



THE LONG-TERM VARIATIONS OF THE HEAT RUNOFF IN THE RIVER NEMUNAS

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ABSTRACT

The heat runoff is a process of heat transfer in the river water. Heat runoff, as a synthetic measure of discharge and water temperature, is useful to define the characteristics of a watershed's response to climate change. It depends on the water abundance and the water temperature of the river and varies depending on the season and the river hydrological regime. The hydrographical network structure determines the changes of heat runoff along the river. Heat runoff of the river has a particularly strong influence on the formation of the ice-thermal regime in the lower reaches of rivers below the dams. The heat runoff of Lithuanian rivers has not been investigated at all. River water runoff was investigated quite well, but another component - the water thermal regime of rivers has not been sufficiently investigated. The aim of this work is to assess the heat runoff and the character of its temporal variation in the river Nemunas. In this paper, the average monthly and warm season (May-October) data of water discharge and water temperature were used for the period of 1945-2010. Data of 4 water gauging stations (WGS) of the river Nemunas were used. The heat runoff was calculated and its changes over the basin were evaluated. During the warm season the most intensive hydrological and biological processes occur in the water bodies. Relations between heat runoff of the river Nemunas and its water temperature and water discharge values were analyzed. Reliable correlations of these parameters were obtained. Long-term and along-the-course changes of heat runoff of the river Nemunas were studied, and the impact of natural and anthropogenic factors on the heat runoff was revealed.

Keywords: river, heat runoff, water temperature, water discharge