Did the past and recent human activities affect the Northern Vosges Mountains ecosystems during the last three millennia?

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Abstract

In the Northern Vosges Mountains, populations have extensively used the forest resources for their daily use as well as to supply xylophagous industries. Several archaeological remains and archives highlight the occurrence of many human activities: old ones as agro-pastoral activities or semi-industrial like glass-making, mines, metalworking, and more recently military activities (Bitcherland). Nevertheless, the beginning of these activities as well as the first human impacts on the Northern Vosges Mountains ecosystems have not been clearly identified or dated. In attempt to highlight the anthropogenic impacts and to identify their beginning in the Northern Vosges Mountains, a multiproxy analysis, with pollen, non-pollen palynomorphs (NPP), seeds analyses and geochemical analyses (XRF), is carried out on several cores sampled in peatlands close to industrial sites. Palynological studies show that the environment in the Northern Vosges Mountains was extremely wooded during the three last millennia. Three phases of human impacts, more or less significant depending to sites, occured. During the Late Neolithic phase, crops appeared and other anthropogenic indicators - like weeds, ruderal and pastoral taxa - as well as coprophilous fungi and carbonized particles increased, showing the beginning of the agro-pastoral practices. The Gallo-Roman period is characterized by the increased of pastoral indicators and of *Quercus*, probably privileged to gather acorns. At this period, geochemical analyses show the beginning of the semi-industrial activities with the increase of metallic trace elements inputs in the peatland, especially lead. During the Middle Age, the decrease of all trees taxa and the increase of anthropogenic taxa highlight a very important land use consistent with the establishment of human population with castel or abbaye foundation. Moreover, study of local vegetation in the peatland like mesohygrophilous and aquatic taxa as well as *Sphagnum* shows for example the increase of the water level in the peatland at the Middle Age.

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