



Channel migrations and urban development - The Loire river during the first millenium at Tours (France)

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Philippe Gardère. Channel migrations and urban development - The Loire river during the first millenium at Tours (France). Fluvial Archives Group - FLAG Biennial Meeting 2018, Sep 2018, Liège, Belgium. hal-01966780

HAL Id: hal-01966780

<https://hal.science/hal-01966780>

Submitted on 29 Dec 2018

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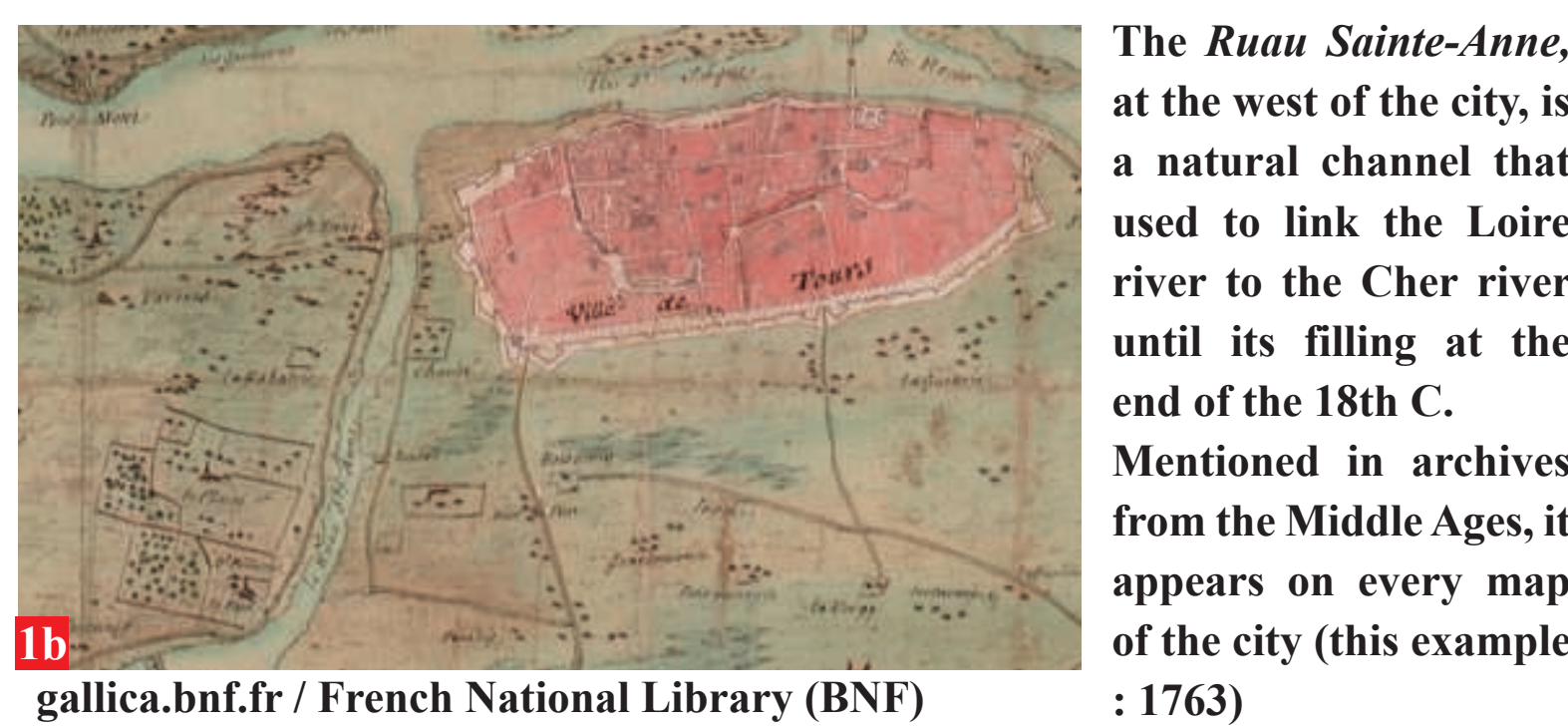
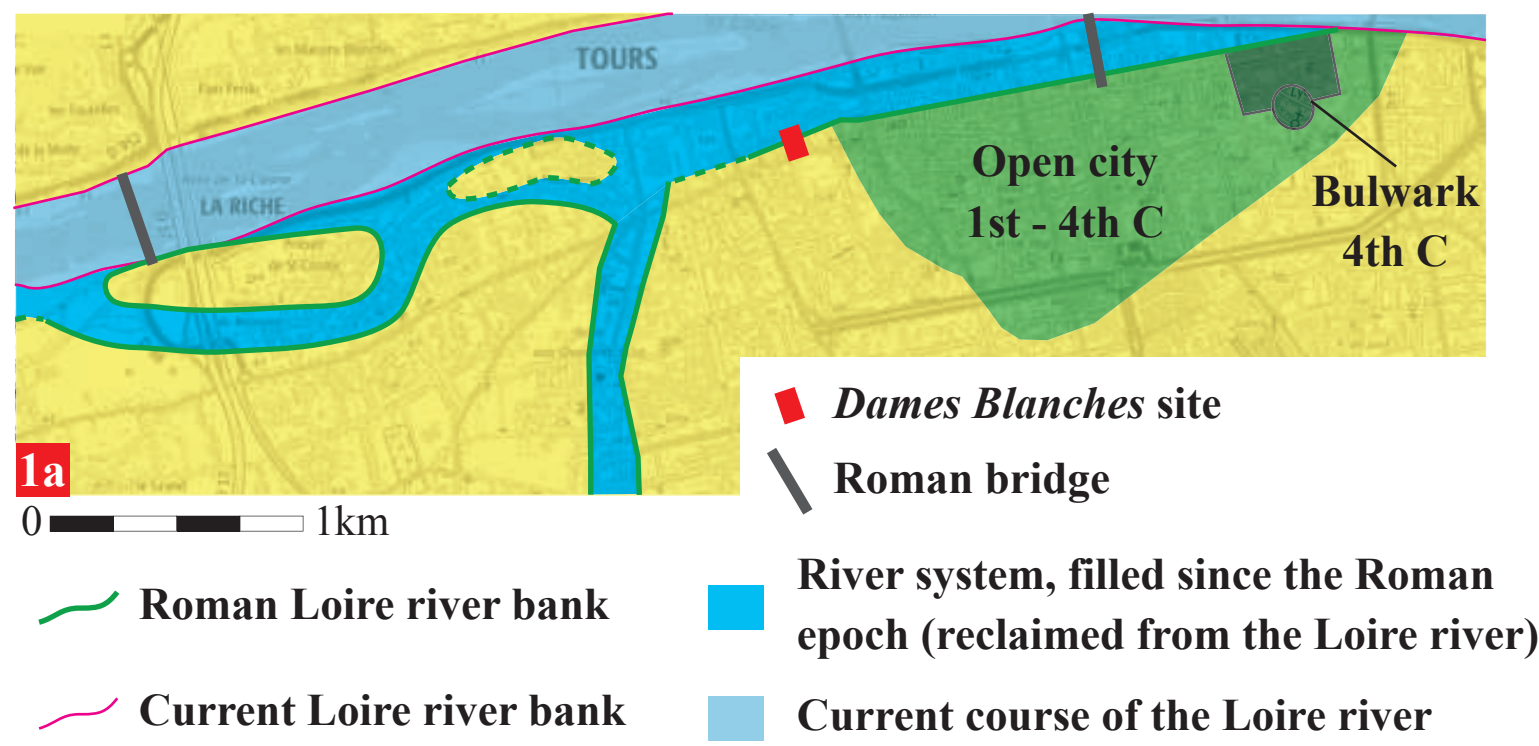
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CHANNEL MIGRATIONS AND URBAN DEVELOPMENT

The Loire river during the first millenium at Tours

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The Roman port of the *Les Dames Blanches* site in Tours (France) was located at the western edge of the open city, from the 1st to the 4th century AD. It stood between the two bridges known before the fourth century [1a]. The course of the Loire river was significantly different from the one we know today: two islands located in the main channel were separated from the left bank by a southern branch of the river*. This port was also 400 meters upstream from the mouth of the *Ruau Sainte-Anne* [1b].



