



## **Changes in state of permafrost and seasonal frosted during the 21st century as simulated by the IAP RAS climate model under the anthropogenic SRES scenarios**

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Climate model of intermediate complexity developed at the A.M.Obukhov Institute of Atmospheric Physics RAS (IAP RAS CM) is extended by a detailed module for soil thermal and hydrological processes. A set of simulations forced by the greenhouse gases and sulphate aerosol is performed with this model. For the 19th-20th centuries, these forcings are prescribed in accordance with the historical data. For the 21st century, three scenarios of anthropogenic influence are adopted in The IAP RAS CM realistically reproduces thermal and hydrological state of the northern land masses environment for the historical period. In particular, the model successfully simulates extents of permafrost and seasonally frozed ground with global values about 21 *mln km<sup>2</sup>* and 33 *mln km<sup>2</sup>*. During the 21st century, an anthropogenic warming is accompanied by a drastic shrink of the permafrost cover. Its total extent amounts 10 – 12 *mln km<sup>2</sup>* (4 – 8 *mln km<sup>2</sup>*) for years 2036–2065 (2071-2100) depending on the forcing scenario. Till the late 21st century, permafrost basically remains only in the eastern Siberia and in Tibet but with seasonal thaw depths enhanced in comparison to the present-day ones. Seasonally frozen ground expands up to 36 – 37 *mln km<sup>2</sup>* for both these time intervals.