Supporting Information for "Mapping the thermal structure of southern Africa from Curie depth estimates based on wavelet analysis of magnetic data with uncertainties"

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1. Figures S1 to S7

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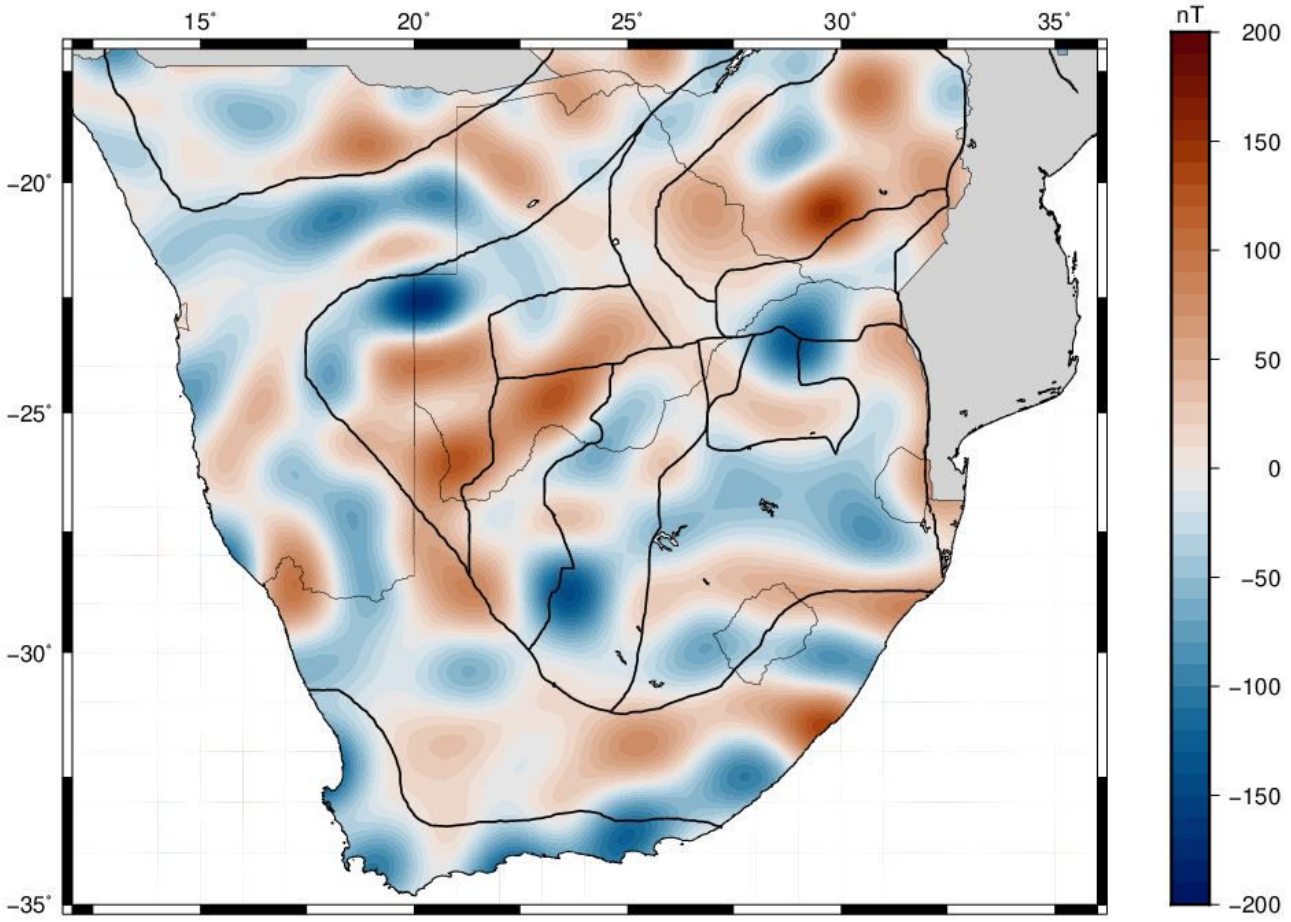