The alluvial sequence in this study expands over an average thickness of about 3.50 meters [2, 6]. Prior to the developments of the 1st century, alternating fine sands and silts (set I) [4b] place the sector away from the channel and from the highest floods. During the first and second centuries, a wharf and wooden casings were built [5c, 5d, 5e]. The textures of alluvial deposits get increasingly sandier (set II) [3c, 3d], testifying to the growing proximity of the river. The quays were abandoned at the end of the 2nd or 3rd century, due to their silting. [5b]. A necropolis was established in the fourth century. During the first part of the early Middle Ages, the Loire river migrated south and reached the site (set III) [3b]. This phenomenon is the cause of a significant reduction in the area of potential occupation. The site is partially drowned. The archaeological hiatus, which coincided with the settlement of the channel and significant inflows of coarse sand, lasted at least until the eighth century. The river then began a filling phase, with the bank moving northward. An area that was first regularly flooded (set IV) [4a], then spared by recurring floods, formed during the ninth century. The newly vacated space was quickly improved and developed.

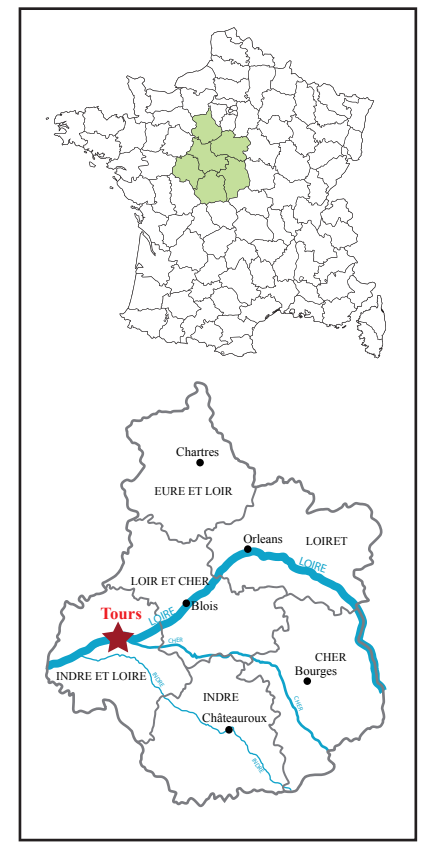
While the Roman path was still in use, a new bank road was built and contained occupations until at least the twelfth century [5a]. Previous research ** confirmed a gain of about 50 meters of the city on the river at that time.

For later periods, the archives and analysis of deposits indicate that the course of the Loire river was strongly constrained by man. The main channel being stabilized, the incursions of the floods towards the south were less frequent. In *Les Dames Blanches* site, a late downward trend in the base level was recorded in the upper deposits in the northern part of the site (set V) [3a].

From then on, nature and human societies started a struggle that would continue throughout the historical period. By digging ditches and canals, man sought to drain a constantly humid environment. By building earthworks and levees, inhabitants tried to contain floods which they saw as more and more intrusive as urban pressure forced them to colonize the edges of the Loire river.

* : DUFAY B., GAULTIER M., LACROIX M.-Ch., TAN C.-C., 2014, La Riche, Prieuré Saint-Cosme, Rapport de diagnostic, Tours : CG 37, 266 p.

** : GALINIE H., RANDOIN B., 1980, Rue de la Victoire (site 8), in : Fouilles archéologiques à Tours, rapport préliminaire, BSAT, 39 : 619-635.

