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**The need to transition from the planetary K-index to the local K-index
when assessing geomagnetic activity in Israel and Western Asia**

ANNOTATION: Comparative data on geomagnetic activity with the planetary index Kp and data on geomagnetic activity for the observatory located at the geographical latitude of Israel show higher values of Kp in relation to the K index for our latitudes. Considering the absence of an observatory in the region of Israel that measures geomagnetic activity and the relevance of such information not only by latitude but also by geographical longitude, it is proposed to create a laboratory of geomagnetic measurements at the observatory of Israel, which would provide a sufficiently large region of Western Asia with useful information on geomagnetic activity and present the K index at the latitude and longitude of this region to international centers.

KEYWORDS: Magnetosphere, geomagnetic activity, planetary index Kp, local K-index.

Introduction

Depending on the latitude, the magnitude of the Earth's magnetic field at its surface has values from 25 to 65 μT [1]. And a number of works have considered the change in geomagnetic activity depending on the latitude of the area [2,3]. Moreover, the farther from the equator, the greater the value of geomagnetic activity can be.

There is also a dependence of the geomagnetic field on local time, shown in [4,5]. And this can be reflected in the generalized data not only by latitude, but also by longitude for a given region.

The magnitude of geomagnetic disturbance is often estimated by the K-index, which is a quasi-logarithmic local index of the 3-hour range of magnetic activity relative to the assumed curve of a quiet day for one geomagnetic observatory. In this case, in the absence of local data on geomagnetic activity in a local region, in most cases the planetary Kp-index is used, calculated as the average value of the K-indices determined at 13 geomagnetic observatories [6] located between 44 and 60 degrees north and south geomagnetic latitudes.

Comparative analysis of Kp and K indices

The values of the planetary Kp index are often used in Israel to assess geomagnetic disturbances in our region [7]. And on the website of the Institute for Integration and Professional Adaptation, in the Current Solar Activity Forecast section [8], the Kp forecast for the next 3 days is given, published by the Space Weather Prediction Center (SWPC) of the National Oceanic and Atmospheric Administration [9]. And earlier, based on the data [9], the Kp values were given for the previous 5 days.

However, since the Kp index is calculated based on the K index data obtained from observatories located at higher latitudes than Israel, it was assumed that the Kp value would be higher than the actual K index value in Israel. And this assumption, in particular, was confirmed by comparing the data on geomagnetic activity with the planetary Kp index and the data K index on geomagnetic activity for the observatory located at a latitude close to Israel.

Fig. 1 shows the K-index data of four observatories located at different latitudes for three days from January 16 to 18, 2025, taken from [9]. From Fig. 1 it is clear that the higher the observatory in latitude, the higher the Kmax value. Thus, for the College Observatory, located at a latitude of

