

The Numerical Simulation of the Evolution of Thunderstorm with Hail, its Electric Structure and Triggered Dangerous Phenomena in the North-West Russia. Dovgaluk Yu. A., Veremei N. E., Sinkevich A. A., Mikhailovsky Yu. P., Popov V. B. Proceedings of MGO. 2018. V. 590. P. 7—26.

The results of numerical simulation of thunderstorm with hail and triggered dangerous phenomena for atmospheric situation in Saint-Petersburg on Jul 22 2017 are presented in the article. Small dimensional model was used.

Spatial and temporal dynamics of the basic characteristics of the cloud and precipitation were investigated. Two cases were compared: without and with taking into account heterogeneous freezing of cloud droplets. It is shown that for the second case precipitation formation (including hail formation) occurs more intensively. Dynamics of cloud electric structure at different life stages was simulated.

The impact of electric processes on precipitation formation and dangerous phenomena (shower, hail) was investigated. It is shown, that the impact of electric forces on coalescence contributes to decrease of both: precipitation intensity and amount of precipitation.

Keywords: cloud, precipitation, hail, electric charge, electric field.

Tab. 2. Fig. 8. Ref. 12.

Experimental and theoretical studies of the effect of aerosol particles of the submicronic range on the electricity of the ground layer. Morozov V. N., Paley A. A., Pisanko Yu. V., Sokolenko L. G., Zaynetdinov B. G. Proceedings of MGO. 2018. V. 590. P. 27—47.

The paper discusses experimental data obtained at the Voeikovo test site for studying the dependence of the electrical parameters of the surface layer of the atmosphere on the concentration of aerosol particles. A theoretical interpretation of the results is given. The influence of the global distribution of aerosol particles on the potential of the ionosphere was studied. The problem of the effect of coagulation processes on the formation of aerosol particles of a water aerosol in the range (3–200 nm) is considered.

Keywords: aerosol particles, electrical conductivity, electric field strength, ionosphere potential, coagulation of aerosol particles.

Fig. 5. Tab. 2. Ref. 12.

Results research parameters electromagnetic radiation of lightning in the near zone. Snegurov A. V., Snegurov V. S. Proceedings of MGO. 2018. V. 590. P. 48—102.

The review of theoretical and experimental researches parameters electromagnetic radiation of lightning at distance up to 100 km, carried out in the Voyeykov main geophysical observatory.

Keywords: lightning discharges, amplitude spectrum, phase characteristics, polarization.

Tab. 5. Fig. 14. Ref. 89.

Adaptation of construction sector to climate change based on the analysis of weather and climate risks (the case of Pskov, Smolensk and Bryansk Regions). Akentyeva E. M., Klueva M. V. Proceedings of MGO. 2018. V. 590. P. 103—117.

The paper presents the evaluation findings of direct weather and climate risks for construction sector in the territory of Pskov, Smolensk and Bryansk Regions. Assessment of climate change impact on tailored climate indexes values for building construction is considered. The article states that highest risk for construction sector arises from variation in ice and wind loads on buildings and constructions, loads on water disposal system, as well as life of the buildings reduction.

This article reviews initial adaptation actions for construction sector that can reduce the risk within the conditions of climate change.

Keywords: weather and climate risks, climate change, adaptation actions.

Tab. 2. Ref. 17.

Zoo Climatic conditions of the southern half of Kazakhstan under climate change. Baisholanov S. S. Proceedings of MGO. 2018. V. 590. P. 118—129.

The zoo climatic conditions of the southern half of Kazakhstan are estimated, their spatial distribution is analyzed. Maps of the amount of non-grazing days in winter, the date of spring sheep shearing and the duration of the stable hot period for sheep grazing were built. In the southern half of Kazakhstan, the average amount of non-grazing days in winter is 2—20 days. Spring sheep shearing on average begins in the period from April 20 to May 20. The duration of the stable hot period for sheep grazing is 60—120 days for fine-wool sheep, 20—80 days for hair sheep. Date of the beginning of movement of the fine-wool sheep to summer pastures comes from May 15 to June 15. Date of the beginning of movement of the hair sheep come on 20-30 days later. In the conditions of climate change until 2050 changes in bioclimatic indicators are forecast.

The amount of non-grazing days in winter by 2050 will decrease by 2—6 days. In spring sheep shearing will come on 3—5 days earlier. The duration of the stable hot period for fine-wool sheep will increase by 14—18 days, for hair sheep by 5—11 days. Date of the beginning of movement of sheep to summer pastures will come on 4—6 days earlier.

Key words: zoo climatic conditions, amount of non-grazing days, duration of the stable hot period, spring sheep shearing, climate change, fine-wool sheep, hair sheep.

Tab. 2. Fig. 3. Ref. 10.

