

New land-based method for surveying sandy shores and extracting DEMs: the INSHORE system

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Abstract The INSHORE system (INtegrated System for High Operational RESolution in shore monitoring) is a land-base survey system designed and developed for the specific task of monitoring the evolution in time of sandy shores. This system was developed with two main objectives: (1) to produce highly accurate 3D coordinates of surface points (in the order of 0.02 to 0.03 m); and (2) to be extremely efficient in surveying a beach stretch of several kilometres. Previous tests have demonstrated that INSHORE systems fulfil such

objectives. Now, the usefulness of the INSHORE system as a survey tool for the production of Digital Elevation Models (DEMs) of sandy shores is demonstrated. For this purpose, the comparison of DEMs obtained with the INSHORE system and with other relevant survey techniques is presented. This comparison focuses on the final DEM accuracy and also on the survey efficiency and its impact on the costs associated with regular monitoring programmes. The field survey method of the INSHORE system, based on profile networks, has a productivity of about 30 to 40 ha/h, depending on the beach surface characteristics. The final DEM precision, after interpolation of the global positioning system profile network, is approximately 0.08 to 0.12 m (RMS), depending on the profile network's density. Thus, this is a useful method for 3D representation of sandy shore surfaces and can permit, after interpolation, reliable calculations of volume and other physical parameters.

Keywords Topography · Total station · Beach morphology · Beach volume

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Introduction

To study processes that are related to storm impact, coastal erosion and morphodynamic characterisation, it is important to gather good-quality