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ABSTRACTS

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Long-term land use and land cover changes in the Carpathians

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Since the mid-19th century, the Carpathians have undergone several political and socio-economic transformations that influenced the land use patterns and land cover. The most important ones were liberation of peasantry in 1848, collectivization after World War II, transition to market-oriented economy and re-privatization of land after 1990 (Kozak, 2010). Among the most pronounced changes were those related to forest transition: reversal from the shrinking to expanding forest cover (Mather, 1992).

We document the forest expansion process for the Polish Carpathians, using series of vectorized historical topographic maps (1860s, 1930s, 1970s) and contemporary satellite data for all the area. In addition, we map forest succession patterns with high resolution aerial data for a sample of communes. The preliminary results show that in the Polish Carpathians the forest cover was relatively stable till 1930s and increased after World War II. Results of local scale analysis prove that forest succession on abandoned agricultural land adds to the forest or tree covered area especially since 1990s. Referring to the meta-analysis of land use and land cover change case studies carried out for the whole Carpathian range (Munteanu et al., Forest and agricultural land change in the Carpathian region – a meta-analysis of long-term patterns and drivers of change. *Land Use Policy* [submitted]), we note the analogy of land use and land cover change processes in the Polish Carpathians and other parts of the range.

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Impact of the Carpathians on the genetic structure of the spruce bark beetle *Ips typographus*

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The Carpathians are a range of mountains forming an arc roughly 1,500 km long across Central and Eastern Europe. They are an important area for biodiversity and belong to one of the major refuges of the last ice ages for many organisms. The forests of the Carpathians are dominated by spruce, which have suffered continuous outbreaks of the eight spined spruce bark beetle, *Ips typographus*, in recent decades. The phylogeography of this spruce pest is well documented, however, little is known on small scale, i.e., the Carpathians. Here we applied a mitochondrial marker and studied the genetic variation and structure of Carpathian populations and compared data with published one from other European populations. Twelve haplotypes were characterized and 42% of those were not detected in other European populations. Despite a slight genetic structure, differences were observed in the haplotype distribution and diversity between the Western/Southern Carpathians and the Eastern Carpathians reflecting at least two potential refugial areas for *I. typographus* within the Carpathian mountain system. Further data show that the Eastern Beskidian Mountains of the Carpathians could act as barrier for several European haplotypes. This small-scale analysis reveals that the Carpathians have been an important glacial and postglacial refuge for *I. typographus*. This information is important for a preventive and reactive forest management.

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Environmental history of the extinct lake Šúr (Western Carpathians, Slovakia) during the Late-glacial and Holocene: a multi-proxi approach

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Our project is aimed at paleoenvironmental reconstructions of local vegetation and landscape character of the Nature Reserve Šúr (Western Carpathians, Slovakia) during the Holocene and Late-glacial. Development and origin of the lake and changes of vegetation and landscape in the spatiotemporal context are reconstructed by using a multi-proxi approach: pollen, macrofossil, diatom analysis. These data are supported by radiocarbon dating, detailed sediment stratigraphy and micromorphology of samples taken from three cores in this area. The sedimentary record of the lake Šúr was chosen due to its exceptional position within the area of contact zones between the Pannonian basin and Western Carpathians. We test the hypothesis whether this type of reconstructed environment is able to reflect climatic changes during the Pleistocene/Holocene transition. Our aim is also to detect refugia of temperate trees in Late-glacial and to trace pollen indicators of agriculture in the middle Holocene. First results show the unique ecosystem of the Šúr Lake during the first half of the Holocene. Macrofossil record gives detailed evidence of shallow brackish lake with macroremains of aquatic plants *Zannichellia palustris* and *Chara* and littoral and swampy species *Typha* and *Cyperus fuscus*. The pollen record reflects trees refugia very close to this area. A pine forest was frequently admixed with broad-leaved trees (such as *Quercus*, *Ulmus*, *Tilia* and *Corylus*) during the Late-glacial.

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