Methodology of assessment and prediction of climate parameters in the conditions of non-stationary climate. Kobysheva N. V. Galyuk L. P., Faselko D. V. Proceedings of MGO. 2018. V. 590. P. 130—143.

The estimating technique of the probability quantiles and the return period of extreme meteorological variables in the conditions of non-stationary climate are considered. Along with the traditional approach to solving of statistical problems by means of regression equation, the authors offer based on the thesis of S. S. Kutateladze about Pareto optimality – the multiple (up to 5-6 times) transformation of original series – is used. These time series are formed as the regression of absolute deviations of meteorological values from the arithmetical mean or median. As a result, the probability of extreme values and their return periods are determined with a given accuracy, taking into account heteroscedasticity and trends.

Keywords: climate instability, trend, heteroscedasticity, statistical quintiles, recursive residual

Tab.3. Fig. 4. Ref. 16.

The state of the protective ozone layer over the Russian Federation territory (more than 40 years of regular observations). Shalamyanski A. M., Romashkina K. I., Pavlova K. G., Solomatnikova A. A., Talash S. S. Proceedings of MGO. 2018. V. 590. P. 144—159.

This paper presents the becoming of Roshydromet ozone network and shows how it was able to achieve high quality total ozone measurements based on a simple optical instrument and become an integral part of the WMO GAW ozone network. It is shown how the method of total ozone measurements was developed, mainly used the measurements of the clear and cloudy sky zenith. This method allowed monitoring of the ozone layer state over the Russian Federation territory throughout 42 years, including the polar and subpolar area. Based on the long-term series of measurements were obtained climatic total ozone rates for 5 regions of Russia, and identified trends and trend changes in the thickness of the protective ozone layer over the vast territory of the Russian Federation.

Keywords: total ozone, atmospheric ozone, ozone layer, ozone network, climate rates.

Tab. 3. Fig. 2. Ref. 12.

Estimation of the success of the prediction of wind storm in Arkhangelsk by the A. I. Snitkovsky method. Abramova I. F., Novikova N. A., Drobzheva Ya.V. Proceedings of MGO. 2018. V. 590. P. 160—170.

The results of the analysis of wind forecasts in Arkhangelsk obtained on the basis of the Snitkovsky method are presented. The results of the calculation of the criteria for the success of wind speed forecasting for the period from July 2017 to March 2018 for the city of Arkhangelsk showed that the Snitkovsky method is not effective for predicting storm values of wind speed.

Keywords: wind, method, forecast, success.

Tab. 3. Fig. 2. Ref. 9.

Calculation of air pollution using boundary integral equations. A. D. Ziv. Proceedings of MGO. 2018. V. 590. P. 171—189.

The paper discusses the use of integral equations to expand the capabilities of the standard source-receptor model for calculating the concentrations averaged over a long period. Derived in the standard way for the classical boundary-value problem for the one-dimensional equation of atmospheric diffusion, they are assumed applicable to the indicated model. As a result, it is possible to use the model to calculate concentrations and surface fluxes taking into account the dry deposition. One obtain in addition the relations, which gives the way to calculate concentration at different levels and take into account the sources of the surface flux type. Note that almost all obtained integral equations are valid for the initial model with all its features as gravitational settling, removal by precipitation and line chemistry or radioactive decay. The computational aspects are also considered. It is shown in particular that accurate calculations often make it possible to avoid large enough errors.

Keywords: weather and climate risks, climate change, adaptation actions.

Fig. 3. Ref. 23.

The pollution of atmosphere air by heating enterprises of Nalchik town.

Sozaeva L. T., Shungarov I. H., Hergay A. G. Proceedings of MGO. 2018. V. 590. P. 190—198.

In the given article the pollutants emission calculations results in the atmosphere from heating enterprises of Nalchik are presented. On the basis of the calculation of the dispersion of pollutants in the atmosphere using the «Ecolog 4.5» program, it was shown that there excess of the maximum permissible concentrations of nitrogen oxides and carbonic oxide in residential areas that are closest to the boiler houses are not.

Keywords: atmospheric air pollution, ground level concentration, nitrogen oxides, carbonic oxide, maximum permissible concentration

Tab. 2. Ref. 6.

Analysis of thaw regimes in Saransk (Russia) from 1960 to 2016.

Lyskova S. A., Efimova Yu. V., Voskanyan K. L. Proceedings of MGO. 2018. V. 590. P. 199—208..

In the given article the pollutants emission calculations results in the atmosphere from heating enterprises of Nalchik are presented. On the basis of the calculation of the dispersion of pollutants in the atmosphere using the «Ecolog 4.5» program, it was shown that there excess of the maximum permissible concentrations of nitrogen oxides and carbonic oxide in residential areas that are closest to the boiler houses are not.

Keywords: thaws, periodicity, duration, temperature regime, synoptic processes, circulation conditions.

Fig. 2. Tab. 4. Ref. 7.