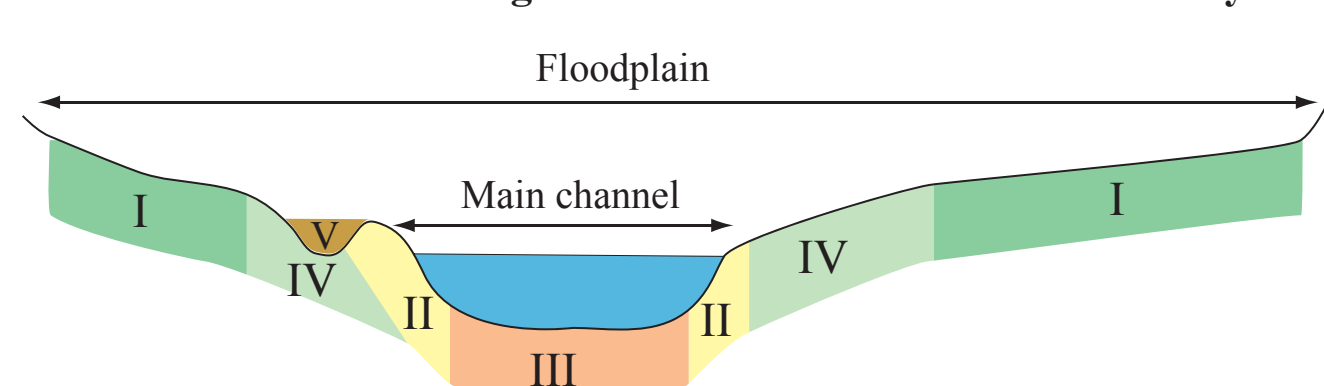


Les Dames Blanches site
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