Journal of Coastal Research	23	1	275–276	West Palm Beach, Florida	January 2007

DISCUSSION

Discussion of: ANFUSO, G. and GRACIA, F.J., 2005. Morphodynamic Characteristics and Short-Term Evolution of a Coastal Sector in SW Spain: Implications for Coastal Erosion Management. *Journal of Coastal Research*, 21(6), 1139–1153.

J.J. Munoz-Perez[†], G. Gomez-Pina[‡], and L. Moreno[§]

[†]Applied Physics Department
CASEM
University of Cadiz
11510 Puerto Real
Spain
juanjose.munoz@uca.es

[‡]Coastal Department
Ministry of Environment
Marianista Cubillo n. 7
11071 Cadiz
Spain
ggomez@mma.es

[§]Department of Civil Engineering:
Transportation Infrastructure
EUIT Obras Públicas, Alfonso XII, 3-5
28071 Madrid
Spain
luisjuan.moreno@upm.es

ANFUSO and GRACIA (2005) performed an excellent beach monitoring program consisting of topographic levelings carried out with a monthly periodicity from March 1996 to May 1998. They used 13 cross-shore profiles distributed along the study area, from Chipiona, at the Guadalquivir River mouth, to Rota, north of the Bay of Cadiz. Between April 2000 and October 2002, monitoring was complemented by profiling of only five transects every two months. Furthermore, some quite interesting conclusions about the morphodynamic characteristics of this coastal stretch and their possible implications for coastal management were proposed. However, as the engineers responsible for the beach nourishment projects performed in the Gulf of Cadiz for the last two decades, we consider that some remarks should be made in order to avoid any undesirable misunderstanding.

The authors stated that "In general, nourished beaches have not shown great endurance. The limited success of the works had a number of causes (ANFUSO *et al.*, 2001), including the lack of basic information on the coastal morphodynamics of the zone." To begin with, according to the SPANISH SHORE ACT (1988), bathymetric levelings and biological and littoral dynamics studies are mandatory before initiating each nourishment project. Such studies are only excluded in emergency cases. Furthermore, analysis of field data and aerial photographs from 1956 had shown that the coastline was retreating at a rate of approximately 1 $m \cdot y^{-1}$ in some points of the Gulf of Cadiz (MUNOZ-PEREZ and ENRIQUEZ, 1998). Because of this reason, leaving aside the economic importance of the beaches for the touristic incomes in Spain, the Ministry of the Environment decided to start a coastal protection program based on the most natural way to solve the erosion problem: sand replenishment (GOMEZ-PINA, 1999). Monitoring tasks have been performed since the first nourishment, each of which has lasted for at least two years. It is true that the cost of beach maintenance in a few cases became excessive, but they were in a minority. Comparison of the data about the different erosion rates and other related parameters (MUNOZ-PEREZ *et al.*, 2001) showed that small yearly renourishment, similar to the yearly losses, instead of greater nourishment performed with a periodicity of many years, would lead to economic savings, as well as to a better use of the natural resources. Moreover, although an impartial judgement is always difficult on one's own work, autocritical reviews of beach nourishment projects are sometimes made (*e.g.,* GOMEZ-PINA *et al.,* 2004).

ANFUSO and GRACIA (2005) made smart use of the surf similarity index for the morphodynamic classification of the studied beaches. This parameter, introduced by Iribarren and Nogales (IRIBARREN and NOGALES, 1949), and thus called the Iribarren number, relates the beach slope to the square root of wave steepness. It was introduced as $\xi_o = \tan\alpha/\sqrt{H_0/L_0}$ for deep water or $\xi = \tan\alpha/\sqrt{H/L}$ at a depth where wave transformation due to shoaling before breaking begins.

As the values found by ANFUSO and GRACIA (2005) are close to the limit between plunging and spilling breakers, bottom friction over a reef flat, which is the case of some of the beaches studied by the authors, should be taken into account. HORIKAWA and KUO (1966) demonstrated that, because of the friction over a horizontal rocky bottom, the ratio between the local wave height and the mean water depth decreases from 0.8 to become almost constant, at about 0.5, in the inner zone. Wave decay expressions can be consulted, for example, in FREDSOE and DEIGAARD (1992). On the other hand, it is

DOI: 10.2112/06-0637.1 received 23 January 2006; accepted in revision 13 November 2006.