Principal components analysis and trend surface analysis of a small-scale pattern in a transition mire

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Abstract

Principal components analysis and trend surface analysis have been applied to a transition mire with the aim to characterize the vegetation pattern and reveal the major trends of variation. The first three PCA axes were ecologically interpretable, viz. the 1 st and 2nd as a complex soil moisture gradient and the 3rd axis as a gradient in the amount of peat in the soil. The ecological interpretability of the 1st axis of PCA after VARIMAX rotation, is unclear because some outlier samples caused a reorientation of the axis. TSA appeared to be useful for the clarification of joint patterns of species groups, which were major contributors to ordination axes in terms of component loadings. The smooth effect of TSA was briefly discussed in connection with the influence of extremes upon the outcoming trend structure. The use of four-variable TSA including a time series is emphasized for the study of spatial-temporal relations and ecological succession.