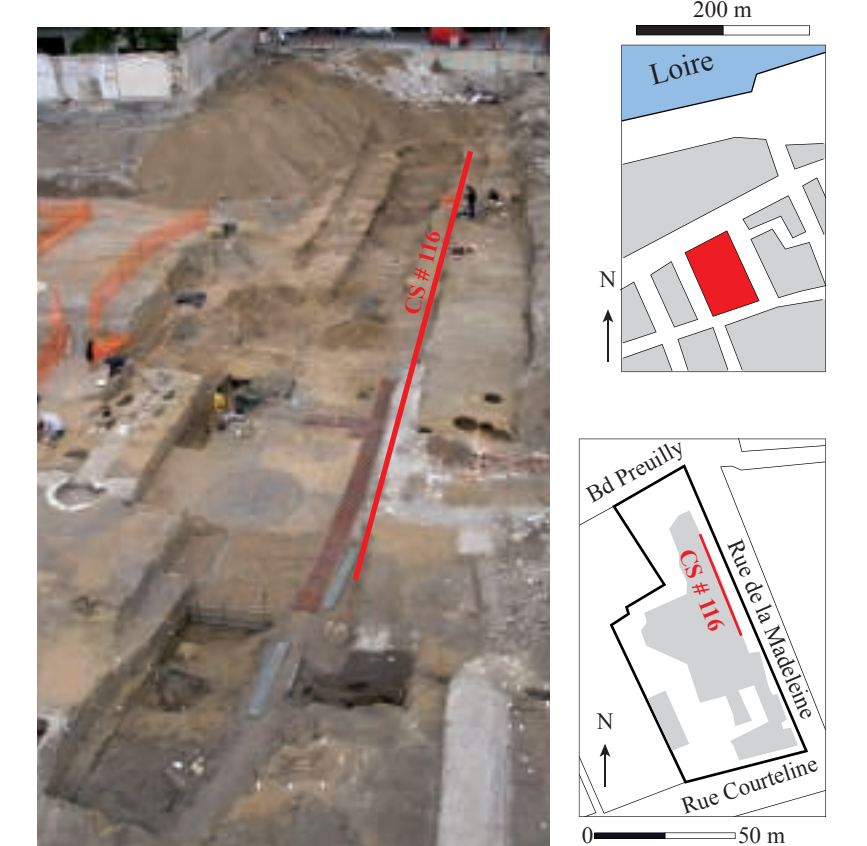
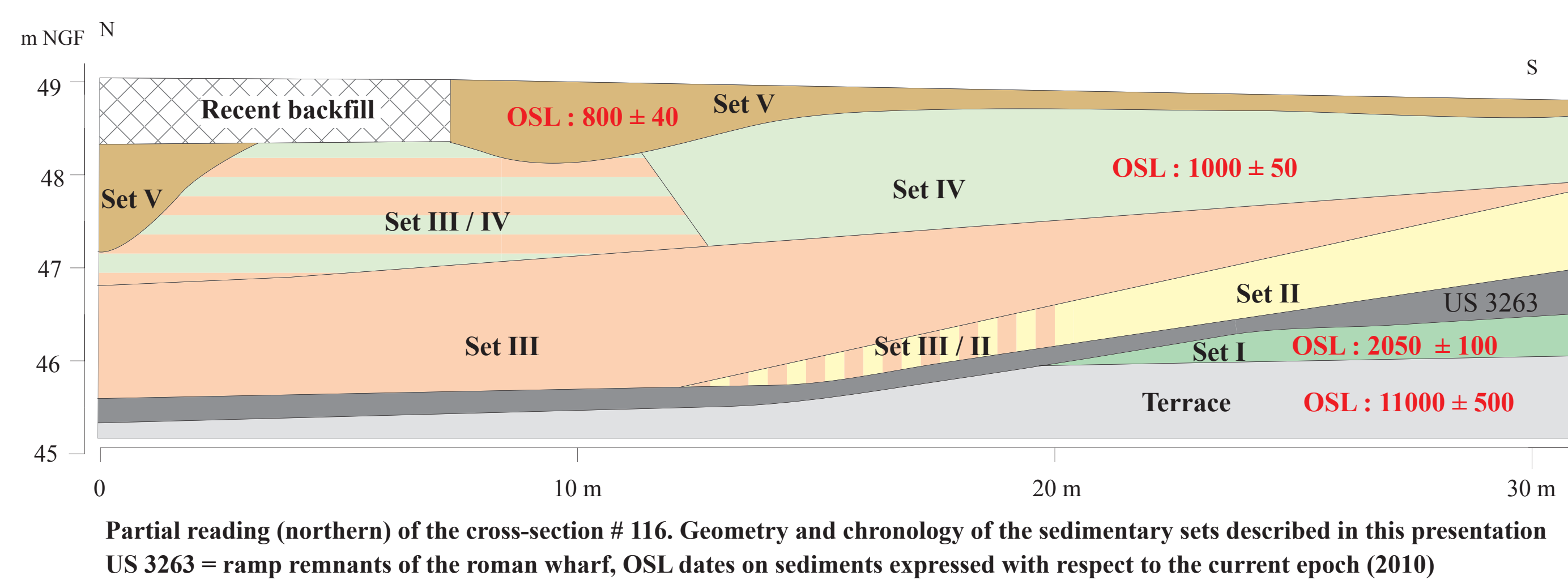
https://www.inrap.fr/
clinique-des-dames-blanches-1305

