



The Feasibility of the Revised Spherical Cap Harmonic Analysis (R-SCHA): Examples of regional magnetic models and interpretation

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We have recently proposed a new method for modeling the geomagnetic field at the regional scale. This method, called Revised Spherical Cap Harmonic Analysis (R-SCHA), is based on the solution of Laplace equation in a conical region associated with particular boundary conditions. The new mathematical functions are able to represent faithfully the spatial variations of potential fields in a restricted area. In order to outline the relevance of these basis functions, we tackle different inverse problems using this novel method.

First examples are given for the Earth. Indeed, considering satellite data only, we show that the formalism is very efficient to highlight quickly and very accurately the major magnetic anomalies detectable at satellite altitude. Then, by a joint inversion of aeromagnetic, repeat station data and satellite CHAMP data over France, we derive a vectorial regional model with a minimum wavelength representation of 40km.

The second set of examples is chosen for Mars. Results obtained on modeling magnetic data recorded by Mars Global Surveyor mission are presented in order to discuss the importance of magnetism for understanding the history of the solar system. The interpretation of the maps could be used as primary information about the possible resources available on Mars.