Figure S1. Lithospheric magnetic anomaly of Southern Africa derived from Satellite model LCS-1 (Olsen et al., 2017)

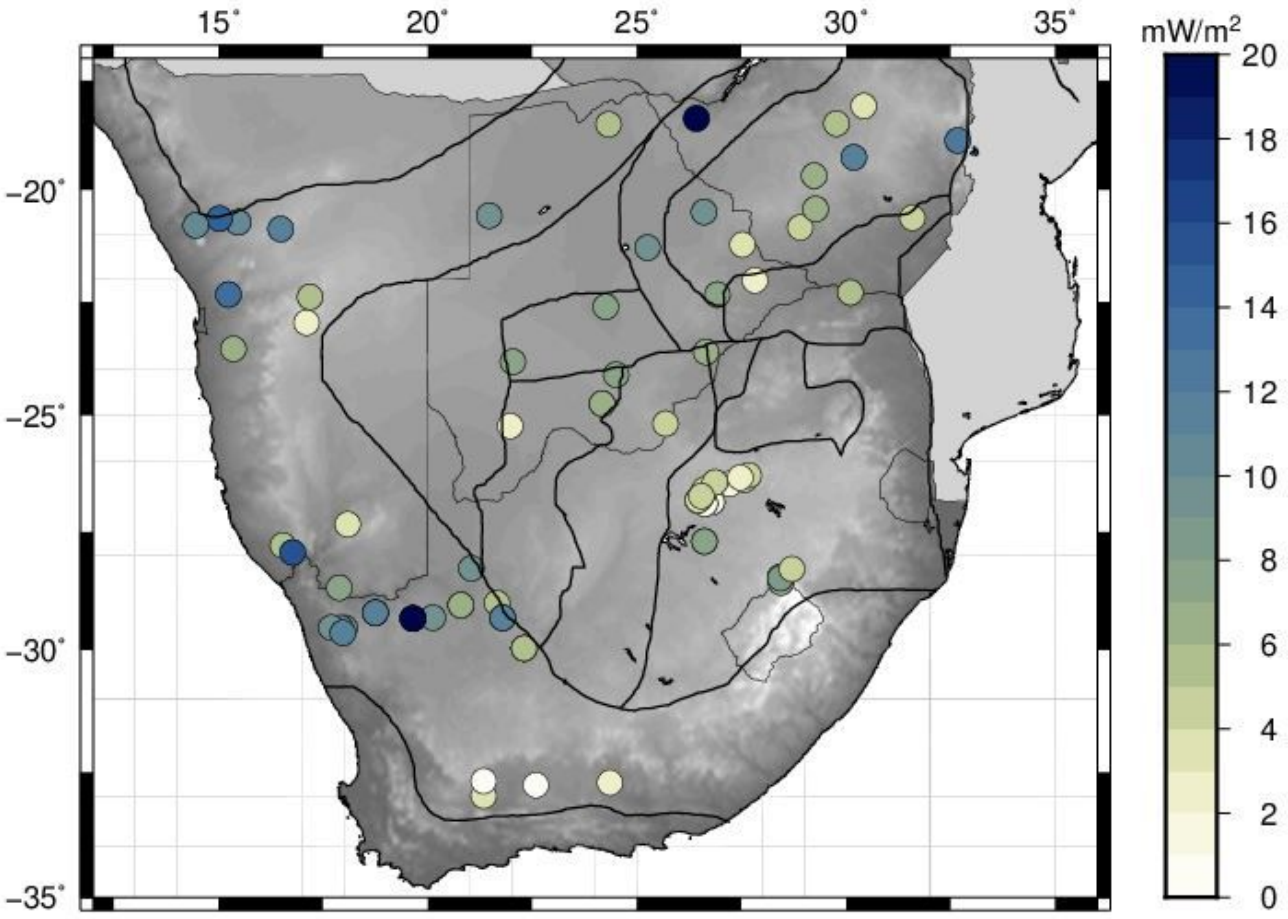

Figure S2. Uncertainty for the measured heat flow data (Lucazeau, 2019).

