A geomagnetic estimate of heliospheric modulation potential over the last 175 years

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CORRECTION

Correction to: A Geomagnetic Estimate of Heliospheric Modulation Potential over the Last 175 Years

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The article "Geomagnetic Estimate of Heliospheric Modulation Potential Over the Last 175 Years" by Owens et al. contained incorrect data in two of the Figures. The Brehm et al. (2021) time series of heliospheric modulation potential presented in Figures 1 and 8 of Owens et al. (2024) was incorrect due to an error in file management. The values shown were around 10% lower. Figures 1 and 2 here show the corrected figures.

These data were only used for illustrative purposes, and thus the main conclusions of Owens et al. (2024) are unchanged. However, the statement in the Discussion section that "The ^{14}C-based estimate of ϕ (Brehm et al. 2021) shows more of a downward trend in the 20th century than the new geomagnetic reconstruction" can now be disregarded.

The original article can be found online at https://doi.org/10.1007/s11207-024-02316-9

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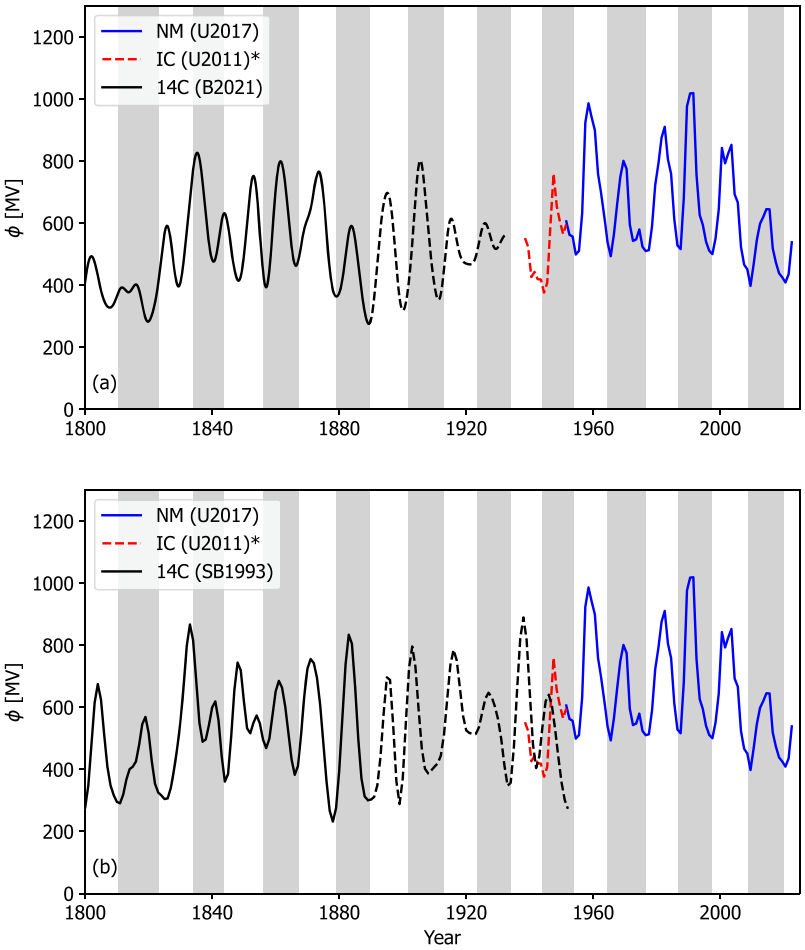

Figure 1 Corrected Figure 1. Bridging the gap between ^{14}C and instrumental heliospheric modulation potential, ϕ, estimates. All time series are annual resolution. Grey- and white-shaded regions show even- and odd-numbered solar cycles, respectively (from minimum to minimum). The neutron-monitor (NM)-based estimate of ϕ from U2017 is shown in blue. The uncertain Usoskin, Bazilevskaya, and Kovaltsov (2011) extension based on ionisation chamber (IC) data is shown as a red dashed line. Black lines show the ^{14}C-based ϕ estimates. Panel (a) shows the Brehm et al. (2021) estimate. Panel (b) shows the ϕ estimate from the University of Washington ^{14}C record (Stuiver and Braziunas 1993). In both panels, the dashed lines indicate the approximate period of increased uncertainty in ^{14}C ϕ due to dilution of natural ^{14}C in the atmosphere due to burning of fossil fuels. A gap exists between the reliable instrumental-based estimates (NM and/or IC) and ^{14}C estimates of ϕ.

