



## **Modelling hydrological processes at different scales across Russian permafrost domain**

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The project aims to study the interactions between permafrost and runoff generation processes across Russian Arctic domain based on hydrological modelling. The uniqueness of the approach is a unified modelling framework which allows for coupled simulations of upper permafrost dynamics and streamflow generation at different scales (from soil column to large watersheds).

The base of the project is hydrological model Hydrograph (Vinogradov et al. 2011, Semenova et al. 2013, 2015; Lebedeva et al., 2015). The model algorithms combine physically-based and conceptual approaches for the description of land hydrological cycle processes, which allows for maintaining a balance between the complexity of model design and the use of limited input information. The method for modeling heat dynamics in soil is integrated into the model.

Main parameters of the model are the physical properties of landscapes that may be measured (observed) in nature and are classified according to the types of soil, vegetation and other characteristics. A set of parameters specified in the studied catchments (basins analog) can be transferred to ungauged basins with similar types of the underlying surface without calibration.

The results of modelling from small research watersheds to large poorly gauged river basins in different climate and landscape settings of Russian Arctic (within the Yenisey, Lena, Yana, Indigirka, Kolyma rivers basins) will be presented. Based on gained experience methodological aspects of hydrological modelling approaches in permafrost environment will be discussed.

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