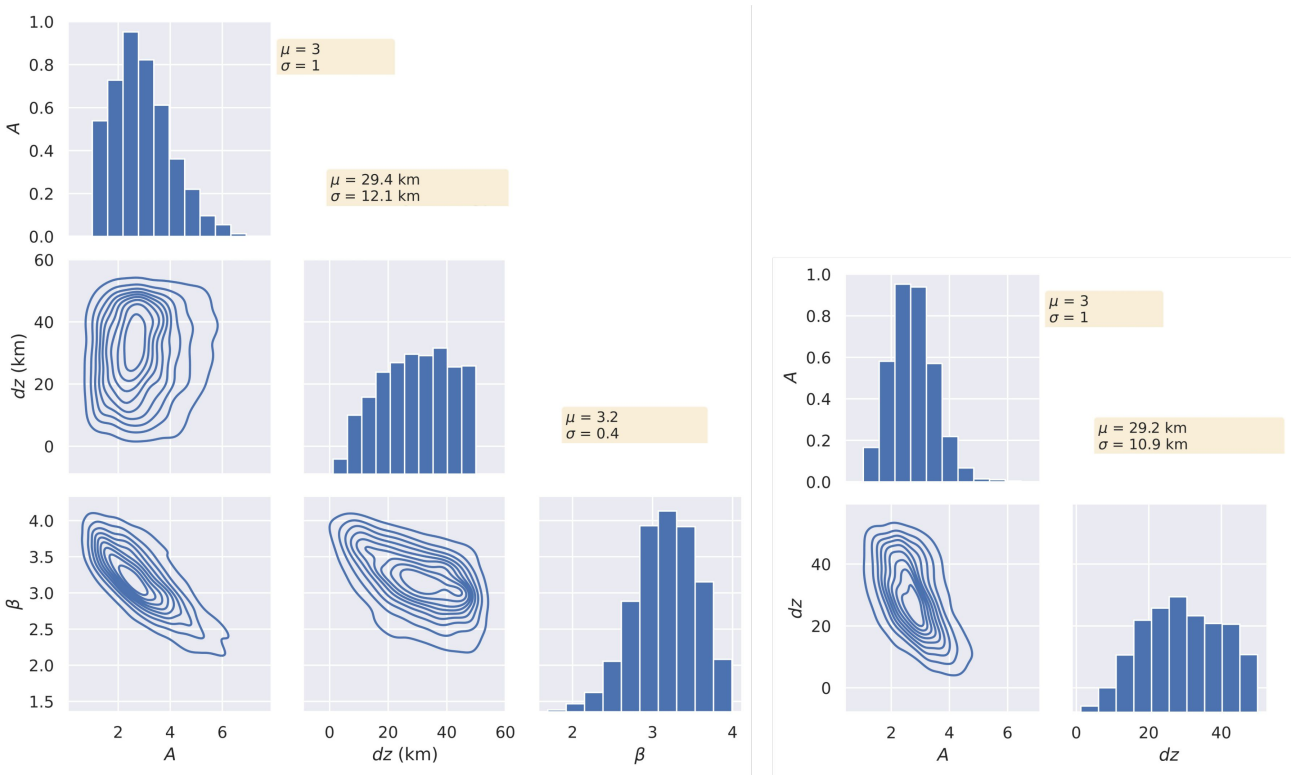

Figure S3. Statistical distribution of model parameters from at location B of Figure 5-a: marginalized and joint posterior distribution from the simultaneous inversion for the parameters z_b, β, and A (right panel) and for the simultaneous inversion for z_b and A, with fixed $\beta = 3.0$ (left panel). Statistical information on each z_b, β, A is provided in the orange boxes; μ is the mean value, σ is the standard deviation. Note that the parameter dz in the above plots indicates Δz in our notation, so that $z_b = z_t + dz$.

