

**To the use of numerical model of thunderstorm to study the role electrical forces in formation of dangerous weather phenomena.** Mikhailovsky Yu. P., Dovgaluk Yu. A., Veremey N. E., Sinkevich A. A. Proceedings of MGO. 2017. V. 587. P. 7—31.

Possibilities of using of a numerical non-stationary one-and-half-dimensional thunderstorm model for studying the role of electrical forces in formation of dangerous weather phenomena are analyzed in the article Processes of electrification and charge separation and also mechanisms of affect of electrical processes on cloud dynamics and microphysics are described. Electrostatic force impact on cloud updrafts (downdrafts) and precipitation particles movement are considered in the model. The simulation of electrical forces affect on shower and hail intensity was performed for one case of severe hail at the Northern Caucasus. It is obtained that contact mechanism of particles electrification (melting hailstone – cloud droplet, rain drop – cloud droplet) play the greatest role in cloud electrification. Consideration of electrical processes causes some decrease of shower and hail intensity. To retrieve more common regularities it is necessary to perform some additional investigations for various cases and to carry out modification of parameterization schemes of precipitation formation and electrification.

*Keywords:* convective cloud, model, electrification, charge, electric field, shower, hail.

Tab. 2. Fig. 6. Ref. 23.

**Aircraft studies of the electric field strength and aircraft charge in convective clouds at the early stage of development.** Torgunakov R. E., Mikhailovskiy V. Yu., Sinkevich A. A. Proceedings of MGO. 2017. V. 587. P. 32—46.

The paper describes results of an aircraft experiment of the study of a group of convective clouds at an early stage of development. To calculate the electrical field strength and aircraft charge authors use a computer modeling technique. The analysis of relationships and patterns between such characteristics as the electrical field strength, the aircraft charge, LWC, the updrafts velocity, and the overheating is carried out.

The electrical field strength in the investigated clouds was equal to  $-92$  V/m (minimum  $-320$  V/m) on average, mean value of aircraft charge was equal to  $-4,1 \cdot 10^{-6}$  C (minimum  $-9,9 \cdot 10^{-6}$  C). Absolute value of electrical field strength and aircraft charge increases with the increase of LWC.

*Keywords:* electrical field strength, aircraft, charge, convective clouds, liquid water content.

Tab. 2. Fig. 7. Ref.18.

**Some results of the investigation of the process of mergers of convective cells over the territory of the Leningrad region.** Kolbin V. A., Kuznetsov A. D., Seroukhova O. S., Simakina T. E., Solonin A. S. Proceedings of MGO. 2017. V. 587. P. 47—55.

The article discusses the process of combining convective clouds over the Leningrad Region territory. The analysis of changes in radar characteristics obtained with the help of Doppler radar "Pulkovo" is performed. It is shown that in the cloud formed as a result of confluence of convective cells, the water content, the height of the maximum radio-echo, the area of precipitation, radar reflectivity increase. An increase in the area of precipitation is found to be on average twice.

*Keywords:* clouds, convective cells, the process of combining, radar characteristics.

Fig. 5. Ref. 7.

**Charge of drops of water at evaporation and condensation.** Shavlov A. V., Dzhumadzhi V. A., Yakovenko A. A. Proceedings of MGO. 2017. V. 587. P. 56—78.

The mechanism of electrization of water and ice at evaporation (condensation) is offered. It is shown that at evaporation water charge carriers - protons and hydroxide ions collect on the phase front, and at condensation are exhausted. Estimates of electric charge of water drops of spherical shape at various radiuses of drops are executed.

*Keywords:* Water, Ice, Evaporation, Condensation, Charge Separation, Poisson's Equation.

Fig. 6. Ref. 23.

**Radiative and temperature indices (metrics) of modern anthropogenic climate changes.** Karol I, L., Kiselev A. A. Proceedings of MGO. 2017. V. 587. P. 79—97.

The FRR (Forced Regime Response) metric that is aimed to estimation of the climate system response to radiatively active atmospheric species content changes is considered together with well known Radiative Forcing index. These metrics characterise the both extern (anthropogenic) impact on climate system in the atmosphere and of its response on various external impacts. The single energy balance equation is used as first approximation for FRR estimates. The both above metrics and their seasonal variations in the modern troposphere of mid and high northern latitudes are considered with simple models.

*Keywords:* quantitative estimates of climate system response on anthropogenic impact, energy balance equation, seasonal changes of atmospheric CO<sub>2</sub> content, seasonal thawing of Arctic sea ice.

Tab. 5. Ref. 18.

**A simple method for obtaining microflows of gases to control the errors in quantitative chemical air analysis techniques (for example, formaldehyde, hydrogen fluoride and phenol.** Vollberg N. Sh., Uspenski A. A., Gurevich I. G.,Stepakov A. V. Proceedings of MGO. 2018. V. 587. P. 94—104.

A method has been developed for obtaining microflows of gases when analyzing the quantitative chemical composition of atmospheric air with such priority components as formaldehyde, hydrogen fluoride, phenol. An obvious advantage is the availability and simplicity in the work on air pollution control

*Keywords:* dosing, microquantities of gases.

Tab. 3. Fig. 1. Ref. 7.

**About control of convective clouds precipitation using radar parameters.** Kashleva L. V., Ngo Dinh Hu, Mikhailovskii Yu. P. Proceedings of MGO. 2017. V. 587. P. 105—115.

The article presents the method of control of precipitation intensity using radar parameters of convective clouds at the distance of 90-180 km from radar. The analysis of radar characteristics obtained with the help of MRL-5 in Voeikovo during 2006-2009 is performed. It is shown that precipitation intensity may be controlled by means of the radar reflectivity at the level of zero isotherm and of the thickness of supercooled layer.

