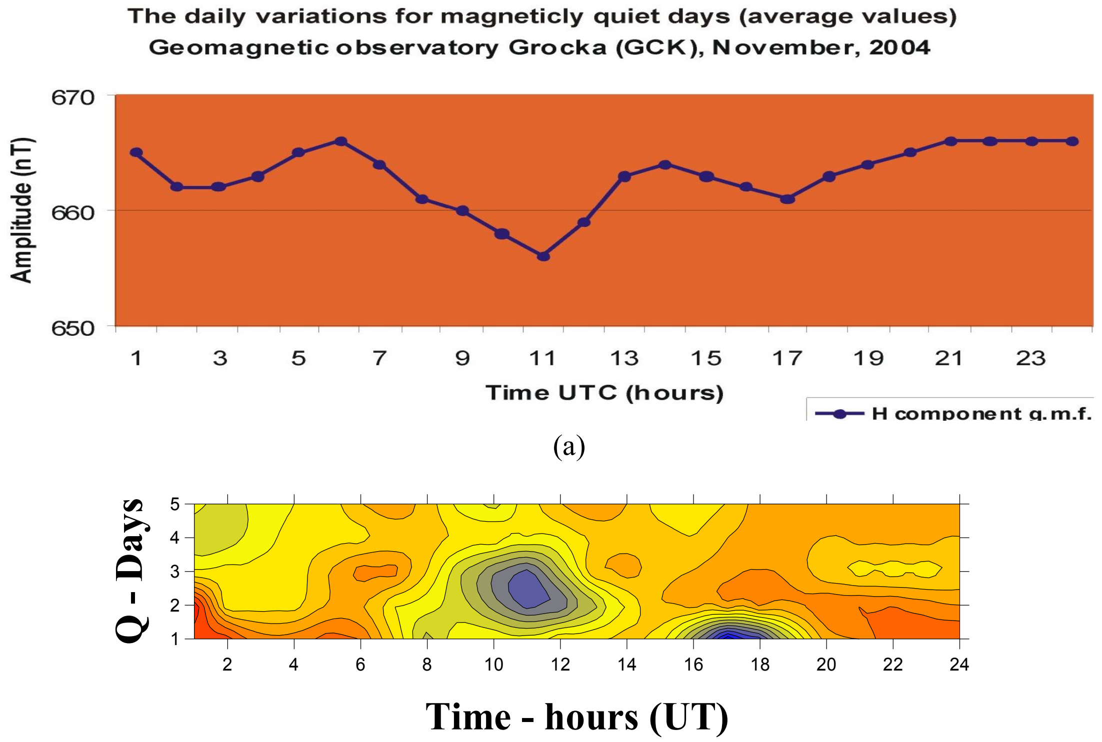
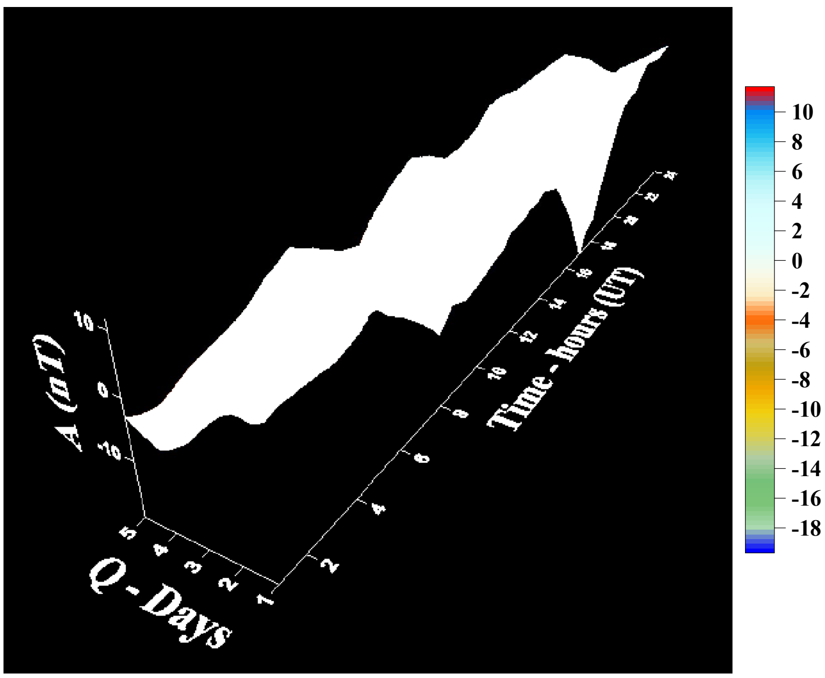
On the S_d disturbed daily variation is registered maximum value from $H = 22\ 728$ nT, to minimum hourly mean value of the horizontal component of geomagnetic field from $H = 22\ 429$ nT. Deviation maximum hourly mean value from the $S_{d(\text{mean})}$ value was $\Delta H_{\max(d)} = +140$ nT, and deviation minimum hourly mean value was registered $\Delta H_{\min(d)} = -159$ nT (Fig. 10a,b).

