Information of bedload is widely required for purposes of infrastructure design within river channels and valleys, mainly dredging, navigation safety, water intake facilities and pipeline crossings. Over 200 empirical equations are derived to estimate bedload, each having its errors and use limitations. In this paper, N.I. Alexeevsky method (based on quantification of dune migration) is employed to estimate bedload for 27 cross-sections on the rivers of Russian Arctic.

According to quantitative estimates, Lena River provides major input to the Arctic Basin, amounting to over 15 mln t/year. For smaller rivers of comparable order, a higher bedload is observed in Verkhoyansk-Kolyma Mountains, while it is lower for the regions of Arctic Plains and Western Yakutia.

Most bedload migrates through cross-section during spring freshet, with up to 75-80% in Western Yakutia, and around 50% in the Verkhoyansk region, where summer precipitation is abundant, causing high rain floods.

Fraction of bedload in total load is also spatially distributed. On plains it generally equals 5-15% (Arctic Plains with silty, cryodisturbed soils). Only large rivers with braided channel pattern have bedload fraction value of about 35-50%. High sediment size and density within mountainous areas cause bedload fraction rise up to 70-80%.

This research outlined a distinct difference of bedload features within the Russian Arctic, linked them with regional permafrost conditions following geocryological sectoriality. Correlative analysis revealed a log-linear link between quantitative bedload features and mean annual water discharges. Derived equations, respectively regionalized, can be used for bedload estimation in ungauged basins of the Russian Arctic.