

## Understanding and the modeling of hydrological processes in cold region

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The cold regions of high latitude and highland are widely distributed over the Northern Hemisphere. The hydrological process of cold region is more complex compared with other areas due to the existing of snow, ice and permafrost. It has been reported that the environment in the cold region could be changed more remarkably than other regions along with global warming. Therefore, it is requested by various aspects to understand the hydrological process of the cold regions. In order to understand the regional water cycle, two methods are usually used in the field of hydrology and meteorology. One is an atmospheric method, in which general circulation models as tools of numerical weather prediction or climate simulation models are used. Another way is the hydrological method, in which some hydrological models are developed and applied to a certain river basin. To present the hydrological cycle precisely, those models also include a numerical simulation scheme of heat fluxes on the land surface based upon energy budget calculations. In the presentation, a hydrological model used in northern Eurasia regions will be introduced. The model is composed of four components: one-dimensional soil-vegetation-atmosphere transfer scheme, runoff formation model, river ice model and river routing model. Especially, the processes of snow-cover, river frozen and activity layer of permafrost are considered in order to simulate the river runoff process in cold regions. The results of the model application to large rivers, for example, the Lena River, the Selenge River and the Yellow River in northern Eurasia will be introduced in detail.