

Technical Notes

Debris Flows of the Tunkinsky Goltsy Mountains (Tunkinsky District, Republic of Buryatia in Eastern Siberia)

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Abstract: On the night of June 28, 2014, near the village of Arshan in Tunkinsky district, Republic of Buryatia in eastern Siberia, two types of debris flows were formed as a result of intense storm precipitation: 1) debris floods along the river Kyngarga; 2) debris flows along the valleys originating from the cirques of the southern slope of the Tunkinsky Goltsy range, which went in the south-west direction towards the village. A year later, July 14, 2015, in the village of Arshan a debris flood occurred in the river Kyngarga. During the Holocene debris flows have occurred repeatedly, traces of which are seen in the sections of loose deposits. Their age was defined with the help of radiocarbon analysis of buried soil horizons. A historical analysis of debris flow activity on the territory for more than a century was made using published scientific works. Natural factors for the formation of debris flow situation were considered (synoptic and climatic conditions, hydrology, geology and landscape structure were evaluated). Reasons for the most recent debris flows were defined. A detailed analysis was given of the valleys of a number of rivers where results of debris flows were the most destructive. As a result of the debris flow along the river Kharimta, realignment of the river network took place. Consequences of debris flows for the natural environment and infrastructure of the village of Arshan were evaluated. It is considered that the partial destruction of the village of Arshan is a distinct possibility in the near future due to debris flows from cirque #1.

Keywords: debris flow, soil avalanchings, kars (cirques), radiocarbon age, Holocene, Tunkinsky Goltsy Mountains, Arshan village

1 Introduction

The areas of intensive development of debris flows, the main factors of their formation and distribution are presented in the articles of Siberian scientists (USSR Academy of Sciences 1963, Astrakhantsev and Ivanov 1964, Astrakhantsev and Budz 1966, Budz 1969). The most thorough study of debris flows identified the geological, geomorphological and hydro-meteorological factors and conditions of formation of debris flows (USSR Academy of

Sciences 1963). The methodological basis for the study of debris flows in the mountains south of eastern Siberia was established by Astrakhantsev and Budz (1962).

In recent decades, the study of debris flows has focused on the mechanisms of their formation in the conditions of intense torrential rainfall, in particular with the use of instrumental measurements and modeling techniques (Takahashi 1981, Anderson and Sitar 1995, Iverson et al 1997, Berti et al 1999, Jakob and Hungr 2005, Sassa and Wang 2005, Gregoratti

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