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## GEOMORPHOLOGICAL INDICATIONS OF HAZARDOUS PHENOMENA IN THE BAIKAL RIFT ZONE (\*\*)

**Abstract:** UFIMTSEV G.F., *Geomorphological indications of hazardous phenomena in the Baikal rift zone.*

In the marginal sections of the Baikal rift zone, some landforms produced by natural disasters are identified. Most of them have seismic origins. Pure tectonic landforms are piedmont scarps and trenches. They originate during seismic rejuvenations of faults at the rift valley slopes. In the subsurface segments of the young faults high-grade tectonic disintegration of rocks is observed. Therefore seismogenic trenches and scarps are accompanied by great rock falls, rock slides and gravity faults. Geomorphological indications of high-grade disintegration of rocks in the zones of young faults are badlands and rock streams.

In the Barguzin rift valley traces of major outbursts of rock material from the ridge along the valleys of large rivers are revealed. These are aggregations of angular blocks in the marginal parts of the depressions near the mouths of the large valleys. Near the basin slopes they are represented by compact heaps of boulder. The sizes of individual boulders amount to 200 m<sup>3</sup> and over. At a distance from the mountains their scatter over the surface of the piedmont fans is observed. Evidently, quick outbursts of large volumes of rock material into the basin occurred after the destruction and collapse of landslide dams which barred the valleys during earthquakes.

**KEY WORDS:** Geomorphological hazard, Morphotectonics, Baikal rift zone, East Siberia.

**Riassunto:** UFIMTSEV G.F., *Indizi geomorfologici di fenomeni di rischio nella fossa tettonica del Baikal.*

Nelle zone periferiche della fossa tettonica del Baikal si trovano morfologie prodotte da disastri naturali. Di solito esse hanno un'origine sismica. Morfologie strutturali sono le scarpate pedemontane e i solchi che si originano presso i versanti della fossa durante il ringiovanimento sismico di faglie. Sono state osservate anche forti demolizioni di rocce presso le faglie recenti; così i solchi sismogenetici e le scarpate sono accompagnate da grandi frane. Indicazioni della degradazione del rilievo nelle zone delle faglie recenti sono le colate di detrito sui versanti e i calanchi.

Nella fossa di Barguzin sono state osservate tracce di grandi cadute di materiale roccioso lungo le valli dei fiumi. Si tratta di ammassi di blocchi spigolosi di roccia situati nelle parti marginali della depressione presso lo sbocco delle valli. Le dimensioni dei singoli blocchi variano fino 200 m<sup>3</sup> e oltre. Ad una certa distanza dai versanti si osserva la loro sovrapposizione ai mantelli alluvionali pedemontani. Evidentemente il franamento di queste grandi quantità di materiale nel bacino si verificò dopo il collasso e le frane che avevano sbarrato le valli durante i terremoti.

**TERMINI CHIAVE:** Rischio geomorfologico, Morfotettonica, Fossa tettonica del Baikal, Siberia Orientale.

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### INTRODUCTION

The slopes and marginal segments of the rift valleys of southern East Siberia (Baikal rift zone) display the results of many different hazardous processes associated with mountainous relief. The period of obtaining the information on these processes is rather short (no more than 300 years). That is why in geological and geomorphological studies of the region attention is concentrated upon the geomorphological evidence of their previous occurrence. Special methods are developed, e.g. the paleoseismogeological method of predicting the seismic regime based on investigation of the effects of prehistoric earthquakes (FLORENCOV, 1960; SOLONENKO, 1962).

### FACTORS OF MANIFESTATIONS OF HAZARDOUS PROCESSES

Two factors produce manifestations of hazardous geomorphological processes on the slopes and in the margins of the rift valleys of the Baikal rift zone. Seismic activity of the region is the first one. Strong earthquakes result in instantaneous tectonic deformations of the landforms, and high seismic background evidently stimulates movement of loose weathering products on inclined surfaces. That is why on the steep basal facets of the fault scarp on the rift valley slopes the thickness of the slope sediments often amounts to many tens of metres.

The second factor is increasing disintegration of the bedrock in the subsurface portions of the zones of young faults limiting the rift valleys. The young faults usually develop within the wide zones of ancient (Precambrian) faults and therefore they include tectonics of several generations. Among the fault zones tabular blocks of rocks cut by fissures are distributed. In the mountainous relief strong tectonic disintegration of bedrock on the marginal tectonic scarps result in formation of numerous rock and debris slopes located lower. We call such areas «rocky badlands» (figg. 1, 2).