2 Theoretical model of lateral changes in the facies from the sedimentary sets I to V



Main events identified on the site

- Distal position on the floodplain before the 1st century
- Stable sedimentary context, landing stage in the 1st and 2nd centuries, persistence of floods
- Southward migration of the Loire river. Sedimentary gaps and abandonment of the harbor
- The channel evolves: filling during the High Middle Ages and shift towards the north
- The site was permanently occupied again in the 9th century
- Very fragmentary sequences after the 12th century. The main channel disappears, small channels prograding towards the north by gradually embanking

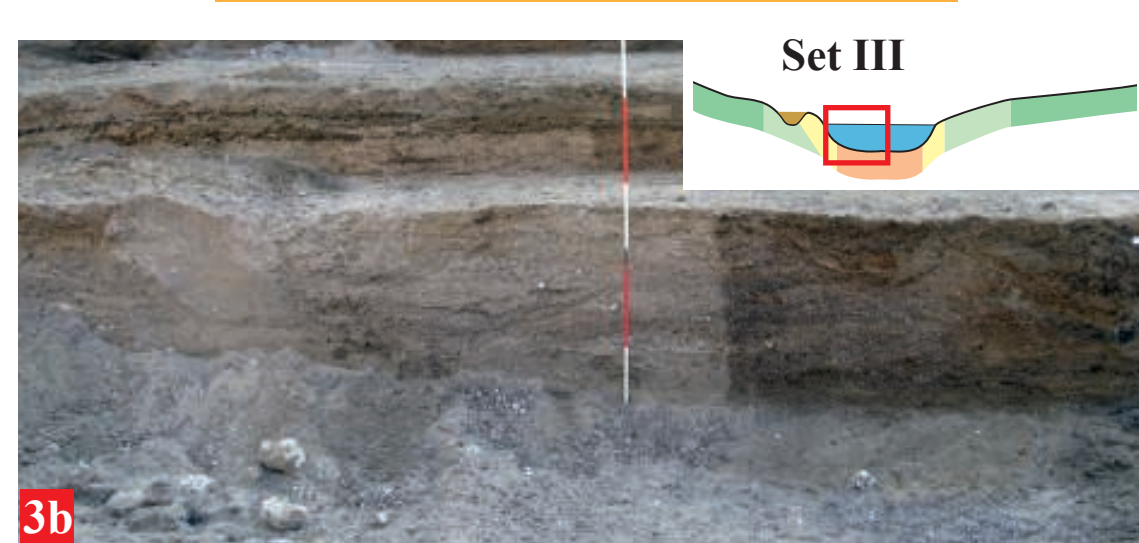


Location and general view of the site

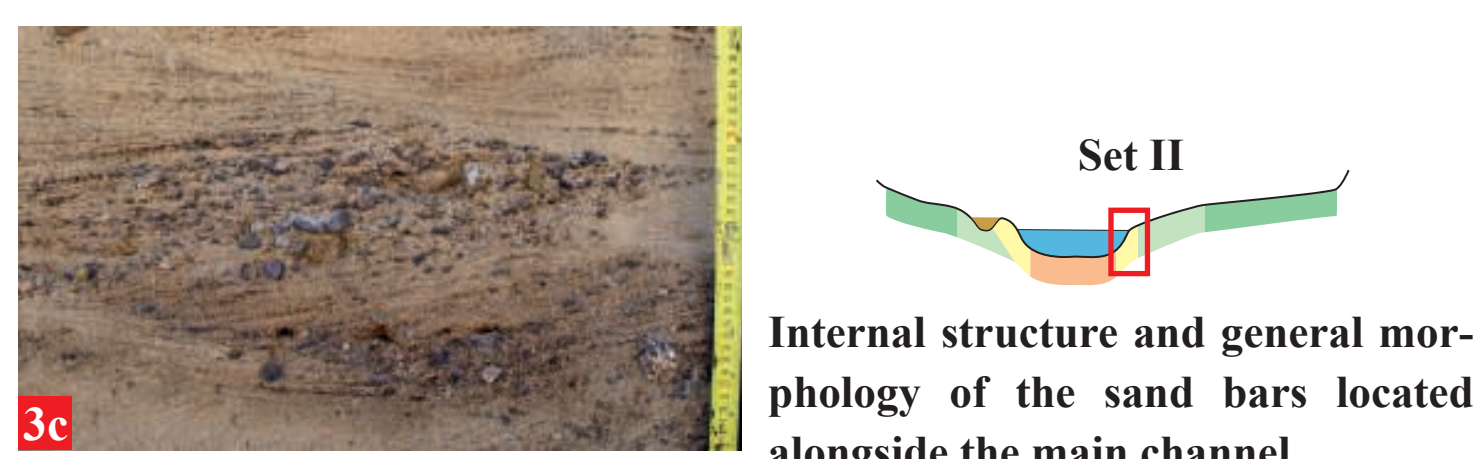
3 Sandy facies - Proximal area



The shift to the north and the incision of the channels testify to the changes on the plain and a gradual lowering of the base level of the Loire river system

