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Solid Earth
Discussions

Interactive comment on "Constraining the geotherm beneath the British Isles from Bayesian inversion of Curie depth: Integrated modelling of magnetic, geothermal and seismic data" *by* Ben Mather and Javier Fullea

Anonymous Referee #1

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This paper uses estimates of the depth to the Curie isotherm from a spectral analysis of magnetic anomalies to model a temperature distribution of the crust from which a simulated heat flow field is created. Its novelty is in applying different window sizes for the estimation of Curie depths and using statistical techniques to quantify uncertainty. The methodologies are explained succinctly and applied methodically.

In general the Curie depth estimates are commensurate with crustal thicknesses estimated from geophysical techniques. Deeper Curie depths have higher uncertainty and therefore it is unclear how reliable the results of the Curie depths in southwest Ireland

are. There is a discussion on the effect of increasing window sizes, but does this mean these results should be discounted due to the large error? Similarly very deep Curie depths are shown in the southern North Sea. I have assumed this is an error due to a lack of magnetic anomalies.

The heat flow map is based on a crustal model by Baykiev et al. (2018) and predicts increased heat flow in northwest Scotland, in excess of 90 mW m-2. Heat flow of this magnitude is normally associated with crustal regions enriched in radiogenic minerals. There is a lack of surface heat flow measurements to corroborate the simulated heat flow, but some are shown for the tip of northeast Scotland. These measured data are less than the simulated heat flow data. Does this imply that the simulated heat flow is too high? If not, why do the data disagree? The measured heat flow are from Pollack et al. (1993) which is an abstract. As the data cannot be referenced they should be included in the paper and compared to the simulated data.

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