



Holocene landscape and land-use change under human impact. Examples from Central Europe (Lower Rhine Embayment)

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In the Lower Rhine Embayment (LRE), as in other parts of Central Europe, several main periods of colluvial deposition (mainly Metal Ages, Roman time, Medieval time) and four main periods of alluvial and overbank deposition in the floodplains (Early Holocene, Metal Ages, partially Roman time, Medieval, Early Modern time) can be divided. The summary of colluvial sedimentation can be shown by using interdisciplinary methods, consisting of sedimentological, geochemical and archaeological methods. This allowed reconstructing a detailed land-use history. To clarify the origin of the colluvial deposits loess-sequences also have been studied geochemically and were compared to loess- and loess-like deposits from adjacent areas, such as the Northern Eifel Mountains or the Middle Rhine. The results clearly show that only the combination of methods of natural sciences and the humanities allow optimal processing of these complex findings. To sum up these results the following cycles cause by human activities can be found in the LRE: 8 periods with soil formation (P = pedogenesis), followed by a phase with mainly stable land surfaces but some rill / gully erosion (R) and succeeded by intensive erosion and colluviation (E) caused by mainly sheet floods in an more open landscape. Especially during the Metal Ages and High Middle Ages erosion is clearly detectable. In the woodlands strong deforestation took place especially due to the production of charcoal and firewood as well as grazing activities. In addition, the development of mining and related industries in the 15th to 16th centuries and further increase in 19th century produced a strong contamination of floodplain deposits. Different periods of an increasing grassland since Medieval time cause by socio-economic effects that results in a reduction of soil erosion can be distinguished.