

Excercise 17.01.2018

Cornelius Senf

cornelius.senf@geo.hu-berlin.de

Overview

In todays excercise your goal is to explore and predict the climatic niche of Europes most important coniferous tree species (of the genus *Picea* (spruce), *Pinus* (pine) and *Abies* (fir)) by contrasting them to occurences of Europes most important broadleaved tree species (of the genus *Fagus* (beech), *Acer* (Maple) and *Quercus* (Oak)).

Data

- Occurences of tree species of the genus *Pinus*, *Picea*, *Abies*, *Fagus*, *Acer* and *Quercus* as CSV file (species.csv)
- BioClim clipped to Europe (bioclim.tif)

Products to be created

- Descriptive graphs of the climate niche of coniferous and broadleaved species
- A map of the estimated probability of coniferous species occurrence (i.e., how likely is it for any pixel to contain a coniferous species over a broadleaved species)

Analysis steps

- Perform a PCA on the bioclim dataset
- Extract BioClim at plot locations
- Develop a model predicting the probability of coniferous species occurrence using the BioClim components as predictors
- Apply the model to the PCA stack to map the probability of coniferous species occurrence

Tips and hints

- For calculating the PCA use a sample of approx. 50,000 pixels as we did in last weeks course.
- Chose only components that explain a substantial proportion of variation.
- Extracting the PCA values at the plot locations can be achieved by: `raster::extract(stack, plots[, c("x", "y")])`.
- Useful graphs for exploring the climate niche might include boxplots and histograms.
- For exploration, group species among their genus (use the `tidyr::separate()` for doing so).
- For modelling, regroup genres as 'coniferous' or 'broadleaved'.
- Think about the model to use. Tip: The response is coniferous (1) or not coniferous (0).

Finally

Discuss problems in class. Ask Fabian for help.

Contradictory to what I said last week, you have to submit your solution (as html created using markdown) until next weeks session (24.01.2018).

Good luck!