

Numerical Modelling of Dust Propagation in the Atmosphere of Tbilisi City in Case of Western Background Light Air

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Abstract : Tbilisi, a large city of the South Caucasus, is a junction point connecting Asia and Europe, Russia and republics of the Asia Minor. Over the last years, its atmosphere has been experienced an increasing anthropogenic load. Numerical modeling method is used for study of Tbilisi atmospheric air pollution. By means of 3D non-linear non-steady numerical model a peculiarity of city atmosphere pollution is investigated during background western light air. Dust concentration spatial and time changes are determined. There are identified the zones of high, average and less pollution, dust accumulation areas, transfer directions etc. By numerical modeling, there is shown that the process of air pollution by the dust proceeds in four stages, and they depend on the intensity of motor traffic, the micro-relief of the city, and the location of city mains. In the interval of time 06:00-09:00 the intensive growth, 09:00-15:00 a constancy or weak decrease, 18:00-21:00 an increase, and from 21:00 to 06:00 a reduction of the dust concentrations take place. The highly polluted areas are located in the vicinity of the city center and at some peripheral territories of the city, where the maximum dust concentration at 9PM is equal to 2 maximum allowable concentrations. The similar investigations conducted in case of various meteorological situations will enable us to compile the map of background urban pollution and to elaborate practical measures for ambient air protection.

Keywords : air pollution, dust, numerical modeling, urban

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