GLOFCA
GLACIER LAKE OUTBURST FLOODS IN CENTRAL ASIA

University of Zurich[UZH]

unesco

ADAPTATION FUND

GLOF and debris flow Early Warning System in the Talgar catchment, Kazak Republic

CONCEPT for PRELIMINARY PLAN

Context

In the framework of the project GLOFCA on "Reducing vulnerabilities of populations in the Central Asia region from glacier lake outburst floods in a changing climate", funded by the Adaptation Fund and implemented by UNESCO and the University of Zurich, four Early Warning Systems (EWS) will be designed and implemented in Central Asia. These EWS are planned to mitigate the risks related to glacier lake outburst floods at four pilot sites in the Republics of Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan.

Figure 1: Key elements of Early Warning Systems (UNDP, 2018)

The EWSs developed at the pilot sites are expected to act as a proof of concept for future scaling of the developed institutional and technical solutions developed within the project. GLOFCA understands an EWS in a holistic manner and according to international standards, including all its components, namely: risk knowledge, monitoring and warning service, dissemination and communication, and response capability.

This document describes the concept of the EWS in the Talgar catchment in the Kazakh Republic.

Purpose

The main purpose of the Talgar GLOF and debris flow EWS is to provide timely warning in the form of alarms to the exposed population. To achieve this goal, GLOFs and debris flows in the Talgar catchment need to be detected reliably, warning and alarms need to be disseminated via suitable channels and media to reach all exposed persons, and effective response needs to be achieved by a suitable information and communication concept. This concept it therefore structured along the four key elements of EWS.

Planned Monitoring and alarming

Monitoring Stations

In the following, we illustrate the proposed EWS plan for the Talgar catchment. In Fig. 2 we give an overview all the valley scale. Later on, we provide some detailed information about the single stations.

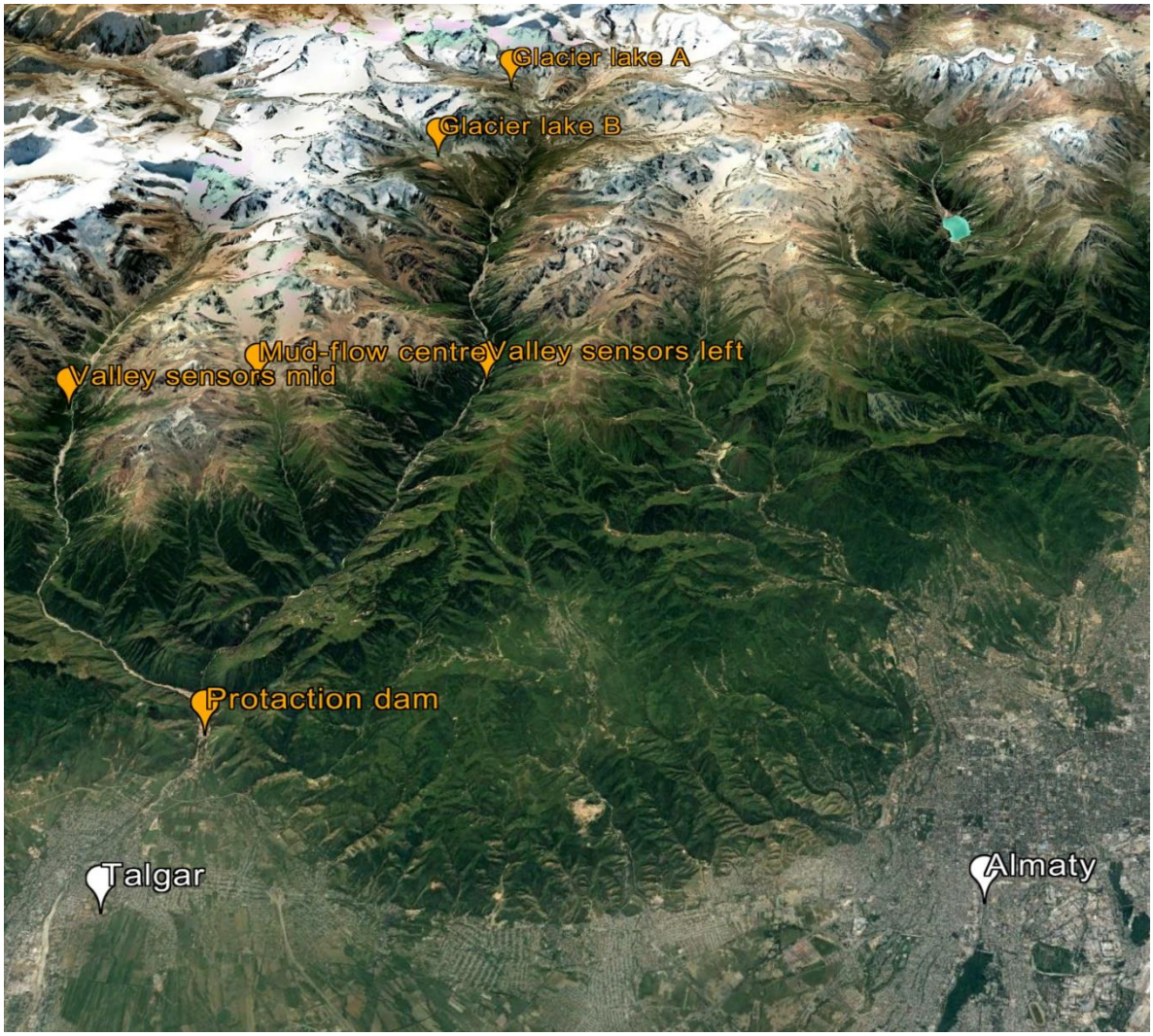
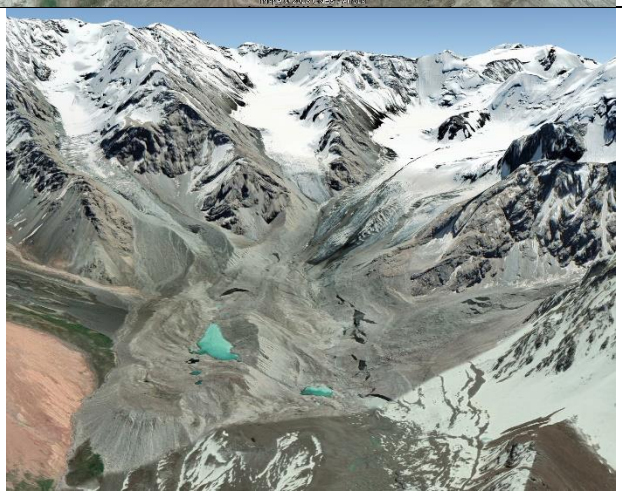
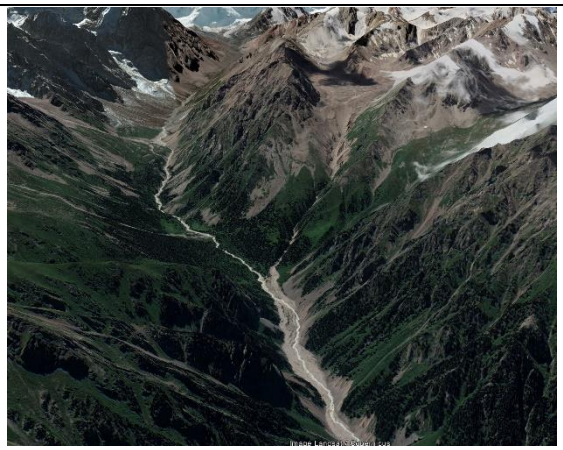


