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Intensity of geomorphological processes in NW sector of Pacific rim marginal mountain belts

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Continental marginal mountains, including the mountain belts of Russian Far East, are characterized by supreme terrain contrast, mosaic structure of surface and crust, and rich complex of modern endogenous processes – volcanism, seismicity, and vertical movements. Unstable state of geomorphological systems and activity of relief forming processes here is caused also by deep dissected topography and the type and amount of precipitation. Human activities further stimulate natural processes and increase the risk of local disasters. So these territories have high intensity (or tension) of geomorphological processes. Intensity in the authors' understanding is willingness of geomorphological system to be out of balance, risk of disaster under external and internal agent, both natural and human.

Mapping with quantitative accounting of intensity of natural and human potential impact is necessary for indication the areal distribution trends of geomorphological processes intensity and zones of potential risk of disasters. Methods of map drowning up are based on several criteria analyzing: 1) total terrain-form processes and their willingness to be a hazard-like, 2) existence, peculiarity and zoning of external agents which could cause extreme character of base processes within the territory, 3) peculiarity of terrain morphology which could cause hazard way of terrain-form processes.

Seismic activity is one of the most important factors causing activation of geomorphological processes and contributing to the risk of dangerous situations. Earthquake even small force can provoke many catastrophic processes: landslides, mudslides, avalanches and mudflows, tsunami and others. Seismic gravitational phenomenons of different scale accompany almost all earthquakes of intensity 7-8 points and above, and some processes, such as avalanches, activated by seismic shocks intensity about 1-3 points. In this regard, we consider it important selection of high intensity seismic zones in marginal-continental mountain systems and also offer to give them extra points of tension, the number of which increases depending on the strength of the shock. Such approach allows to identify clearly the most potentially hazardous areas where there may be various, sometimes unpredictable scale catastrophic processes, provoked intense underground tremors. We also consider the impact of the depth of topography dissection and the total amount of precipitation. The marginal-continental mountain systems have often radically different moistening of coastal and inland slopes. And this difference can be 500, 1000 mm and more, that, undoubtedly, affects the course and intensity of geomorphological processes on slopes of different exposures.

The total evaluation of intensity of geomorphologic processes exceeding 15 points is considered to be potentially catastrophic. At 10-15 points tension geomorphologic processes is extremely high, and at 5-10 points - high, less than 5 points - low. The maps of the key areas of the Russian Far East - Kamchatka and the north of Kuril Islands, Sakhalin and the Western Okhotsk region were compiled. These areas have differences in geodynamic regimes, landscape-climatic and anthropogenic conditions and highly significant in relation to the differentiated estimation of geomorphologic tension. The growth of intensity of geomorphological processes toward the Pacific Ocean was recorded: from 7-10 points in Western Okhotsk region to 10-13 at Sakhalin and to 13-15 points for Kamchatka.