

### **Case Study 5: Andalucia, Spain.**

The geographical setting of the Andalusian coastal area depicts a high variety of environments. Sandy beaches, tidal flats, dune systems, spits, and cliffs form the over 1000 km of shoreline of the Southwestern end of Europe. These are the result of a combination of a number of factors, among which the following are to be highlighted:

Its geographical location, at the southern end of the Iberian Peninsula and its proximity with the African Continent, Andalusia is at the transitional position between the mid latitudes and the inter-tropical areas of the Planet Earth. Andalusia also located at the meeting point between the Atlantic Ocean and the Mediterranean Sea.

These facts determine the presence of a great variety of climatic zones all along the Andalusian shoreline, which have a transcendental influence on both the hydrological behaviour of rivers of the Andalusian coast and constitute its main source of sediments, as well as the maritime climate that drives erosion, transport and sedimentation processes in the littoral zone (direction and intensity of the waves, amplitude of the tides, marine currents, etc.).

The geological context is another factor, as Andalusia is in the area of contact between the African and the European plates. Therefore the Andalusian coastal area has been subjected to intense tectonic processes that have shaped its current layout. In fact, the Andalusian coast falls within the most tectonically active regions of the Iberian Peninsula. There is a marked difference between the Atlantic and the Mediterranean coastal zones, since the former is developed mostly on post-orogenic formations filling the depression of the Guadalquivir River, which gives it a wide and gently sloping continental shelf; and the Mediterranean is under the influence of the great mountain ranges of the Beticas (note that this is the area where we find most mountainous elevation in the Iberian Peninsula, with almost 3500m of elevation a short distance from the coast), where the continental shelf is narrow and with a steep slope.

The morphological characteristics of the Andalusian coast depend largely on the agents that control their coastal dynamics: waves, tides, currents and wind. On the Atlantic coast the wave characteristics are marked both by the regime of winds as its aperture Ocean, which favours the arrival of long fetch swell waves. Mediterranean waves, however, are limited by the proximity of the African coast. As for the tides, the Andalusian Atlantic coast is mesomareales, and the Mediterranean is microtidal. The presence of the Strait of Gibraltar, where a complex exchange of large volumes of water between the Atlantic and the Mediterranean occurs, gives a special character that makes its print on the regime of winds and the sea currents, among others.

The Andalusian coast has important values and other natural resources that are the basis for important economic sectors. The beaches and the landscape are of great importance for the support of the region's economy since ancient times, even today with the economic sector of Tourism and Leisure. The anthropogenic pressures are the main factor of degradation of the coastal formations.

The Government of Andalusia approved in 2002 the adoption of a Regional Climate Change Strategy,

in what was one of the first institutional initiatives of Spain in this regard. Within this Strategy, it was felt that to prepare for climate change, the first thing to do was to cope with mitigation policies, whose mission was to reduce emissions of greenhouse gases and promote its drain capacity. With this objective in 2007 was approved the Andalusian Action Plan for the Climate-Mitigation Program.

In 2010, the Andalusian Program for Adaptation to Climate Change was adopted. It has been a step in the development of the Strategy. The overall objective of this Program is to minimize the vulnerability of the region of Andalusia to the negative effects of climate change by integrating adaptation into planning, which would exploit the potential parallel effects positive climate change.

This is performed through 5 specific objectives:

1. Developing sectoral measures and adaptation actions at the regional and local levels, based on the diagnosis and assessment of impacts of each field.
2. widen strategic knowledge about the impacts and consequences of climate change in Andalusia.
3. Promote joint action by the Region of Andalusia on climate change.
4. Promote the action of the Local Government and the companies and organizations that operate in the private sector in adaptation.
5. Encourage participation in training in adaptation to climate change.

The Andalusian Adaptation Program develops through four sub-programs:

Subprogram 1: Immediate measures.

Subprogram 2: Sectoral analysis of assessment of the effects of climate change.

Subprogram 3: Sectoral adaptation measures.

Subprogram 4: Continuous improvement of knowledge and governance.

#### **References:**

Análisis preliminar de la vulnerabilidad de la costa de Andalucía a la potencial subida del nivel del mar asociada al cambio climático (2011). Consejería de Medio Ambiente, Junta de Andalucía. 154 pp.