Chapter 10
Paleoenvironmental Evolution of the Lagoon of Mahres (Gulf of Gabes, Tunisia) Based on Its Ostracod and Benthic Foraminifera Associations

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ABSTRACT

This chapter is devoted to the reconstruction of the palaeoenvironment of the Mahres lagoon (gulf of Gabes, Tunisia). Two primary proxies have been the most studied during the last decade: sedimentary criteria and microfossils. In this study (core ''Mh''), we used a microfossil-based proxy (ostracods and foraminifers) and Granulometric analysis. The results reveal the succession of three extreme events episodes (Units: U1, U3 and U5) characterized by very high-energy hydrodynamics possibly linked to the occurrence of major storms. These units are marked by an increase in coarse sediments and an increase in coastal marine ostracods made up of Neocytheredeis fasciata, Pontocythere elongata, Semicytherura incongruens and

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benthic foraminifera including Sorites orbiculus, Peneroplis perstus, Rosalina bradyi, Rosalinna. Macropora, Valvularina bradyana and Planorbulina mediterranensis.

INTRODUCTION

Several microfaunal groups such as diatoms, dinoflagellate cysts, ostracods or foraminifera have been proposed as bioindicators in the coastal marine and lagoonal environments (Alve, 1995; Anderson, 2000; Anadon et al., 2002; Willard et al., 2003; Rodriguez-Lazaro and Ruiz Muñoz, 2012). According many authors, a bioindicator is a collective of organisms that give information about the paleoenvironment, with effect variables being their mere presence or absence, abundance or a statistical index applied to their populations (Johnson et al., 2020; Giamali et al. 2020, 2021). Ostracods and foraminifera are usually used as bioindicators of changing environmental conditions in recent and quaternary environments. Their microfaunal assemblages, population density, diversity are variable, depending on various environmental factors such as water temperature, salinity, water depth, grain size, dissolved oxygen, nutrient concentration or hydrodynamic (Carbonel, 1980 ; Miller et al., 1987 ; Maamaatuaiahutapu et al. 1994 ; Mémery et al. 2000 ; Ben Rouina et al., 2016 ; Noucoucouk et al., 2021) ; . The sedimentological and micropaleontological studies on the eastern coast of Tunisia focused the outcrops series and those intersected by drilling of the paralic and endorheic sebkhas in the Gulf of Gabes show that the relative variation in sea level (Lakhdar et al., 2006), coastal dynamics and hydro-isostatic readjustment (Morhange & Pirazzoli, 2005; Jedoui et al., 2000) as well as extreme events (Kohila et al, 2021 ; Ben Rouina et al., 2016 ; Boujelben,2013 ; Frébourg et al., 2010), would be the factors responsible for the evolution and change of environments in the Quaternary.

In this work, we propose a reconstruction of the Mahres lagoon development which is part of wetlands partially separated from the marine environment by a coastal barrier.

The aims of this chapter are: (1) characterizing the paleo-environments which succeeded one another at the location of the core ‘‘Mh’’. (2) Identify the impact of the different factors related to coastal dynamics, climatic variation, hydro-isostatic readjustment, eustatism and extreme climatic events. We mainly consider the analysis of ostracods and benthic foraminifera present in the core ‘‘Mh’’ sediments to characterize paleo-environments and shed light on the natural forcing mechanisms responsible for environmental evolution.