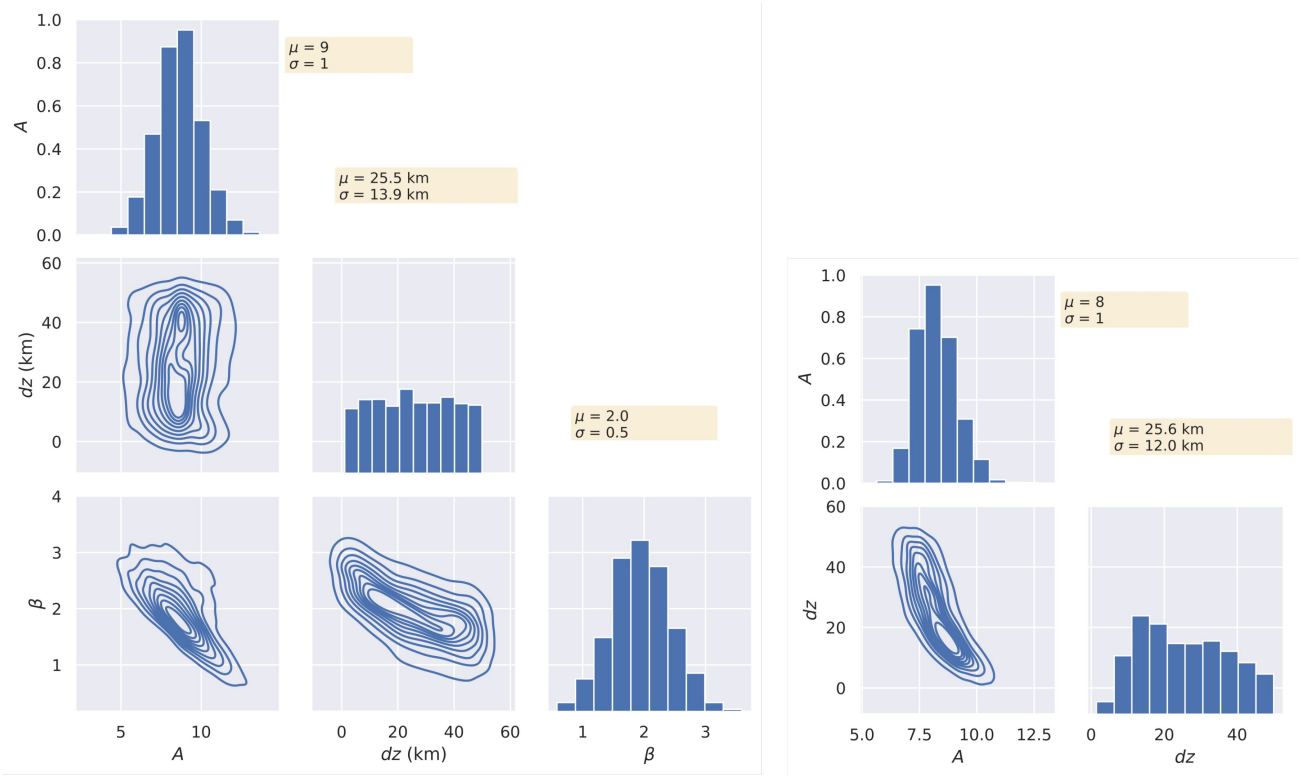

Figure S4. Statistical distribution of model parameters from at location C of Figure 5-a: marginalized and joint posterior distribution from the simultaneous inversion for the parameters z_b, β, and A (right panel) and for the simultaneous inversion for z_b and A, with fixed $\beta = 3.0$ (left panel). Statistical information on each z_b, β, A is provided in the orange boxes; μ is the mean value, σ is the standard deviation. Note that the parameter dz in the above plots indicates Δz in our notation, so that $z_b = z_t + dz$.

