



Calibration of the stable oxygen and carbon isotope signals of stone pine (*Pinus cembra* L.) tree rings at the Eastern Carpathian timberline

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Swiss stone pine (*Pinus cembra* L.) presented the greatest dendroclimatological potential in the Eastern Carpathians owing to the i) significant longevity, ii) strictly constrained ecological preference and the related pronounced temperature regulated growth and iii) well-preserved snag and subfossil findings. Dendroisotope signals, however, were not tested for the species. Increment cores were extracted from three individuals at a timberline site located in the Calimani Mts, Romania. Annual rings were cut with a scalpel under a binocular microscope from each core and each year. Annual increments were treated separately (i.e. non-pooled) to monitor between tree variability and estimate real uncertainty. Extracted α -cellulose was homogenized by ultrasound and converted to CO at high-temperature and the stable oxygen ($^{18}\text{O}/^{16}\text{O}$) and carbon ($^{13}\text{C}/^{12}\text{C}$) ratios were measured and expressed relative to standards in the conventional delta notation.

Both isotopes presented strong intra-tree correlation, therefore the stand average was estimated from the measurements. Carbon isotope record performed the characteristic decline throughout the recent decades; therefore this non-climatic trend was corrected before climate calibration. Mean $\delta^{18}\text{O}$ yielded significant positive connection ($r > 0.5$) with temperature of the summer months for the last century. Spatial signature obtained from a preliminary correlation field analysis suggests that Stone pine $\delta^{18}\text{O}$ from the Calimani Mts will give relevant temperature record for the historical times not only for the Eastern Carpathians but also much southward directions as far as the Central Balkan.

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