Landslide Hazard Analysis (LHA) based on knowledge approach: Case of the Western coast of Algeria

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Introduction

Mostaganem is a province located in the north-western coast of Algeria (Figure 1); its landscape is mainly formed by brittle lithology. The coastal area is socioeconomically well development with an important population growth (Samy and Mohamed 2015). Relating to this, many build-up projects have been initiated within the coastal paleo-dune, which is the most vulnerable rock of the region (Senouci & Taibi, 2019). The combination of local lithology, slope degree and strong rainfall led consequently to several landslide events. Actually, landslide hazard evaluation contributes positively to future management-event decision and territory-planning (Saha & Gupta, 2002; Pathak, 2016).

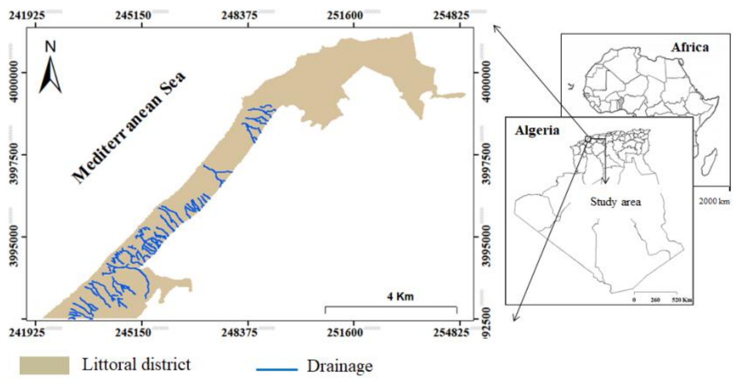

Fig1. Location of the study area

Methodology

This work aimed to identify the sites with a potential geological hazard on the coast of Mostaganem. Under this scope, remote sensing data, field survey and Geographical Information System (GIS) analysis have been carried out. Furthermore, eight parameters have been considered to create the hazard map: lithology, land use land cover (LULC), slope, aspect, rainfalls, distance to stream, distance to road, and distance to fault. These different parameters have been generated in a GIS environment; the lithology data were extracted from geological map, LULC was derived from satellite image Landsat 8 OLI, slope and aspect have been extracted from Digital Elevation Model (DEM), derived from SRTM. All these parameters have been projected in WGS 84 datum/ UTM zone 31. Based on knowledge expert and using ArcGIS 10.5.1 software, each parameter has been weighted on 1-5 scale according to their effect on landslide occurrence.

Using *Raster Calculator* tool, each classed parameter was multiplied with the assigned weight; than the different maps were combined in order to produce the final landslide hazard map as shown in the figure 2. (Michael & Samanta, 2016).

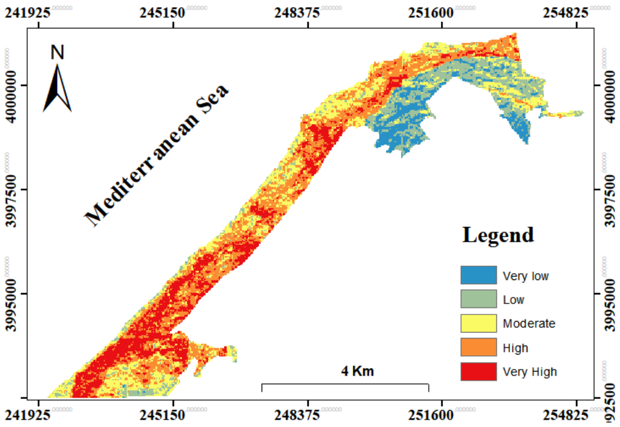

Fig2. Landslide Hazard mapping

The final produced map of Landslide Hazard Analysis is categorized into five classes, based, in this case, on Natural Break (NB) (Manchar et al. 2018). In this sense, the class "very low" represents 8.07 %, the second class (low: 18.53%), the third class (moderate: 32.37%), the fourth class (high: 34.49), and the fifth class (very high: 6.08%). Actually, construction projects related to tourism accommodation and stores are planned in the province of Mostaganem. For that reason, it is necessary to identify the coastal sites that can be affected by possible landslide hazards (Taibi, 2016). The data resulting from this study could be very useful for decision-makers and could contribute to prevent habitation and person damages (Kaur et al. 2018).

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