

## **B04-O09**

### **SNOW COVER IN RUSSIAN ARCTIC CITIES DUE TO CLIMATE CHANGE**

Mikhail N. Ivanov (*Lomonosov Moscow State University, Russian Federation*)

misha\_scout@mail.ru

High-latitude Arctic cities are situated in climatic polar front zone where cyclones occur often. Buildings and constructions interfere the snow-wind flow and cause excessive snowdrifts. In recent years anomaly snowfalls are more frequent as respond on the Arctic's climate change. Cities infrastructure is not ready for rapid snowiness changes that leads to the problem for population and mining companies.

Modern climatic changes lead to warming in the Arctic cities which stimulates heavy snowfalls that is familiar also to Sapporo. Analyzing the plot of the mean monthly air temperature one can trace the increase in temperature for the last decade. On Murmansk, Kirovsk, Vorkuta, Salekhard, Norilsk and other stations, the mean monthly temperature from October to April increased more than 1°C. Owing to this increase in air temperature, the precipitation increased during the last decade, especially in the winter.

A stable snow cover at Polar Circle is formed in late October – early November. In mountains it is formed earlier in accordance with the absolute height and latitude. In the second half of winter snow accumulation decreases and snow is redistributed by snowstorms. Wind plays an important role in snow accumulation. Many buildings were constructed with taking into account western wind direction. In new conditions with prevailing meridional circulation cities infrastructure promotes extreme blizzard snow accumulation. At places shadowed from wind, the snow cover thickness increases both during precipitation and in subsequent periods if the wind strength is sufficient to induce low-level snowdrifts or blizzards accompanied by ground wind. Some houses are covered by snow under third floor.

The increase in winter precipitation enhances the avalanche danger. It is important for cities situated in mountain areas (Kirovsk, Petropavlovsk Kamchatskiy, etc.). In recent years, many people deaths in small avalanches were fixed. Snow loads on roofs of buildings exceed the permissible limits, often it leads to the collapse of buildings and casualties.

Intense snow melting occurs in April or early May. Intense melting is usually associated with arrival of warm air masses and often happens rapidly and suddenly. After the beginning of melting and water infiltration, weight of snow drastically increases up to 0.55–0.65 g/cm<sup>3</sup>. Sometimes local people who are outside the city on winter track or car or skis cannot return home because snow melted or very wet.

If the current rate of climate changing is retained, anomaly solid precipitation can increase; as a result, precipitation in the form of snowfall is expected to prevail, and is expected to become more intense.