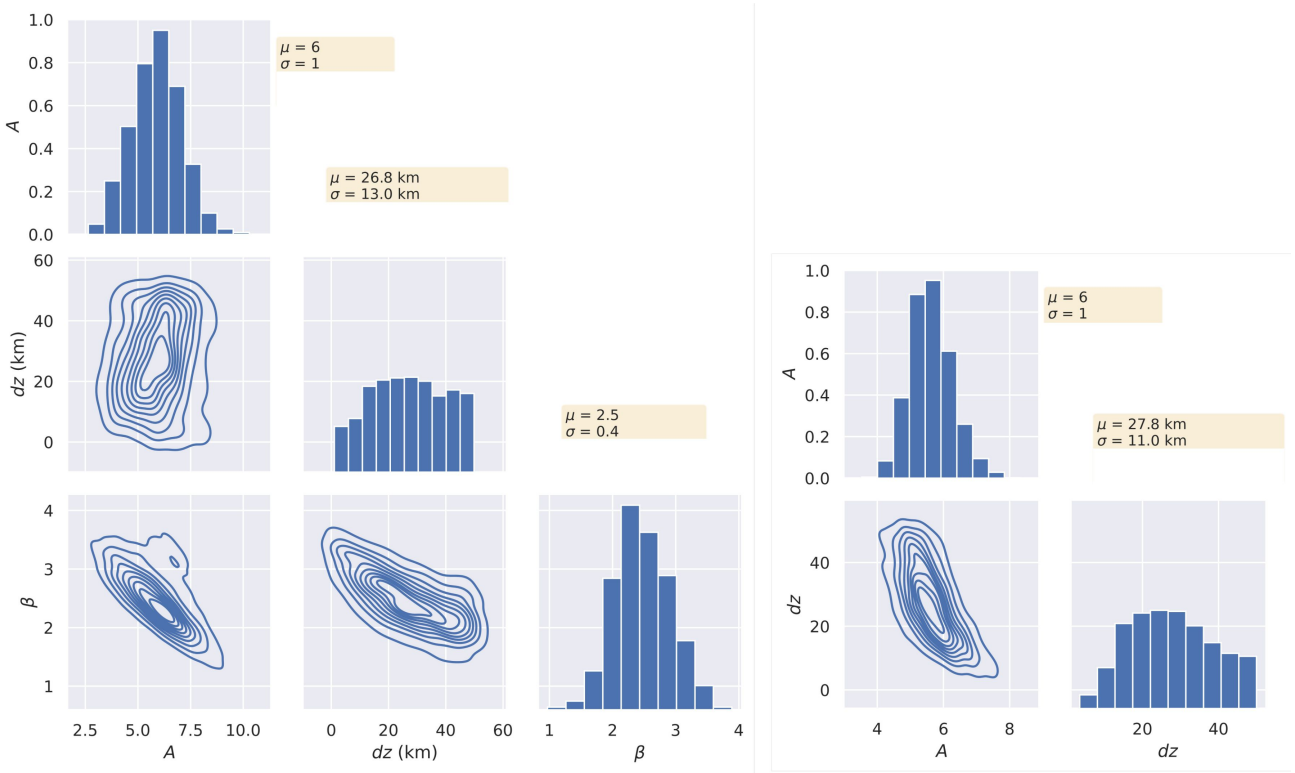

Figure S5. Statistical distribution of model parameters from at location D of Figure 5-a: marginalized and joint posterior distribution from the simultaneous inversion for the parameters z_b, β, and A (right panel) and for the simultaneous inversion for z_b and A, with fixed $\beta = 3.0$ (left panel). Statistical information on each z_b, β, A is provided in the orange boxes; μ is the mean value, σ is the standard deviation. Note that the parameter dz in the above plots indicates Δz in our notation, so that $z_b = z_t + dz$.

