



Human impact variability on soil erosion during the Holocene based on valley floor sediments study in a Parisian basin fluvial catchment (France): crossing sedimentological, archaeological and palynological proxies

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This work is part of the French CNRS ECLIPSE program « Impact anthropique sur l'érosion des sols et la sédimentation dans les zones humides associées durant l'Holocène ». It aims to reconstitute the evolution of human impact on soil erosion at various periods via the study of Holocene sedimentary archives. In this framework the Choisille catchment (288 km²; elevation: 50 – 200 m), tributary of the River Loire near Tours (France), has been the subject of an interdisciplinary study (sedimentology, geophysics, archaeology, palynology). 3 areas are investigated: a downstream stretch, a silicated sub-catchment area and a carbonated sub-catchment area.

In the downstream stretch, located near ancient populated areas, drillings were performed along cross sections through valley floor alluviums. They show that a more or less organic clayey silty sedimentation started at the beginning of the Holocene. The sedimentation rates strongly increased at the beginning of the Subatlantic (Bronze Age), simultaneously with the anthropogenic pressure advent (on set of agriculture), as shown by archaeological and palynological evidences (agricultural settlements, massive loggings on slopes, stockbreeding on valley-floor grasslands).

In the silicated sub-catchment area, located upstream, drillings have shown that clayey silty sedimentation began at the end of the Roman Period, continued during the Early Middle Ages and increased during the High Middle Ages. Spatial archaeological prospecting has revealed a faint anthropogenic presence at the Roman Period, then a decline of population until the High Middle Ages, characterised by an agricultural revival. Palynological analyses have shown that, in this area, grasslands were dominant since the Early Middle Ages, with an increase in cereal cultures at the beginning of the High Middle Ages.

In the carbonated sub-catchment area, drillings have shown that the more or less organic clayey silty sedimentation has begun during the Bronze Age. Sedimentation rates have increased during the Modern era and the Contemporary history.

The high fine sediment storage appeared and evolved differently, depending on the considered period and catchment valley area, due to variation of soil erosion. The difference between a fine, early and regularly increasing sedimentation in the downstream site and the later, intense and non-univocal sedimentation in the sub-catchments doesn't seem to be strictly resulting from natural factors. This idea and the palaeoenvironmental dataset show that the fine sedimentation basically results from an anthropogenic impact, notably in the sub-catchments. Therefore soil exploitation by humans seems to be the main sedimentary production factor.

This work mainly shows that anthropogenic impact (age of appearance, intensity) highly varies spatially, even into a little catchment. This variability would be led by the agricultural potential of the considered catchment valley area.