

The dynamics of the ground-level ozone in the Kola Peninsula at different levels of man-made pollution

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Since 2002 the monitoring of the surface ozone in the Kola Peninsula is done in the center Apatity city, in its suburbs (2 km from the city limits) and in Lovozero (rural site).

During the winter months in conditions of low lighting, when the synoptical situation is preserved and the turbulent mixing remains approximately constant, in rural site there is practically no diurnal cycle of the ozone concentration, while in the center Apatity city in working hours there is a regular decrease (up to 100 percent). This decrease is caused by chemical destruction in reaction with NO, which is accumulated in the boundary layer in conditions of the surface inversion. This effect practically is not observed in the weekends or at the wind velocity exceeding 2 m/sec, providing an inflow of the clean air from suburbs.

During the polar day diurnal cycle of the ozone concentration in Apatity and Lovozero is similar as there exist unstable stratification during the most part of day and there are not conditions for accumulation of the ozone-destruction substances. The presence of the precursors of ozone in the urban practically has no effect on the maximum concentration of the ground-level ozone. This is an evidence of mainly dynamical source of the surface ozone in the high latitude atmosphere and of the insignificant role of the photochemical generation in the Arctic Region. The man-made influence on the ground-level ozone is reduced to the decrease of its concentration and is, in fact, limited by the city territories.

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