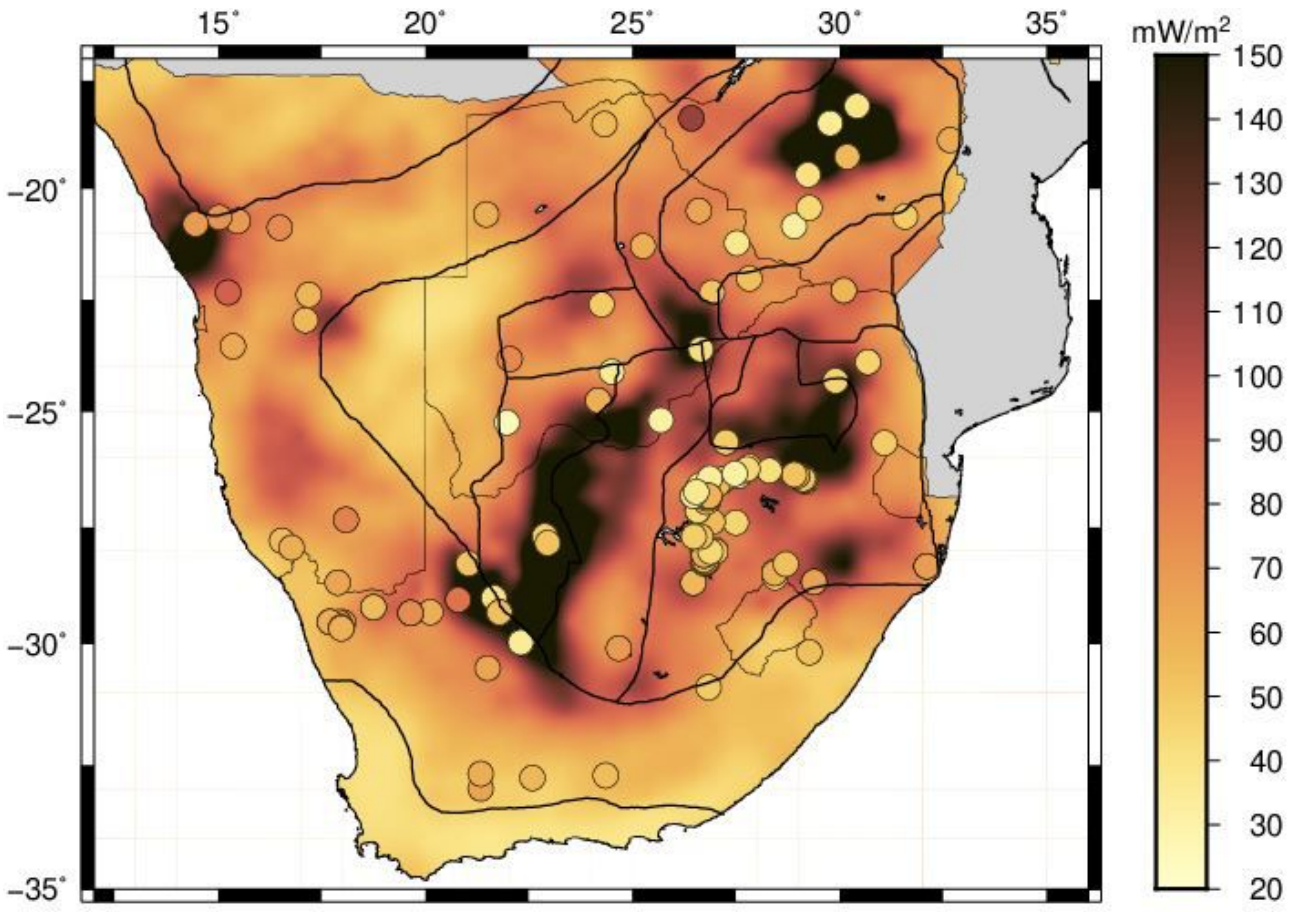

Figure S6. Heat flow distribution calculated from the global Curie depth model proposed by (Li et al., 2017) using laterally constant thermal conductivity (k= 2.5 W/mK) overlain with the locations of the measured heat flow data.

