

The impacts of glacial sediments on slope instability the case of Songhor. Dinevar Basin

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Summary

The expansion of permanent snowboarders in colder periods in the low altitudes of the mountains has led to the forming of cirques, wide valleys, moraines and scratching of hard rocks of valleys. Due to limited water resources, many cities in Iran have developed near the mountains and have gradually expanded to the foothills. Due to glacial erosion in the Quaternary period, these domains contain sediments that have characteristics such as permeability and particles separation. If accompanied by high slope, heavy rainfall and earthquakes, they may lead to instability and environmental changes. This paper aims to identify a relationship between glacial sediments and the potential instability of the Dinur Basin slopes and Songhor. Accordingly, in the first step, traces and extent of glacial sediments were identified through field observations, temperature analysis and analysis of constituent sediments. In the next step, a zoning map of potential slope instability was prepared using fuzzy logic and different parameters including slope, vegetation, altitude, distance from the river and most important of all the scope of glacial activity.

Keywords: Mountain glaciers, Glacial sedimentss, Quaternary, Slope instability.

Theory / Method / Workflow

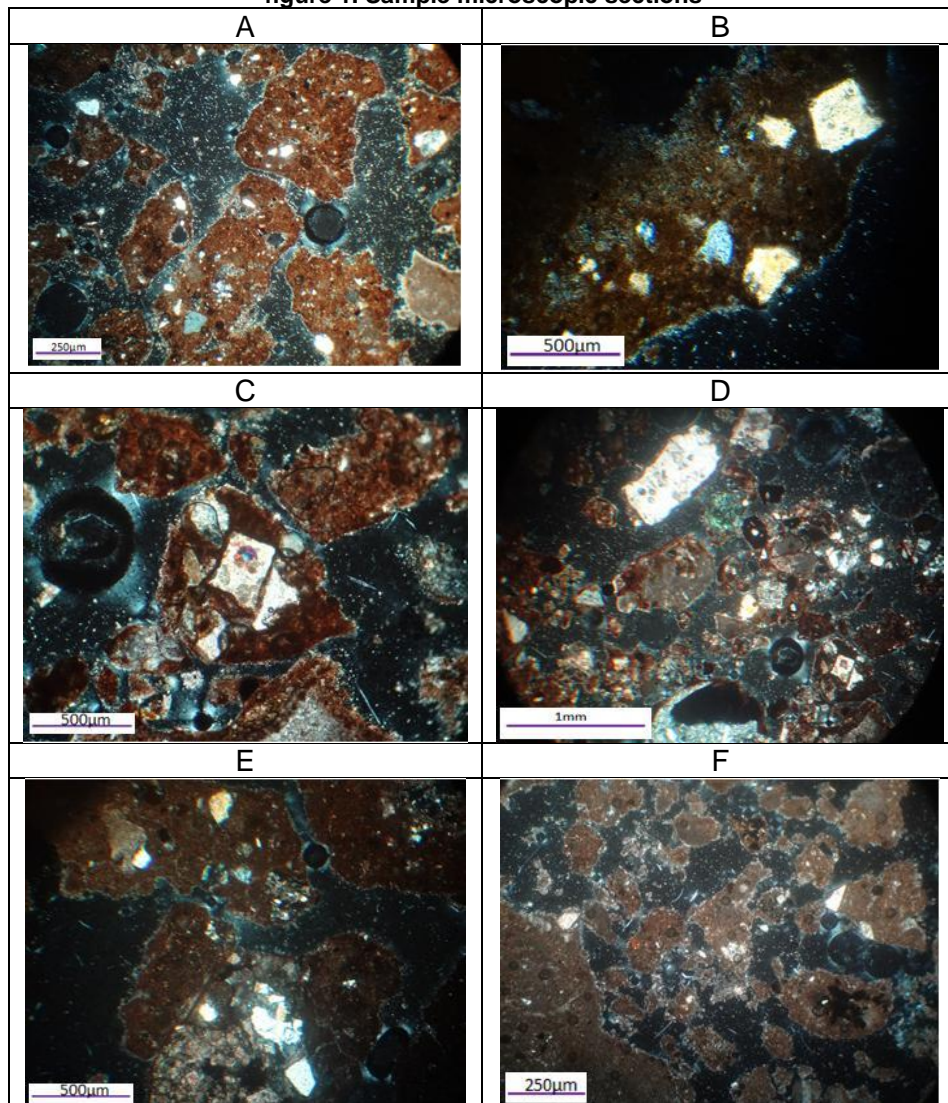
Methodology The materials we used include Topographical map (1:25000) and (1:5000), geological map (1:100000), elevation data of Aster, field research. At first, the cirques were detected based on field research and Topographical maps. Then the snow-line in the last glaciation

was determined by using the Wright method. Sediment samples from the area (six sites) were used to calculate granulometry, deposition parameters and microscopy analyses. Statistics parameters were calculated by Folk method and microscopic studies on thin sections of sediments 1 mm to 0.063 micron was applied for tracking the source.

Results, Observations, Conclusions

The findings of this study revealed that out of 1.7 square kilometers development, from 1987 to 2020, Songhor city expanded to the slopes prone to instability up to 1 square kilometer. The map of slope instability potential also showed that half of the city was located in the area with high potential of slope instability. Furthermore, with respect to the physical development of Songhor to the high slopes, it is necessary to identify the areas prone to slope instability.

figure 1. Sample microscopic sections



Novel/Additive Information

Different measures have been applied for estimating the snow line in the last glacial period of Dalakhani basin. Additionally, challenges of physical development of Songhor city by glacial sediments and instability have been identified. This research has greatly helped to reduce environmental disasters.

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