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Micromorphology of past urban soils: method and results (France, Iron Age - Middle Age)

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Urban soils in French protohistoric and Roman towns and present-day towns of roman origin are several meters thick accumulations, with great spatial and vertical variability due to long duration of occupation. In order to improve our knowledge of both sedimentary and pedological characteristics as well as formation processes of urban soils, micromorphological analysis was carried out on buried towns. The studied sites include Iron Age towns (floodplain sites: Lattes or Lattara, Le Cailar; oppidum: Pech-Maho in the south of France), a roman buried town (Famars or Fanum Martis, North of France), and various towns occupied from the Roman period until now (urban and periurban sites in Paris, Strasbourg, Mâcon... North and East of France). Original method and sampling strategy were elaborated in order to try to encompass both spatial and vertical variability as well as the "mitage" of the present-day cities. In Lattes, representative elementary urban areas such as streets, courtyard, and houses were sampled for micromorphology during extensive excavation. These analyses revealed specific microscopic features related to complex anthropogenic processes (craft and domestic activities discarding, trampling, backfill, building), moisture and heat, and biological activity, which defined each kind of area. Comparison between well preserved buried town and current cities of roman origin, where the sequence of past urban soils is preserved in few place ("mitage") help to identify past activities, building rhythms as well as specific building materials. For example, in Paris, compacted sandy backfills alternate with watertight hardfloors during the Roman period (soils similar to Technosols). At the opposite, various kinds of loose bioturbated laminated dark earth resulting from activities such as craft refuses, backfills, compost or trampled layers were discriminated for Early Medieval Period (soils similar to Cumulic Anthroposol). Moreover, biological activity is usually considered destructive and an evidence of abandonment of the towns during Early Medieval Period by the archaeologists. These results show that in the studied sites the nature, location and intensity of biological activity (Lumbricidae, Enchytraeidae) is dependent on human activities (moisture, organic input) and is an evidence of human presence in town. Thus, the methodology allows identifying past activities and their location in the town, as well as their evolution with time. It highlights cultural and micro-local conditions specificities of each period, and it helps to elucidate urban site formation processes. It shows that soils and sub-soils of present-day cities are composed of a succession of different kinds of urban soils, and that micromorphology is a powerful tool to identify their characteristics such as their physical and biological properties and their discontinuities as well as their functioning.

Key words: site formation processes, Iron Age towns, Roman towns, dark earth, biological activity, Enchytraeidae, Lumbricidae, Technosols, cumulic soils.