

Waterscapes Archaeology:
Multi-Scalar Human-Environment Interactions in Coastal Lagoons



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Introduction

Alexandra Bivolaru, Daniela Cottica
and Christophe Morhange

This volume presents the proceedings of the Session 20, *Waterscapes archaeology: multi-scalar human-environment interactions in coastal lagoons*, held at 7th International Landscape Archaeology Conference, 10-15 September 2022, Iași - Suceava, România and online. It brings together a collection of interdisciplinary studies examining the historical, ecological, and socio-economic significance of coastal lagoons across different regions and historical periods. The chapters explore long-term human interactions with these dynamic ecosystems, focusing on themes such as resource exploitation, settlement patterns, and paleo-environmental reconstructions. Special attention is given to the adaptive strategies developed by past societies in response to environmental changes. In light of contemporary challenges such as climate change and habitat degradation, the volume underscores the importance of integrating historical insights with modern conservation practices for the sustainable management of these vulnerable ecosystems.

Chapter 1, *Waterscapes: long term human-environment interactions in the lagoons from the Mediterranean to the Black Sea*, by Alexandra Bivolaru, explores the historical, ecological, and cultural significance of Mediterranean and Black Sea lagoons, focusing on their role as resources for ancient societies and their cultural identity. A comparative study of Venice lagoon and the Danube delta illustrates how similar environmental features led to different historical outcomes, shaped by geopolitics and geography. The chapter integrates long-term historical and geoarchaeological perspectives, emphasizing lagoons as crucial spaces for understanding the resilience and vulnerabilities of human societies in the face of environmental challenges. Despite their ecological and cultural importance, lagoons are underrepresented in archaeological research, underscoring the need for interdisciplinary studies. This chapter calls for more interdisciplinary exploration of lagoons as repositories of both natural and cultural heritage, emphasizing their role in shaping regional identities and the adaptive strategies of “hydro-societies” that have historically sought to control and coexist with water-related risks. It also addresses contemporary challenges facing lagoons, such as pollution, habitat degradation, and global change, advocating for integrated conservation strategies that balance ecological and cultural preservation with the socio-economic needs of local communities.

Chapter 2, *Archaeological evidence for the socio-economical interdependency of coast and hinterland based on the discovery of new prehistoric sites on the Persian Gulf's northern coasts*, co-authored by Elnaz Rashidian and Abbas Moghaddam offers an in-depth analysis of the recently discovered site of Tahmachi in southern Iran. Dating to the 5th millennium BCE, Tahmachi is the earliest documented prehistoric settlement on the Gulf's northern shore. Initial geoarchaeological investigations indicate that Tahmachi was likely situated near a now-lost, seasonally active coastal lagoon. The paper explores how the settlement utilized the lagoon's agro-pastoral and marine resources, supported by marine fauna remains found in deposits dating from the 6th to the 3rd millennium BCE. It also proposes that Tahmachi was in direct contact with the inland site of Chega Sofla, suggesting an exchange of goods and resources between these settlements. This finding represents the first evidence of such interdependency in the Persian Gulf's prehistory and parallels similar Mediterranean patterns.

Chapter 3, *Diachronic human-wetland interactions on the Salpi lagoon (Apulia, Italy): from the Daunian period to the Early Middle Ages*, by Roberto Goffredo, Girolamo Fiorentino, Ilaria Mazzini and Darian Marie

Totten, discusses the complex interplay between human settlement and the environment around the Salpi Lagoon in Apulia from a diachronic perspective. The chapter begins by examining Vitruvius's account of Salapia's relocation due to health concerns caused by its proximity to a stagnant marsh. It continues by tracing the evolution of the settlement from its initial foundation near a marshy area to its refoundation on more salubrious land with a coastal lagoon transformed into a port. The authors employ a multidisciplinary approach to reconstruct the historical relationship between the settlement and its wetland environment, emphasizing how changes in the lagoon's landscape influenced settlement patterns and economic activities. They explore the adaptive strategies of the inhabitants, including agricultural and urban planning modifications, to manage and exploit wetland resources. The chapter highlights the long-term co-evolution of human activities and environmental conditions, providing insights into the resilience and transformation of the settlement over time.

