Comparison
of Earth's Magnetospheric Magnetic Field Models
in the Context of Cosmic Ray Physics

Laurent DESORGHER[1,2], Karel KUDELA[3], Erwin O. FLÜCKIGER[1],
Rolf BÜTIKOFER[1], Marisa STORINI[4], and Vladimir KALEGAEV[5]

[1]Physikalisches Institut, University of Bern, Bern, Switzerland
e-mails: desorgher@space.unibe.ch (corresponding author),
erwin.flueckiger@space.unibe.ch, rolf.buetikofer@space.unibe.ch

[2]SpaceIT GmbH, Bern, Switzerland

[3]Institute of Experimental Physics, Slovak Academy of Sciences, Košice, Slovakia
e-mail: kkudela@upjs.sk

[4]IFSI-Roma/INAF, Roma, Italy; e-mail: marisa.storini@ifsi-roma.inaf.it

[5]Skobeltsyn Institute of Nuclear Physics, Moscow State University, Moscow, Russia
e-mail: klg@dec1.sinp.msu.ru

A b s t r a c t

Over the last two decades, models of the Earth's magnetospheric magnetic field have been continuously improved to describe more precisely the different magnetospheric current systems (magnetopause current, symmetric and partial ring currents, tail currents and field aligned currents). In this paper we compare the different Tsyganenko models and the Alexeev and Feldstein model in the context of cosmic ray physics. We compare the vertical cutoff rigidity and asymptotic direction of vertical incidence obtained with these models for the January 20, 2005, ground level enhancement and for the big magnetic storm of April 6, 2000. For the event of January 20, 2005, we study the impact of the differences in asymptotic direction obtained with the models on the radiation dose computation at aircraft altitude. For the magnetic storm of April 6, 2000, we discuss the importance of the different magnetospheric current systems in causing cutoff rigidity variations. Finally we summa-

rise the advantages and drawbacks of the different models in the context of space weather.