

Geographical Features of Technogenic Landslides

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Technogenic landslides are processes developed under the combined influence of natural and human (anthropogenic) factors, which significantly change the geomorphological appearance of the environment and create ecological risks. A particularly striking example of this process in Georgia is the Chiatura region, where the extraction of manganese over many years has become the cause of large-scale terrain transformation and the intensification of landslide processes.

Several main factors affect the spread of landslides: geological structure, hydrogeological conditions, slope, amount of atmospheric precipitation, and human mining and agricultural activities. In Chiatura, all these factors coincide with each other, which leads to the intensification of processes.

Both underground and open-pit methods are used in manganese extraction. Underground mining leads to tunnel collapse, surface erosion and landslides. In Chiatura, more than 200 km of tunnels have been documented, which in many cases are no longer reinforced, creating a source for landslide events. One of the most active areas is the Itkhvisi Plateau, where multi-stage landslides are in constant motion, especially during the rainy period. An additional problem is the placement of “waste” rocks – more than 6 million tons of mass are concentrated on 18 hectares, which leads to a change in the terrain and an impact on the vegetation cover. Groundwater pollution, activation of karst processes and the impact of atmospheric factors create a complex ecological threat. It is also noteworthy that the Chiatura region is populated by approximately 30,000 people and one city and about 20 villages are located in the active landslide zone. Therefore, it is necessary to strengthen geoecological monitoring, land reclamation, and implement modern nature protection measures.

The example of Chiatura clearly shows how large-scale the impact of technogenic landslides on the environment and society can be. A complex approach is needed to reduce risks and restore the degraded environment.