

RISK ASSESSMENT OF FLASH FLOOD IN SINAI

ABSTRACT

Sinai is identified as a flood prone area where several flash floods were recorded and resulted in significant infrastructural damages, population displacement, and sometimes loss of lives. Most of the flood management strategies in this area have been geared towards preventing flood by an attempt to control the flood water by dams. Very little attention is paid for formulating rational land use planning to reduce flood induced disaster. Flash flood risk is a major issue to governments who ultimately pay the financial costs of losses resulting from flood events, so preparation of flash flood risk map is very important in this area. The preparation of a comprehensive flash flood risk map for this area would be very important to help in developing planning.

In this study the issue of flash flood hazard, vulnerability and risk mapping has been addressed from the perspective of different mapping scale in a GIS environment. Geographical Information System (GIS) is extensively used to assemble information from different maps, remote sensing and digital elevation model. Two different techniques for flash flood hazard mapping are proposed based on hydrological, metrological and hydraulic parameters. Flash flood hazard map using hydrologic and petrologic causative factors obtained by means of weighting a number of causative factors including maximum daily rainfall heights of 50 and 100 years return period, watershed area, slope of the watershed, drainage density and type of soil type and land use. For the second approach, hazard level is estimated as a function of two available parameters from the hydraulic model; flood depth and flow velocity (flood intensity). Then flash flood intensity and flood hazard map using causative factors compiled to the final flash flood hazard map. Finally, risk map for Al-Arish area was developed by the multiplication of the flash flood hazard map for 50 and 100 years return period with the vulnerability map.

This thesis has developed a systematic methodology for estimating flash flood, vulnerability, and risk maps based on a geographic approach using GIS. It concludes from the risk analysis of Al-Arish area that 21% of the houses and built up areas are under very high risk while 38% of it lies in high risk zone. Likewise, 20% of the agricultural land is under high risk while 69% of it lies in the moderate zones. In general, the rest of Al-Arish area is under moderate risk.