A Winter School in Methods of Data Science,
Myanmar, Jan 2020.

Programming: The course will be taught using the python programming language, a powerful framework that can be downloaded at no cost (https://www.anaconda.com/download/ version 3.7). No previous python experience is required, but prior exposure to programming in some language will be very helpful.

Reference material. The reference for much of the course material is available in the **notes** here, and chapter numbers below refer to this source.

Some of the topics to be covered are

- Single time series: Fourier analysis, power spectrum, autocorrelation (highlighted subsections from Chapter 11, Von Storch and Zwiers, 2001), here.
- Multiple time series: correlation, regression (highlighted subsections from Chapter 8, Von Storch and Zwiers, 2001), here.
- Principal Component Analysis (notes, chapter 4.1)
- Clustering analysis: hierarchical (chapter 6.4), k-means (chapter 6.5)
- Neural networks (chapter 7.4)
  - ●●● *Additional subjects, time permitting:*
- Singular Value Decomposition (SVD, notes, chapter 4.2)
- Singular Value Decomposition applications:
  - computer animation (notes, chapter 4.3.3)
  - over-determined linear equations (more equations than unknowns, 4.3.4)
  - underdetermined linear equations (more unknown than equations, 4.3.5)
  - analyzing the relatioan between two data sets (e.g., stocks in NY vs stocks in Tokyo): Maximum Covariance Analysis (4.3.9)

References

Von Storch, H. and Zwiers, F. W. (2001). *Statistical analysis in climate research*. Cambridge university press.