

> Mintavételezési kérdések a
(geo-)statisztika szemüvegén
keresztül...

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> Szatmári Gábor



VÖS LORÁND TUDOMÁNYEGYETEM
TERMÉSZETTUDOMÁNYI KAR

First Author

GEOSTATISZTIKA

KÉZIRAT

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A téma aktualitása

With the increasing application of statistical analyses in research papers and a lack of clarity regarding how the analyses were done, Steve Jarvis established the journal's Statistics Advisory Panel in 2010 to identify and correct mistakes and misunderstanding; the names were listed in issue 61.3. When Margaret Oliver joined the senior editorial team as a deputy editor, she realized that authors were not using the literature mentioned above for guidance and as a consequence many authors were not presenting their analyses adequately. With the help of Murray Lark, chairman of the Statistics Advisory Panel, she compiled a set of notes to guide authors. These

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Editorial: statistics in the journal

We write this editorial in the light of our experiences during our first year on the Journal's senior editorial team. They are much the same as those that prompted one of us, Richard Webster when he was Editor-in-Chief, to write several didactic papers for readers on: how to summarize their statistics (Webster, 2001), how to express relations between variables (Webster, 1997) and how to analyse and present results from designed experiments and surveys (Webster, 2007). Although all the procedures are in textbooks, Richard's aim was to express them in the context of soil research. A more advanced topic not covered in introductory texts was that of designed experiments in which measurements are made repeatedly on the same units. Examples include daily measurements of gases collected in closed chambers in the field and produced in microcosms in the laboratory, and concentrations of solutes in soil water extracted at intervals from lysimeters. In these circumstances the observations on any one unit, the chamber, the microcosm or the lysimeter, are not independent of one another; they are likely to be correlated in time, and a proper statistical analysis that takes

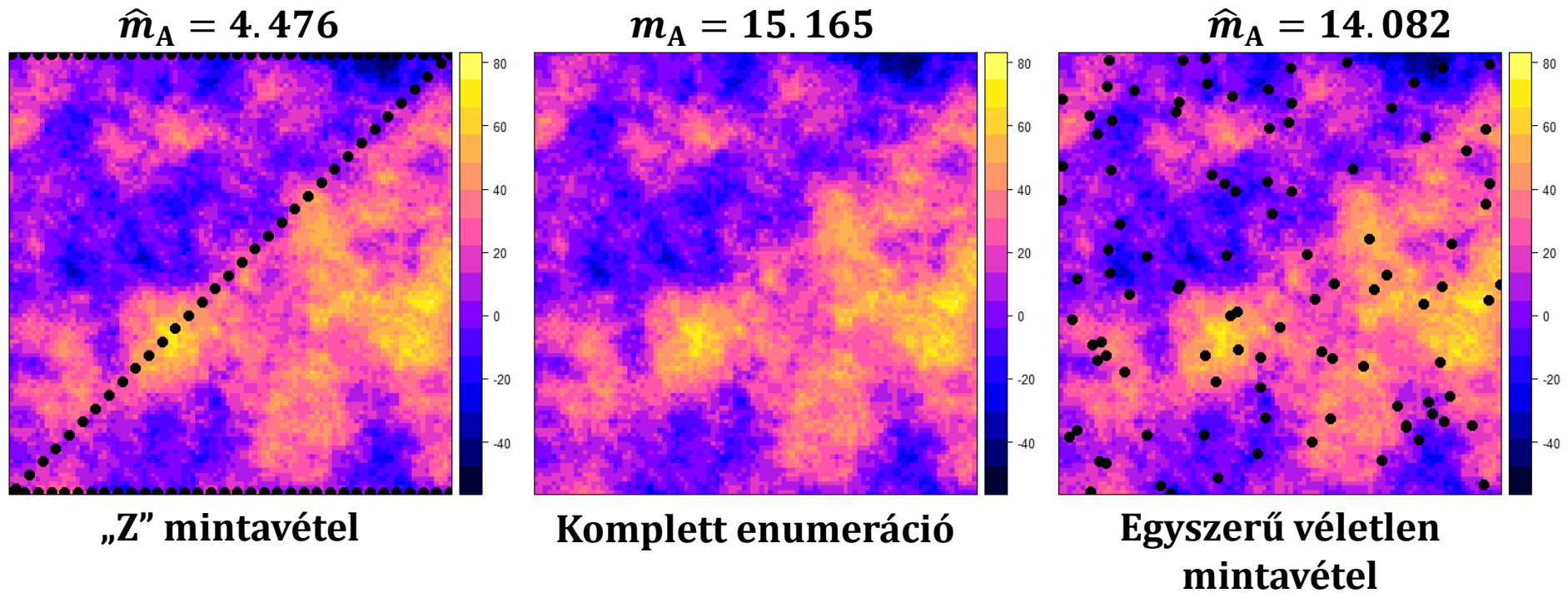
The most common shortcomings are with the analysis of variance (ANOVA). Many papers are submitted without an ANOVA table that can be used to judge whether the analysis matches the design. In many instances we have to request fresh analyses to match the designs or to realize the power inherent in the designs. A common flaw is the misuse of post-hoc comparison methods (e.g. least significant difference). These are designed for use after the principal hypotheses of the experiment have been tested; it is wasteful of the original experimental effort to treat them as the primary tool of inference. We have also to guide authors as to whether their designs and analysis enable them to draw the inferences that they claim from their analyses. We have to reject some papers because the initial sampling or designs are flawed and could never lead to sound inference or prediction; we editors cannot subsequently salvage anything from them. Failures to analyse data from sound designs properly and report outcomes fully and correctly lead to delays for authors because they have to make additional revisions to their scripts.

