



***GEOLOGICAL HAZARDS ASSESSMENT
AND ENVIRONMENTAL CHANGES MONITORING IN
MAYSAN AREA By
USING REMOTE SENSING TECHNIQUES AND GIS***

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَمَا تَوْفِيقِي إِلَّا بِاللَّهِ عَلَيْهِ تَوَكَّلْتُ وَإِلَيْهِ أُنِيبُ (88)

صدق الله العلي العظيم

((الآية 88))

سورة هود

*To Those
Who are the candles in my life;
"My Parents"
&
To Those
Who always encourage me;
"Brothers & Sisters"*

Certification

We certify that the thesis entitled "*Geological Hazards Assessment and Environmental Changes Monitoring by Using Remote Sensing Techniques and Geographic Information Systems*" which is being submitted by **Masar Mahmood Khalf** has been prepared under our supervision at the **University of Basrah**, as a partial fulfillment for the degree of **Master of Science in Geology**.

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Maser

Abstract

The remote sensing and GIS techniques are used to study the geological hazards in Maysan, southeastern of Iraq. The methodology of this project including monitoring the environmental changes using Landsat MSS, TM, ETM+ and OLI scenes to cover the study area for periods (1976 - 2016). these data were processed digitally using a number of specialized software (ERDAS 2014 image, ENVI 4.7 and GIS Programs) in order to enhance the colors and elevations and to producing hazard maps. environment degradations have a significant impact on people lives and property. satellite images data are largely adopted due to its cost effectiveness, short temporal operation and a large area of coverage. These data carried out with GIS software to identify two type of geological hazard zones (GHZ) geomorphologic hazard zones, and (THZ) tectonic hazard zones(.The change detection was monitored through applying unsupervised and supervised classification for land covers for many years. in the end, seven main land cover classes are appeared and used the Tasseled Cap transformation (TCT), Normalized Difference Vegetation Index (NDVI), Aeolian mapping Index (EMI) and Water body Index (WI) for the period (1976-2016). the geometrical and color enhancement procedures of ERDAS used to develop accuracy acceptable GIS maps. These maps used to classify the surface units, surface topography, and soil types, identified the slope unit risk, and geomorphology unit risk, each geomorphology unit related with geohazared that occurs within it. Slope and elevation maps, slope direction and satellite image used to identify the desertification zone, flooding zone, are an indication that the high potential flooding in the Eastern parts of the Maysan region and the zones of high erosion paths are also denoted. The desertification and flooding hazards were restricted in the northeastern parts of the study area. the lineaments analysis with Morphtectonic indices appears that the eastern parts are tectonically active. The THZ and GHZ

used to compile hazard zones and risk classification. the risk zone divided into four zones while the hazards are divided into three zones.

Abbreviations

GPS	Global Positioning System
NASA	National Aeronautics and Space Administration
USGS	United States Geological Survey
DEM	Digital Elevation Modal
3 D	Three Dimension
GIS	Geographical Information System
MSS	Multispectral Scanner System
ETM+	Enhanced Thematic Mapper Plus
NDVI	Normalized Difference Vegetation Index
PCA	Principle Component Analysis
SIR	Shuttle Imaging Radar
IR	Infrared

ASTER	Advanced Space borne Thermal Emission Reflection
LANDSAT	Land Satellite
TM	Thematic Mapper
TC	Tasseled Cap
FCC	False Color Composite
ERDAS	Earth Resources Data Analysis System
UTM	Universal Transverse Mercator
RGB	Red-Green-Blue
HIS	Intensity-Hue-Saturation
NDWI	Normalized Difference Water Index
NDSDI	Normalized Difference Sand Dune Index
EMI	Eolian Mapping Index
GHZ	Geomorphologic Hazard Zones
THZ	Tectonic Hazard Zones

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