

Theoretical research on the global electrical circuit in the atmosphere (review). Morozov V. N. Proceedings of the MGO. 2020. V. 597. P. 6—33.

A review of theoretical works on the global electrical circuit in the atmosphere, carried out both in the Russian Federation and abroad, is considered. The main results are obtained for both stationary and non-stationary models. For stationary models, the problem of interpreting the Carnegie curve describing the global, unitary variation of the electric field strength is analyzed, the influence of solar activity on the modulation of the intensity of galactic cosmic rays is analyzed, the effect of the aerosol component of the atmosphere on the global electrical characteristic of the atmosphere, the ionosphere potential, is analyzed. For non-stationary models, the effect of lightning bolts on variations in the ionosphere potential is investigated. Since, as follows from the papers cited in the article, thunderclouds are the main generator of the electric field of the atmosphere, it is necessary to develop a mathematical model of thundercloud that connects to the global electric circuit model.

Keywords: global electric circuit, ionosphere potential, atmospheric electrical conductivity, lightning currents, numerical models of the global electric circuit.

Tab. 1. Ref. 56.

About the effectiveness of modifying a convective cloud with ice-forming agents. Drofa A. S. Proceeding of MGO. 2020. V. 597. P. 34—50.

The effects of ice-forming agents on the convective cloud for rainfall enhancement were studied with the use of a numerical 3D-model. Using the example of typical for two different regions of Russia clouds, the conditions for obtaining the maximum possible amount of additional precipitation were clarified.

To obtain a significant rainfall enhancement at relatively low reagent costs it is necessary to have a sufficiently large area in the super cooled zone of the cloud. When artificial nuclei of crystallization are introduced into this area, the necessary conditions for effective transformation of cloud droplets into ice particles must be realized.

Keywords: convective clouds, ice-forming agents, complex method, precipitation formation efficiency, nuclei of crystallization.

Tab. 2. Fig. 4. Ref. 16.

Experimental research of the ice-forming efficiency of the AD1 pyrotechnic composition with zinc additions. Khuchinaev B. M., Baisiev H.-M. Kh., Gekkieva S. O., Budaev A. Kh. Proceedings of MGO. 2020. V. 597. P. 51—60.

The results of laboratory experiments to investigate the possibility of further increasing the efficiency of pyrotechnic compositions used in anti-hail products of the Alazan-6 and Alazan-9 type are presented. The pyrotechnic composition AD1 with the addition of finely dispersed zinc powder with particle sizes from 0.01-0.05 mm was used as a test material, which was introduced into the original pyrotechnic composition in a ratio to its total mass of 3, 6 and 9%, respectively.

Keywords: active impact on clouds, pyrotechnic composition, reagent, ice-forming particles, zinc.

Tab. 5. Fig. 3. Ref. 4.

Microclimatic characteristics of the Kholatchakhl mountain region (Dyatlov pass) for February 1—2, 1959. Pigoltsina G. B. Proceedings of MGO. 2020. V. 597. P. 61— 89.

The article presents the results of a microclimatic expert study of the Kholatchakhl mountain area (Dyatlov pass) in the Sverdlovsk region. The calculation of the values of meteorological indicators and the microclimatic characteristics of the given area were carried out for the period from 13:00 on February 1 to 19:00 on February 2, 1959, i.e. for the period including the arrival time of tourists of the Dyatlov group to the slope of Holatchakhl and the next day.

Keywords: Dyatlov pass, microclimatic indicators, mountainous relief, synoptic conditions.

Tab. 4. Fig. 7. Ref. 10.

Monitoring of glaze and rime coating characteristics over the Russian territory in the cold season of 2017/18. Arzhanova N. M., Korshunova N. N. Proceedings of MGO. 2020. V. 597. C.90—103.

Glaze-ice and rime coating characteristics in the cold season of 2017/18 are analyzed. The characteristics considered are the maximum number of days, weight and duration. Normal values are calculated to estimate the abnormality of glaze-ice and rime coating characteristics. Data from 998 Russian meteorological stations of the Roshydromet National Observation Network are used.

Keywords: glaze ice, crystal rime, granular rime, wet snow deposition, anomalies.

Fig. 4. Ref. 9.

Assessment of the impact of climate change on the irrigation norm of agricultural crops in the Almaty region of the Republic of Kazakhstan. Baisholanov S. S., Mukanov E. N. Proceedings of MGO. 2020. V. 597. P. 104—117.

