ATRIUM Report – Alexander Wilkinson

My experience at AIS CR – "Re-use and interoperability of archaeological data", greatly increased my ability in testing and working with archaeological data. Given my position, as just having finished my master's with aspiration for a career in research, it helped me to understand several elements of data use. The methods that were taught will hopefully be implemented into acquiring and using future and current archaeological data.

The first day which taught an introduction to using R and visualization of character and numeric data, although having had previous knowledge of this, helped to introduce new syntax and workflows I had previously not tried.

The second day of teaching focused on querying languages for larger databases of relevant archaeological data such as ARIADNE and Wikidata. This was novel for me, where understanding how data is stored and therefore how SPARQL and AO-CAT ontology can be used, could acquire specific data of interest. The future use of SPARQL queries I can see benefitting my work by creating efficient workflows for data acquisition. This could be through a few ways. Determining quick acquisition of filtered archaeological items, which can then be implemented further to numeric/character statistical analysis. Additionally, the acquisition of artefact or site geolocations can be an additional use for applying spatial statistics. It also explored the benefits and limitations of these large databases in a practical sense, where imputation is very important, yet understanding how database imputation is done can give the user a better handling. The use of this on my own subject (Cernavoda culture) was not successful due to scale of available information, but still, something I intend using in the future.

The third day had a focus on introducing spatial data and its analysis using the Sf and terra packages. Having previously not used these packages, the teaching was incredibly valuable for producing images embedded with simple feature and raster data. It has improved my spatial data visualization which previously relied on only simple feature plotting of data. I'd only previously had introductory lessons to spatial data and thus I look forward to developing better visualisation and analysis.

Possibilities for immediate use could be to create spatial distributions of isotope data, alongside for example elevation models, across the Lower Danube River basin. The isotopic data could determine spatial trends, possibly environmental, that were influencing $\delta^{13}C$ & $\delta^{15}N$ values. Its use could aid discernment of cultural choices that affected animal husbandry and human diets in prehistory.

Day four looked at more complex visualization and statistics of spatial data, producing kernel densities, and point pattern analysis. These methods were used for testing the relationship of covariates to site distributions. The implementation of this could take several forms for my own research. The implication of this for again testing isotopic values in relation to local environment could discern cultural choices in diet. Furthermore, it's use could be implemented to understand changing land use and settlement which occurred at the beginning of the 4th millennium BC in the Lower Danube River basin. Implementing point patterns in this way could possibly determine trends of site choice, in the context of change, which caused the abandonment of the tells reverting to horizontal thin layered settlements.

Overall, the course considering my previous experience has greatly enhanced the ways in which I want to implement data query, use and spatial statistics. I can see myself implementing all aspects and it has given me further ideas for working legacy data in my area of focus in the Lower Danube River basin. The teaching was at a great pace where a good quantity of material was covered but not at the cost of practically seeing its use and the workflow. I want to thank all of those who were part of the organization of the course and its teaching. I do believe it has greatly benefited me and my future work with a basis for understanding and working queries and spatial data analysis.