The rang, apropos the distribution extreme values of S_d variation, for magnetic disturbed days, in November 2004, on Geomagnetic observatory Grocka (GCK) was $\Delta H_d = 299$ nT (Fig. 10a,b).

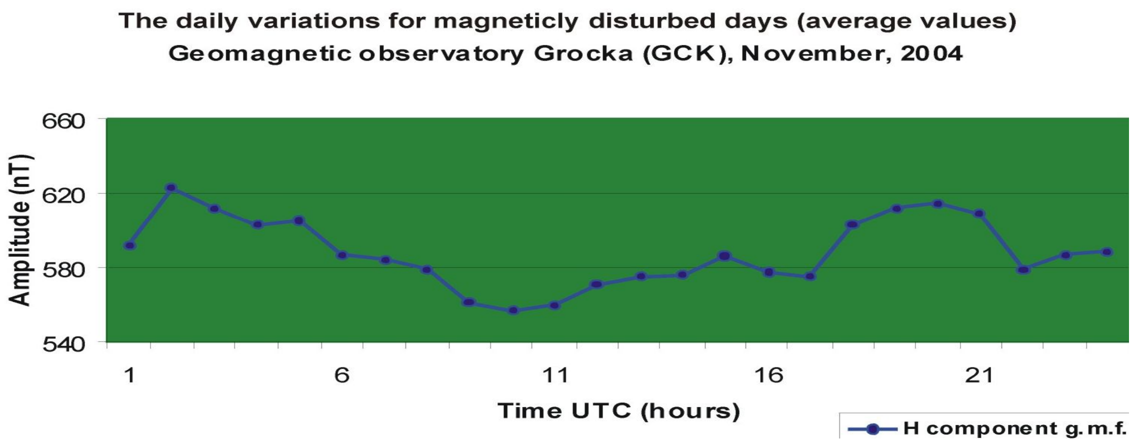


(a)

