

## Study of cosmic ray variations in 2021-2022 based on the ENU scientific complex data

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This work presents a comparative analysis of the time changes in the secondary cosmic ray fluxes recorded by the detector modules of the L.N. Gumilyov ENU scientific complex during the period of powerful geomagnetic disturbances on 04.11.2021 and 13-14.03.2022. Noticeable changes in the geomagnetic indices, solar wind plasma velocity and the potential gradient of the surface electric field were observed. The results of the analysis are presented, the Forbush-decreasing effect is highlighted, and the characteristics and features are considered.

The time intervals in 2021 for which an increase in the particle flux relative to the background one was also observed and registered by the ENU detectors. They are in possible association to electrified clouds, lightning activity, thunderstorms, emission of natural radionuclides, variations of the surface electric field are discussed. The main features of each recorded event are considered. It's shown that several increase events correlate with the dynamics of the surface electric field potential gradient.

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**Primary author:** Prof. MORZABAEV, Aidar (L.N. Gumilyov Eurasian National University)

**Co-authors:** Prof. MAKHMUTOV, Vladimir (Lebedev Physical Institute of the Russian Academy of Sciences); Dr YORKHOV, Vladimir (Lebedev Physical Institute of the Russian Academy of Sciences); Mr FILIPPOV, Maksim (Lebedev Physical Institute of the Russian Academy of Sciences); Dr TULEKOV, Yerzhan (L.N. Gumilyov Eurasian National University)

**Presenter:** Prof. MORZABAEV, Aidar (L.N. Gumilyov Eurasian National University)

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