Figure 2: Map with the preliminary locations of the sensors for the Early Warning System.

Image	Description
	**Glacier lake A (lake number 8)** **Measures water level and visual check on the process** Monitoring camera (1 s/d) or video when triggered Trigger lines in the river bed Communication with radio. This location is already served by a hydro-post.
	**Glacier lake B (lake number 19)** **Measures water level and visual check on the process** Monitoring camera (1 s/d) or video when triggered Trigger lines in the river bed Communication with radio. This location is currently not monitored.
	**Valley sensor left (Left Talgar)** **Measures water pressure and seismic signal of large boulders** Piezometers on large boulder(s) Geophones for passive seismic Includes multiple catchments Monitoring camera (1 s/d) or video when triggered (automatically switch on|off)



Valley sensor right (Mid Talgar)
Measures water pressure and seismic signal of large boulders
Piezometers on large boulder(s)
Geophones for passive seismic
Includes multiple catchments
Monitoring camera (1 s/d) or video when triggered (automatically switch on|off)

Allarming at Talgar protection dam
Check for permission and feasibility. Probably not automatic alarming, but manual control of data and alarm (check already existing protocols). The local natural hazard experts should get a message.

Communication
One or two relay stations for radio communication might be needed. This has to be designed in combination with the network for the other hydro-posts of Kazselezashita.

Dissemination and communication

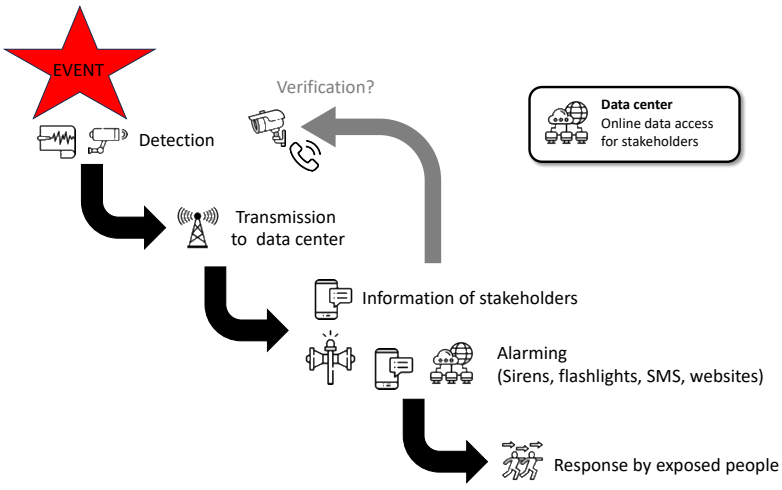


Figure 2: Conceptual event detection and alarming strategy

Data processing and handling
Still to be designed.

Warning and alarming services
Still to be designed.

Responsibilities and protocol
Still to be designed.

Response capacity
Evacuation routes and save havens
Still to be designed.

Information of exposed people
Still to be designed.