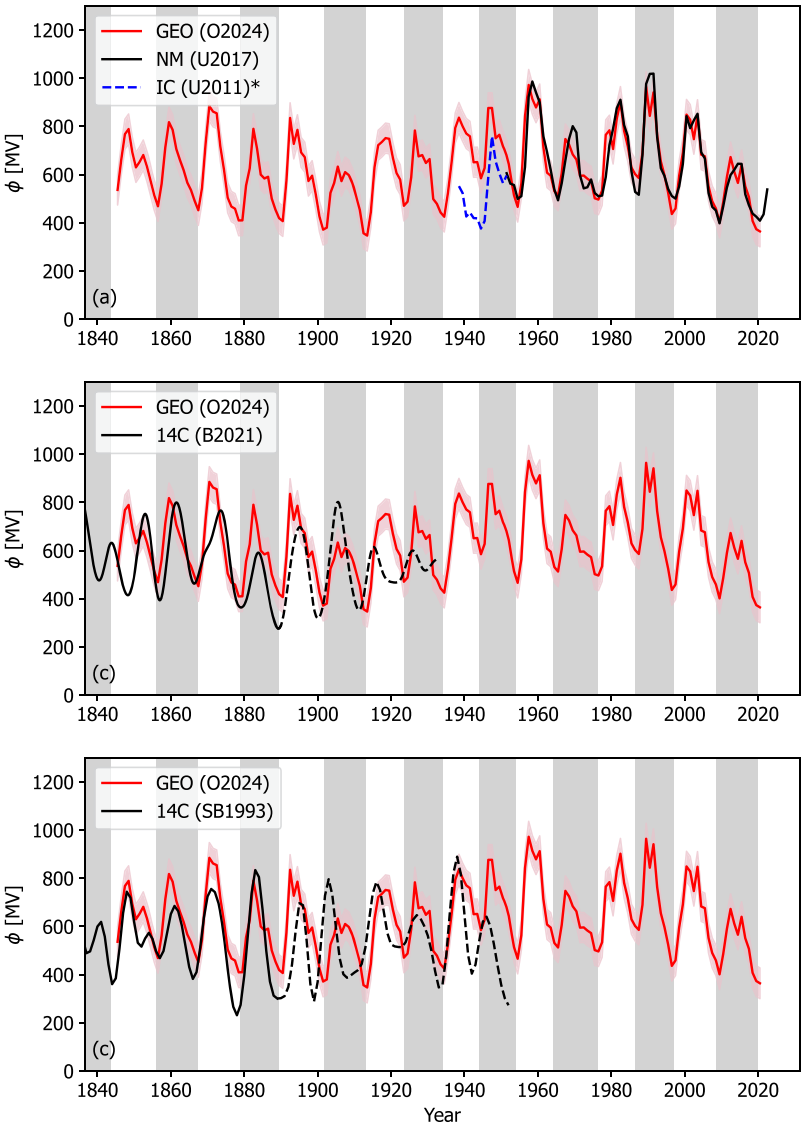

Figure 2 Corrected Figure 8. Estimates of ϕ over the interval 1840 - present. In all panels, the red line shows the ϕ reconstruction using the geomagnetic estimate of F_S and the cycle-averaged estimate of α with shaded areas showing 1-sigma uncertainty bands. The black line in panel a shows the U2017. The blue dashed line shows the scaled ionisation chamber estimate of ϕ. Panel b shows the radionuclide estimates of ϕ, namely ^{14}C-based estimate from Brehm et al. (2021). Panel c shows the equivalent Stuiver and Braziunas (1993) ^{14}C. In both panels b and c, the dashed lines approximately indicate the influence of the Suess effect of burning fossil fuels.

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Declarations

Competing Interests The authors declare that they have no conflicts of interest.

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