

Robust procedure to decompose the geomagnetic field variation and its application to extract a local trend

Ikuko Fujii[1]; Wataru Kanda[2]

[1] Kakioka Magnetic Observatory; [2] DPRI, Kyoto Univ

We develop a robust statistical procedure to decompose an observed geomagnetic field into several components such as a trend, AR component, periodic and externally correlated variations. This is an extended version of our procedure which used the Kalman filter algorithm to decompose the geomagnetic field into a trend, periodic, and externally correlated variations as well as noise. The new version allows non-Gaussian distributions for the noise and the derivatives of the decomposed components by applying the Monte Carlo Simulation method so that outliers can be included and step-like variations of the trend are accepted. Also, combination of the decomposed components is variable for the new version to make a variety of applications possible.

We report on test results using synthetic data sets to evaluate the procedure and on applications to the geomagnetic total intensities observed at volcanoes to monitor slow demagnetization processes.