Climate change is a reality. The changes that humans have made to the planet in the last 100 years have had a huge impact on many ecological systems. One of the major impacts can be observed in the rising of sea level. The level rise of the seas can have dramatic effects on coastal archaeological and cultural heritage. Fluctuations and shifts in temperature, rainfalls, mean sea level, and cultural heritage. Fluctuations and shifts in temperature, rainfalls, mean sea level, and coastal landscapes on the coastal lines. Currently, the Portuguese coastal zone is strongly affected by erosion in association with an important sedimentary deficiency, which was initiated around the beginning of the 20th century, and became strongly enhanced after the 1930s-1940s (Carrasco et al., 2006). These factors will have dramatic effects on the stability of the historical landscapes on the coastal lines. Currently, the Portuguese coastal zone is strongly affected by erosion in association with an important sedimentary deficiency, which was initiated around the beginning of the 20th century, and became strongly enhanced after the 1930s-1940s (Carrasco et al., 2006). These factors will have dramatic effects on the stability of the historical structures, and will critically damage cultural and archaeological sites when located near the shoreline (Carrasco et al., 2006).

The coastal stretch of Boca do Rio, western Algarve, Portugal and the Angerias beach of Roman ruins are an example of such a coast facing erosion. Settlements from ancient human occupation are located near this coastline, and the area has been designated a special protection zone (archaeological station) (Carrasco et al., 2006).

Objectives

The aim of this work is 1) to study the archeological and cultural heritage Portuguese sites which will be affected by climate changes; 2) to quantify the shoreline evolution of the coastal stretch, 3) to evaluate the preservation/conservation options in order to create an up-to-date electronic catalogue to enable remote access to them through the web.

Methods

Cultural and archaeological sites
- The Boca do Rio beach located at the coastal stretch of Boca do Rio, western Algarve, has a collection of Roman ruins, classified as public heritage within the Municipality Plan of Lagos City Council. The Roman ruins of Boca do Rio belong to a small fishery villa, comprising a collection of settlements with mosaics, balnearies, warehouses and a salting production integrated in a small port (Carrasco et al., 2006) (fig.1).
- In Coimbra, on the left bank of the Mondego river, are located the Convento of the Santa Clara-a-Velha, built in the 14th century and abandoned in the 17th century due to frequent floods. Classified as a national monument since 1910 (fig.1).
- On the sea shore of Lavra beach, in Matosinhos, classified as a national monument since 1970, there was one of the largest and best-known salt extraction sets of the Roman period in northern Portugal. The roman cetariae were discovered in 1965, excavated on the bedrock and were composed by a group of 33 tanks (Almeida, 2005) (fig.1).
- Classified as a national monument since 1910, the ruins of the archaeological site of Tróia, in the peninsula of Setúbal, constitutes one of the most important Roman settlements of Portugal. Known as a fish processing industrial complex, was built by the end of the 1st century B.C., and kept fully active until the middle of the 3rd A.D., in which began a progressive and irreversible decadence until the 5th century A.D. (Monteiro et al., 2006) (fig.1).
- The present preliminary study has examined the threat posed by shoreline erosion to a collection of Roman ruins located along the stretch of the Portuguese coast (Boca do Rio, Algarve, Tróia, Setúbal, roman cetariae in Angerias beach, Matosinhos), as also the consequences of sea level rising in river shores and monuments, with the example of the Convento de Santa Clara-a-Velha (Mondego river). It is evident that climate changes are nefarious for coastal settlements, which lead to consider management intervention options in order to protect or preserve the sites. Based on the analysis of possible preservation measures, two main strategies are recommended: execution of coastal protection works and/or the relocation or isolation of the settlements as urgent as possible, to avoid further destruction. Studies focusing on the management of coastal zones that host ancient settlement sites are currently scarce. Considering the increasing rates of shoreline retreat in various parts of the world, there is an increased likelihood that more ancient settlements will be imperiled by coastal erosion.

References