Geophysical Research Abstracts,
Vol. 10, EGU2008-A-05333, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-05333
EGU General Assembly 2008

Societies – fluvial dynamic interactions in the Middle Loire River floodplain during the Middle Ages and the Early Modern Times (Val d'Orléans, France).

C. Castanet (1), J. Burnouf (2), M. Garcin (3), A.L. Cyprien (4), M. Lamothe (5), C. Camerlynck (6), N. Carcaud (7)

(1) Université Paris 1 Panthéon Sorbonne, UMR CNRS 7041 ARSCAN Eq. Archéologies Environnementales & 8591 Laboratoire de Géographie Physique, (2) Université Paris 1 Panthéon Sorbonne, UMR CNRS 7041 ARSCAN Eq. Archéologies Environnementales, (3) BRGM, Bureau de Recherche Géologiques et Minières – Orléans, (4) Université de Nantes, UMR CNRS 6566, Laboratoire d'Ecologie et des Paléoenvironnements Atlantiques, (5) Université du Québec à Montréal, Département des sciences de la Terre et de l'Atmosphère, (6), Université Pierre et Marie Curie, Paris 6, UMR CNRS 7619 Sisyphe, (7) Institut National d'Horticulture, Angers (cyrilcastanet@hotmail.com)

In the study of societies – environment interactions, these works focus on the interrelations arisen between the Middle Loire River fluvial dynamic, the regional climate and the sociosystem during the Middle Ages and the Early Modern Times. The selected sector of study is an overbank section of the Middle Loire River: the *val d'Orléans* (catchment area: 36 000 km^2; *Lat.: 47˚54 N – Long.: 1˚54˚ W*). A geoarchaeological approach integrates, at different spatial and temporal scales, the study of sedimentary archives, in and out archaeological sites, and written archives. This interdisciplinary analysis uses concepts, materials and methods of morphological analysis, stratigraphy, sedimentology, geophysic, pedology, palynology and archaeology. The chronostratigraphic frame was established on the basis of radiometric 14C and Optically Stimulated Luminescence datings (IRSL).

This study shows that, as soon as the beginning of the Middle Age, the societies and the hydrosystem inherit a multi-millenniums Man – environment interactions which exacerbated the intensity of the fluvial response to the hydro-climatic oscillations.

During the Middle Ages, the relationship between the societies and the fluvial dynamic changes. Artificial river embankments are built to prevent overbank flows and flooding of the alluvial plain of the Loire River. The construction of these levees is partly correlated with the agricultural land-use changes in the alluvial plain, the needs relative to the navigation and two episodes of increased fluvial dynamic (roughly X – XIth and XV – XIXth century AD). These levees created new conditions for the hydrosystem and for the society. The dikes became higher inducing a fluvial pattern shift and an incision of the river bed. Furthermore, during the Middle Age, an important urban development occurs in the alluvial plain, behind the levees: *Orleans* agglomeration and two major abbeys (*Fleury* and *Micy*). The new hydro-climatic conditions of the Little Ice Age (L.I.A) united with the increased exposition of societies cause an increase of the risk of flood. During the Middle Age and the Early Modern Times, the accumulation rates of terrigenous matter in the alluvial plain are the most important of the Holocene. They indicate 1/ the important anthropogenic influence on the denudation and on the sediment yield especially in a colder and wetter climate (as the L.I.A); 2/ the partial inefficiency of the embankments to prevent from the flood hazard (as proved by the catastrophic dike breaches described by the written archives).

The continuation of this study aims to share and discuss river management issues. Today, the hydrosystem and the societies of the Middle Loire River inherit from interactions arisen between fluvial dynamic, the climate and the societies of the medieval and modern times. The current incision of low flow channel is interpreted as a response of the hydrosystem to the levees. The response of the hydrosystem to 500 years old installations is only detected today because of the resiliency and of the latent period of its response. In the current context of global climate change, the societies of this alluvial plain inherit an increased risk indirectly caused by medieval societies.