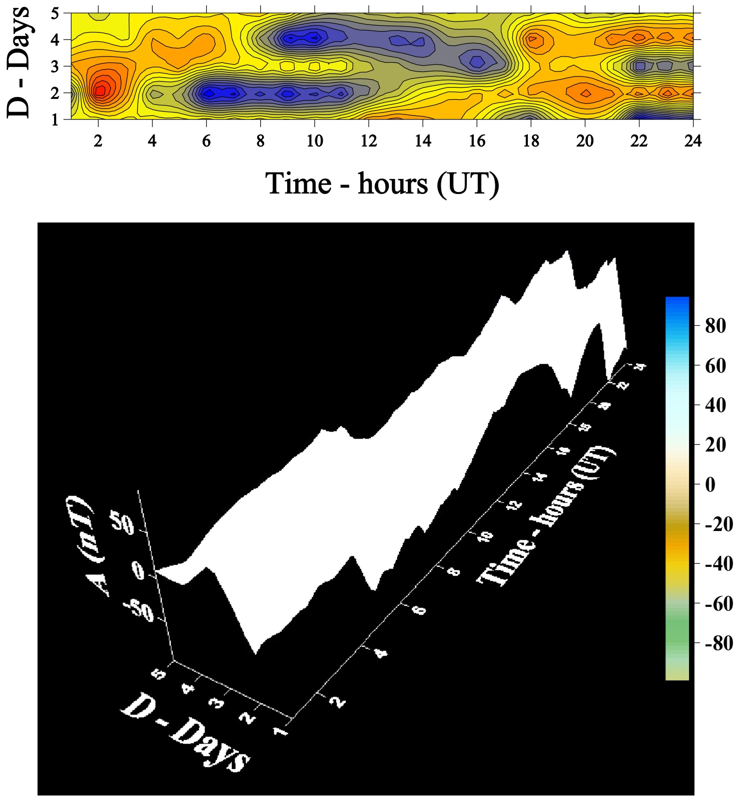


(b)

Fig. 9. The structure of the S_q daily variation for magnetically quiet days which were recorde on November 2004, at the Geomagnetic Observatory Grocka (GCK)



(a)



(b)

Fig. 10. The structure of the S_d daily variation for magnetically disturbed days which were recorded on November 2004, at the Geomagnetic Observatory Grocka (GCK)

CONCLUSIONS

In this study are shown the results of researching of structure regular (periodical) daily variations of geomagnetic field. The results of analyses show how on class of regular daily variations affect extreme changes of solar-geomagnetic activity. Amplitude (magnitude, rang, intensity) of regular daily variations of geomagnetic field is most changed in days when are registered extreme solar geophysical event, as are solar storms, magnetic storms.

In this work is shown one part of researching results of regular daily variations of geomagnetic field components, and indices of geomagnetic activitz. In analyses are used minute registrations and hourly values of geomagnetic field components, in October 2003 and November 2004, from Geomagnetic Observatory Grocka, GMO (GCK) and Geophysical Observatory L'Aquila (AQU).

Changes in the conditions of geomagnetic activities are generated by changes in the mechanism of solar-geophysical activity. Changes in geomagnetic activities during the different phases of the solar cycle may have different forms – from those observed as a daily variation to pulsation. The daily variations and pulsations recorded at observatories are demonstrated by the values of the geomagnetic field's components per minute and per second, respectively.

In 23rd solar cycle, in post-maximum phase or phase secondary maximum, are registered extrem conditions in solar geomagnetic activity. Those are solar and geomagnetic disturbances, which are defined as intensive solar and magnetic storms. One exceptional phenomenon in solar-geomagnetic activity was October magnetic storm (from October 29, 2003) and second event was November magnetic storm (from November 07. 2004).

The S_q regular daily variation which was recorded at the Observatory GMO (GCK) in October 2003, is serial sine-wave signal. The rang S_q daily variation in October 2003, t the Observatory GMO (GCK) was about $\Delta H = 32$ nT.

The S_q daily variation for magnetically quiet days in November 2004, recorded at the Observatory GMO (GCK), had an amplitude of $\Delta H = 41$ nT.

The rang of S_d daily variation for magnetic disturbed days class $d_{(1–5)}$ in October 2003, on GMO (GCK) was $A = 329$ nT. Rang daily variation S_d in November 2004 was $A = 299$ nT. Those were geomagnetic disturbances, apropos intensive magnetic storms class, which is determined phase of secondary maximum, in twenty third cycle of geomagnetic activity.

The structure of variations which was recorded during the October Big Magnetic Storm has three cycles of reduction or depression in the magnitude in the horizontal component (ΔH), and the structure of variations which was recorded during the November Big Magnetic Storm has two cycles of depression in the magnitude of the horizontal component (ΔH) geomagnetic field. The cycles of the magnitude ΔH of changes in the geomagnetic field lasted about ten hours.

In the solar-geophysical investigations possibly have named few kind of division of the *D* field, based on physical considerations (the *D* field – disturbance part of geomagnetic field). These are associated with theoretical ideas as to the electric current systems by which the *D* field is produced.