Chapter 4, *Liminal historical landscapes in southern Tuscany: a multidisciplinary approach for a new narrative*, co-authored by Luisa Dallai, Vanessa Volpi, and Giulio Poggi, provides new insights into the environmental and archaeological understanding of the lower Val di Cornia, central Italy, through the ERC nEU-Med project. The study employs a multidisciplinary approach, integrating geochemical and environmental proxies with traditional archaeological methods to offer a revised diachronic landscape reconstruction. It reveals that the coastal landscape of the lower Val di Cornia has remained notably stable since at least the 4th millennium BC. This stability is coupled with the region's ongoing importance for economic activities such as fish farming and salt production, which persisted from Antiquity through the Middle Ages. The findings challenge previous notions of the region's marginality and instability, instead highlighting its central role in local economies and settlement strategies. Their research underscores the complex and adaptive relationship between human societies and their environment, demonstrating that areas previously considered marginal were, in fact, actively managed and economically significant.

Chapter 5, *Historical landscape analysis on marshlands of the Bay of Cádiz. A non-invasive theoretical approach and experimental experience*, co-authored by Enrique Aragón Núñez, Isabel Rondán Sevilla and Lázaro Lagóstena Barrios, addresses the limitations in understanding human migration and settlement patterns in the Bay of Cadiz due to the underrepresentation of marshlands in archaeological studies. Although coastal and riverine margins are recognized as important, they have not been systematically investigated. The chapter highlights how non-invasive technologies, such as magnetometry and GPR, are transforming the study of marshlands, revealing hidden archaeological landscapes and enabling a deeper understanding of society-environment interactions. Using case studies from the lower Guadalete riverbank, such as La Esperanza and La Martela, the research demonstrates how these methods have identified significant archaeological anomalies, despite challenging environmental conditions. The study emphasizes the need for a more systematic approach to paleo-coastal landscapes and proposes integrating additional geophysical techniques, such as tomographic profiling and geoarchaeological coring, to reconstruct the historical evolution of marshlands and improve interpretations of human activity in these dynamic environments.

Chapter 6, *Landscape evolution in the Venetian lagoon reconstructed through archaeobotanical analyses*, co-signed by Silvia Marvelli and Marco Marchesini, focuses on archaeobotanical analyses to trace the landscape evolution of the Venetian lagoon and its hinterland from the Roman period to the late Middle Ages. By studying pollen, seeds, and wood-charcoal remains from various archaeological sites, the chapter reveals how human activity, climate change, and environmental adaptations influenced vegetation and land-use patterns. During the Roman period, intensive agricultural activities, including viticulture and cereal cultivation, shaped the landscape, though these practices declined in Late Antiquity. In the Early Middle Ages, forested areas dominated the lagoon, but human impact grew with the reclamation of land for farming, particularly cereal crops and vineyards. By the Late Middle Ages, further deforestation and wetland reclamation intensified agricultural production and trade, evidenced

by the wide variety of cultivated plants. This chapter highlights the dynamic interplay between humans and their environment, showcasing how climatic shifts and socio-economic factors drove landscape transformation over time.

Chapter 7, *Coastal lagoons, shifting environments, and control of natural resources*, authored by Annalisa Marzano, delves into the historical and economic significance of lagoons and wetlands in the Roman world, focusing on their multifaceted roles and the complexities surrounding their management. Through historical examples from the Roman world, the chapter addresses the challenges related to the ownership and exploitation of these resources, as demonstrated by conflicts in Priene, Ephesus, and Histria. It examines territorial disputes over these resources between local authorities and Roman tax farmers in these cities, highlighting the impact of lagoonal morphology and shifting ownership laws. These disputes often involved determining property rights and boundaries, exacerbated by the dynamic and shifting nature of lagoonal environments. The disputes between communities and tax farmers underscore the complexities of ownership and the high stakes involved, illustrating how economic pressures and evolving environmental conditions influenced Roman administrative practices and local economies.

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