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Changeability of intra-annual unevenness of runoff, erosion and suspended sediment yield in river basins of East Europe

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The some spatial regularities of the intra-annual unevenness of runoff (R) and suspended sediment yield (SSY) (the natural zonality, dependences on a degree of agricultural activity (a portion of woodiness or cultivated areas), dependences on a river basin area and absolute mean height etc.) in river basins of East Europe (basins of Volga, Don and Ural) have been determined. They are based on analysis of the long-term series of observations (the 1940-1980s) for runoff and suspended sediment yield in 115 basins of small (with areas less 5 000 km^2 – azonal basins) and medium (with areas from 5 001 to 35 000 km^2 – zonal basins) rivers (on materials of Hydro-Meteorological Service of the former Soviet Union) with different landscape-climatic conditions (a zone of taiga and mixed forests (34 basins), a zone of broad-leaved forests (26 basins), a zone of forest-steppes (21 basins), a zone of steppes (25 basins), a zone of semi-deserts (9 basins)). Total area of all river basins is 777 956 km^2. The average duration of observations for SSY is 18 years (76 basins – 11-20 years, 33 basins – 21-30 years, 6 basins – 31-40 years). Main parameters of intra-annual unevenness were chosen:

- the average long-term ratio between maximum and minimum monthly values of runoff (max/min(R)) and suspended sediment yield (max/min(SSY));

- the average long-term ratio between the maximum monthly value and annual norm value of runoff (max/N(R)) and suspended sediment yield (max/N(SSY));

- the average long-term ratio between annual norm value and minimum monthly value of runoff (N/min(R)) and suspended sediment yield (N/min(SSY));

- portions of maximum and minimum monthly values of runoff and suspended

sediment yield in its total annual values (P_{max}(R) and P_{min}(R), P_{max}(SSY) and P_{min}(SSY) respectively);

- ratio between river-bed and basin types of erosion in different natural and anthropogenic conditions.

Dimensionless of these parameters allows uniform approach for characteristics of some spatial regularities of intra-annual unevenness of runoff and suspended sediment yield.

Some geomorphic aspects of this changeability and approaches for improvement of eco-geomorphic situation in this region during XXI century are considered in the Paper.