The beach as a tourist attraction is a key factor for tourism destinations competitiveness. The beach ecosystem services have included recreational functions which provide benefits and well-being to local communities. Coastal erosion is decreasing the attractiveness of coastal areas leading to natural and economic impacts. The effects of climate change are predicted to have dramatic consequences, particularly when coastlines are retreating inland in response to rising sea levels [1]. The most likely scenario is the loss of considerable coastal areas and the reduction of the beach coverage [2]. Nevertheless the tourism literature has been overlooked the climate change, probably explained by the complexity of expected tourism demand reactions [3]. There has been little examination of the impact of climate on the success of tourism destinations [4] and the importance of physical changes in the beach ecosystem services [5] [6]. The competitiveness models of tourism destinations usually consider natural resources but a large scale and transfer environment-attractiveness relationship it is difficult from national to local level.

This paper analyses the vulnerability of the beach tourism at local level towards climate change by means an index approach. Their construction is simple and affordable, and the results of the index calculations are understandable. The datasets used are referred to the physical conditions of the beach and lodging in the coastal municipalities. The beach coverage and the changes projected are available through the project C3E included in the NAP. This project subdivides the coastline into squares (units) and provides information about length/area of the beaches and the response of the shoreline to sea-level rise. The time frame chosen is four-fold and thus represents the current scenario and a hypothetical situation projected in 2020, 2030 and 2040. The lodging data is published by the regional statistics services every year (considering 2014 database in any scenario). The index has set as follows: \( I = \frac{A - R \times L}{B} \) where A is the beach coverage at a particular scenario (m); L is the beach length (m); R is the coastal retreat estimated at a particular scenario (m); and B is the bed places in coastal municipalities.

The index has been tested in the province of Alicante, one of main beach tourism destinations in Spain. The length of the beaches is 78 km and supposes 33% of province shoreline. The capacity of the tourist accommodation sector in coastal municipalities is estimated in 191,784 bed places. The province is subdivided in four squares (units 54 to 57). The units 56-57 have 37.5% of total length beaches, 33.6% of total beaches coverage and 80% of total bed places. Both units incorporate important tourist destinations as Benidorm, Calpe, Jávea or Dénia. The index estimates 7.01 and 13.86 m²/bed for unit 56 and 57 in the current scenario respectively. The result for unit 54 is 89.3 m²/bed and 62.5 for unit 55. We appreciate that situation between 54-55 and 56-57 units is unevenly balanced. Nevertheless the coastal retreat is worse in first than last units. The percent of beach coverage affected would have from 1.03 up to 1.19%. In 2030 would have from 2.35 up to 2.71%. More than 3 point increase is estimate in 2040 going from 3.72 to 4.26%. The variation of area per bed place would have from 0.29 up to 3.32 m² in absolute terms if we compare current and 2040 scenarios. While the 56-57 units decrease 0.29 and 0.60 m², 54-55 units do 3.32 and 2.46 m² respectively. These consequences on beach coverage should be on the agenda of tourism industry and the integrated coastal management.

References

Fig. 1. Beach coverage and bed places distributed in squares (units).

Fig. 2. Coastal retreat estimated by squares (units).