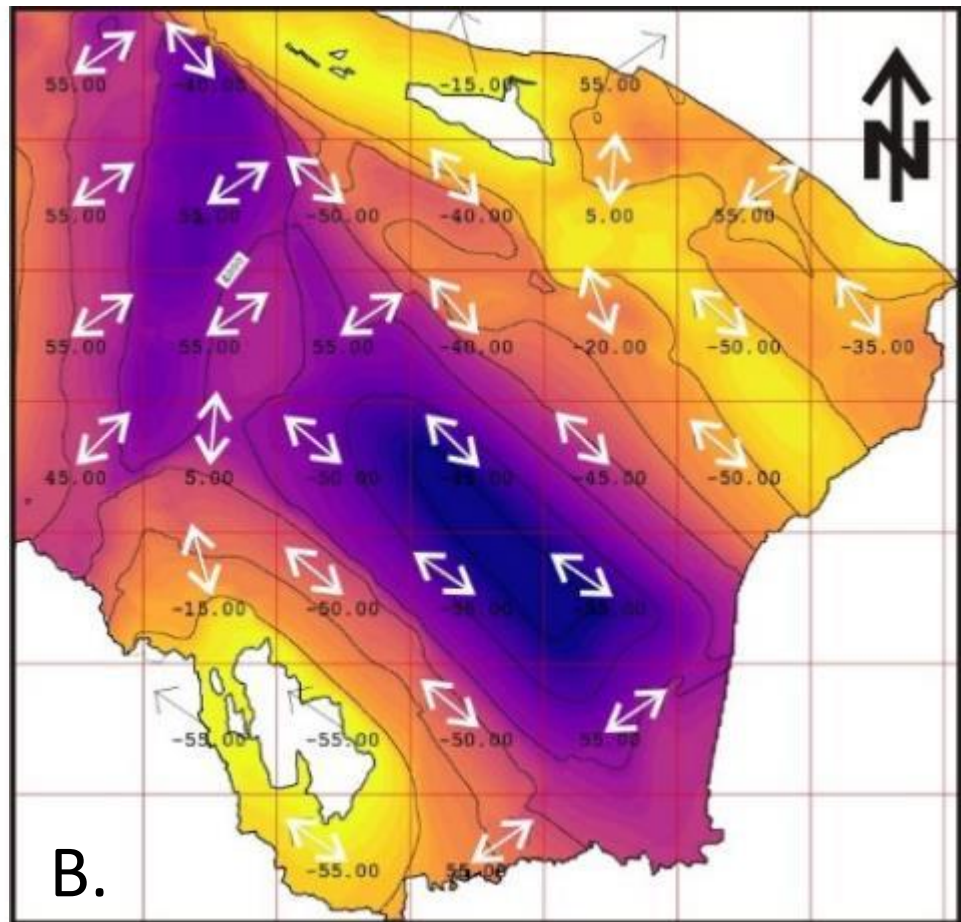




Comparison of the results

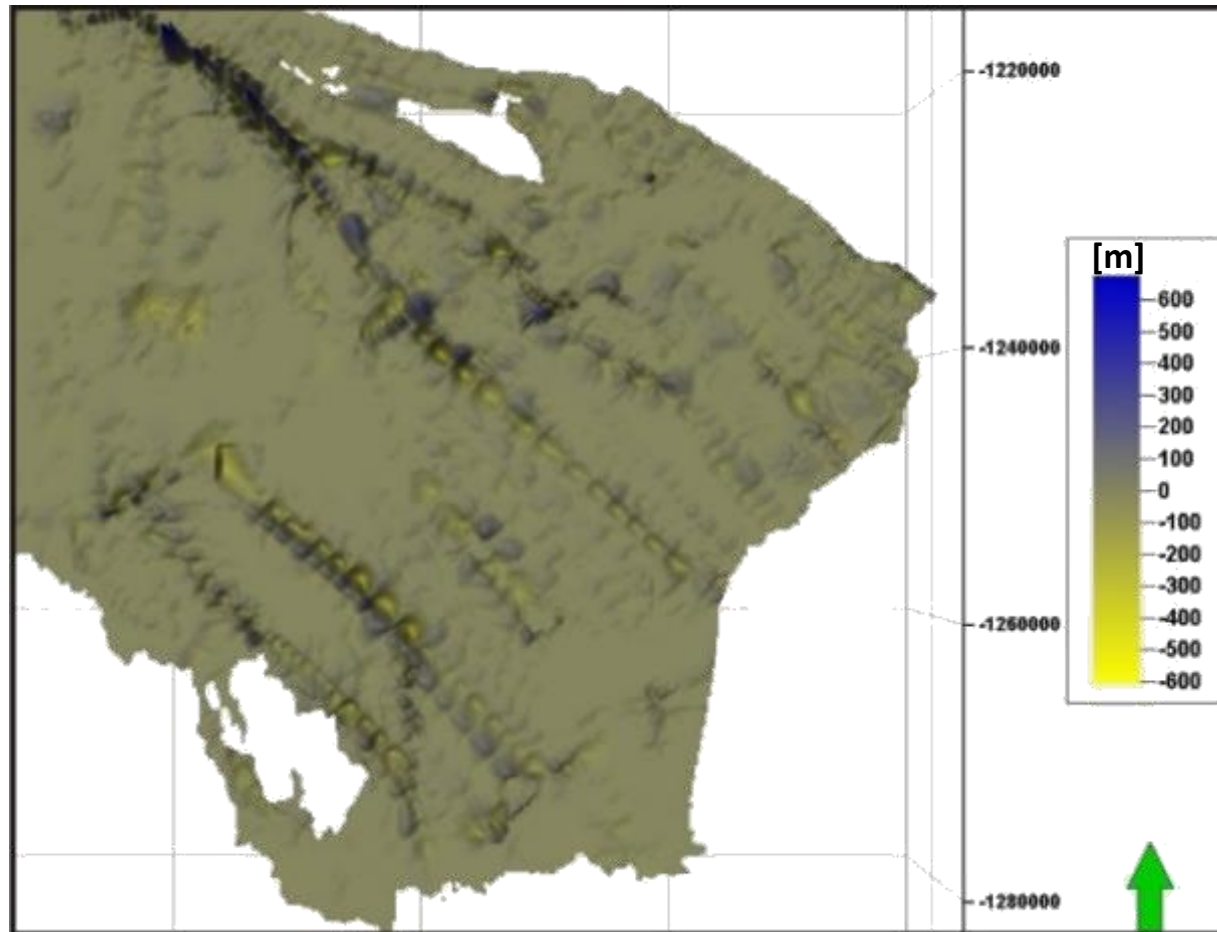


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Differences between global and local approach



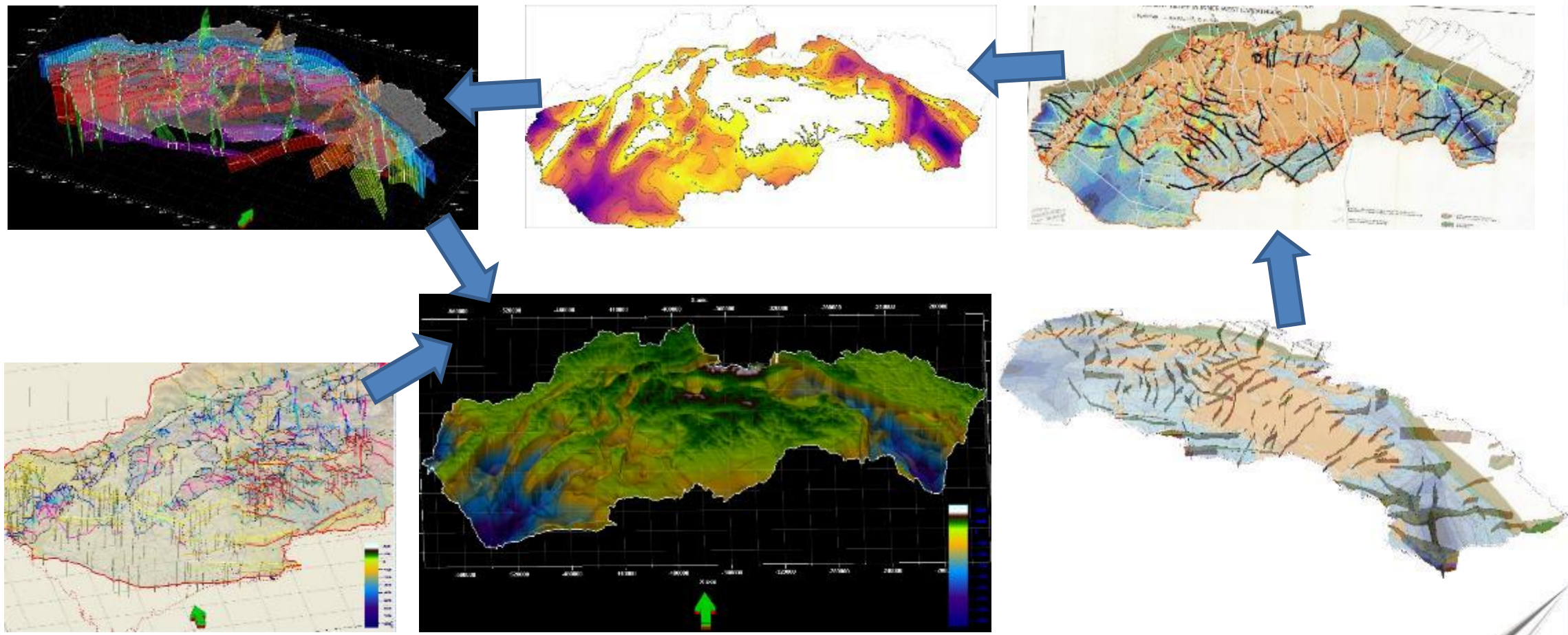


Conclusions

- Moving geostatistics methodology is very useful in cases of complex structural patterns as soon as the target area becomes large (national or regional models) or density of data becomes very high.
- The impact of the local anisotropies for modelling of pre-Tertiary relief is obvious.
- Moving geostatistics has proved to be useful methodology for our project (at least for the upper part of model 😊).
- There is still a space for another optimising of parameters.



Future work





Thank you for your attention

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