The agricultural crops which heat supplied in the Almaty region are identified. The aridity of the growing season in the conditions of current and expected climates by 2030 and 2050 is estimated. The total water demand of agricultural crops was calculated under the conditions of modern and expected climates by 2030 and 2050. Based on the total water demand and precipitation, the irrigation norm of crops was determined in the conditions of modern and expected climates by 2030 and 2050. The expected climate change will lead to an increase in the irrigation norm of agricultural crops, depending on the duration of their vegetation, by 2030 by 6–10%, and by 2050 by 14–21%.

Keywords: agriculture, irrigated agriculture, irrigation rate, agriculture crops, vegetation season, total water consumption, climate, climate change.

Tab. 5. Fig. 1. Ref. 10.

Temperature of the peat deposit for marshland of the Kola Peninsula. Kalyuzhny I. L., Lavrov S. A. Proceedings of MGO. 2020. V. 597. C. 118—134.

Long-term integrated observations at marshland of the Kola Peninsula has allowed to assessment relationship between main characteristics of the peat deposit temperature regime and basic affecting factors. Periodicity of the surface air temperature changes cause changes in temperature of the marshland surface and peat deposit. During a warm period of the year (June, July, August) minimal monthly temperature of the marshland surface is correspondingly equal to $(-2,4)$ °C, $0,74$ °C and $(-1,6)$ °C. Marshland frosts within summer are observed from 10 to 25 days per month. Mean annual temperature for peat deposit of depth from 20 to 160 cm is equal to $2,2$ °C, while for upland plots of the same depth mean annual temperature amounts $3,4$ °C. Annual temperature fluctuations for peat deposit is less than for upland plots. Mathematical modeling made it possible to determine a trend of mean annual temperature for peat deposit equal to $0,045$ °C/year, that is significantly more than for upland plots.

Keywords: marshland of the Kola Peninsula, temperature of the peat deposit surface and in depth, affecting factors, temperature trends

Tab. 3. Fig. 8. Ref. 10.

Total suspended particles and nitrogen dioxide in St. Petersburg airhead: subjective assessments, measurements, calculations. Ziv A. D., Dvinyanina O. V., Solov'eva E.A. Proceedings of MGO. 2020. V. 597. C. 135—161.

Paper gives brief overview of the of particulate matter and nitrogen dioxide air pollution in Saint Petersburg, Russian Federation, based on data for 2014-2018. As the dustiness of the city environment is rather evident and this feature concerns the number of other cities in Russia authors analyzed the spatial –temporal patterns of PM pollution and its possible connection to NO₂ pollution. Based on this comparison together with modelling of long term average concentrations authors make the attempt of quantitate evaluation of contribution of the auto transport.

Keywords: particulate matter, nitrogen dioxide, air pollution modelling, average concentrations.

Tab. 4. Fig. 6. Ref. 32

Experience of multispectral multilevel ecomonitoring of the industrial waste storage sites caught up inside the urban development (ash dump located at the Dal'nevostochny avenue as an example). Melentyev V. V., Melentyev A. V., Matelionok I. V., Smirnova A. S., Chernook V. I. Proceedings MGO. 2020. V. 597. P. 162—171.

The problems of ecomonitor industrial waste storages with using satellite SAR discussed and perspective of practical applying of multispectral instruments installed onboard drones for documental charting of dusting areas are fixed.

Key words: ecomonitoring, waste storage sites, ash areas, satellite SAR survey, multispectral drones.

Fig. 6. Ref. 7.

Experimental work to determine evaporation from the water surface at VNIGL water-evaporation plants for the period from 1950 to 2019. Kalyuzhny I. L., Reshetnikov F.Yu. Proceedings of MGO. 2020. V. 597. C.172—188.

The article discusses the stages of development of the water-evaporation complex of the FSBI “SHI” Valdai branch. As a result of the first stage of work, based on field studies, the main technical characteristics of network devices, a GGI-3000 evaporator and a standard pool of 20 m² were defined. The main results of the subsequent stages of determining the evaporation characteristics by evaporators and pools installed on the dry land, the coastal zone of the lake and on the float are considered. It is shown that the inter-correlation relations between data from the evaporators are determined by a correlation coefficient not lower than 0,90—0,97. The closest values of evaporation in relation to evaporation from the pool are the data from of a thermally insulated evaporator GGI-3000TM.

Keywords: evaporation, water surface, evaporators, pools, Valdai.

Tab. 7. Fig. 5. Ref. 16.