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Session chair: Elena Paoletti

Causes of changes in growth of European forests: Analysis of the roles of climatic factors and nitrogen nutrition

Kahle, H.-P., Spiecker, H. (University Freiburg, Germany), Pérez-Martínez, P.-J. (formerly University of Freiburg, Germany), Unseld, R. (University of Freiburg, Germany).

Temporal trends and spatial patterns of height growth changes of Norway spruce (*Picea abies* L. Karst.), Scots pine (*Pinus sylvestris* L.) and European beech (*Fagus sylvatica* L.) forests across Europe were analyzed in relation to changes in air temperature and precipitation, and to levels of foliar nitrogen. Results show that mean height growth rates have significantly increased during the period 1960 to 2000: 25.1% for beech, 24.8% for pine, and 22.8% for spruce. Based on yield table assumptions these changes in height growth correspond to increases in total volume production of 74.0% for beech, 44.9% for pine, and 56.4% for spruce. The level of height growth acceleration is fairly constant over the last 40 years. Mean height growth acceleration rate of beech with higher N nutrition was more than two times larger than of those with lower N. A similar tendency was indicated for pine, but not for spruce. The higher the site index, the lower the level of change in height growth of pine and beech. A spatially explicit statistical model was developed to explain a significant amount of the spatial variability in changes of mean height growth rate of spruce and pine across parts of Central and Northern Europe.