Report for atRium Training at Brno (16-20 Sept 2024)

Swe Zin Myint
Phd candidate
Institute of Archaeological Sciences
University of Bern

I have wished to participate in an international training course or summer school such as "Re-use and interoperability of archaeological data" that will distribute lectures and practical experiences on R programming and advanced analysis methods. I have no background knowledge about programming especially R programming before I started my Phd. However, I started to learn R in 2022, and have been practiced on my own. I attempt to apply R programming on my data analysis in PhD research. This summer school training program organised these skills: Coding in the R programming language, querying data from the ARIADNE Knowledge base, and analysing data using various spatial analysis methods.

I have learnt these following skills from the lecture talk on "Introduction to R & R workflows and Data analysis & visualization in R" by Peter Tkáč. These lectures organized two parts: **Concept/ Theory, and Practice**.

- R essentials for Statistics: R program coding (symbols, operators, functions, and basic syntax), Data preparation (variable types and index)
- Understanding R functions
- Package installation (e.g. tidyverse, dplyr, etc), create, describe and graph a vector
- Writing different file types (excel, csv, text files), and how to import data from different locations, how to save output from R console, & how to adapt the R code of R programs
- Data Manipulation: Making a smart table using mmtables and other function
- Data Visualization: basic codes and packages (Colourful graphs: Pie, Bar, boxplot, scatter plot, histogram & others)
- Data Visualization (advanced): ggplots (colourful graph: One chart described, by one or many variables together)

I was introduced new topics, new knowledge and challenges for future research by this program on the second day and the following days: "ARIADNE & AO-Cat Ontology and Querying ARIADNE SPARQL Endpoint" distributed by Petr Pajdla, "Spatial analysis: Introduction to SPARQL and Analyzing spatial data in R" by Giacomo Bilotti, and "Advanced spatial analysis methods" by Michael Kempf. I obtained new knowledge about what is ARIADNE and how to Link Open Data (LOD), and how to create or build the LOD. I have also learnt types of Spatial data: what are the Vecotor Data, and what are the Raster Data. As Simple spatial data analysis

in R, sf (simple feature) and terra (raster data)" packages can be used. Since I have not had enough knowledge of QGIS or GIS and this lecutre is first time I have attended, this Spatial Data course was not easy to follow the lecture. However, I learnt a lot new things, and I have an idea for my future research how to produce high resolution map, hwo to manage multi layer data, how to create and link the locations of cave sites in Myanmar and neghbouring Southeast Asia countries (especially Thainland, and Vietnam.

This training improved my skills in basic functions in R (data importing, coding, manipulating, visualisation & reporting), and basic statistics with R (quantitative data analysis, descriptive and inferential statistics), and I also obtained the ability to apply more complicated and advanced analysis methods practically in my own research. To reach my research goal, all these skills I acquired from this training will be constructive for data analysis in my PhD research and also for future research. Attending this training at Brno and obtaining this chance was a great opportunity, and can extend the horizon of my knowledfe and my new skill. I have been keen to learn advanced and sophisticated archaeological data handling and analysis methods.