



2dh non linear methods to simulate long term assessment of Nourishment on sandy beaches

Philippe Larroudé

LEGI BP 53 38041 Grenoble, France, larroude@hmg.inpg.fr

Examples of nourishment tests carried out on the near shore zone are few and far between in the relevant literature, compared to the many ones undertaken directly on the beach. SAFE, latest European project within the MAST program, acknowledges the absence of reference documents on this question, although such a technique could presumably constitute a less costly alternative (Hamm *et al.*, 2002).

The use of offshore bars to fight beach erosion was based on the fact that they represented a substantial reservoir of sediments. However, the essential role these bars can play in wave mitigation was evidenced by recent studies. Hence, working on reinforcing existing bars or even adding extra bars is a convincing approach, for they constitute a line of defence with no visual impact and are therefore environment-friendly. The method offers the added benefit of tapping abundant fine sands, easily available offshore, to build up the bars.

The coastal morphology evolution can not be represented with average climatic conditions but need to simulate the extreme events as the storms and therefore, in a long term approach, the morphological evolution is the result of the combination of storm events and calm periods.

The aim of the paper is to find a methodology for long term prediction of nourishment to protect beaches with two hydro-morphological numerical models. The simple simulations are obtaining with the Multi1dh simple model (Camenen & Larroudé 2003). With this simulations an average year weather is find taking into account the climate change and the vulnerability of the coast line. The results are using as input data in a simulation of the climatic conditions during a long period of time for the

morphological evolution with the complete 2DH model. Using this approach we create yearly waves conditions and to repeat this ideal weather with storm event and calm period several year to proceed of long-term simulation of nourishment.

All these assumptions should, of course, be systematically checked, the purpose of the exercise being to assess, through mid-term bathymetric evolution simulation, the consequences of the implementation of offshore bar nourishment.

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Reference Camenen B. and Larroudé Ph. (2003) Un modèle morphologique côtier pour la création de barres rythmiques, *Revue française de génie civil*, Génie côtier, vol. 7, pp. 1099-1116, 2003.

Hamm, L., Capobianco, M., Dette, H.H., Lechuga, A., Spanhoff, R., Stive, M.J.F, (2002). A summary of European experience with shore nourishment, *Coastal Engineering*, 47, 237-264.