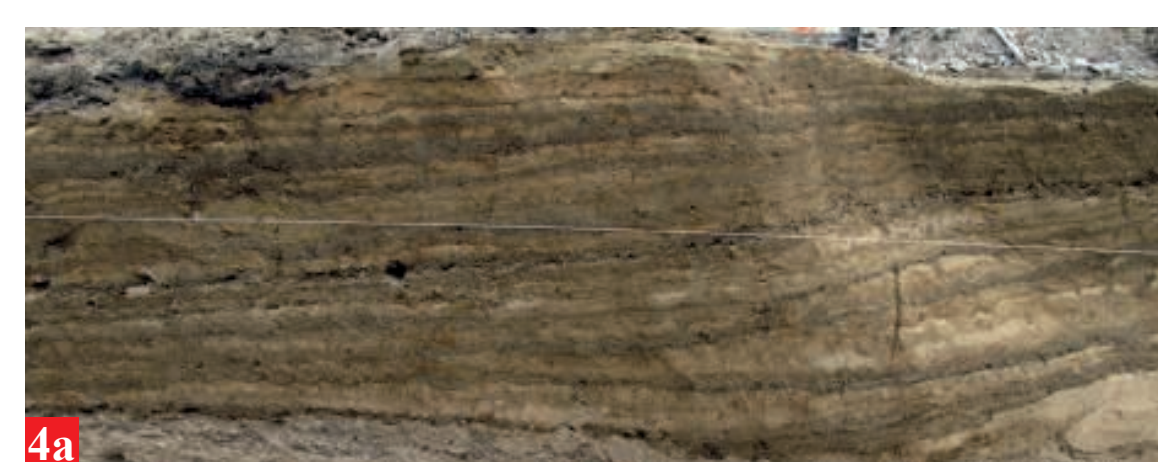


General view of the sandy filling of the channel. Foreground: blocks from the Roman wharf (US 3263)



Internal structure and general morphology of the sand bars located alongside the main channel

4 Silty facies - Distal area



Sandy-silty doublets testifying to regular flooding. A textural polarity appears, with decreasing granularities from north to south



Characteristic alternation of floods in the distal area. Deposits deformed because of the poles pegged for the Roman pier

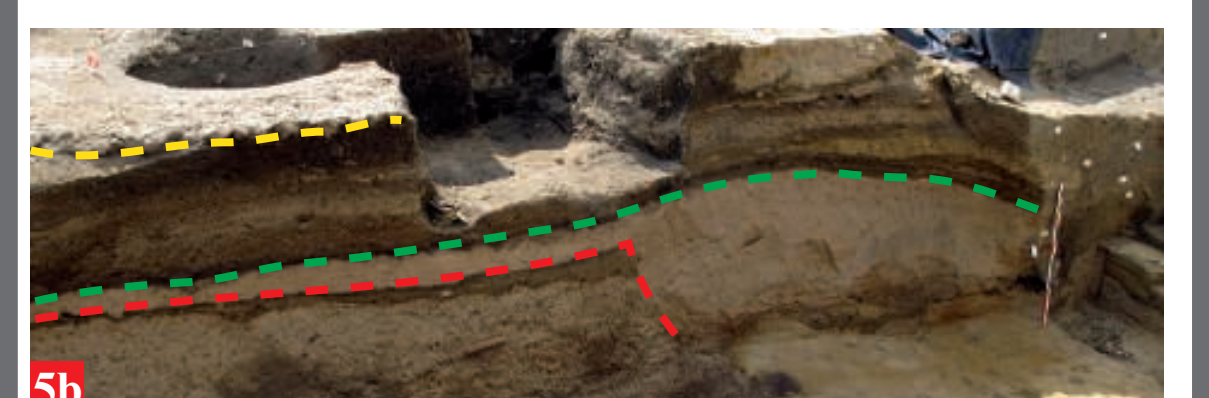


Partial view (southern) of the cross-section # 116. Left (north): alluvial sequence; right (south): Roman wharf, remnants of the planked casings filled with light sand

