

Contribution of GIS to the Forecast mapping of marine flooding risk of a coastal sebkha of Soliman (Gulf of Tunis – Tunisia)

Noura Brahmi ^{a,c,*}, Mohsen Dhieb ^{b,c}

^a *Geomatics of Geosystems Research Laboratory, University of Manouba, 2010 Manouba, Tunisia. noura_brahmi@yahoo.fr*

^b *King Abdulaziz University, Saudi Arabia. mohsendhieb2003@yahoo.fr*

^c *SYFACTE Research Laboratory, University of Sfax, Tunisia*

* Corresponding author

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Abstract:

Lagoon environments are known to be systems in morphologically unstable equilibrium. The study of their morphodynamic Future is an essential question for the management of coastal areas.

Located north of the city of Soliman, about thirty kilometers east of Tunis, the coastal sebkha of Soliman corresponds to the downstream part of the plain of Grombalia-Soliman. It is bordered by Soliman-Plage to the west, by a dune cordon which separates it from the sea to the north, by agricultural land to the northeast, east and southeast, and by a sansouire to the south-west. The inlet, to the northwest of the sebkha, serves as a spillway for the waters, brought mainly by the El Bey wadi, but it also allows the intrusion of sea water during strong storms.

This article aims to show the contribution of GIS to mapping the marine flooding of the coastal sebkha of Soliman (Gulf of Tunis) according to scenarios considering the protection measures and the probable acceleration of sea level rise. The Digital Elevation Models of centimetre resolution were of undeniable value for the study of the general trend of future evolution on the one hand, and the quantification of submersible zones on the other hand. Through the predictive cartography of the marine submersion, we tried in this paper to study the evolutionary tendencies of the hydrosystem of the sebkha of Soliman, whose evolution remains still little known. Extreme sea levels were determined considering the Intergovernmental Panel on Climate Change estimates provided in the 2007 report; for the scenarios of a rise in water level by 2100 and the rise during storms. The first results show that the decline of the coastal strip will most certainly continue.

Eventually, it is likely that the silted grau could open up permanently in the recent bar separating the sebkha from the sea by submerging its peripheral marshy areas (Figure 1). This perspective is obviously accompanied by questions about the management of human issues present on the coastal strip. The ability of dunes and sebkha to migrate inland should be compromised to a minimum. This can take place by reinforcing non-buildable zones such as the 100 meter zone of the marine public domain law (MPD), especially since this sector hosts a new tourist project which extends from Soliman to Sidi Errais in the north of the sebkha. A margin of land wider than that necessary for the safety of goods and people could be essential.

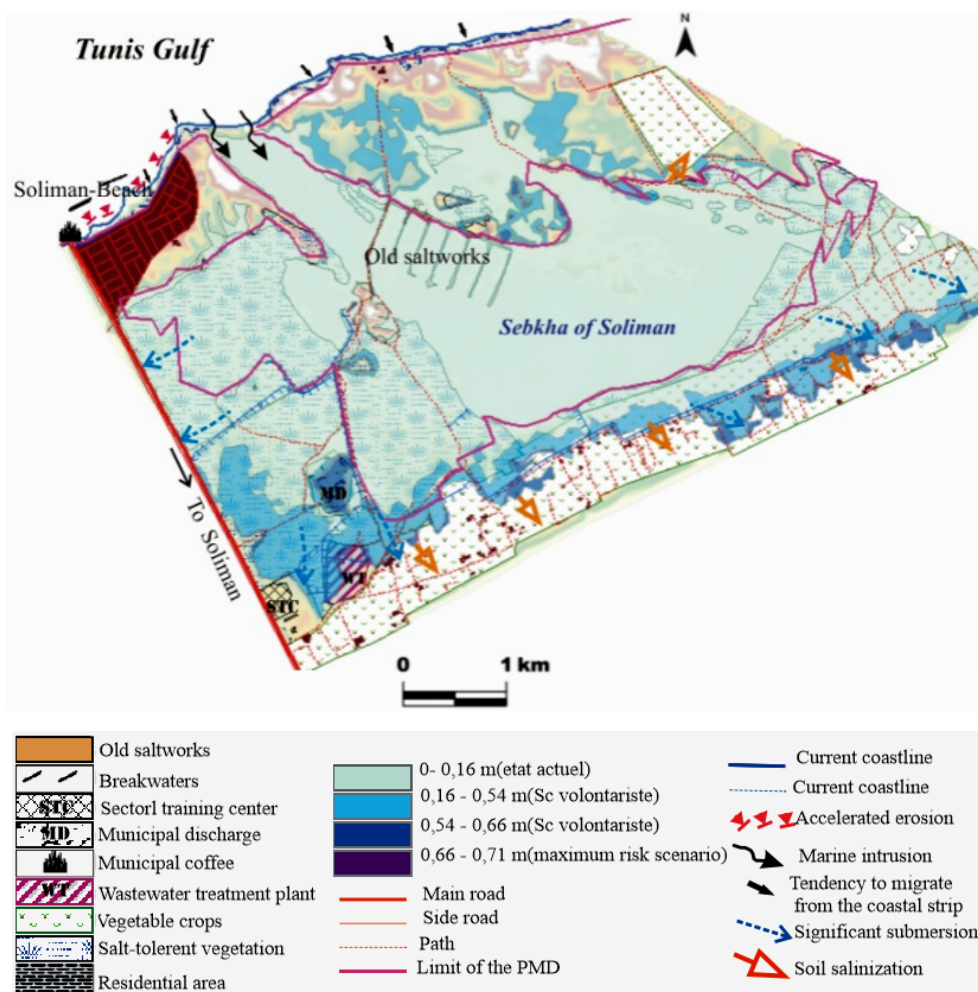


Figure 1. Morphogenic and environmental impacts of marine flooding on the ecosystem of the Sebkha de Soliman and its neighborhoods.