

雪氷写真館⁸⁴ モスクワの雨氷 (平成 22 年 12 月 25-26 日) /
Freezing rain in Moscow, December 25-26, 2010



Fig. 1a-c. Tree branches and plants coated in glaze ice after an ice storm in Moscow.

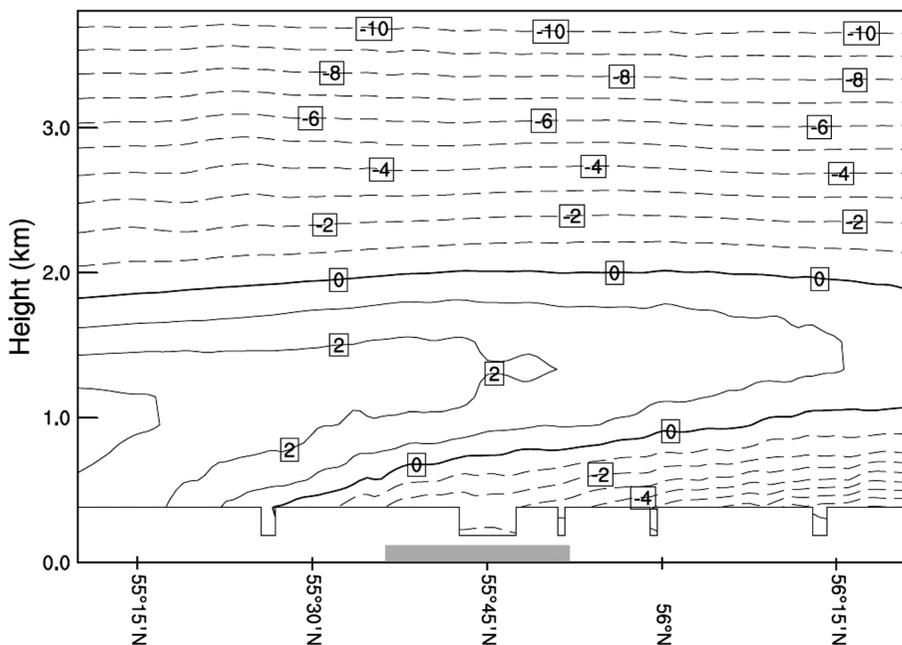


Fig. 2. Vertical cross section (S-N, along longitude $37^{\circ}31'$) of air temperature above Moscow (shown by gray shading) simulated by Weather Research and Forecasting mesoscale model (with 1.1km grid spacing) at 03 : 00 am, 26 December 2010 (local time).

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These photographs of iced trees (Fig. 1) illustrate an event that turned into a disaster for the capital of Russia, Moscow, on December 25–26, 2010. The city and its surroundings were literally paralyzed by a freezing rain that induced multiple failures of various infrastructures, including electric power lines and transportation. The freezing rain was caused by a snowfall through a warm air layer (up to $+2^{\circ}\text{C}$) at altitudes 0.7–2.0km over a cold layer with sub-freezing temperatures (Fig. 2). The event caused the following:

- more than 400,000 people were left without electricity;
- black out in Domodedovo Airport, lasting more than 10 hours, caused a delay of about a hundred of flights and effected about six thousand waiting passengers;
- disrupted work of trains, trams, trolleybuses and the subway produced a collapse of the public transportation system and initiated multiple traffic jams;
- in Moscow alone more than 40,000 trees were broken by the weight of accreted ice;
- thousands of power lines, electric substations and cars were damaged by icing and fallen trees;
- icy streets turned the city into a huge ice rink and caused more than 1000 injuries among residents.

Total losses to electric grids exceeded \$33 million USD (Source: *IDGS Holding*). According to the *Hydrometeorological Centre of Russia* nothing similar to this event has happened in Moscow since December 1979.

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