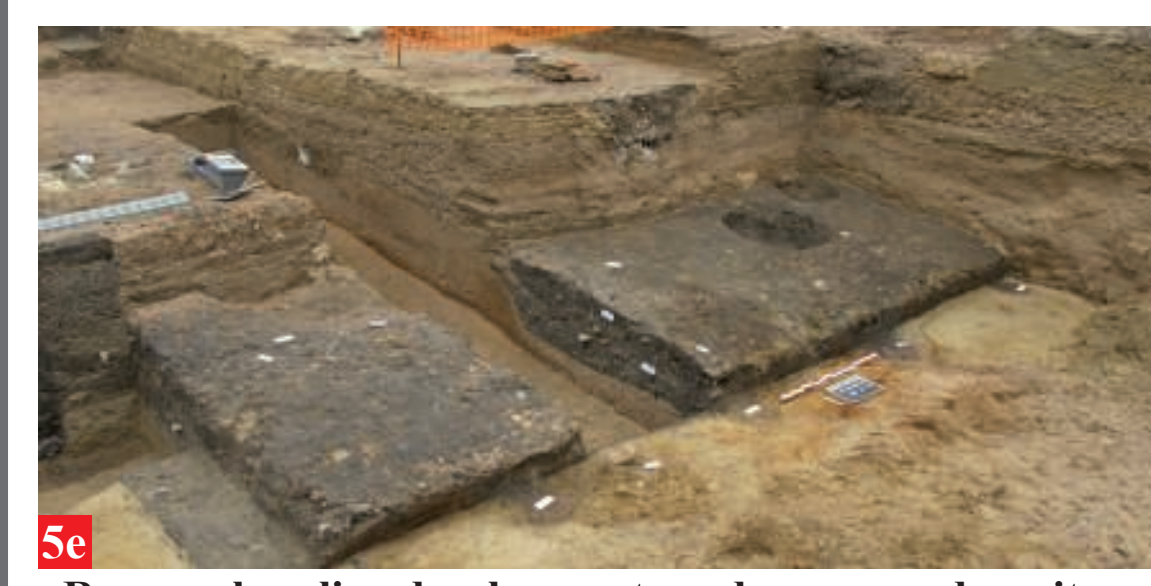
5 Archaeological structures



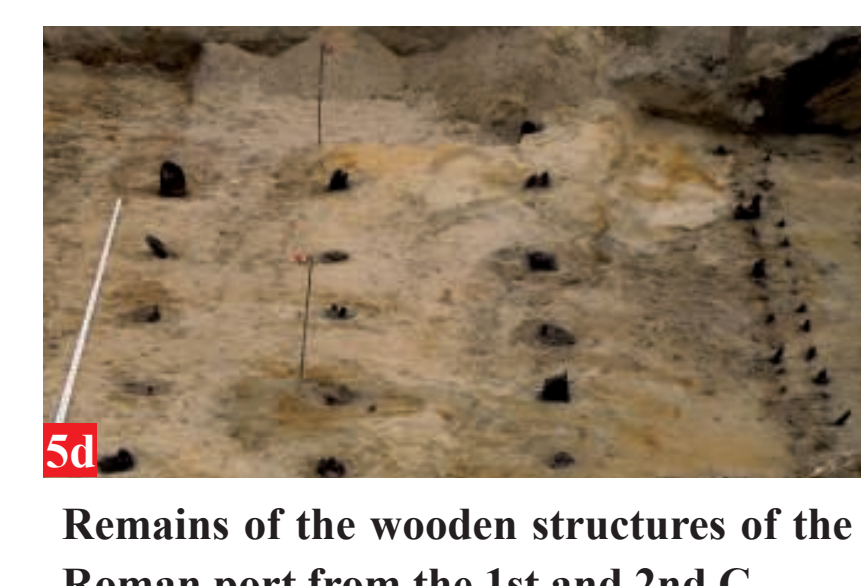
Domestic oven and pits linked to medieval housing (left), along the twelfth-century road (right)



Three successive states of the wooden docks filled with light sand. The oldest (in red) is sealed by a flood deposit, which has led to a repair and raising (in green) of the structure. The final state of the quay is marked by the installation of a raised terrazzo (in yellow), pierced by domestic pits from the Middle Ages



Roman shoreline developments and sequence deposits



Remains of the wooden structures of the Roman port from the 1st and 2nd C



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In the interval of about nine centuries (1st to 10th C), the left bank of the Loire river underwent major morphological changes and very rapid environmental transformations. The main channel moved approximately 200 meters south of its original position. After an aggradation phase and a filling by coarse sands, the river shifted to a more northerly position. These events and the erosive phenomena that they imply explain the archaeological hiatus that affects the whole left bank for that period. The excavation of *Les Dames Blanches* site leads to the conclusion that the available space, which appeared during the ninth century and could be urbanized, was essentially the result of a natural environmental forcing. In the eleventh century, the inhabitants of Tours sought to expand the suburbs of the city and took over this newly emerged sector, which did not result from large-scale artificial developments.