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The potential of subfossil trunks for deriving floating dendrochronologies in NE Romania

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The subfossil wood material collected along rivers from north-eastern part of Romania was dated with radiocarbon and dendrochronological investigated. The study area is represented by Siret and Moldova rivers. Both rivers originate in the Eastern Carpathians where they collect the majority of their tributaries, further crossing through the eastern sector of the mountains by creating transverse valleys. Along these rivers, on reaches covering lengths of 100 km and 140 km, tree-rings samples were collected (n = 40 along Moldova River and n = 37 along Siret River). Of the total number of 77 collected wood samples, we dated 26 in order to determine the absolute age.
The species of subfossil trunks belong to Quercus (n=51), Ulmus (n=20) and Alnus genus (n=3). The ratio between the average growth and the trunk age varies greatly, from trees aged as little as 38 years with average diameters above 32 cm, to trees as old as 184 years with diameters of just 45 cm. The absolute age of subfossil trunks varied from few decades to 6900-6670 cal yrs BP.
The obtained result consists in dendrochronological series which covers periods from Mid to Late Holocene. The highest concentration of deposited subfossil trunks was carried out in the last 3000 yrs BP. Therefore, it is possible to create an exclusively dendrochronological sequence for this time frame. A first step in this direction is the extension of living tree rings series (180 yrs.) with modern wood in order to create an enlarged series of 383 years, (as illustrated for rings series of modern oaks in Dolhasca site, Siret Valley). Albeit there are many gaps in the reconstruction of these phases, several clusters are easily distinguishable, i.e. 3500-2900 years BP, 2200-2075 years BP, and 1000-800 years BP extending to LIA. By relating this data to obtained information from other proxies (lacustrine sediments, pollen records, lake levels, etc) we may conclude that the two major periods in Holocene history were characterized by large hydrological events and were, thus, conducive to significant changes in the fluvial domain (avulsion, sedimentation), which strongly affected riparian forests, as well.
This is the first tree-ring chronology to cover such a long time frame (nearly 7000 years, based on incomplete information), albeit with many gaps, in our geographical region. About 95 - 97% of riparian trees can rarely provide series longer than 400 years (Becker, 1993; Friedrich et al., 2004) and this is directly linked to the frequency of flood events destroying floodplain forests. We consider our longest tree ring series (322 yrs.) ranks between the limits quoted above by the latter authors for oaks vegetating in floodplain forests.