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Pedo-sedimentary record of human-environment interaction in ditches and waterlogged depressions on tableland (roman and early medieval period) : micromorphological cases studies from Marne-la-Vallée area (Paris Basin, France)

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On lœss derived soils located on the Stampien plateau from the Paris Basin (France), archaeological anthroposols and ancient cultivated soils are only preserved in very few places. Recent archaeological excavations showed the presence of a pattern of roman ditches and waterlogged depressions (« mares ») under the actual cultivated horizon (Ap). This presence strongly suggests extensive past agricultural practices and water management. An original system of ditches was found Near Marne-la-Vallée (France). It is composed of two parts, one being large ditches characterized by flat bottom and sometimes water layered deposits, called « fossés collecteurs » by the archaeologists, and the orher being smaller ditches with colluvial deposits. Our objectives was to use archaeological and micromorphological studies in order to study i) the agricultural function of these ditches and depressions, ii) their evolution with time. Observations conducted on the infilling of a « fossé collecteur » at Bussy-Saint-Georges suggest that it was not part of a drainage system, but that it was a linear water controlled system, with a ramp in one part, and a basin or a tank in another, and that it was used for others anthropic activities. In the same area, a large waterlogged depression was studied, and micromorphological analysis helped to elucidate its pedo-sedimentary formation processes. At the bottom, massive silty clayey matrix retained water. Thin layers composed of silt and clay (indicating low energy flows and decantation), sometimes impregnated and hardened by iron, alternated with silty deposit (indicating higher ernergy water layered deposits). The thin, non porous and iron impregnated crusts helped to raise the depression level, as well as, most likely the water table during roman period, maintaining waterlogging conditions. At the beginning of the early medival period, a slightly peaty event was discriminated. Higher in the profile, in more redoxic conditions, ferruginous infilling of the microporosity and some vertic pedo-features alternated with higher energy deposits (fine sands). Some other important results are to be considered. The sedimentary matrix characteristics succession, a more calcareaous and lœss like sediments for the roman period and the beginning of the early medieval period, and a decarbonated matrix with clay, probably coming from the erosion of a luvisol, at the end of early medieval period. As a conclusion these elements show that two differents areas of the plateau were successively exploited. Furthermore, in all the profile, sedimentary and pedological features indicate successive water flows of variable intensity, wich could have been influenced by meteorological / climatical events, but our results suggest that they were more likely to have been controlled mainly by human activities, in connection with soils and ditch system management, especially during the early medieval period.