Project Database of ICP Forests
PROJECT DESCRIPTION

ICP Forests

LRTAP
Long-range Transboundary Air Pollution

PROJECT INFORMATION

Project title: Adapting forestry to climate change in Rhineland-Palatinate (Germany)

Project ID: 101

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PROJECT DESCRIPTION

Background
Reliable information on the current as well as the future (under altered climatic conditions) suitability of tree species is needed in order to adapt forestry to climate change in Rhineland-Palatinate. This particularly applies for the five main tree species in Rhineland-Palatinate (beech, oak, spruce, scots pine and douglas fir).
Relevant indicators for the suitability of a tree species under specific climate conditions are abundance (frequency, percentage of covered area) as well as vitality. The European Level I system provides reliable information for these indicators.
The established methodology of „bioclimatic envelopes", which is based on natural abundance, has the disadvantage of solely representing the ecological potential of a tree species under natural competitions. Depending on the tree species, this may cause a more or less severe distortion of the results from the real physiological potential. We believe that the abundance of a tree species on a Level I plot is more appropriate for the assessment of the physiological suitability. This is based on the assumption that tree species are predominantly found / were predominantly planted on suitable sites.
Hypotheses

- The more frequent a tree species under specific climatic conditions and the better its vitality, the better the suitability of the species under these climatic conditions.

- The analysis allows a classification for each species ranging from "not suited climatic conditions" to "very well suited climatic conditions".

- The application of this classification to the current as well as future climatic conditions in Rhineland-Palatinate allows a differentiated assessment of the suitability of each tree species based on temperature and precipitation (following the methodology established for the "bioclimatic envelopes").

Methodology

- statistical analysis of abundance/frequency as well as vitality of each tree species for all plots of the Level I system, differentiated by climatic conditions (temperature and precipitation)

- classification of suitability and potentially derivation of a threshold for no suitability

- applying the derived classification to the climatic conditions of Rhineland-Palatinate: current climate as well as climate projections (ensemble of 17 members), both 5 km horizontal resolution

- maps as final product, additionally documentation as well as discussion of the current and future suitability of the tree species