1096-41-1644 **Christian Gerhards*** (gerhards.christian@gmail.com), University of Kaiserslautern, Department of Mathematics, 67653 Kaiserslautern, Germany. *Optimized kernels for the combination of global and local data on different spheres.*

Nowadays, a large amount of global satellite data is available for gravity and geomagnetic field modeling. The ill-posed problem of downward continuation, however, renders the reconstruction of strongly localized features at the Earth surface problematic. Data directly collected at the Earth surface does not suffer from this problem. But since surface data is typically only available locally, it is less suited for the reconstruction of global features. Thus, a combination of satellite data with surface data becomes necessary to obtain accurate models.

In this talk, we address the problem based on a multiscale approach with optimized convolution kernels (assuming a spherical satellite orbit and Earth surface). The optimization is done in such a way that the kernels at the lower scales behave well for the downward continuation of satellite data while the kernels at the higher scales have a good spatial localization, i.e., they pay tribute to the local availability of surface data. This allows a smooth combination of both types of data and does not require the patching of two separate (global and local) models. We want to indicate the geophysical background as well as the mathematical aspects of this approach together with numerical tests indicating its performance. (Received September 16, 2013)