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Geoscientific Instrumentation Methods and Data Systems Discussions

Interactive comment on "Harmonic quiet-day curves as magnetometer baselines for ionospheric current analyses" *by* M. van de Kamp

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General Comments.

This manuscript presents a new method to remove long-term (e.g., secular and seasonal) and quiet-day (e.g., Sq) variations, as well as some drifts and jumps due to equipment artifacts, from magnetometer records. The goal being to identify the 'disturbance magnetic field' from relatively rapid ionospheric currents other than Sq (e.g., DP1 and DP2). The method is clearly described with step-by-step examples of its application to real data and balanced discussion of merits, issues, and alternatives.

It thus complements several other documented methods currently in use and may provide some advantages over them, such as continuity across day boundaries and improved removal of instrument artifacts. The development of different techniques and

their application to the same data is useful in assessing model error.

For these reasons, the manuscript is a useful contribution to scientific and technical progress.

Specific Comments.

The most disappointing aspect of the manuscript is that the new method has only been compared with two rudimentary baseline methods and not with the most recent state-of-the-art methods. Consequently some of the claims about the advantages of this newest method are not proven. The explanation given is that 'the implementation of those methods is rather complicated', which seems a little weak. Surely the authors of the other methods could have been approached to provide the relevant processed data. Regarding the Gjerloev (2011) method, I believe that data is available with and without baselines removed through the SuperMag website http://supermag.uib.no/, such that this method could have been compared with that presented in the manuscript.

To avoid a perpetuation of this problem, it would be helpful if the author of this manuscript provided a link to supplementary information and computer code for implementation of this new method by other users.

In common with many related methods, the somewhat ad-hoc sequence of processing steps involving very different methodology (medians, interpolation, thresholds, Fourier analysis, etc) makes it difficult to understand the overall filter that has been applied to the data, which may be important for subsequent time series analysis and scientific interpretation of the resulting signal for example.

Technical Corrections.

A number of steps in the procedure are inadequately defined to allow results to be even approximately reproduced by others on other magnetometers:

Discontinuity detection method – p. 96, lines 18-19

Interpolation method (linear, cubic, other?) – p. 98, lines 21-22

Threshold optimisation methods – p. 100, lines 21-22, and p. 102, lines 3-4

Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss., 3, 87, 2013.