



Fluvial landscapes – human societies interactions during the last 2000 years: the Middle Loire River and its embanking since the Middle Ages (France)

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This research deals with the study of fluvial landscapes, heavily and precociously transformed by societies (fluvial anthroposystems). It aims to characterize i), fluvial responses to climate, environmental and anthropogenic changes ii), history of hydraulical constructions relative to rivers iii), history of fluvial origin risks and their management - (Program: AGES Ancient Geomorphological EvolutionS of the Loire River hydrosystem). The Middle Loire River valley in the Val d'Orléans was strongly and precociously occupied, particularly during historical periods. Hydrosedimentary flows are there irregular. The river dykes were built during the Middle Ages (dykes named turcies) and the Modern Period, but ages and localizations of the oldest dykes were not precisely known. A systemic and multi-scaled approach aimed to characterize i), palaeo-hydrographical, -hydrological and -hydraulical evolutions of the Loire River, fluvial risks (palaeo-hazards and -vulnerabilities) and their management. It is based on an integrated approach, in and out archaeological sites: morpho-stratigraphy, sedimentology, geophysics, geochemistry, geomatics, geochronology, archaeology. Spatio-temporal variability of fluvial hazards is characterized. A model of the Loire River fluvial activity is developed: multicentennial scale variability, with higher fluvial activity episodes during the Gallo-Roman period, IX-XIth centuries and LIA. Fluvial patterns changes are indentified. Settlement dynamics and hydraulical constructions of the valley are specified. We establish the ages and localizations of the oldest discovered dikes of the Middle Loire River: after the Late Antiquity and before the end of the Early Middle Ages (2 dated dykes), between Bou and Orléans cities. During historical periods, we suggest 2 main thresholds concerning socio-environmental interactions: the first one during the Early Middle Ages (turcies: small scattered dykes), the second during the Modern Period (levees: high quasi-continuous dykes).