Geophysical Research Abstracts,
Vol. 10, EGU2008-A-00784, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-00784
EGU General Assembly 2008


# Influence of the solar wave and corpuscular radiation variation on the calculation of the secular variation of the Earth's main magnetic field

S. Filippov, L. Gromova, L. Dremukhina, A. Levitin, T. Zvereva

Pushkov Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation of Russian Academy of Sciences (IZMIRAN), 142190, Troitsk, Moscow Region, Russia (sfilip@izmiran.ru)

Modern models of the International Geomagnetic Reference Field (IGRF) are developed basically by means of the spherical harmonious analysis (SHA) of satellite data. The time changes of a geomagnetic field are estimated by these models. In particular, one of the integrated characteristics of a geomagnetic field are parameters of the central dipole – coefficients $g_1^0$, $g_1^1$, $h_1^1$. Calculation of changes of these parameters by last models IGRF (2000.0, 2005.0) leads to a conclusion - the central magnetic dipole (it is about 90 % of the whole energy of geomagnetic field) decreases about 15 nT/yr. Our work shows, that this decrease is overestimated approximately in 3 times. To prove this statement, 450 daily models of a geomagnetic field have been constructed at an interval 2001-2005. For this purposes data of CHAMP mission were used. Further the correlation factor between time series of $g_1^0$, $g_1^1$, $h_1^1$ of these models and daily average values of F10.7 index, describing parameters of solar wave radiation have been estimated. The same estimates were made for daily average values of parameter $\Sigma$vBs, describing corpuscular radiation of the Sun - the sums of hourly average values vBs for a day (Bs=0 for Bz$>$0; Bs = - Bz for Bz$<$0; v - speed of a solar wind). These parameters of solar wave and corpuscular radiation reflect time dynamics of ionospheric currents governed by conductivity of an ionosphere and an ionospheric electric field. Factors of correlation of $g_1^0$, $g_1^1$, $h_1$ and F10.7, $\Sigma$vBs have turned out to be equal 0.7. By means of the certain technique we managed to clarify the factors named above of influence both wave (F10.7) and corpuscular ($\Sigma$vBs) radiation of the Sun. In this

case speed of decrease of the central magnetic dipole of the Earth appears to be equal about 5 nT/yr, that is almost three times less, compared with those followed from IGRF models. The suggested way of the account of wave and corpuscular radiation of the Sun can be used to increase an accuracy of IGRF models.