Recap MA Thesis Lepke

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Summary

Main objective

- Predict drought in Central Amazonas Basin (CAB) based on global sea surface temperatures (SST)
- Motivation: Droughts in Amazonas strongly influence regional ecosystem and lead to high biomass carbon impact
- Related work: “An early warning indicator for Amazon droughts exclusively based on tropical Atlantic SST” (Ciemer et al. 2020)

(Summary justification see ciemer)

Summary Ciemer et al, 2020

- Monthly data from 1981 to 2016, 35 years
- SST: Compute monthly anomalies w.r.t long term mean
- Drought: Precipitation -> Drought (3-SPI), then averaged over Central Amazon Basin
- Compute correlations for SST and drought, over whole period of time
- Identify 4 highly correlated regions (unweighted networks, 10% strongest correlations)

- INSERT GRAPHIC here

- Use significant correlations as weights in further networks
- For each region create series of networks
- Each network based on 24 month of data, sliding window
- Result is time series of Average Cross Correlaion (ACC)
- Information from whole data set used for the sliding window approach
- Two atlantic regions become more interesting
- Investigate network dynamics between NTAO and STAO

- INSERT GRAPHIC here, ACC

methodological approach

- step by step, all regions, 4 regions, 2 regions, interaction
- Development over time
- We would like to investigate the capabilities of regression models

Summary Scope

- Fit a predictive model to the data
- LASSO regression, FUSED LASSO, variable preselection...
- Apply statistical methods for model evaluation/ validation (Cross Validation for Time Series)
- Use different time lags..

Pipeline

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Summary work done so far

- Using CDO for data handling
- Applying STL algorithm
- Correlation Analysis
- Cross Validation for Time Series
- First LASSO Models fitted

Correlation Analysis

Cross Validation (with graphics)

Fitting LASSO Model (with graphics)

appendix

(? how did they do the coupled network then ? corr grid in the sea and CAB, then average of each region, gives one value for each 24 month sliding window)