*Keywords:* meteorological radar methods, radar reflectivity, precipitation intensity, zero isotherm, thickness of supercooled layer.

Fig. 4. Ref. 8.

**Annual variations in tension of the electrical field of the atmosphere and the polar electrical conductivities for air measurement data at Vostok Station.** Sokolenko L. G., Sterkhov P. L. Proceedings of MGO. 2017. V. 587. P. 116—124.

Presents monthly averages of atmospheric electricity parameters for good weather conditions at the Antarctic Vostok Station for 1989-1990 Gg received between 34 Soviet Antarctic expedition. They compare with similar data in the region of St. Petersburg. Allocated to annual variations in atmospheric-electrical characteristics that are specific to both hemispheres.

*Keywords:* atmospheric-electrical characteristics, positive electrical conductivity of air, negative electrical conductivity of air, the monthly mean values.

Fig. 3. Ref. 4

**Indirect calculation methods of global solar radiation for assessing solar energy resources of a region on the example of Yakutia.** Trofimova O. V., Zadvornyykh V. A. Proceedings of MGO. 2017. V. 587. P. 125—136.

The work considers the comparison of global solar radiation calculated by the various indirect methods with observations data, as well as the possibility of using of the satellite data information.

The maps of the annual global solar radiation calculated by indirect methods, based on observation data and satellite information (NASA SSE database) on the territory of Yakutia are presented.

*Keywords:.* global solar radiation, indirect calculation methods, NASA SSE database.

Tab. 4. Fig. 4. Ref. 14.

**Spatio-temporal variability of the aerosol optical thickness of the atmosphere in Primorye by terrestrial and satellite data.** Plakhina I. N., Pankratova N. V., Makhotkina E. L. Proceedings of MGO. 2017. V. 587. P. 137—152.

The analysis of temporal changes in the AOT atmosphere in the territory of the Far East, performed according to the data of actinometric stations of Roshydromet, data of the AERONET network and satellite observations is presented. It is shown that extremely high values of aerosol turbidity (daily, monthly) are formed under the influence of local conditions and under the influence of transboundary transport of air masses from the territory of Mongolia, northeastern China and also from the ocean.

Differences were determined in the annual course of AOT, due to the peculiarities of the location of individual stations. Two types of annual progress are distinguished: for stations located on the coast and inside the continent.

*Key words:* aerosol optical thickness, AERONET network, satellite observations, temporal and spatial changes.

Tab. 3. Fig. 6. Ref. 18

**Analysis of the causes of fires in the Krasnoyarsk Territory and their relationship to meteorological parameters.** Mazurov G. I., Akselevich V. I. Proceedings GGO. 2017. V. 587. P. 153—172.

The possible causes of fires in hydrometeorological conditions in the taiga of the Krasnoyarsk Territory are analyzed statistically by the example of three weather stations for the period 1992-2014. 8 working hypotheses of causes of fires are considered. Clear dependence on these conditions is not revealed. Only a decrease in the number of fires in case of rain has been established. Therefore, it is recommended to call it by active influences on clouds, including resource ones. In addition, it is noted that a strong wind and a dry period contribute to the rapid spread of forest fires.

The hypothesis of a group of scientists of the Moscow State Regional University on stimulating the occurrence of fires in forest tracts is supported by the separation of methane and associated gases from bogs and soils with a low autoignition temperature. It is planned to conduct further research in this direction.

Some practical recommendations are given to prevent the occurrence of fires in the taiga and their suppression.

*Key words:* forest fire, burning, methane, spontaneous combustion, drought, resource clouds, precipitation

Tab. 4. Fig. 11. Ref. 20.

**Examination of the model of air humidity in the Northern Hemisphere, All Union State standard 26352-84 on the ground of aerological data.** Berezina M. A., Volobueva O. V., Drobzheva Y. V., Drobzhev V. I. Proceedings of MGO. 2017. V. 587. P. 173—203.

Results of the joint analysis of average monthly height profiles of the mass humidity fraction for longitudes close to 0° e.l., 80° e.l. and 80° w.l., 180° w.l. for July and January 2011-2013, and height profiles of the mass humidity fraction, builded in accordance with the empirical model of the All Union State standard 26352-84, are represented.

*Keywords:* Height profile, mass humidity fraction, experimental value, model.

Tab. 9. Fig. 12. Ref. 3.

**Professor Kusieli S. Shifrin as a pioneer of passive microwave radiometry.**  
Melentyev V. V. Proceedings of MGO. 2018. V. 587. P. 204—230.

The paper contains reminiscences about scientific activity of outstanding Russian scientist professor/ Kusieli S. Shifrin who was working at the Voeikov Main Geophysical Observatory (department of investigation of solar radiation) who had suggested new methodology of the retrieving different meteorological parameters of the system “Earth-atmosphere” with using passive microwave remote sensing. As result he stayed a world-wide recognized founder of new direction in space meteorology and oceanography. High priority of these pioneer investigations represents great achievement of Russian domestic science. The paper contains also the description of the “creative laboratory” of scientist, his character and different interests in cultural life of Russia, including poetry as well relation with colleagues and apprentices

The author of reminiscence was a PhD student of prof Shifrin and collaborated with him many years for further development new contemporary technologies practical application of the satellite microwave survey in geophysics.

*Keywords:* remote sensing, atmospheric optics, hydro-optics, brightness temperature, passive microwave radiometry, space meteorology, satellite oceanography.