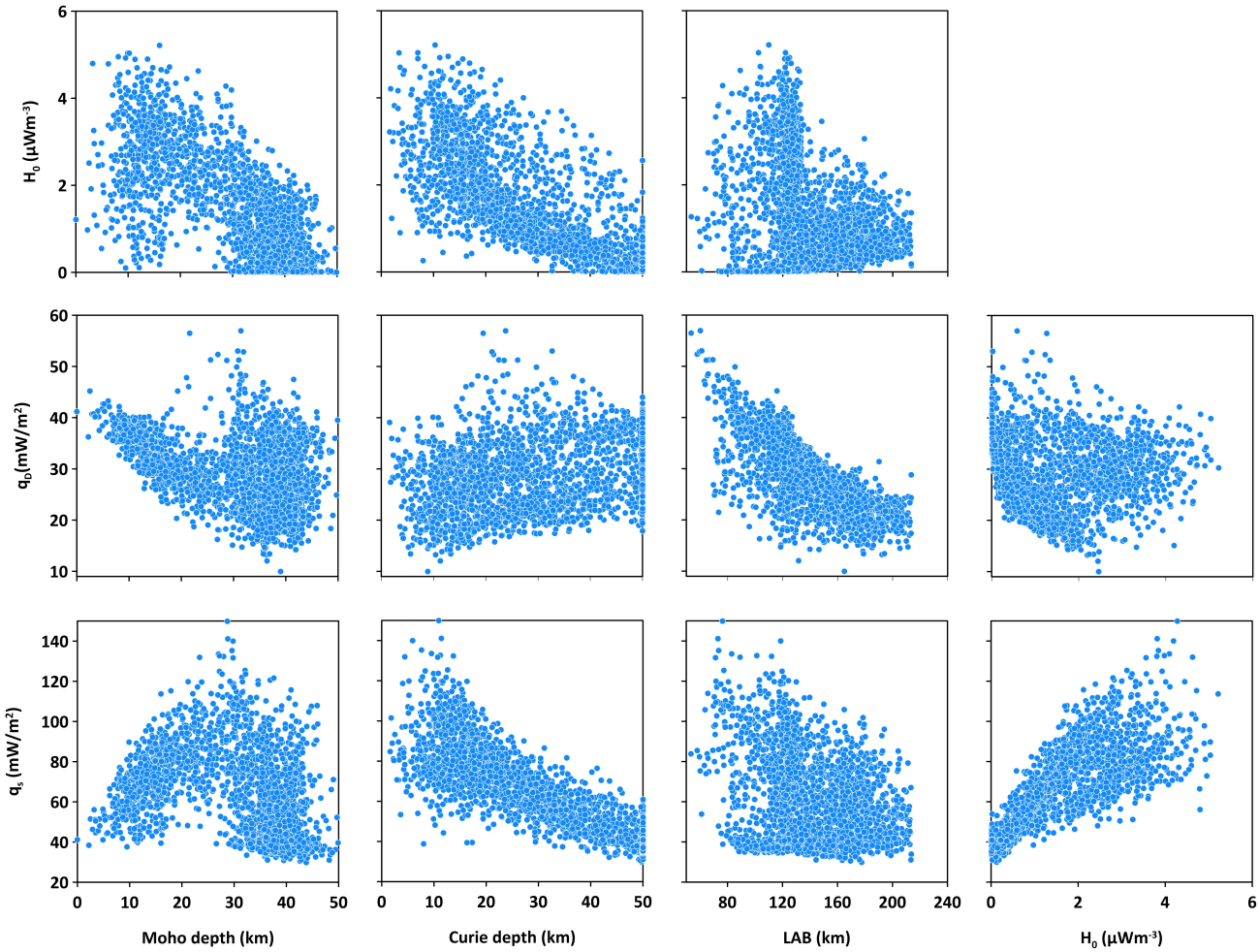

Figure S7. Correlations between different input and output parameters resulting from the heat flow modelling for a setup with varying thermal conductivities (cf. section 5.1.2 in the main text and (Lösing et al., 2020)) as a scatter plot. The figure shows a correlation between Curie depth with heat flow and heat production. LAB is correlated with mantle heat flux, and a linear correlation between heat flow and heat production is revealed.

References

Li, C., Lu, Y., & Wang, J. (2017). A global reference model of curie-point depths based on EMAG2. *Sci. Rep.*, *7*, 45129.

Lösing, M., Ebbing, J., & Szwillus, W. (2020). Geothermal heat flux in antarctica: assessing models and observations by bayesian inversion. *Frontiers in Earth Science*, *8*, 105.

Lucazeau, F. (2019). Analysis and mapping of an updated terrestrial heat flow data set. *Geochemistry, Geophysics, Geosystems*, *20*(8), 4001-4024. doi: 10.1029/2019GC008389

Olsen, N., Ravat, D., Finlay, C. C., & Kother, L. K. (2017). Lcs-1: a high-resolution global model of the lithospheric magnetic field derived from champ and swarm satellite observations. *Geophysical Journal International*, *211*(3), 1461–1477.