



Ostracods and benthic foraminifers as a key to unravel Holocene depositional dynamics of coastal wetlands: evidence from the N Adriatic record

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Mediterranean coastal wetlands, composed of a variety of submerged and temporally emerged sub-environments (e.g., swamps, saltmarshes, mud flats, lagoons), are highly valuable and dynamic settings at the interface between land and sea. The rapid response to changing boundary conditions and the high environmental sensitivity of these areas, put them at risk as biodiversity hotspots and natural resources.

Through a multi-proxy study of the N Adriatic coastal record, involving both sedimentological and palaeobiological (ostracods and benthic foraminifers) data, we investigated the contribution of meiofauna communities for assessing the environmental dynamics and resilience strategies of microtidal lagoons/wetlands in response to river and coastal processes under highstand sea-level conditions (ca. last 7.0 kyr BP).

Modern distribution patterns of the meiofauna across the main N Adriatic lagoonal areas (Venice, Marano and Grado Lagoons) and nearby Isonzo Delta wetlands were investigated based on published datasets. The integration between ostracod and benthic foraminiferal data furnished us the opportunity to distinguish five biofacies corresponding to muddy sub-environments (i.e. swamp, saltmarsh, mud flats, inner and outer lagoon), which differ in terms of salinity conditions, degree of confinement and intertidal morphologies. Ostracods proved to be excellent environmental indicators in freshwater-oligohaline supratidal (occurrence of *Candona* species) and brackish subtidal (dominance of *Cyprideis torosa*, *Loxoconcha* and *Leptocythere* species) settings; on the other hand, foraminifers were the only meiofauna component encountered in intertidal areas (mainly *Trochammina inflata* and/or *Ammonia tepida*-*A. parkinsoniana*).

Using these biofacies as a reference, we were able to depict a variety of depositional facies within the mid-late Holocene succession buried beneath the southern wetlands of the Po coastal plain (Northern Italy) through the quantitative analysis of the meiofauna content of eight reference cores. The integration of palaeobiological data into a well-constrained, high-resolution stratigraphic and chronological framework allowed the identification of the palaeoenvironmental changes and depositional processes that determined the complete filling of a wide lagoon, formed during the peak of marine transgression around 7.0 kyr BP and subsequently hosting the Po Delta system. Around 6.0 kyr BP, a major turnover in ostracod+benthic foraminiferal assemblages testifies to the establishment of a lagoon strongly affected by sea currents, especially tides that became the main source of sediments into the basin. This tidally-influenced depositional phase lasted ca. 2000 years, and was promoted by a combination of autogenic factors including specific morphologies of the coastline (i.e. wide embayments) and basin characteristics (i.e. very shallow, flat N Adriatic shelf), as well as river delta lobes dynamics that determined a very low sedimentary input of land provenance.

Around 2700 kyr BP, the abrupt disappearance of benthic foraminifers and the occurrence of a freshwater-oligohaline ostracod fauna reveal the switch from a tidally-influenced lagoon to a barred paludal basin, developed behind the cusped beach ridges of an Etruscan Po delta lobe. The activation of this lobe isolated the basin from the sea, determining its sediment starvation up to present day.