The DCF field is produced by electric currents flowing near the surface of the hollow carved by geomagnetic field in the solar stream or cloud that generates magnetic storms. The current flows as long as the corpuscular flux continues. The main effect of the DCF field at the Earth's surface is to increase *H* component in low and middle latitudes, more on the dayside than on the nightside of the Earth.

The DR field is produced by enhanced west ward electric current round the Earth during the storm. This current is associated with the motions of energetic particles in the outer geomagnetic field. The main effect of the DR field at the Earth's surface during storms is to reduce *H* component in low and middle latitudes. The DCF and DR currents flow at distances of a few Earth radii far above the main terrestrial ionosphere.

The DP field is produced by currents flowing in the ionosphere. They are driven by elelctromotive forces in the auroral zones. This DP field has a different time scale from that of magnetic storm. They may be a fourth addition to the preexisting fields during the storm. The solar gas may carry with it a magnetic field transported away from the Sun. This field may be denoted by DSM – Disturbing Solar Magnetism (S-J. Akashofu, Chapman S., 1972).

The mass, quantity and strength of energetic flows in Sun's magnetic field, speed of Sun's wind, CMEs energetic flows, energetic magnetic clouds and dynamic of solar-geomagnetic processes, which happen in sources of D field, were extremely strong in October 2003 and November 2004. Named solar-geophysical processes were source of intensive extremely disturbances and magnetic storms in geomagnetic activity.

The structure of variations which was recorded during the October Big Magnetic Storm has three cycles of reduction or depression in the magnitude in the horizontal component (ΔH), and the structure of variations which was recorded during the November Big Magnetic Storm has two cycles of depression in the magnitude of the horizontal component (ΔH) geomagnetic field. The cycles of the magnitude ΔH of changes in the geomagnetic field lasted about ten hours.

The complex spectrum of the variations of the geomagnetic field which were recorded during the October and November Big Magnetic Storms indicates extremely strong processes in energy exchange in the solar magnetic field, and extremely high incidences of solar flares, proton fluxes and CMEs which induced very major changes in interplanetary conditions and consequently in solar-geophysical conditions and geomagnetic activity conditions.

This study shows the results from a survey of the structure of the regular or periodic daily variation in the geomagnetic field. The influence of changes in solar and geomagnetic activities on this type of variation is also shown. The periodic diurnal variation in the geomagnetic field is most intensive during the days in which extreme solar-geophysical activity is recorded, such as during solar storms, geomagnetic disturbances or geomagnetic storms.

Acknowledgements: Results of researching of geomagnetic field variations and geomagnetic disturbances (geomagnetic storms), which are registered on European observatories of middle geomagnetic latitude, are shown on workmanship assemblies and workshops, in international MEM Project, which last from 2004 to 2008. In this work is shown the part of results of those researching.

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Р е з и м е

ИСТРАЖУВАЊА НА СТРУКТУРАТА НА ДНЕВНИТЕ ВАРИЈАЦИИ НА ГЕОМАГНЕТНОТО ПОЛЕ

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Клучни зборови: соларна активност; геомагнетна активност; дневни варијации; геомагнетни нарушувања

Промените на соларната активност влијаат на промените на геомагнетната активност. Структурата на геомагнетната активност МСЕ може да се прикаже со класата периодични и апериодични варијации на геомагнетното поле.

Во трудот се прикажани резултатите од анализата на периодичните и апериодичните дневни варијации на геомагнетското поле (класа на варијации S_q и S_d) и резултатите од анализата на нарушувањата на геомагнетската активност (класа на индексот R_i и K_p). Класата на дневните варијации на геомагнетното поле е анализирана за месеците кога се регистрирани интензивни соларни и мегнетни бури, а тоа беше во октомври 2003 и ноември 2004 година. Во анализите се користени индексите на соларно-геомагнетните активности и средночасовните вредности на компонетите на геомагнетното поле, кои се регистрирани на Геомагнетната опсерваторија Гроцка (GCK), Србија.