Misunderstanding and sometimes incorrect analyses remain, and we are having to return an increasing number of papers to authors for revision and clarification of exactly what they have done. What we want to see are transparent accounts of the statistical analyses, tables of results that match the designs of experiments and surveys and correct statements of errors and inferences. Authors must realize that it is important to describe their sampling in detail, the number of units (i.e. the size of samples), the number of replications in a design and the nature of randomization if that is appropriate.

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Én csak a mintaterületemre szeretném kiszámolni a vizsgált tulajdonság/jellemző/változó átlag értékét...



Fogalmak

Populáció

Cél populáció

Mintázott populáció

Mintázási egység (sampling unit)

Minta (sample)

Minta méret (sample size)

Minta térfogat (sample support)

Randomizáció

Valószínűségi változó

Autokorreláció

Regionalizált változó

Stacionaritás

Modell alapú megközelítés

Design alapú megközelítés

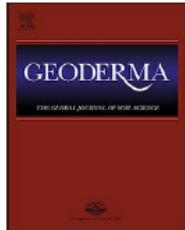
Tokaji talajfelvételezés



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Geoderma

journal homepage: www.elsevier.com/locate/geoderma



Optimization of second-phase sampling for multivariate soil mapping purposes: Case study from a wine region, Hungary

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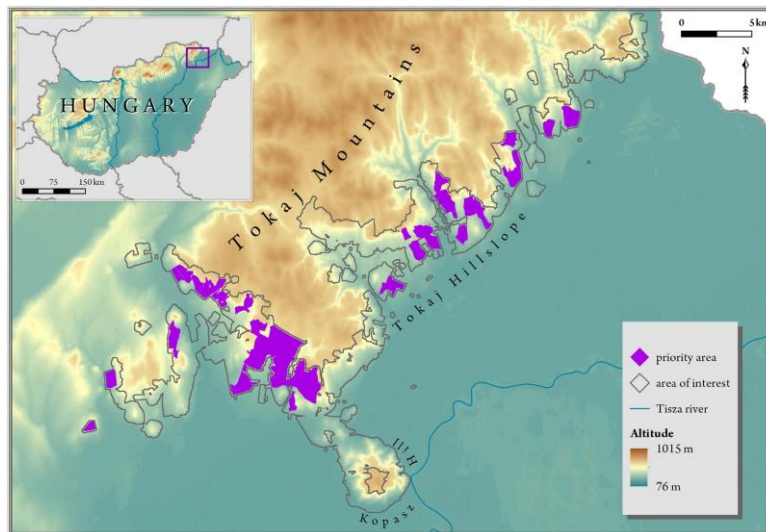
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Digital soil mapping
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ABSTRACT

Over the last decades extensive work has been done on sampling optimization. Many of the related papers focused on the optimization of sampling for only one soil property. However, there is a necessity to prepare a sampling strategy which is optimized for multivariate digital soil mapping (DSM) purposes. The aim of our work was to elaborate a sampling optimization methodology for multivariate DSM considering the demands on economic efficiency. We presented and tested it through a real-time survey at Tokaj Wine Region, Hungary. The soil properties of interest were pH, soil organic matter (SOM), and calcium carbonate (CaCO_3) content. The end-users defined the minimal requested precision for the DSM products (in terms of the average range of the 90% prediction interval), and priority areas on which more detailed survey was requested. We planned a two-phase soil survey based on regression kriging (RK). The results from the first-phase sampling were used to parameterize the second-phase sampling in which spatial simulated annealing (SSA) was applied. The spatially averaged range of the 90% prediction interval was the pre-survey quality measure which can be readily derived from the RK variance. The workflow can be summarized as follows: (1) rank the soil properties considering their spatial



Take home questions...

- **Milyen kvantitásra keresem a választ? Globális vagy lokális?**
- **Figyelman kívül hagyhatom az adatok közötti tér- és/vagy időbeli autokorrelációt a statisztikai vizsgálatok során?**
- **Az adatok közötti autokorreláció hatással lehet az eredményeimre? Ha igen, akkor milyen mértékben?**
- **A randomizálást miként vezettem be a mintavételi stratégiába?**
- **A stacionaritási feltételezéseimet nyilvánvalóvá tettem a mintavételi tervben?**
- **A mintavételi elemeim azonos „support”-tal rendelkeznek?**
- **Mekkora a reprezentatív „suppor”-t az általam vizsgált jelenségre?**
- **Miként tekintek a vizsgált jelenségre? Populáció vagy superpopuláció?**
- **Az adott léptékben még van „értelme” új mintát venni?**