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Assessment of extreme waves impact on coastal area by GIS

M. De Leonardis (1), G. Mastronuzzi (1), **C.Pignatelli** (2), P. Sansò (3)

(1) Dipartimento di Geologia e Geofisica, Bari University, Italy, e-mail: g.mastrozz@geo.uniba.it

(2) Geomorphology and Environmental Dynamics Phd School, Bari University, Italy, e-mail:pgcs01n6@uniba.it

(3) Osservatorio di Chimica, Fisica e Geologia ambientali, Dip. di Scienza dei Materiali, Lecce University, Italy, e-mail: paolo.sanso@unile.it.

Extreme waves and tsunamis impact along Mediterranean coast is generally neglected into the coastal zone management notwithstanding recent research shows that this region has been struck by numerous severe events during historical times. The aim of this study is to determine the extreme waves run-up based on waves and geomorphological parameters (slope of the continental platform, coastal slope and roughness, extreme wave characteristics and son on) as well as to identify the areas of southern Apulian coast prone to inundation.

Southern Apulia coastal area has been subdivided in 17 UCU (Unique Condition Units) taking into account the different morphological types which constitute the local coastal landscape. A mosaic of the topographic and nautical maps, at scales 1:25000 and 1:100000 respectively, has been created using a GIS. Starting from the Digital Elevation Model of emerged and submerged coastal area, slopes ranging from 0-3 m (dune ridges limit), 3-10 m (back dune areas) and 10-20 m (maximum estimate of tsunami run-up) above m.s.l. have been calculated. In the same way submarine slopes ranging from 0-7.5 m (normal sea wave action), 7.5-20 m (sea storms action) and 20-120 m (tsunami wave action) have been determined.

The collated data set allows a matrix to be implemented; rows represent the UCU subdivisions whereas in columns several geomorphological elements are reported (regional slope of UCU, dune belt size, distance from shoreline to dune belt, Beniawski's

parameters for rocky coasts, ecc.). This data set has ben used to calculated for each UCU the maximum run-up of storm and seismic waves and to estimate their impact. Then, GIS potentiality has been exploited to indentify the coastal areas prone to inundation in response to different run-up values and to detect the most vulnerable UCU.