

GIANT CURRENT RIPPLE MARKS (DIAGNOSTICS AND PALAEOGEOGRAPHIC SIGNIFICANCE)

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In the 40s of the last century some new geomorphologic forms were discovered in North America (J. Pardee) and in the 80s – in Eurasia (V.V. Butvilovsky, A.N. Rudoy), they were called “giant current ripples”. Their development was associated with the processes which had occurred within the outflow channels during cataclysmic glacial superfloods – floodstreams (diluvial floods) resulted from the outthrows of great Late-Pleistocene ice-dammed lakes. Giant current ripple marks – are active channel relief forms which developed on the near-talweg areas of the pre-core parts of main valleys of cataclysmic outflows out of the outburst water bodies, the latter being of the ice-dammed origin, as a rule (A.N. Rudoy). These marks are morphologic and genetic macroanalogues of small sand ripples in the contemporary streams and rivers, but they are by two-three orders bigger in dimensions and are formed with boulders and pebbles with minor participation of smaller fractions.

The relief of giant current ripples serves very often as the basis for hydraulic reconstructions (work by V.R. Baker and P.A. Carling), which enable calculation of discharges, velocities and depths of the water streams across the ripple fields. The outcomes of these calculations do not reflect the maximal values of chief parameters of superfloods (these values are achieved at the channel lines within narrower parts of the channels, i.e. – within gorges where no ripples are formed, but the destructive flood activity predominates). These outcomes, however, give a notion of the grandiosity of water-glacial cataclysms (discharges of the floodstreams in the Altai over the fields of giant current ripples, according to V.R.

Baker and P.A. Carling, would exceed a half million cubic meters per second).

At the boundary of the 20th-21st centuries the publication activity of the opponent of the diluvial origin of giant current ripples became very active. Reports and papers which appeared at the time inherited to a certain extent the opinion of B.A. Borisov who had always written that the ridged relief in the mountains of the southern framing of the USSR was ribbed moraines. But practically at the same time these works suggested some different, frequently polar with the same authors, hypotheses. In particular, some opinions were expressed, that the current ripples in the Kuray basin are: 1) inversional marginal intraglacial water-ice relief (Okishev, the 70s); 2) small-ridged, polyridged ribbed moraines (Okishev, the 80s); 3) tectogenic relief (Okishev, beginning of the 21st century, together with A.V. Pozniakov); 4) cryogenic relief (Okishev, beginning of the 21st century, together with A.V. Pozniakov); 5) no ripples but something from the things mentioned above (Baryshnikov and others, beginning of the 21st century). Giant current ripples at the site of Platovo-Podgornoye settlements at the Altai foothills are 1) “megarifels” (Okishev, 1980s); 2) giant current ripples (G. Ja. Baryshnikov, the 90s); 3) ravines (D.A. Timofeev, beginning of the 21st century, oral report). These and some other authors, who published all these intercontradicting hypotheses, do not, nevertheless, polemize with each other, and, moreover, do not argue with themselves. For that, they all together appose the diluvial origin of giant current ripple marks polimizing furiously and originally with the authors of the diluvial theory.

Meanwhile, both in America and Russia the structure and morphology of this relief have been studied rather well. The very fact of the presence of the giant current ripple relief in the river valleys, on the one hand, enables reconstruction of the water-glacial events at the upper reaches of the rivers and their dating to some extent. On the other hand, it gives the opportunity assembled with other types and forms of the diluvial morpholithocomplex to restore the hydraulic parameters of the water

streams and to estimate the geologic role of cataclysmic processes, which had been caused by climatic alterations, glacial dynamics, transgressions of the lakes and outbursts of the latter, in the formation of the contemporary surface of the dry land.

The report presents diagnostics of the giant current ripples according to their morphology and structure on the basis of the well-studied locations of the relief in different regions of the world.