Effects of daily temperature and photosynthetic production on growth variation of Scots pine in northern Finland

Pekka Nöjd[1], M. Korpela[2], J. Holmen[2], H. Mäkinen[1], M. Sulkava[2] and P. Hari[3]

[1]Finnish Forest Research Institute,Vantaa Research Unit, P.O. Box 18, FI-01301, Vantaa, Finland
[2]Helsinki University of Technology, Department of Information and Computer Science, P.O. Box 5400, FI-02015 TKK, Finland
[2]Finnish Forest Research Institute Vantaa Research Unit, P.O. Box 18, FI-01301, Vantaa, Finland
[3]University of Helsinki, P.O. Box 27, FI-00014 University of Helsinki, Finland

The growth of Scots pine near the northern timber line in Scandinavia has been studied intensively since the early days of dendrochronology. We aimed to add a new aspect to the studies by analysing the relationship between daily rather than monthly mean temperatures and ring-widths of the species. Correlations between temperature sums for all time periods between 1.4. and 31.8. and ring-widths were tested. In addition, estimated (modelled) daily photosynthetic production was used in the analysis. Tree-ring data from the Värriö natural park in northern Finland was used. Highest correlations between ring-widths and daily temperatures were obtained for periods starting around the summer solstice (21.6.) and ending in late July. These periods are - incidentally - rather close to the month of July, traditionally identified as a strong regressor in this type of studies. The result was rather similar when estimated daily photosynthetic production of the species was used. The period yielding the highest correlation started slightly later, the beginning of July, and correlations were slightly weaker.