

## **MID-LATITUDE AURORAS WITH DATA FROM OPTICAL INSTRUMENTS OF THE NATIONAL HELIOGEOPHYSICAL COMPLEX**

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Optical instruments of the National Heliogeophysical Complex (NHC) recorded 45 mid-latitude auroras (MLA) at the beginning of the cycle 25 of solar activity. Of these, in 26 cases, structures corresponding to SAR arcs were observed in the airglow. The NHC optical instruments include all-sky cameras, Fabry-Perot interferometers, photometers and spectrometers in the visible and infrared ranges.

We obtained MLA registration statistical data by all-sky cameras depending on the geomagnetic situation. The Kp and Dst indices were chosen as indicators of geomagnetic disturbance. In addition, attention was paid to the presence of structures similar in spatial characteristics to SAR arcs. Based on these data, threshold geomagnetic indices were obtained, at which the operator manually differentiated MLA, including spatial structures similar in their characteristics to SAR arcs, in the images of all-sky cameras in the 630 nm channel. Next, based on the obtained threshold geomagnetic indices, we assessed favorable periods for recording MLA with all-sky cameras. A seasonal variation in the number of registered MLA per month and the number of “favorable” periods for the MLA development was obtained. The geographic latitude distribution of observed SAR arcs was also obtained depending on the Dst index based on data from the NGC all-sky cameras. Such dependencies make it possible to identify cases with atypical dynamics of MLA structures. One of the storms that differs from the average distribution is the extreme storm of May 10–12, 2024. The dominant emission of this MLA was the forbidden lines of atomic oxygen [OI] 630.0 and 557.7 nm, with the ratio of these lines intensities at the aurora maximum up to 15 above the northern horizon, and up to 30 at the celestial pole. The 630.0 nm airglow intensity during the main phase of the magnetic storm exceeded 25 kR.

Experimental data were obtained using the equipment of the Angara Shared Equipment Center (ISTP SB RAS) <http://ckp-angara.iszf.irk.ru/>.

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