

Abstract

The principal goal of this thesis was to provide relevant information on the spatiotemporal dynamics of erosion-sedimentation and weathering processes in the last climatic cycle and to interpret the obtained data in the context of European paleoenvironmental development. Representative sequences of loess, paleosols and lacustrine sediments from the area of the Bohemian Massif, the Carpathian Foredeep, the the Vienna Basin and the northern edge of the Pannonian Basin were investigated using a wide range of instrumental tools and paleontological methods. A uniform analytical approach applied to these sedimentary facies has provided ample new information about the paleoclimatological and paleoenvironmental development of East-Central Europe – an important region in the transition zone from oceanic to continental macro-climatic settings. The individual studies included in this PhD thesis cover the complete period of the Upper Pleistocene (MIS 5–2; ~130–12.7 ky BP) and are presented as separate chapters in the order of the superposition of strata.

Chapters III/1–3 deal with the results of research into six loess/paleosol sequences (LPSs) situated in the Central Bohemian Massif, throughout the Moravian Valleys, and at the northwest and north edge of the Pannonian Basin. A detailed paleoenvironmental analysis, based mainly on results of studying environmental magnetism, geochemistry and soil micromorphology, has revealed significant differences in the intensity of pedogenetic and chemical weathering processes. These differences are caused mostly by the different geographic locations of the investigated sites: Westerly and northerly situated localities were influenced by the oceanic macro-climate of the Atlantic region and by the wetter and cooler climate of the pluvial zone of the Scandinavian ice-sheet, respectively. By contrast, the pedogenetic development of sites in the southeast part of the investigated region was mostly influenced by arid climatic conditions of the Pannonian Basin. Differences in climatic development can also be observed within the Pannonian Basin itself (the wetter peri-Carpathian region vs the arid climatic condition of the central part). The results of research into LPSs show a considerable effect of divergence in paleoenvironmental processes during the glacial period of the Late Pleistocene and suggest that the geographical variability of these processes is a topic of urgent importance.

Chapters III/4–5 deal with the Late Glacial period and the Last Glacial–Interglacial transition (~16–8 ky BP). Multidisciplinary research of three paleolakes and two fossil soils discovered in the Třeboň Basin offered so far the most detailed information about the Late Glacial paleoenvironmental development in the eastern part of Central Europe. Among other facts, the results clearly show that during this period the research area was significantly influenced by hydro-climatic changes of the Northern Atlantic.

This thesis has also brought many new findings about the applicability and interpretation possibilities of magneto-mineralogical and geochemical methods in instrumental analyses of sedimentary and soil records.