

Module 12: Geostatistics

Week 3: Mini-project

For the final week of this module you will work on a mini-project.

Aims

The aim of the project is to give you the opportunity to undertake a concise but thorough piece of geostatistical analysis and to write it up in a short report. This will allow you to implement the concepts and skills you have learnt in the first two weeks of the module. By doing this, you reinforce and develop your understanding and technical competence.

Learning objectives

At the end of the week you should be able to:

- formulate a concise geostatistical problem that is appropriate to the dataset in hand;
- propose appropriate objectives and questions to address the problem;
- read your data into an appropriate software package and pre-process it as appropriate;
- implement statistical and geostatistical analysis appropriate to the problem;
- present interpret and discuss your results;
- write a concise conclusion;
- use references appropriately at all stages.

These learning objectives may seem wide ranging. Indeed they could be applied to your MSc thesis. The key thing for this week is to pick a concise and manageable problem. You will not have time to do detailed original research but you do have the scope to be creative and to thoroughly and carefully analyze your data. You should choose a dataset that requires minimal pre-processing.

Overview

The week is planned as followed

- Monday 25 June
 - Decide which dataset to use. Formulate your geostatistical problem, objective and questions
- Tuesday 26 June
 - Brief oral presentation (maximum 5 minutes and 3 slides) outlining your intentions for the project. You should state the problem, objectives and questions and give an overview of your data.
 - Plan your method and proceed with pre-processing and analysis.
- Wednesday 27 June
 - Analysis
- Thursday 28 June
 - Analysis and writing
- Friday 29 June
 - Short oral presentation (maximum 8 minutes and 6 slides). Give a brief review of the problem, objectives and questions presented earlier in the week and spend the remainder of the time on analysis, discussion and results.

The deadline for submitting the report is midnight on Sunday 01 July 2018.

4 Report format

The project should be organized as follows:

1. Introduction
 - a. Including problem statement, research objectives and questions.
2. Methods
 - a. What methods will be used in this project?
3. Data.
 - a. Provide a concise overview of the data and field site. You need to provide key descriptors (e.g., location, date, time, sampling scheme, pre-processing (e.g, lab processing) but focus on those relevant to the objectives and questions.
4. Results and analysis
5. Discussion
6. Conclusion
 - a. This should be kept short and linked back to the problem, objectives and questions in the introduction.
7. References
 - a. References must be used appropriately throughout the project. You have received extensive guidance on referencing in Module 11.
 - b. You should consult at least 4 references for this project.

There is no minimum length for the report. Typically a report might include approximately 6-8 pages of text but may be longer after the inclusion of figures.

5 Practical matters

Several datasets are made available to you via Blackboard. You could also use the example datasets made available in R. You can also use your own dataset, for example from your work or from your MSc thesis. This could be a great idea, but please discuss it first with the lecturer. An MSc thesis is a much bigger project and the data may require substantial pre-processing. We need to make sure that you have a manageable project for this week.

We expect that you will undertake most of your analysis using Excel and R (particularly the gstat library), since you have used these over the past two weeks. You are free to use other appropriate software (e.g., GIS software), but we will not provide much support for these.

In order to give some hints for projects, here are some titles from previous years:

- Distribution mapping of Wildebeest in Serengeti Park, Tanzania using indicator kriging
- Using indicator kriging to estimate probability distribution of locust swarms: Mauritania
- Using regression kriging to interpolate rainfall data
- Comparing ordinary kriging and cokriging to estimate the spatial distribution of Pb content in the soil
- Spatial association of urban slum population in African and Latin American
- Geostatistical modeling of Buruli ulcer (BU) prevalence
- Can the light that penetrates the canopy be predicted accurately using a kriging approach?
- Prediction of soil depth using slope parameter as predictor by regression kriging technique