

Modelling hydrological changes in surface in relation with anthropogenic drivers and consequences on human health and local economic

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Marais des Baux are located between Alpilles in the North and the plain of the Crau (South-East) of the town of Arles, in the South of France. Already built in Roman times, swamps located at the outlet of the Baux valley basin have experienced an increased human pressure during last centuries. Apotheosis of human development is the period of post-war with Marshall Plan and the development of the Common Agricultural Policy (CAP). At the beginning of the 21st century, inverse hydrologic dynamic is observed. Renaturation of the lower parts of the marshes, where land is less profitable, has reversed the trend of previous centuries. To be sustainable, this annealing must be accompanied by water governance at the watershed scale. This work aims to help policy makers and managers to good governance of the territory.

Hierarchical multi-scale approach has enabled a better understanding of hydrological flows. In addition, knowledge of different actors' strategies is not enough. There may be different interests and strategies within the same group of actors. In this case, this is what we observe between farmers located on the upstream parts of the watershed eager, for some, to increase irrigation, and those located downstream, in the marshes, forced pump to maintain water levels corresponding to the expectations of the majority of the actors. On the other hand, there is a negative image of still marsh near a rural population and new rural population. Decreasing pumping or to send a higher volume of water could significantly increase flooded areas. This increase in flooded areas could facilitate the development of certain mosquito species. These mosquitoes not only represent a potential health risk for human populations but also increase the discomfort felt by the local population and tourists. This discomfort may also have an impact on economic activity linked with tourism. The work allowed the testing of different scenarios of flooding, according to the hydraulic management of the watershed. The modeling also performed to simulate a change in rainfall locally to measure hydrological and environmental consequences. According to these scenarios, it was possible to map the potential areas of mosquitoes breeding sites (presence / absence of mosquitoes) and their impact on urban populations in terms of health risks and nuisance.

This territory represents many interests for decision-makers interested in issues of governance and renaturation. To improve the inclusion of better water governance and territories, as well as facilitate dynamic annealing, it might be necessary to help decision-makers having a better knowledge of the impact of human drivers on water management on the territory. This increased knowledge would also enable local decision-makers to improve their awareness of the heritage and biodiversity of wetlands.

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