



Interpretation of the near-Earth external fields in the GSM and SM frames

H. Lühr (1), and S. Maus (2)

(1) GeoForschungsZentrum Potsdam, Germany, (2) National Geophysical Data Center, NOAA, Boulder, CO

Satellite data sampled at a low-Earth orbit allow for the separate determination of the external contributions caused by currents in the magnetosphere. We have used day and night side Oersted and CHAMP data from the years 1999 to 2004 to investigate this field component. In contrast to earlier studies, we decomposed the field into contributions originating from sources organised in the Solar-Magnetic (SM) frame and those in the Geocentric-Solar-Magnetospheric (GSM) frame. For an Earth-fixed observer, stable fields in those frames generate diurnal and annual variations which in return cause induction currents in the subsurface layers. All of these effects have been modelled here. Our primary results are: There is a dominant constant magnetic field of about 13 nT in the GSM frame pointing southward. This field component is attributed to the quiet-time tail current system. For the SM frame we obtain a constant field of 7.9 nT and a variable part which can be parameterised by the Dst index. The field in SM is attributed to the combined effect of the magnetopause and ring current. A comparison of the external field variations derived from our model with the measurements of latitudinal distributed observatories reveals a remarkable agreement.