An impact of aerosol pollution of the atmosphere during forest fires on the evolution of convective clouds and precipitations associated with them. Dovgaluk Yu. A., Veremey N. E., Toropova M. L., Sinkevich A. A., Kurov A. B., Volkov N. N., Ignatiev A. A. Proceedings of MGO. 2017. V. 585. P. 7—38.

Numerical simulation of interaction of convective cloud with aerosols, formed during forest fires, was performed. wo cases: 2010, Aug 6 (Moscow region) and 2016, Jul 24 (Leningrad region) were under consideration. Two models were used: three- and one-and-half-dimensional. Comparison of the simulated results for every case (for non-polluted atmosphere and polluted atmosphere by soot and ash formed by forest fires) were carried out. These substances were assumed to have ice-forming properties. Results of three-dimensional simulation have shown that aerosol pollution of the atmosphere led to the decrease of the intensity of both rain and hail from the cloud due to forest fires.

Keywords: forest fire, cloud, convection, precipitation.

Tab. 6. Fig. 12. Ref. 30.

Investigation of Cu Merging in the north-west of Russian. Popov V. B., Sinkevich A. A. Proceedings of MGO. 2017. V. 585. P. 39—55.

Results of investigations of cloud statistical characteristics changes during their merging over Saint-Petersburg area and suburbs are presented. 14 cases of cloud merging, which occurred during warm periods of 2015 and 2016, were selected for this study. The characteristics of the clouds were derived from radar sounding data of the atmosphere using DWRS-C weather radar. To obtain the precipitation characteristics, radar data were calibrated by the measurements of precipitation with the help of gauges Pluvio2 200, which use weighted method of measurement.

It is noted according to the results of the study, that the merging process leads to the increase of medians in the distributions of following characteristics: the height of cloud top, the height of the maximum reflectivity, the maximum reflectivity in the atmosphere column, the maximum intensity of precipitation and the precipitation flow, and also to the clouds area decrease.The statistical significance of the obtained results was verified using the non-parametric Wilcoxon signed-rank test. During the test, no statistical significance in the medians change of the characteristics under consideration was found at the significance level p=0,05.

Keywords: cloud merging, weather radar, precipitation.

Tab. 2. Fig. 2. Ref. 37.

Studies of Precipitation Formation Processes in Convective Clouds Based on Numerical Simulation Results. Belova L. K., Drofa A. S. Proceeding of MGO. 2017. V. 585. P. 56—76.

The processes of precipitation formation in convective clouds under their natural development and at their modification with hygroscopic agents are analyzed with the use of a full-sized 3D-model. It is shown that most efficiently precipitation formation occurs in vigorous clouds with solid ice particles. The analysis of the precipitation formation processes at their modification with hygroscopic agents shows that the introduction of hygroscopic particles into a cloud results in an increase of precipitation particles fraction in the cloud liquid water content. Based on the results of numerical simulation, a series of laws significantly changing the efficiency of cloud modification with hygroscopic agents was formulated.

Keywords: convective clouds, hygroscopic agent, cloud liquid water content, precipitation formation efficiency.

Tab. 1. Fig. 5. Ref. 15.

Field Tests of Cloud Modification Efficiency with a Salt Powder. Drofa A. S., Ivanov V. N., Danelyan B. G., Koloskov B. P., Bychkov A. A., Tchastukhin A. V. Proceeding of GGO. 2017. V. 585. P. 77—84.

The results of a field experiment are presented on modification of a stratified precipitating cloud with convective cells with a salt powder. The results were obtained during the activities in weather modification in Moscow on 11 September 2016. These results indicate that the hygroscopic powder can be used for precipitation enhancement from warm low-intensity convective clouds, from which at their natural development no precipitation occurs or the amount of which will be small.

Keywords: hygroscopic agent, radar registered cloud parameters, precipitation amounts.

Fig. 5. Ref. 10.

Methods of identification mesoscale clouds on the satellite images. Kuznetsov A. D., Serouhova O. S., Simakina T. E. Proceedings of MGO. 2017. V. 585. P. 85—97.

The article presents the results of complex methods of digital image processing to identify the mesoscale cloud cover from satellite multispectral images.

Automatic synthesizing information in different channels is made using the method of principal components. Decomposition of the main components of images of different resolution carried by a two-dimensional discrete wavelet transform. Identification of shallow convection systems, localized convection regime change based on the use of texture analysis and synthesis of the three RGB-textural features.

Keywords: mesoscale clouds, digital processing of satellite images, wavelet analysis, principal component analysis, texture analysis.

Tab. 1 Fig. 7. Ref. 6.

Remote sensing of the optical parameters of clouds through the use of aircraft measurements of solar radiation in the visible and near infrared ranges. Melnikova I. N., Kuznetsov A. D., Serouhova O .S., Simakina T. E. Proceedings of MGO. 2017. V. 585. P. 98—109.

The results obtained by remote sensing of the optical parameters of an extended cloud.

Used aircraft measurements of scattered solar radiation. The albedo of the underlying surface, the optical thickness, single scattering albedo, parameter scattering phase attenuation and absorption coefficients restored by measuring the intensity of spectral channels in 8 0,340; 0.381; 0.472; 0.682; 0.870; 1,035; 1,219; 1,273 m above and below the cloud and inside it. We consider the results of the two NASA experiments conducted in 2000 and 2008 over the ocean near the coast of South Africa and California.

Keywords: remote sensing, using planes, the intensity of diffuse solar radiation, the optical parameters of clouds, the albedo of the underlying surface.

