Geophysical Research Abstracts
Vol. 12, EGU2010-6492, 2010
EGU General Assembly 2010
© Author(s) 2010

Aerosol Chemical Composition over West and East Siberia

Boris Belan, Georgii Ivlev, Artem Kozlov, Tatyana Rasskazchikova, Denis Simonenkov, Gennadii Tolmachev, Nadezhda Fokina, and Aleksandr Fofonov

Zuev Institute of Atmospheric Optics SB RAS, Tomsk, Russia (bbd@iao.ru, +7 3822 492086)

During last years Institute of Atmospheric Optics participated in some international research campaign, in which its Antonov-30 airborne laboratory performed several remote flights. Four of them were carried out in 2006-2008 in framework of YAK–AEROSIB project on circular trip with 3 intermediate flight stops: Novosibirsk – Mirny – Yakutsk (point of turn) – Lensk – Bratsk – Novosibirsk. The last remote flight was carried out in 2008 in framework of scientific program of International polar year POLARCAT in 2008 on circular trip with 6 intermediate flight stops: Novosibirsk – Salekhard – Khatanga – Chokurdakh – Pevek (point of turn) – Chokurdakh – Yakutsk – Mirny - Novosibirsk. Airborne sampling is performed in the 500 to 7000 m atmospheric layer, in series on 3 altitudes, with duration 10-12 min on each fixed altitude. During one non-stop flight there were realized up to 5 series ascending from 500 to 7000 m. Concrete altitudes of sampling in every concrete flight and series were defined according to season, local synoptic conditions, and with correction on the aircraft flight regulations. Aerosol is sampled onto Petryanov filters (AFA-type), which then analyzed in the Laboratory of Environmental Monitoring of Tomsk State University. The volume of air aspirated through each filter is 1.5-3 m^3. Physico-chemical techniques of quantitative analysis are used to analyze the chemical composition of the aerosol (Si, Al, Fe, Mg, Ca, Ti, Cu, Mn, Cr, Ag, Pb, Ni, Ba, Sn, V, Mo, Co, B, Be, K^+, Na^+, Cl^-, SO_4^{2-}, NO_3^-, Br^-, F^-, NH_4^+).

Vertical profiles of ion and element concentrations were reconstructed in terms of middle of part of sampling. Such profiles with horizontal extension up to 1000 km allow us to evaluate reputes of anthropogenic transport eastwards from Europe and Ural. Special interest has Arctic regions. There are mainly observed generation and accumulation of sulphate aerosol higher than base layer of rainy nebulosity. At that, both main peak of acid counteragent of sulphate-anion and secondary that is in the same atmospheric region. But secondary peak (below 2000 m) apparently relates to below-cloud aerosol generation from acid-forming gases from local anthropogenic sources, which scavenged by precipitation into surface layer.

This work was funded by Presidium of RAS (Program No. 16), Brunch of Geology, Geophysics and Mining Sciences of RAS (Program No 5), Russian Foundation for Basic Research (grant No 08-05-92499), and Federal Agency for Science and Innovation (State Contract 02.518.11.7153).