Practical exercise for the course **"Spatial Data Analysis"** in the **WASCAL Master Research Programme on Informatics for Climate Change**, Ouagadougou, Burkina Faso
November 2022

Task 1

1.1: Import the dataset 'parasite_rate_africa.csv'. https://github.com/SteveMHill/SpatialAnalysis22/tree/main/final_project

1.2: How many observations are included in this dataset? Calculate the number.

1.3: When was the start of the first observation? When was the last?

1.4: What is the average (mean) parasite rate (%)? Calculate.

1.5: Extract all those measurements for which metrics for malaria are available.

1.7: Create a map showing the parasite rate in Africa. The map shall show the country's borders, the location of the surveys, and the parasite rate for each point. Think of a smart way to represent this data on a map (You must not forget to provide an appropriate legend and axis description).

1.8: Analyze the point pattern of observations, e.g., analyze if the observations are clustered or not AND explain the result.

1.9: Create a map showing the main clusters of observations.

1.10.1: Extract all those observations for (i) West African countries (16 countries!) and for (ii) the WASCAL member countries. Create a raster of the parasite rate for each of the two regions (i and ii) using spatial interpolation and validate your result.

1.10.2: Create two maps showing your results. Explain the results.

1.10.3: Discuss possible errors in your interpolation.

1.10.4: Export your results as spatial rasters.

1.11: Extract the average parasite rate for each WASCAL member country.

1.12: Rank these countries by their parasite rate and visualize this ranking in a plot.

Task 2

2.1: Search for an open-source dataset showing point observations. Remember that we were working with fire observations in the first week of our course. You can also use other point observations such as population density or else. It can be any for which you have coordinates and attributes available.

2.2-2.12: Repeat all the steps from 1.2 to 1.12.

Format of practical work: Analyses to be done in QGIS, with Python or R. Hand in all your results and explanation with maps and/or tables (Take care that you have a proper table and figure captions) in a PDF document. State your name properly. Submit to steven.hill@uni-wuerzburg.de AND sarah.schoenbrodt-stitt@uni-wuerzburg.de

Access to data: https://github.com/SteveMHill/SpatialAnalysis22/tree/main/final_project

Deadline: Thursday, 8th of December 2022.

Stay curious and enjoy!