The highest surface ozone concentrations in and around Moscow in the summer 2002

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It is shown that in July-August 2002, unfavorable weather conditions occurred in Moscow megapolis, which led to increased photochemical ozone generation. It was, evidently, for the first time since 1991 that the fraction of photochemically generated ozone exceeded the natural ozone level for a long time. Abnormally high mixing ratios of surface ozone were measured at all the weather stations in Moscow and Moscow Region, the observational results showing good agreement. At temperatures of about 30 ^{o}C and in conditions of zero or slight wind (not more than 2 m s^{-1}), surface ozone mixing ratios would reach 140 ppb or more. The situation was partly caused by forest and peatbog fires, which produced smog in Moscow in the period from 30 July to 2 August, and partly, evidently, by automobile exhaust under the unfavorable weather conditions. The time variation of surface ozone is adequately described by a regression relation with temperature and wind speed in a 0-1.5-km altitude range. It is inferred that in order to effectively forecast high levels of surface ozone in Central Russia, upper-air parameters, characterizing both horizontal advection and processes of vertical mixing in the lower troposphere, must be employed.