Project Database of ICP Forests
PROJECT DESCRIPTION

PROJECT INFORMATION

Project title: Δ-Drivers BIOPART: Driving factors of beta-diversity in European Forests

Project ID: 62

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PROJECT DESCRIPTION

Weight and assessing interactive effects of ecology and biogeography in determining the total diversity of European forests using a spatially representative sample. The general hypothesis to be tested is that the effects of present day ecological factors are less important than biogeographical factors in determining the total diversity of forests in Europe.
Leading with overall vascular plants recorded in the spatially representative network LI, we do expect the following:

- Diversity component accounted by the biogeographical region > than diversity accounted by the lower scale components (plot, site, forest type).
- Distance decay rate across biogeographical regions > distance decay rate within biogeographical regions (after correction for spatial extent)
- Beta nestedness within biogeographical regions > across biogeographical regions (spatial extent correction) Beta complementarity across biogeographical regions > distance decay rate within biogeographical regions (after correction for spatial extent).

Ecological research usually emphasizes patterns of species richness (alpha diversity) and the underlying eco-evolutionary processes responsible of its origin and maintenance.
Few studies deal with continental scales focusing on dissimilarities in species composition among areas (β-diversity), trough distance-decay (Qian and Song 2012: Latitudinal gradients of associations between beta and gamma diversity of trees in forest communities in the New World N and S; only trees, 200 sites)
Beta diversity (changes in composition of species assemblages) depends on 1) spatial species turnover or complementarity (species replacement; common vs. exclusive, dissimilarity) and 2) nestedness (non-random species loss, an assemblage is a subset of the next one).
Turnover and nestedness can behave differently due to local drivers\filters (ecology) or biogeography (incl. historical\evolutionary species pool).
Attempts and references for disentangling this two components have been applied mostly on animals (from Beetles to anphibians, e.g.: Baselga 2010); Chiarucci et al 2010 applied additive partitioning and species-area relationships to island biogeography; Beauchmp and Shafroth 2011 in xeric riparian phytocoenoses; Martiny 2011 deals with bacterial beta-diversity.

Approach: Beta diversity will be examined as Species presence\absence by using, e.g., Jaccard similarity index (c\a+b+c), Simpson dissimilarity index (min a,b)/(c+ min a,b); c=common; a, b=exclusive species.
Comparing two different scales on species counts; and measuring similarity between sites (or dissimilarity).
Considering the independence β vs. α-diversity, the application of multiplicative partition (β=γ/α) instead of additive partition of diversity (β=γ-α) can be discussed.