The concentrations of organic/elemental carbon and total protein in atmospheric aerosol of the near-ground atmospheric layer of Southwestern Siberia in the summer of 2012

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An extreme situation related to air pollution was recorded in Southwestern Siberia due to extensive forest fires in the summer of 2012. The paper presents the results of the study of atmospheric aerosol samples collected in 2 points separated by a distance of 80 km from each other. Previously it was shown (Buryak *et al.*, 2011) that the results of measurements in these points were highly correlated; therefore, they can be considered similarly. In the first point, samples were collected from June 20 to July 19, and in the second point series of observations were performed from June 21 to 30, from July 30 to August 10 and from August 30 to September 6.

Aerosol sampling was performed by pumping the air at a flow rate of 13 m^3/h for a day through fiber filters of AFA-HA-20 type and glass fiber filters.

Macc The mass of deposited aerosol was determined by the gravimetric method.

The concentrations of organic (OC) and elemental carbon (EC) were determined by the thermal method (reaction gas chromatography) described in (Popova *et al.*, 2007). The reaction chromatography method allows us to determine OC and EC concentrations by high-temperature separation in inert atmosphere. Each component is oxidized to CO_2, converted into CH_4 and recorded by a plasma-ionization detector. Thus, when the sample is heated (up to 700ºC) in inert atmosphere, organic substances evaporate and are determined as organic carbon, and elemental carbon is determined at burning in an oxidizing atmosphere.

The total protein masses in the samples were determined using a fluorescent dye (You *et al.*, 1997).

The measurement results are presented in Figures 1 and 2. During the period of the maximal smoke in the air in June and July, the total aerosol mass was always (and on some days exceeded) 100 μg/m^3. In August – September this concentration decreased to approximately 30 μg/m^3. OC and EC concentrations also changed during the period of the maximal smoke practically in proportion to the total mass of aerosol, and OC concentration was higher than that of EC during all days of observation. The concentration of the total protein in atmospheric aerosol remained at a normal level for this year all the time: 0.5 – 1.0 μg/m^3. Thus, forest fires in the region did not produce any significant influence on the total protein concentration in atmospheric aerosol.

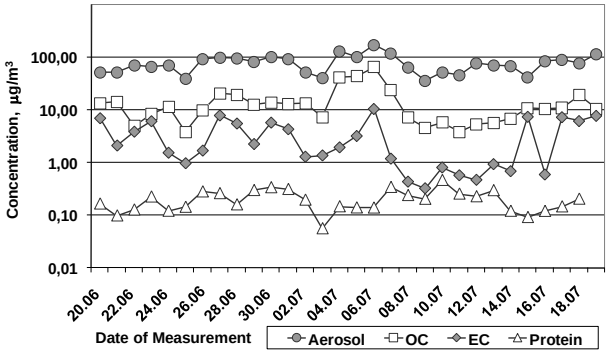

Figure 1. The results of measuring the concentrations of aerosol, organic/elemental carbon and total protein in 1 sampling point.

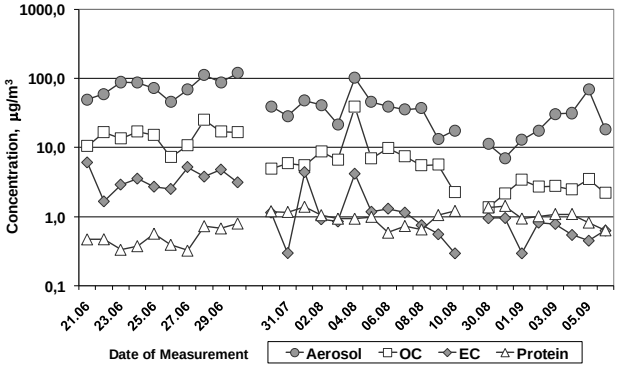

Figure 2. The same for sampling point 2.

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Popova, S.A., et al. (2007) *Chem. Sustain. Develop*. **15**, 97-103.

Buryak G.A., et al. *Abstracts of the XVIII Meeting of the Working Group "Siberian Aerosols".* Tomsk, 2011. P. 63 (in Russian)

You, W.W., et al. (1997) *Annal. Biochem.*, **244**, 277-282.