



TROICA-10 Experiment: Study of Moscow Pollution Plume by Mobile Railway Laboratory

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Since October, 04, up to October, 07, 2006, the unique expedition of mobile laboratory of 2 carriages TROICA-10 around Moscow on outer railway circle was carried out. During the campaign the mobile laboratory made 3 complete circles around Moscow performing continuous measurements of main gaseous (NO, NO₂, CO, CO₂, SO₂, CH₄, NMHC, O₃, SO₂, NH₃) and aerosol atmospheric constituents, as well as of radiation and of meteorological parameters. 24 air samples have been taken and analyzed for VOC (aromatic hydrocarbons) content. Measurements revealed strong plume of pollution about 35 km wide spreading eastward from Moscow. The enhancements of concentrations for different species amounted to 8-10 ppbv for NO₂, 0,1 ppmv for CO, 40 µg/m³ for submicron aerosol. Other species except ozone also showed some growth. Increase of pollution level eastward of Moscow is also evident from results of chemical analyses of aromatic hydrocarbons (benzene, toluene, m, p and o-xylols). Side borders of pollution plume were very vivid due to strong Western transport during campaign, and width of plume was some larger than Moscow diameter. Inside the plume "cap" one can notice also sharp peaks of SO₂, CO, NO_x and NMHC caused by local sources near the railroad. Radial measurements toward Moscow center revealed quite sharp increase for most of pollutants crossing Moscow "border" that coincides in fact with Moscow circle highway. Distribution of minor gases and aerosols were obtained when crossed radial main highways going out of Moscow. The work was supported by International Scientific and Technology Center (ISTC Projects # 2773).