



Modeling of the spatial distribution of precipitation and using of satellite systems «GRACE» in hydrological studies

Alexander Onuchin and Anastasia Musokhranova

Sukachev Institute of Forest, Siberian Branch, Russian Academy of Sciences, Krasnoyarsk, Russian Federation

The precipitation dynamics was studied in the zone of the atmospheric pollution of the Noril'sk Mining and Smelting Complex (from west to east from 88°-101° E, and from north to south - from 58° -72°). N. The total monthly precipitation as derived from the data of 11 meteorological stations for the period from 1955 to 2009 was used for the analysis.

The precipitation being one of the major water balance components affect the hydrological regime of the territory, as well as the state and functioning of ecosystems. The precipitation formation is a complex process depending on many factors. The most important ones are the water content and the temperature of the air mass and the peculiarities of vertical air motion.

The cyclogenesis and the forced upward movement of air masses meeting the orographic barriers cause the precipitation. The type of the spatiotemporal distribution of precipitation is caused by the interaction between these two components (the first one is temporally dynamic and the second one, especially in the mountains, is quite spatially variable).

For study area were obtained mathematical models which show the relationship background of snow with the amount of solid precipitation on representative meteorological stations and characterize the features of the distribution of solid precipitation in the study area based on geographical coordinates, altitude and terrain parameters that determine the barrier shade effects.

The specificity of the natural conditions of formation of water resources and the hydrological regime of rivers in study area requires special methods for studying them. In the study of the dynamics of moisture content in the active layer a promising direction is the use of satellite systems «GRACE» (Gravity Recovery and Climate Experiment).

Developed methodological approaches to the assessment snow pack according to GRACE, along with data on the value of solid precipitation at representative weather stations the data on snow pack received as a result of snow measurements were involved. Attempt to identify the correlation of GRACE data with snow pack and solid precipitation was made.