

# **A long-term forecasting of spring catastrophic floods in Northern Asia caused by air sudden warming**

O. Pokrovsky

Main Geophysical Observatory, St. Petersburg, Russia, [pokrov@main.mgo.rssi.ru](mailto:pokrov@main.mgo.rssi.ru) / Fax +7-812-297-86-61 / Phone +7-812-297-64-43

Global warming leads to increasing of water temperature in Northern Atlantic, which in turn causes a rapid degrading of the ice extent in Eastern Arctic. Most dramatic reduction of ice sheet was observed in Kara, Laptev and East-Siberian Seas during late summer and early autumn. These changes provided a more intensive energy exchange between air and sea surface while sea surface temperature demonstrated a positive trend. Appearance of new phenomenon - the atmospheric convection over ice-free sea surface led to development of low atmospheric pressure anomaly area, which spread over most part of Northern Siberia in Septembers since the beginning of current century. It is only one part of Arctic dipole phenomenon related to appearance of two atmospheric pressure field extreme value domains of opposite signs in Eastern and in Western Arctic. Wave theory explains appearance of high atmospheric pressure domain over the same area of Northern Siberia in late winter as a reaction to atmospheric pressure disturbance occurred in late summer. Extremes in anomalies of atmospheric pressure field, which spread over large territory, prevents a normal zonal atmospheric flow across Siberia from west to east and can cause a flow of opposite direction in Eastern Siberia. Inflow of warm and humid air masses from Pacific Ocean and South-East Asia is a main reason of sudden spring warming in Eastern Siberia. It is interesting to note that in contrast to above the winter positive pressure anomaly causes a rapid cooling in Eastern Europe and in Western Siberia. Thus, suggested approach permits us to develop a physical background for a long-term forecasting model of potentially dangerous weather situations, which might be precedent to catastrophic floods at Siberian rivers. Major input data (ice extent, sea surface temperature, atmospheric pressure and wind fields) are inferred from satellite remote sensing data. This talk will be illustrated by many examples of dangerous sea surface and weather field evolving and by samples of the seasonal forecasting based on the fuzzy-neural model.