



A modeling approach to the interpretation of tree rings from Northern Eurasia.

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The signal recorded in tree-ring based reconstructions of North Eurasian climate is filtered through the interaction of the tree with its environment, and through the process of sampling, measurement and analysis applied to the tree rings. Two simulation models are used to examine the complexities of both “filters” in the case of larch trees growing on the forest tundra at or close to the northern tree limit. One, the Vaganov-Shashkin model, models the climatic control of the processes of cell division, expansion and maturation leading to the production of tree rings (Vaganov et al, 2006; Evans et al., 2006). It deals with non-linear interactions between these processes and daily meteorological variables, and generates not only the size of each year’s ring, but also its internal structure. It is thus eminently testable against observed data. The other, a new model named SYNCHRON, allows the exploration of the sensitivity of a dendroclimatic reconstruction to assumptions of the methods used to extract climate signal from a collection of tree-ring data, the degree of replication and the specific distribution of samples of various ages through the reconstructed period. The implications will be discussed of results from these investigations, particularly for understanding of the climate of the past 2000 years in Northeast Eurasia, and for recent and near future wood formation.

References

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