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Climate signal in a Picea abies tree ring chronology in Eastern Romanian Carpathians

I. Vieru, I.H. Holobâcă, O. Pop, I.A. Irimuș, and M. Georgescu
Babeș-Bolyai, Cluj-Napoca, Physical Geography, Romania (vieru.ioana@gmail.com)

Trees are both sensitive and adaptive to environmental change; consequently they are often used as indicators for past climate variability. The correlation between climate and growth of spruce (Picea abies (L.) Karst) in Eastern Romanian Carpathians was tested by choosing a sample site situated beneath the upper timberline (where the climatic factor would be more restrictive), at the altitude of 900 - 1000 m, on the north facing left slope of the Goșman valley (Neamț county).
The tree ring width chronology covering most of the last three centuries was derived from the 25 living spruce trees sampled. The climatic dataset comprises monthly average temperature and precipitation values from the closest 7 weather stations, as well as for the nearest grid point of CRU TS. 3.1 dataset. One of the methods consists of detrending and standardization the tree ring using a negative exponential function and a linear function, the average population index being calculated using a bi-weight robust mean. The statistical significance of correlation is tested with the bootstrap method and the coefficients that exceed the 95% confidence level are highlighted.
Preliminary results indicate a significant correlation between the tree ring chronology and the average winter temperatures (November, December and January) of the grid dataset. The length of this temperature dataset also allows the performance of correlation with evolutionary and moving intervals, which is not possible in the case of instrumental data.
Further on, differences in standardization methods used and the corresponding results are detailed. The results of Regional Curve Standardization are of particular interest, considering the limited length of the chronology, and the possible bias introduced by the modern sample of uneven aged trees that is prone to a contemporaneous-growth-rate-bias.

Keywords: dendroclimatology, tree ring, standardization, correlation, RCS method.