Tab. 4. Fig. 3. Ref. 7.

Analysis of international practices with elaboration of national plans for adaptation to climate variability and change (structure, objectives, expected results, authorized workers). Vasilev M. P. Proceedings of MGO. 2017. V. 585. P. 110—125.

The paper discusses national plans for adaptation to climate variability and change created in USA, Great Britain and European Union. The main stages of iterative adaptation process and their implementation feature are analyzed. The findings can be used in the context of adaptation program developing for Russian Federation.

Keywords: climate change, adaptation plan, economic assessment, weather and climate related risks

Ref. 15.

Climatology of the cloud cover in Moscow. Gorbarenko E. V., Shilovtseva O. A., Bunina N. A. Proceedings of MGO. 2017. V. 585. P. 126—141.

The analysis of the temporal variability of the characteristics of the clouds according to the hourly visual observations of cloud amount at the Meteorological Observatory of Moscow State University over a 50-year period is presented. The influence of modern changes in cloudiness on the duration of sunshine and the arrival of total solar radiation is estimated. Comparison with satellite and observational data in meteorological terms is made.

Keywords: total and low cloud amount, long-term observations, climate, solar radiation.

Tab. 4. Fig. 6. Ref. 9.

Quantitative characteristics of extreme precipitation in southwestern Iran Annotation. Rusin I. N., Maddah M. A. Proceedings of MGO. 2017. V. 585. P. 142—157.

In the present study, statistical characteristics of daily precipitation totals (DPT) is analysed in Khuzestan province (southwestern Iran) to determine a more detailed knowledge of empirical and theoretical distribution functions of DPT using observation datasets. The values of extreme DPT for 99th, 95th and 90th percentile of rain-day amounts are computed (precipitation 99, 95 and 90 calculated for wet days, respectively). Finally, the spatial distribution of extreme DPT is produced and its correlation with topography and mean annual rainfall amounts over the study area is obtained and reported.

Keywords: daily precipitation totals, extreme precipitation, statistical characteristics, distribution function, Khuzestan (Iran).

Tab. 4. Fig. 4. Ref. 9.

Unfavorable weather conditions complexes development for specific souse groups (caaase study of city Gubakha, Perm region). Kostareva T. V., Kichigina L. S., Tyapkina I. A. Proceedings of MGO. 2017. V. 585. P. 158—169.

This article presents the analysis of meteorological conditions conductive to transporting pollution from single sources in the case of the city Gubakha (Perm region). We considered 342 single sources of pollutant emissions into the atmospheric air on ten industrial and power enterprises. Of them, 286 sources are located on the territory of JSC «Gubakha koks», JSC «Metafracs», LLC «Metadineay», the gross emission of which is equal to 80 – 85%. The detailed group division of all stationary emissions sources, located within the city, is shown. In total, we allocated 5 groups and defined the complexes of unfavorable weather conditions (UWC) for each of them. The sources of medium altitude with cold emissions and low sources are dominated in Gubakha. About 13 complexes of unfavorable weather conditions were revealed. Presented UWC complexes allow concretizing the transmission of warnings to consumers. Some practical recommendations for more targeted compilation and transmission of forecasts and warnings are presented in the article.

Keywords: single sources of pollutant emissions, complexes of unfavorable weather conditions (UWC), unfavorable wind direction (UWD), dangerous wind speed.

Tab. 3. Ref. 15.

Calculating the diffuse part of ligth in transmittance in clear and cloud atmosphere. Melnikova I. N., Novikov S. S. Proceedings of MGO. 2017. V. 585. P. 170—186.

Values of the illumination of the surface, the flux of direct solar radiation, and the part of diffuse radiation are required in addressing the many challenges of climate science, alternative energy, architecture, agriculture. It is necessary to understand the of error value that occurs when using generally accepted single-scattering approximation in tasks of the implementation of LI-DAR sensing of the atmosphere. This paper clarifies the issues, the proportion of diffuse solar radiation and the contribution of higher order of scattering in the solar radiation flux, transmitted by the atmosphere, are assessed for a set of atmospheric optical parameters and different lighting geometry.

Keywords: solar radiation, surface illumination, atmospheric optical model, scattered radiation, order of scattering, solar zenith angle

Tab. 6. Fig. 5. Ref. 11.

Direct and indirect effects between thunderstorm activity, temperature and atmosphere composition on a regional scale: sensitive tests with WRF-CHEM. Kolomeets L. I., Smyshlyaev S. P. Proceedings of MGO. 2016. V. 585. P. 187—211.

Production of nitrogen oxides (NOx) affect the distribution of chemical constituents in the upper troposphere/lower stratosphere. In order to study the relationship between thunderstorm activity, chemical composition and atmosphere temperature experiments with WRF-Chem have been evaluated. Prediction of lightning flashes is based on Price and Rind parameterization (1992). Sensitive tests show the strong relationship between lightning origin nitrogen oxides, ozone, temperature and peroxide radical.

Keywords: nitrogen oxides, ozone, lightnings, feedbacks, parametrization, convection, temperature, convective instability atmosphere indices.

Tab. 2. Fig. 12. Ref. 20

Radiometeorological research in Voeikov MGO. Tarabukin I. A. Proceedings of MGO. 2017. V. 585. P. 212—260.

A review of theoretical and experimental radio-meteorological studies conducted at the Voyeykov main geophysical observatory is presented over an 80-year period of time from the time of their inception to the present.

Keywords: radio meteorological research, radio meteorology, radar, microwave radiometry

Ref. 125.