Research Methods for Climate Science (2020)
Tentative Tasks

Task 1: Cluster Analysis (CA)

The aim of this task is to study the characteristics of three CA algorithms. As discussed, use the climate dataset (CRU) over the city of your interest for this task. Using "R" or "Python" or "Statistical" software, cluster the data matrix to explore the groping of (i) the climate variable and (ii) years (1960 -2010) over the city, for each of the three algorithms (single linkage, average linkage, and Ward's algorithm). Write a scientific report to summarise your findings. If possible (for bonus marks), give physical interpretations of your results.

Task 2: Principal Component Analysis (PCA)

The aim of this task is to study the characteristics of PCA and compare them with that of CA. As discussed, use the climate dataset (CRU) over the city of your interest for this task. Using "R" or "Python" or "Statistical" software, perform PCA on the data using (i) rotated and (ii) non-rotated methods to reduces dimension of the dataset and identify the leading principal factors (PFs; i.e. processes). Write a scientific report (with appropriate diagrams) to discuss influence on the climate variables and the temporal variation of the PFs over the study period. If possible (for bonus marks), give physical interpretations of your results. Compare the results with those obtained with Ward's method in Task 1