Oak tree-ring chronologies - an instrument to estimate Carpathians role to separate climate influence in Northern Romania

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Actual climate conditions are in permanent changes and trees can provide information on the magnitude of current modifications compared with the past. Through dendrochronological methods we have analyzed a network composed of 17 chronologies belonging to the Quercus genus to highlight the role of macro-climate induced by the major landforms in printing a specific growth response pattern to climate. The transect is located in North Romania following a straight line of about 400 km length, crossing the Carpathian Arch. The aim of this study is to highlight the areas with homogenous response of trees to the climatic factors. This fact is important for building long dendrochronological series considering that it is appreciated reduced scale applicability. It is known that in the study area covered with oak-trees the number of long series used for climate reconstructions is reduced. The material used is represented by the dendrochronological series which were sampled according to the standards accepted by the scientific literature. The statistical methods used consist in employing PCA analysis to highlight the spatial segregation, related to PC1 scores. Also hierarchical cluster analysis (HCA) was applied in order to group the series with common features on basis of similarities/dissimilarities. The Euclidian distance between the chronologies was calculated and sampled areas were grouped according to Ward minimum variance method. In addition we performed a redundancy analysis (RDA) which the ordination of the axes it is a linear combination of supplied environmental variables. The correlation analysis with climate factors was accomplished by using bootstrap correlation. The pointer year analysis (the selection criteria is PC1 scores <-0.5) was also performed. The results were related to the postglacial recolonization routes obtained by analyzing the chloroplast DNA.