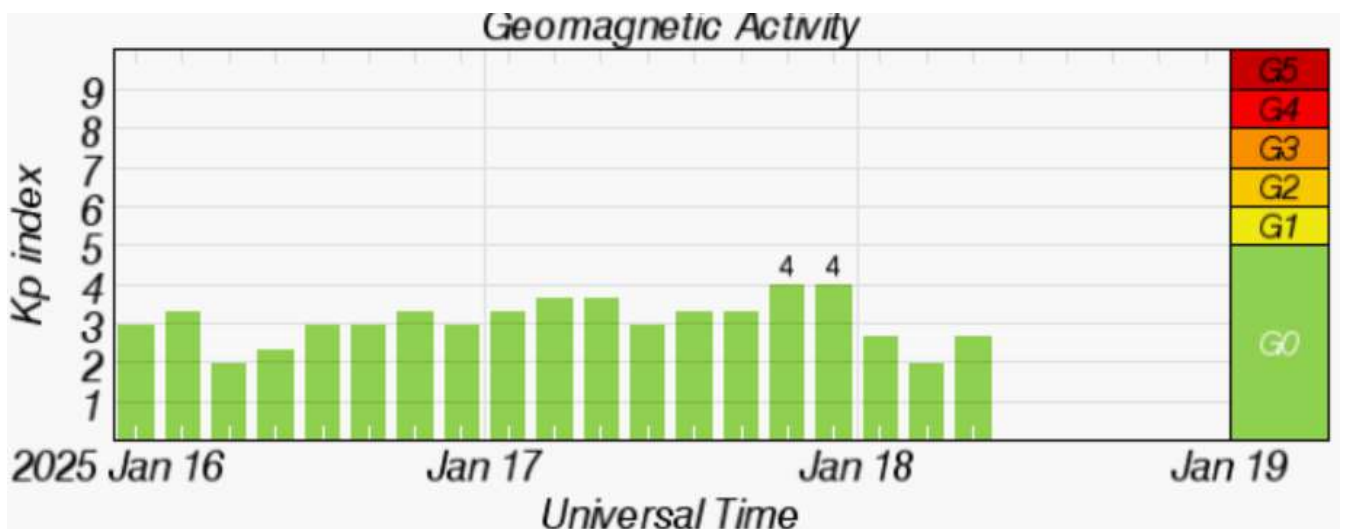


Fig.2

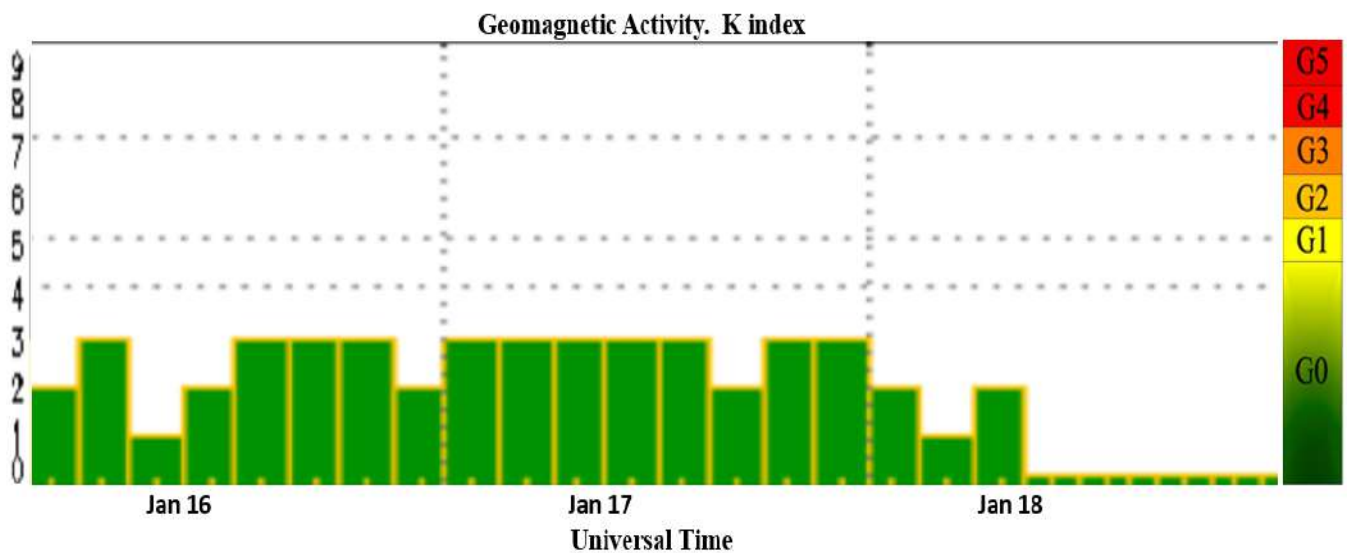


Fig.3

Conclusions

We consider it expedient to create a laboratory of geomagnetic measurements in the observatory of Israel, which would provide our rather large region with useful information on geomagnetic activity and represent the K index at our latitude and longitude to international centers.

Taking into account our knowledge and experience in the development of measuring instruments, including equipment for spectral analysis and magnetometry, the employees of the Institute of Integration and Professional Adaptation are ready to help in this important matter for Israeli science and practical tasks

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