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Human impact and climatic oscillations during medieval times in central Jura Mountains (France and CH).

E. Gauthier, M. Magny and O. Peyron (1)

(1) Laboratoire de Chrono-Ecologie, CNRS-UMR 6565, faculté des Sciences et Techniques, 16 route de Gray, 25 030 Besançon cedex.

Medieval human impact in Jura Mountains is quiet well known today. Pollen analyses performed on peat bogs and lake have brought to light environmental history and human activities during the two last millennia. The results show that the roman period is characterised by agricultural practices and local clearing. Land abandonment affects most of the sites at the transition with the Middle Age (5^{th}century AD). This phase is related to favourable climatic conditions. Anthropogenic indicators reappear at all of the sites at the dawn of the 7^{th} century. Climate seems cooler and farming activities are developed within a forest environment but the regularity of anthropogenic indicators suggests the development of a definitively established settlement. The demographic explosion and the monastic and secular expansion of the 11^{th} and 12^{th} centuries favour the populating of the entire mountain. During the Medieval Warm Period, clearances intensify and result in an important decline of the forest cover around the villages. The 14^{th} century, with its warning signs of the Little Ice Age and its succession of wars and epidemics, marks a clear decline in agriculture. From the 15^{th} century, landscape was characterised by new strong deforestation and substantial human impact, in spite of the climatic reversal of Little Ice Age.

A comparison between these first palynological data and a multi-proxy approach (high temporal resolution analyses of pollen, lake-level fluctuations and paleoclimatic reconstructions), carried out at lake Joux (Jura Mountains, CH), confirm the first observations. Lake-level fluctuations analyses show several phases of high and low lake level during the last millennium. Lake-level fluctuations are related to a succession of cooling and warming phases and they are perfectly correlated with solar activity and

residual ^{14}C records. One more time, the schema of land use/abandonment modelled on the climatic variations is not completely adapted to the observations made in Jura Mountains and more particularly at lake Joux. Only the MWP is related to an important phase of economic and demographic development. The late medieval period, during the L.I.A, is characterized by a low human impact at its beginning, in the XIVth century, and a strong deforestation and an agrarian development from the 15^{th} to the 19^{th} centuries. These observations suggest that land use could not only be controlled climatically during medieval times: this hypothesis would deny the role of political, economic and social dynamics.