



Climate changes and human impact on the Mistras coastal barrier system (W Sardinia, Italy)



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ARTICLE INFO

Keywords:

Holocene
Millennial scale transgressive-regressive cycles
Roman warm time
Tharros
Punic harbour
Sinis Peninsula

ABSTRACT

Integrated archaeological and geological studies conducted on Mistras coastal barrier system of central Sardinia showed that it developed as transgressive systems during the final stages of the Holocene sea level rise (final stage of the Holocene Climate Optimum, about 6300–6000 cal y BP), and become regressive (prograding) from about 2500 cal y BP, when sea level reached the present elevation.

The regression of the coast was, however, not continuous, but characterized by distinct Transgressive-Regressive phases (T-R), associated to precise climatic fluctuations, tied with global eustatic and climatic phases.

The first regression occurred between 2500 and 1900 cal y BP. This time interval, known as Roman Warm, coincides with the Phoenician, Punic and Roman attendance of the west Sardinia coast. At that time, areas close to the coastal cities had to host landings and perhaps ports probably located at short distance from the shoreline. Archaeological excavations and findings have documented that in the Mistras area Punic constructed a long boulder structure (probably dated from the 4th century BCE) to better protect an incipient lagoon used as the harbour of the city of Tharros. This had the effect to modify the normal behaviour of the beach system that transformed from spit to barrier lagoon.

During the second regressive phase, the well-established beach lagoon system developed quasi continuously for > 1200 y (650 and 1850 CE). This progradation started during a new warm period (Medieval) and continued favoured by gentle sea level fall occurred during the cold Little Ice Age time. During this time, after the abandonment of the city of Tharros and of the Sinis Peninsula, the Mistras area was poorly populated. As consequence, there was no more an active harbour and large sandy dunes developed and nourished the shore allowing a no man-influence progradation of the coast.

The third stage is the current one and begun about 165 y ago (post 1850 CE) after the relative sea level rise occurred after the end of the Little Ice Age.

Geological and archaeological data of western Sardinia barrier lagoon systems revealed that the Mistras barrier lagoon evolution was human influenced since the Punic time. The study pointed that little human activities on the coast could influence its natural behaviour and landscape, and that little climatic changes both positive and negative can induce progradation or erosion of the system as well.

1. Introduction

Climate changes are one of the main actual topics, and to define how much the human impact has and is affecting them is of utmost importance. Investigating how environments could change in response to past climate changes is one of the keys to hypothesize possible future

scenarios in the short/medium term.

The coastal areas are those where small eustatic and/or anthropogenic changes can cause significant environmental modifications (see for example Fig. 5 of Mimura, 2013).

In this respect, studies of the Holocene sedimentary sequences of coastal plain and delta systems around the world have shown a similar

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