Identifications of Teleconnections from data

https://www.nature.com/articles/s41598-019-45423-5.pdf

📍 **Ziel:** Du weißt was alle Figures bedeuten und wie kann die Korrelationsanalyse den Klimatologen helfen die Teleconnections besser zu verstehen. Data Science Exkurs: du verstehst wie Network Analyse kann dabei helfen die Muster in komplexen Klimadaten zu finden.

▼ What did authors try to accomplish?

- Framework to identify similarly evolving SST (Sea Surface Temperature) and Teleconnections

▼ What were the key elements of the approach?

- Data characteristics

  - SST data 1979 - 2015

  - Spatial resolution of 2.0-degree latitude x 2.0-degree longitude

  - 9456 grid points

  - Normalized to reduce temporal autocorrelation

- Wavelet Multi-Scale Correlation

  - Each grid cell → Network node

  - Links between pair of nodes = Wavelet multiscale correlation (combination of *maximum overlap discrete wavelet transformation and Pearson correlation)*

- Network construction

  - Schematic of network construction. Each grid cell of the SST dataset is considered as node and similarity between each pair of nodes is calculated using the WMC measure. By applying the 95th

percentile threshold along with multiple testing, a link between each pair of nodes is set up.
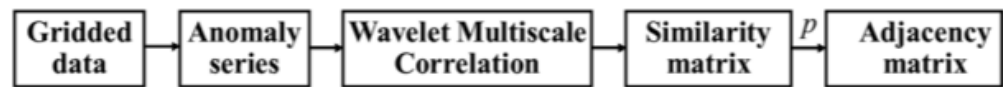
- 5% link density combined with multiple testing (requirement for edges)

Structure**:**

1. Construct network

2. Worldmap showing the number of links at different timescales

3. Frequency distribution of link lengths at different timescales

4. 3D-Projection of links

▼ What can you (possibly) use yourself?

- Network construction methods

- Use different timescales

▼ What other references do you want to follow?

- Agarwal, A., Maheswaran, R., Marwan, N., Caesar, L. & Kurths, J. **Wavelet-based multiscale similarity measure for complex networks**. The European Physical Journal B 91, https://doi.org/10.1140/epjb/e2018-90460-6 (2018)