



Data Request Form

To obtain data from the European Vegetation Archive (EVA), please first make an enquiry to the EVA database administrator Ilona Knollová (ikuzel@sci.muni.cz) whether the data meeting your needs are available. If they are, please fill in the form below and submit it to Milan Chytrý (chytry@sci.muni.cz) or another member of the EVA Coordinating Board.

- Applicant's name:

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- Project title:

Scale dependence of macroclimate as explanatory of species' distribution and richness patterns with varying spatial resolution

- Brief description of aims and methods of the study:

Background:

A close link between climatic conditions and the patterns of plant species distribution and richness is the general underlying assumption of predictions about ecological effects of current environmental changes related to climate change on continental scale. Information about species occurrence with continental extent is therefore frequently correlated with macroclimatic variables to obtain information about potential future developments.

However, the sources of information about species spatial occurrence used for these assessments are very heterogeneous in spatial resolution ranging from plot-based information derived from large plot databases with fine spatial resolution to gridded information about species spatial occurrence derived from coarse scale investigations about species occurrence or range maps based on expert knowledge. All these data have the same spatial extent (e.g. Central Europe) but strongly differ in the spatial resolution of available information. Studies focusing on the environmental drivers of species spatial distribution often do not account for these scale-specific differences, which can strongly hamper general conclusions about the consequences of climatic changes on species richness as a fundamental part of biodiversity.

Strong theoretical background exists about the scale-dependent importance of abiotic (climatic) factors as drivers of species distribution/richness. Whereas biotic interactions are assumed to be the major drivers of species spatial occurrence on small spatial (plot-level) scale, climatic conditions are believed to be the predominant drivers of species occurrence / richness on large spatial (continental) scale. Thus, macroclimatic factors should have significantly less explanatory power regarding patterns of species occurrence based on plot-level information (fine resolution) compared to coarse-scale information about species spatial occurrence. This may result in low



Data Request Form

correlations between high resolution (plot-level) occurrence data and coarse-scale climatic data (e.g. taken from global and regional climate models). Thus, mixing up different scales of observation for explanatory and response variables might lead to seriously flawed conclusions about the environmental drivers of species richness. However, comprehensive empirical studies testing these assumptions are largely lacking up to now.

In this project we want to investigate the scale dependence of macroclimatic factors compared to biotic interaction in explaining patterns of plant species distribution and richness with continental extent but varying spatial resolution. We therefore want to compare plot-level information from the comprehensive plot database European Vegetation Archive with coarse-scale information about species occurrence. This biotic information derived from different sources will be correlated with coarse-scale (gridded) information about macroclimatic conditions (derived from worldclim and CHELSA climate).

Approach:

(a) Collect and generate information about species spatial occurrence / species richness with different spatial resolution / from different data sources: i) high resolution data from plot-level investigations ii) coarse-scale gridded information with similar spatial resolution as the gridded climatic information generated from plot-level investigations, iii) coarse-scale gridded information with similar spatial resolution as the gridded climatic information generated from species distribution maps.

(b) Correlate all three types of spatial information about species distribution / richness with coarse-scale macroclimatic information and compare the explanatory power of climatic factors using standard regression methods (linear and non-linear).

(c) Quantify the relative importance of biotic interactions for the three different types of distribution / richness information compared to the relative effect of macroclimatic factors by using joint species distribution modelling approaches.

Output:

This study will provide a first comprehensive, empirical test of a well-established theoretical concept about the scale-dependent importance of abiotic vs. biotic drivers of plant species occurrence and richness and will have far reaching practical relevance for climate impact research and related scientific disciplines. An in depth understanding about the effects of scale mismatches between explanatory and response variables, which will be provided by our study, is urgently needed in the fast evolving field of big-data ecology. The results from this project will increase the general understanding about scaling effects in ecological research and will help to increase the reliability of ecological studies working on continental scale ecological patterns and their drivers.

- Will someone else be involved in data editing or analysis in addition to the applicant?

Currently not. At a later stage possibly other members from the Departments of the applicants (e.g. a master student) or someone from the EVA Consortium who contributes significant expertise might get involved.

- Estimated time of delivery of results (e.g. manuscript submission):

2017



Data Request Form

- Geographic area needed (e.g. countries or range of geographic coordinates):

All

- Vegetation types needed (syntaxa):

All

- Other data selection criteria:

None

- Envisaged publications:

(1) At least one publication in a high-ranking ecological journal.

- Specification of the co-authorship arrangements in publications based on the requested data (e.g. the extent of possible involvement of the original data providers, or of EVA data managers if extra work for this project is needed from them):

We will inform all data providers as well as the EVA Coordinating Board when we have achieved major results or plan the presentation of results on a conference. In any case data providers shall be informed about the project progress at least annually. In case a paper project should become concrete, we will announce this also to all data providers and offer that from each database that contributed at least 5% of the final dataset the custodians can propose one active co-author to join the team of authors (optionally we might accept co-authorship offers from nominees of smaller databases if they make valuable methodological/conceptual contributions). We will also offer co-authorship to the members of the EVA coordination and administration.

I agree with the terms of EVA Data Property and Governance Rules as approved on 26 May 2012 (<http://euroveg.org/download/eva-rules.pdf>).

[place, date]

Bayreuth, 30. August 2016

[applicant's name]

Andreas Schweiger & Jürgen Dengler