



HAL
open science

Erratum to: Earth's core internal dynamics 1840-2010 imaged by inverse geodynamo modelling

Julien Aubert

► **To cite this version:**

Julien Aubert. Erratum to: Earth's core internal dynamics 1840-2010 imaged by inverse geodynamo modelling. *Geophysical Journal International*, 2014, pp.1683-1683. 10.1093/gji/ggu235 . insu-03581104

HAL Id: insu-03581104

<https://insu.hal.science/insu-03581104v1>

Submitted on 19 Feb 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

Erratum to: Earth’s core internal dynamics 1840–2010 imaged by inverse geodynamo modelling

by Julien Aubert

Dynamique des Fluides Géologiques, Institut de Physique du Globe de Paris, Sorbonne Paris Cité, Université Paris-Diderot, UMR 7154 CNRS, 1 rue Jussieu, F-75005 Paris, France. E-mail: aubert@ipgp.fr

A spurious contribution has been noticed in the residuals of inversions using the COV-OBS main magnetic field. This arose from an erroneous transcription of the covariance matrix \mathbf{R}_B . Being several orders of magnitude below the magnetic field signal, the error does not affect the inversion results themselves but only has an impact on the computation of the misfits (Figs 1 and 2) at epochs where

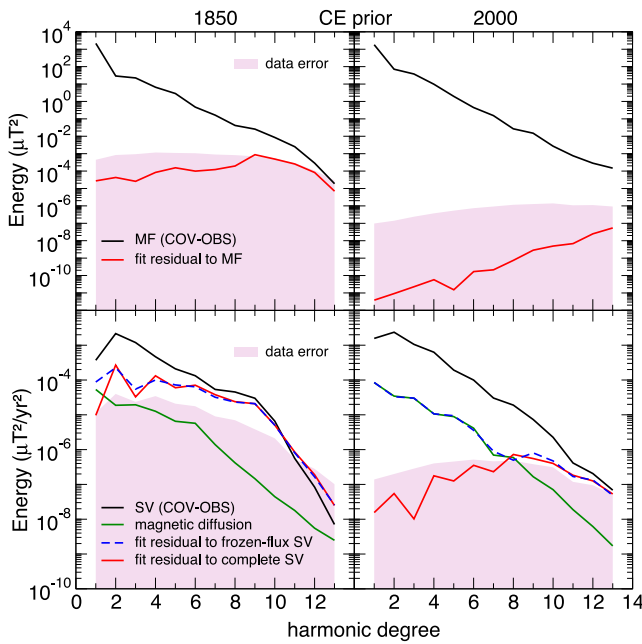


Figure 1. Mauersberger and Lowes energy spectra (black lines) of the main magnetic field (MF, top) and secular variation (SV, bottom) from COV-OBS in 1850 (left-hand side) and 2000 (right-hand side). Also shown are the inversion residuals obtained with prior CE (red lines), together with the typical data error levels (purple zones) prescribed by COV-OBS. These error levels are obtained by summing the diagonal variances in \mathbf{R}_B and $\mathbf{R}_{\dot{B}}$. In the lower panels corresponding to the secular variation, the spectra of the estimated magnetic diffusion $\eta \nabla^2 W_{lm}(r_{\text{CMB}})$ are also reported (green lines), together with the spectra of fit residuals to the secular variation $\mathbf{M}\mathbf{x}_{f_s} - \mathbf{b}$ (red lines). The frozen-flux misfits to the secular variation data in dashed blue lines then correspond to $\mathbf{M}\mathbf{x}_{f_s} - \mathbf{b} - \eta[\nabla^2 W_{lm}(r_{\text{CMB}})]_{l \leq 13}^{\text{Tr}}$.

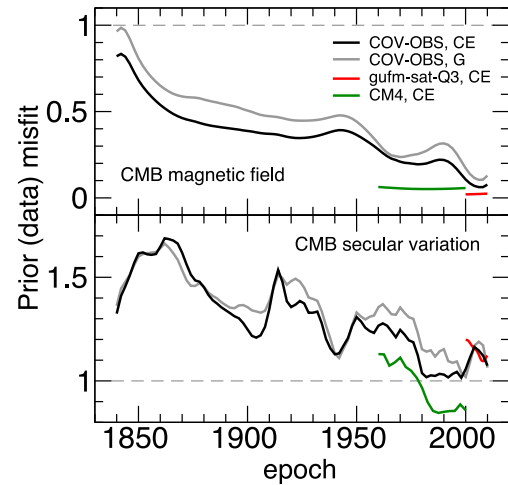


Figure 2. Normalized misfits to the data (prior misfits Δ_B (top) and $\Delta_{\dot{B}}$ (bottom, see text for definitions), obtained by inverting models COV-OBS, gufm-sat-Q3 and CM4 with priors CE and G. A misfit of 1 (dashed grey line) denotes an acceptable fit (0 is optimal).

the data accuracy is higher than the spurious signal. The corrected figures presented here show that the misfits to the main magnetic field data are now acceptable throughout 1840–2010. Points made in the main text concerning anomalously high misfits to the main magnetic field data should thus be discarded. Results concerning misfits to the secular variation data remain unchanged.

REFERENCE

Aubert, J., 2014. Earth’s core internal dynamics 1840–2010 imaged by inverse geodynamo modelling, *Geophys. J. Int.*, **197**, 1321–1334.