Spatiotemporal characteristics of the December 1, 2023 magnetic storm on data from the NHC optical complex and the Irkutsk Regional Astronomical Society

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The paper considers a strong geomagnetic storm on December 1, 2023, during which mid-latitude aurora (MA) was recorded at the Geophysical Observatory of the ISTP SB RAS (103°04`E, 51°48`N) using optical instruments of the NGK . Due to the high intensity of the mid-latitude aurora, its registration was possible not only with specialized optical instruments, but also with household cameras. The minimum value of the Dst index on the observation day was -108 nT, the Kp index reached 7.

The optical complex of the National Heligeophysical Complex (NHC) is located at the Geophysical Observatory of the ISTP SB RAS and includes all-sky cameras, photometers, spectrometers and Fabry-Perot interferometers. The Irkutsk Regional Astronomical Society (IRAO) and astronomy enthusiasts took photographs using digital cameras at several points within the Irkutsk region.

A joint analysis of the obtained images was performed using the georeferencing technique [Syrenova et al., 2021] of frames from the NGK camera and photographs of astronomy enthusiasts. The spatiotemporal characteristics of the observed MA structures are presented, calculated taking into account spatially separated images of simultaneous observations.

With growing interest in aurora and mid-latitude auroras, combining citizen science observations at multiple locations with data from monitoring observatories is relevant for improving the accuracy of characterizing geomagnetic storm events.

1. Syrenova, T.E.; Beletsky, A.B.; Vasilyev, R.V. Geograficheskaya privyazka kadrov shirokougolnyh system. J. Teh. Fiz. 2021, 91, 1990–1996. (In Russian)