CHAPTER 8

CONCLUSIONS

The additional arguments to the existing literature, obtained from the landslide hazard analysis of Asarsuyu catchment are grouped into two; conclusions about landslide phenomena in Asarsuyu catchment and new approaches generated for data driven landslide hazard assessment.

A. Landslide Phenomena in Asarsuyu Catchment:

1. The Asarsuyu catchment is investigated for four different periods. It is found that except Bakacak and Bülbülderesi landslides there exists 33 individual landslides in 1952, 45 in 1972, 39 in 1984 and 37 in 1994.
2. The major causes for generation and for reactivation of landslides is found to be the change in land cover, and the increasing interaction of human activity resulting in land use changes.
3. The northern slopes of Asarsuyu catchment is classified as very low hazard. The attributes responsible for this classification is quite reasonable as these areas are the least populated, the land cover is not disturbed, dense forest, very distant to E-5 highway and to the major active fault and the lithology is intact enough.
4. The Southeastern slopes, especially the Bolu Mountain Highway pass are definitely on very high hazard class. The reasons could be listed as: the removal of lateral supports by E-5 highway cut slopes, fill areas of E-5 highway resulting in readily unstable unconsolidated material, close location to active faults, high disturbance to land cover, high activity of highway resulting in extra vibration, and the presence of flyschoidal units.

B. New Approaches for Data Driven Landslide Hazard Assessment Procedures:

1. In the conversion of non attributed continuous data into categorical variables, true distances are used rather than map distances.
2. In the generation of decision rules of landsliding mechanism, a buffer zone is added to the crown and side areas, to reveal the best undisturbed morphological conditions to be stored as attributes of a new database called “Seed Cell Database”.
3. The decision rules are directly based on Seed Cell Database such as the data outside the seed cell range is discarded as it is also been discarded by the nature by not having a single landslide.
4. In diving the classes of parameter maps, a new method is proposed and presented as percentile method, which is also dependent on “Seed Cell Database”.
5. Factor analysis is used to figure out new obscure factors present in the current data set.
6. Logical regression is implemented and forced to be used with both categorical and continuous data sets.
7. For hazard map comparison a two fold methodology is proposed: 1).area comparison in which a new index SCAI is introduced and 2). Spatial comparison in which re-coding matrix is presented.

Following issues can be listed as recommendations for future research:

1. High resolution remote sensing products can be used to derive DEM’s of any desired time period in order to check the system accuracy and to re-establish the hazard assessment at any time
2. New data sets such as: rainfall, geotechnical, hydrological and soil map related data, could be implemented in this hazard assessment procedures, if problems in data production stages are solved.
3. Seismic data could be implemented regarding different lithologies, if microtremor data, and P and S wave distribution maps are made available.