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# Development of an Application for Monitoring and Analyzing the Dynamics of the Tuyuk Su Mountain Glacier

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- I. Introduction
- II. Methodology
- III. Results and Discussion
- IV. Conclusion

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##### Abstract:

The Tuyuk Su glacier is a source of fresh water and is of crucial importance for the Almaty region from both an environmental and social point of view. However, the Tuyuk Su glacier continues to shrink at an alarming rate, and this will reduce the inflow of fresh water. This article presents an application for monitoring this glacier. Our approach is based on digital mapping from Landsat 7 and 8 satellite images. Remote sensing allows estimation of parameters such as snow cover, glacier height and ice index on large geographic and temporal scales. Tabular data on the area of the glacier and the balance of snowfall and melting on the glacier are also given. The result is published in a web application that allows you to visualize, select the desired boundaries of the glacier and build a graph based on the received data. The application is not yet able to automatically select the desired areas of the glacier, so the polygon tool is used here. With the help of the Timelapse tool in the application, an animated visualization of the change in the glacier has been added, which once again confirms the reduction of the glacier every year.

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## I. Introduction

Monitoring of glaciers using remote sensing is the key to environmental monitoring of the Tuyuksu glacier in the Almaty region. Glaciers are a source of fresh water and are of crucial importance for the Almaty region from both environmental and social points of view [1]. However, glaciers continue to shrink at an alarming rate, and this may [Sign in to Continue Reading](#) lead to a decrease in fresh water resources. This issue requires effective and efficient methods of observing and delimiting glaciers in order to track changes and plan for the systematic management of water resources and glacier-related hazards in order to prevent risks.

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