



## **Landscape history and land-use dependent soil erosion in central Bosnia from the Bronze Age to Medieval Times**

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The inland areas of the northwestern Balkan peninsula and in particular of Bosnia and Herzegovina are poor in natural archives suitable for the reconstruction of past environmental changes and vegetation history. Consequently, palaeoenvironmental analyses are scarce with only three palynological studies available dating back to 1973, 1956 and 1934. Central Bosnia, however, is rich in archaeological heritage, featuring numerous prehistoric settlement sites along the river Bosna starting in the early Neolithic. This generates the need for palaeoenvironmental reconstructions to support and complement recent archaeological research in this area. Here we present results from a 450 cm gyttja-peat sequence from Seoce Jezero, a small mire located at 600 m NN on a plateau above a tributary of the river Bosna 30 km northwest of Sarajevo (central Bosnia). Fourteen AMS C-14 dates provide a robust time-depth-relationship which covers natural and anthropogenic environmental changes at Seoce Jezero from the Bronze Age to early Medieval Times. Pollen, macrofossil and geochemical analyses of 167 samples produce a high resolution record of land-use and vegetation change up to a half-decadal time scale. The palaeoenvironmental record starts ca. 1800 BC (3750 cal. BP) and reveals an initially relatively undisturbed landscape dominated by *Fagus*- and *Quercus*-*Carpinus* woodland. Anthropogenic influence is clearly visible from 1400 BC (3350 cal. BP) onwards and comprises woodland clearances, pasturing and crop cultivation. Pollen analyses confirm several consecutive phases of different land-use character and intensity. Phases of high land-use pressure culminated at the transition Bronze Age/Iron Age (1100 BC), the late Iron Age (400 BC), late Roman times (AD 300) and from AD 700 onwards. In between, stages of forest regeneration could be detected, most pronounced in the period between 70 BC and AD 150 (2020-1800 cal. BP), when anthropogenic influence virtually ceased. Whereas land use in the Bronze and Iron Age and to a lesser extent in Medieval Times was dominated by agriculture, the period of Roman influence between 200 BC and AD 600 (2150-1350 cal. BP) also had a strong extensive pastoral economy, which lasted until Medieval Times. Four consecutive successional cycles of vegetation (*Juniperus*–*Populus*–*Quercus*) illustrate the pattern of land-use changes and landscape development (pasture–abandonment–reforestation) over a period of ca. 1000 years. Another feature of anthropogenically induced landscape change is the occurrence of several conspicuous clay layers which are up to 30 cm thick and free of pollen, i.e. obviously deposited in a very short time span. These layers occur only in those periods of high land-use intensity in which agricultural activities predominated and pasture was subordinate. Highest input of clay takes place at the beginning of each land-use phase, demonstrating that the geomorphologic process system in the catchment area stabilised after an initial peak in soil erosion rates. It can be shown that in spite of a considerable landscape opening the shift to extensive pastoral farming prevented further soil erosion at the Seoce Jezero plateau.

The results obtained represent the first well-dated inland record of landscape change in an area of ca. 200 km radius and complement the knowledge about the Holocene vegetation history on the Balkans.