

# PROCESSES IN A PLASMA OF A CUMULUS CLOUD

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Processes in a plasma of a cumulus cloud, involving a water saturated vapor in air with charged water microdroplets, lead to formation of atmospheric electricity. The Earth is negatively charged, and its charging occurs as a result of the fall of negatively charged microdrops of water under the influence of the gravitational field of the Earth in a cumulus cloud. This concept of atmospheric electricity generation has existed since the first half of the twentieth century, and the task of the analysis is to detail it based on measurements and numerical estimates for global electrical parameters of the atmosphere based on physical principles. The conditions under which the negative and positive charges of the atmospheric plasma of a cumulus cloud can be separated are formulated. Atmospheric air ionization occurs under the action of secondary particles of a nuclear reaction involving a cosmic particle and the nucleus of an air molecule in a region of about 1 cm in size. Charging of large microdroplets occurs at the first stage of relaxation of the plasma formed, and after their departure from the ionization region for a time of about 1 s. small water microdroplets acquire an excess positive charge. The subsequent separation of the charge occurs as a result of different rates of incidence in the ascending air flow of negatively and positively charged microdroplets. This nature of the processes is characteristic of a nonuniform distribution of microdroplets in a cumulus cloud in the form of jets. The subsequent growth of microdroplets, as well as an increase in the strength of the electric field and electric current inside the cumulus cloud occurs during the entire lifetime of the cumulus cloud. The analysis shows that the contribution of lightning in the Earth's charging is several percent, whereas the main contribution to this Earth's charging results from the fall of negatively charged microdroplets. Their size is the order of 20 microns on the last part of the existence.