

Interactive comment on “Distance Scaling Method for Accurate Prediction of Slowly Varying Magnetic Fields in Satellite Missions” by P. P. Zacharias et al.

Anonymous Referee #1

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General comment: The article demonstrates some peculiarities of measurements during magnetic cleanliness analyzing and interesting methods of estimation of magnetic interference generated by a set of sources localized in an unknown and random way. However, practical applicability of the suggested method is limited to the case when the point of interest is located between two magnetometers (“Extrapolation between the magnetometers”) placed at big enough distance – in this case, one can get much better accuracy in comparison to the widely used model of equivalent dipole. Nevertheless, knowledge of the equivalent dipole parameters is important for prediction of attitude of a satellite (in low Earth orbit).

Major comments: Why values of magnetic field calculated using different approaches

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(both theoretical, actually) are named as “predicted” and “theoretical” (p. 5, line 21) and the difference between them is used as criterion of “quality” of predictions? Especially taking into account next statement: “For low frequencies ($\omega \rightarrow 0$), the vector potential theory and the Biot – Savart law can be used interchangeably” (p.5, l. 4), as well as the fact that all modelling and simulations in the article have been done for DC magnetic field.

Concerning section B. “Extrapolation at larger distances using smoothing technique”, it would be interesting to compare results shown in Fig. 5 with equivalent dipole field - the r^{-3} dependence.

Why Eq. 8 “signifies that the magnetic field fall-off will exhibit the r^{-3} distance power law dependence at smaller distances” (p. 8, l.1)?

Other results are rather trivial – errors decrease when the ratio distance to the EUT’s size increase.

Minor comments:

The abbreviation EUT should be explained when used the first time

The statement about magnetic sources as dipoles: “However, this assumption is not always valid since several parameters of the magnetic sources may have significant impact on the EUT’s magnetic signature.” (p. 1, l. 33) is probably excessive here since it is explained below on p. 2, l. 20.

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