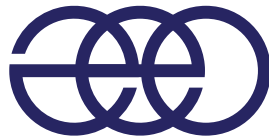**INSTITUTE OF GEOGRAPHY**
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PRACTICAL GEOGRAPHY AND XXI CENTURY CHALLENGES

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CURRENT DYNAMICS OF LOW-MOUNTAIN LANDSCAPES IN THE RUSSIAN ALTAI UNDER CLIMATE CHANGE AND ANTHROPOGENIC IMPACT (THE MAIMA RIVER BASIN AS A CASE STUDY)

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The Maima river basin (776.5 km^2) is a key model territory for low-mountain landscapes, which occupy more than 90% of its area. The basin is located in the Northern (69.6%) and North-Eastern Altai (30.4%) physical-geographical provinces (Chernykh, Samoylova, 2011) and includes the largest agglomeration in the Russian Altai (Gorno-Altaisk town, Maima and Kyzyl-Ozek villages). In the basin, there are a hydrometeorological station Kyzyl-Ozek (average annual precipitation – 799.7 mm, evaporation – 533.5 mm) and a gauge station Maima.

According to the modern landscapes map (scale 1:100 000), transformed landscapes occupy 6.8% of the basin: mono-species tree plantings – 1.5%; arable lands – 1.2%, buildings – 4.1%.

The dynamics of a land cover was studied using the Landsat images for 3 time slices (1976, 2001, 2016) and 4 types of land cover, i.e. water body, arable lands and settlements, forests and natural herbal community. Over the past 40 years, forests area has decreased by 13.6% (105.4 km^2). In the Northern Altai, forests area in the expositional forest-steppe was reduced by 22.4% (15.7 km^2), in subtaiga and mountain taiga – by 16.6% (77.8 km^2), in the North-Eastern Altai chern and mountain taiga – by 5.5% (11.9 km^2). Most forests have turned into natural herbal communities. The area of water bodies has slightly decreased, while that of settlements and arable lands has increased.

To analyze the atmospheric humidification, the drought index Si (Ped, 1975) was used. In 1940/41–1976/77, 8 years (22%) were humidified: 7 "excessively humidified" (Si$\leq$ -2.0) and 1 "humidified" (Si$\leq$ -1.5). The "drought" (Si$\geq$ 2.0) was only in 1961/62. In 1977/78–2013/2014,

there were 10 (27%) "dry" years: "drought" – 7 and "droughty" (Si≥ 1.5) – 3. "Excessively humidified" year was only in 1984/85. In 1940/41–1976/77, the average annual water flow made up $\bar{Q}$=8.8 m³/s, and in 1977/78–2013/14 – $\bar{Q}$=8,1 m³/s. In 1940/41–1976/77, there were 3 extremely high-water (10% flow probability, 1946/47, 1957/58, 1968/69) and 3 extremely low-water (90% flow probability, 1962/63, 1963/64, 1967/68) years. In 1977/78–2013/14, there were 4 extremely high-water (1983/84, 1992/93, 1994/95, 2013/14) and 4 extremely low-water (1997/98, 2006/07, 2007/08, 2011/12) years.