Geophysical Research Abstracts
Vol. 13, EGU2011-3387, 2011
EGU General Assembly 2011

Electromagnetic induction at Ganymede

Mario Seufert, Joachim Saur, and Fritz M. Neubauer
Universität zu Köln, Institut für Geophysik, Köln, Germany (seufert@geo.uni-koeln.de)

The interior of Ganymede is assumed to include multiple conductive layers which lead to magnetic signals induced by the variable magnetospheric background field of Jupiter. Candidates for such layers are a possible liquid water ocean between low pressure and high pressure ice layers and the core region of the satellite. The strength of the induced magnetic fields occurring at the surface depends on the frequency and amplitude of the inducing Jovian field and on the conductivity structure inside Ganymede. We determine several frequencies and the associated amplitudes of the Jovian magnetospheric field at Ganymede by analyzing models for the internal field of Jupiter, the magnetospheric current sheet field and the field originating at the magnetopause boundary. The three major periodicities we predict for the background field at Ganymede are: the synodical rotation period of Jupiter with respect to the satellite (10.5 hours), the rotational period of Ganymede itself (171.7 hours) and the rotational period of the sun (641.9 hours) which influences the magnetosphere via the solar wind pressure. This information is used to determine inductive response of Ganymede using an electromagnetic induction model. For two multilayer interior models we give estimates for the strength of the induced field measurable at Ganymede in the presence of conductive ocean and core layers.