Geophysical Research Abstracts
Vol. 12, EGU2010-4296, 2010
EGU General Assembly 2010

Modeling of matters removal from swampy catchment

N.G. Inishev (1) and L.I. Inisheva (2)

(1) Tomsk State University, Tomsk, Russia, (2) Tomsk State Pedagogical University,Tomsk, Russia, inisheva@mail.ru

This work shows the results of fixed study of geochemical conditions in the system of landscape oligotrophic profile at Vasyugan mire spurs, and also we make an approach to processes modelling of compounds removal from swampy catchment.

During investigation of symbolic model of chemical matters removal from the surface of a catchment basin and their movement along the channel network it was taken into account that removal of chemical elements during the period of spring flood and rain high waters occur mainly with overland flow.

During calculation of dissolved matters movement the following admissions take place: 1. The problem is solved at one-dimension set-up. Concentration of investigated components is taken as averaged one along the flow cross section or effective area of slope cross-section for overland runoff, i.e. it changes only lengthways and in time. 2. It is considered that dissolved matters spread due to movement of water and together with its particles. 3. Processes of water self-clarification are not considered.

The model is calculated on the basis of discharge of the investigated ingredient, i.e. matter mass moving through the given flow cross-section into time unit. This is the peculiarity of the model. Matter removal together with water flow is determined if necessary. Everyday impurity consumptions and its concentration can be estimated at the outlet at the moment of time according to convolution integral.

Estimation of overland runoff and water inflow into the channel network is based on the mathematic model of outflow formation from peatland areas which considers basic processes carrying out at catchment and basin channel network.

Stored moisture estimation of snow cover is taken according to snow survey data before snow melting. Everyday water supply to the surface of water collection was determined according to the results of snow melt intensity estimation by the methods of temperature coefficient and water yield from snow (A.G. Kovzel). All the estimations were made taking into account layering unevenness of snow cover in deferent landscapes. Stored water distribution in the limits of every landscape was approximated by the curve of gamma distribution with parameters which are the results of snow survey.

Everyday basin water yield was determined as difference between excesses of water coming above usage for filling of its water retaining tank. The size of the water retaining tank before start of snow melting depends on the basin wetting in the previous autumn. Autumn river flow is taken as a degree of water retaining tank filling before the snow melt. It is supposed that there is a process of water accumulation at slopes. Between theses water supplies and overland runoffs there is a nonlinear link. Temporary melt water detention, which comes from mire in swamp forest, is considered. Estimations are made individually for field, forest and swamp parts of the basin of the river Kljuch.

Estimation of HA removal from the surface of catchment of the river Kljuch is taken as an example of model application. The results reveal possibilities of the given approach to modeling of dissolved matters removal from the swampy area.

Acknowledgements: This research was supported by RFFR (No.No. 09-05-00235, 09-05-99007), Minister of education and science (No. 02.740.11.0325).