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Ecosystem observations and perspectives of atmospheric chemistry research in Central Siberia due to Zotino tall tower construction.

A. Skorokhod (1), S. Verkhovets (2), Y. Vaganov (3) and N. Elansky (1)

(1) A.M.Obukhov Institute of Atmospheric Physics RAS, Russia (skorokhod@ifaran.ru/+7-495-9631652), (2) V.N. Sukachev Institute of Forest SB RAS, Russia, (3) Siberian Federal University, Russia

In September, 2006, the construction of 302 m tall tower near Siberian village Zotino (90 E, 60 N) in Kranoyarsky Krai, Russia was completed. This will allow providing wide research of atmospheric chemistry and climatic parameters in Central Siberia. In parallel with the tall tower construction studies of local ecosystems state and their parameters have been carried out. Permanent measurements of O3, NO and NOx at the tall tower footprint are ready to start.

The objective of this work is to conduct complicated investigations of atmosphere chemical composition (concentration of O3, NOx, VOC; aerosol microphysical and chemical properties) near Zotino Tall Tower and to evaluate most representative Siberian ecosystem parameters and changes in ecosystems under present climate changes.

Planned observations of reactive gases should contribute to our very little knowledge about ozone sink and uptake by Siberian ecosystems, about ozone reactions with biogenically emitted volatile organic compounds (BVOC) which are supposed to be important source of OH radical and secondary organic aerosols.

Basing on satellite LANDSAT-7 images and TERRA-MODIS information classification of the region of 100 km radius around the tall tower according to vegetation types has been done. NDVI (vegetation index) with characterizes the status of vegetation was calculated as well. Similar vegetation and ground types (22 classes at the moment) have been defined and proper transects for ecosystem field inventorying have

been determined. Inventory of most representative vegetation types on 172 test points has been provided in 2006. Data from LANDSAT date analyses as well as ones of inventorying have been added into GIS of region as new layers.

Preliminary data on volume and mass storage of rough wooden residues in the most representative forest types have been received for the tall tower footprint. Carbon concentration in phytomass components has been determined for pines, greenmosses and lichens. Measuring equipment (including analyzers of O3, NO, NO2, aerosols as well as of spectrometers for measuring CO and CH4 total content in air column) have been prepared and adopted to local conditions. Inventory of regional sources of substances that are planned to be measured (ozone, nitrogen oxides, carbon oxide, soot and submicron aerosol) has been provided for largest industrial centers of Siberia on base of TROICA data.

To study long-range atmospheric transport to Central Siberia NOAA HYSPLYT 4 trajectory model and NOAA re-analyses fields' database are used. Adjustment of RAMS (Regional Atmospheric Modeling System) model to simulate atmospheric transfer to the observation point from neighbor areas using data about underlying surface data has been fulfilled. Special software has been debugged to assimilate various data on natural and anthropogenic sources/sinks of the atmospheric pollutants in the HYPACT (HYbrid Particle Concentration Transport) model.

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