Geophysical Research Abstracts
Vol. 17, EGU2015-5453, 2015
EGU General Assembly 2015


# Describing temporal variations of the geomagnetic field using a modified virtual observatory scheme: application to Swarm data

Diana Saturnino (1), Benoit Langlais (1), Hagay Amit (1), and Mioara Mandea (2)

(1) LPG Nantes - Laboratoire de Planetologie et Geodynamique CNRS - UMR 6112, University of Nantes, France (diana.saturnino@univ-nantes.fr), (2) CNES - Centre National d'Etudes Spatiales, Paris, France

We propose a new approach to describe the spatial variability of the temporal changes of the geomagnetic field using space measurements. Although the temporal geomagnetic field changes are well described by observatory time series, the characterization of its spatial variability is hampered by the uneven distribution of the observatories. To get a global data coverage and to drastically improve geomagnetic field models the satellite measurements become essential. In these study we analyze these data to directly describe the secular variation, in the same manner as for ground observatory locations. However, it is difficult to directly compare satellite and observatory data due to satellite movements. To overcome this we follow a Virtual Observatories (VO) approach, defining a regular and globally homogeneous mesh of VO volumes at the satellite altitude. As the satellite measurements are acquired at different altitudes for the same defined location, a correction for the altitude dependence is needed. For solving this problem, we apply an Equivalent Source Dipole (ESD) technique. For each VO and during a given time interval, all measurements are reduced to a unique location, leading to time series similar to those available at ground magnetic observatories. Tests with synthetic satellite data are used to validate this approach. We apply our scheme to measurements acquired during the first year of the ESA Swarm mission. We present here the first results over the European area, where we locally compare the VO time series to ground observations, as well as to satellite-based model predictions.