

Historical telecommunication in the Hindukush-Karakoram-Himalayas: An ancient early warning system for glacier lake outbursts

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Mountain societies are in a crucial transition phase in terms of the management of natural hazards. Advances in geographic technologies, such as a variety of remote-sensing tools and mobile communication systems, have drastically changed the way of early warning methods in difficult accessible high mountain environments compared to those of ancient times. In order to implement new natural hazard policies, it is essential to unravel the traditional ways of disaster management which is presented here by a case study from the Hindukush-Karakoram-Himalayas.

In the rugged relief of the Himalaya Region, the exchange of information was a labor-intensive and time-consuming task for remote high mountain villages before the infrastructural development and the introduction of modern communication systems. Therefore, early warning of natural hazards with long run-out distances seems to have been rather impossible. However, in the present study a historical optical long-distance and fast operating communication system over horizontal distances of several hundred kilometers was discovered during field investigations in the Hindukush-Karakoram and the transmission paths reconstructed in the following years. The so called Puberanch-system relied on a chain of fire signals as used by ancient societies in other mountain and coastal environments in the world. It was originally in use for the alert against war attacks from hostile neighboring communities. Later on, it served as an early warning system for glacier lake outbursts, which have been in the end of the 19th century and beginning of the 20th century one of the most devastating natural hazards in the region. Remarkable is the fact that fire posts were located in extremely harsh environments at altitudes above 4000 m requiring a highly sophisticated supply system of fire wood and food. Interviews with local inhabitants, the evaluation of historical travel records and international newspapers proved, that the system has been operated in the entire Hindukush-Karakoram Region including Ladakh. The locations of selected signal fire signal chains have been reconstructed for the Valleys of Shimshal, Karambar and Rupal.

Natural hazard management is increasingly dominated by external technological and cost-intensive approaches in the Himalayas. Local traditional knowledge and practical expertise may be given up without an alternative plan for hazard management. Thus, the intervention from external side in traditional mountain societies and the implementation of distinct security expectations has to be well considered at the long-term.