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## Observation of neutron burst associated with cloud-to-ground lightning discharges

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The made at the Institute for Cosmophysical Research and Aeronomy of an instrument system for the synchronous recording of variations in the neutron flux, the atmosphere electric field strength and the electromagnetic radio emission during lightning discharges is reported. Neutrons were detected at Yakutsk (altitude 94m, latitude 61°59.362' N, longitude 129°41.874' E) by a low-energy cosmic-ray SNM-15 lead- covered neutron counter and lead-free neutron counter with 10-μs resolution are obtained during short-range lightning events in the vicinity of Yakutsk. In the immediate vicinity of the neutron detectors the electric field-mill was installed to register the electric field and its variations during thunderstorms. The electric field-mill was calibrated in an artificial electric field and has a measurement range of ±50 kV/m. A linear antenna is mounted in the vicinity of neuron detectors to sense the short-term electric field variations associated with a lightning discharge. It was found that the neutron bursts are observed in the negative lightning discharge only. It was established that all the neutron flux bursts were observed during the thunderstorms with the only type of electric structure of the thundercloud having a compact positive charge at the bottom. We discuss the possibility of generation of neutrons in the lower part (the point of impact into the ground) lightning discharge.

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## UV radiation from the atmosphere: Results of the MSU satellites measurements

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Moscow State University had launched several scientific- educational micro satellites "Tatiana", "Tatiana-2" and "Vernov" with one of the tasks - a search of near UV glow of the atmosphere. Short review of their results will be presented. In 2016, as a continuation of the previous work on study of the transient atmosphere glow in near UV, new satellite "Lomonosov" expected to be launched. Large aperture telescope TUS on board this satellite is able to measure atmosphere fluorescence radiated by different transient sources in the Earth atmosphere. The shortest signals (tens of microseconds) are expected from extensive air showers generated by ultra high energy cosmic rays. Electronics of TUS starts to measure images of this phenomenon with time resolution 0.8 microseconds. Longer (up to seconds) signals are expected from atmosphere electric discharges, from dust grains and meteoroids burned out in the atmosphere. Data on the atmosphere ultraviolet transients initiated by electric discharges are of special interest.

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