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Geothermal heat-flux anomalies in continental Greenland from probabilistic inversion of satellite magnetic data

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Previous estimates of Geothermal heat flux in mainland Greenland using satellite magnetic data have been performed using linearized forward solution schemes, often using only a few, coarse, constraints obtained from e.g. crustal composition and regional susceptibilities. We present a new Geothermal heat flux map derived from the satellite crustal field by probabilistic inversion, constrained using the layout of known geological regions and corresponding susceptibility data, as well as crustal thickness estimates, to establish expected (prior) susceptibility and crustal thickness distributions. The inversion is enabled by subtracting a magnetic remanence model from the satellite crustal field, and using the resultant estimate of the induced portion of the crustal field to obtain magnetic crustal thickness estimate (Curie isotherm depth), which is subsequently used to estimate geothermal heat flux. The results are new, detailed maps of magnetic crustal thickness and geothermal heat flux estimates for continental Greenland, useful in e.g. ice sheet modeling.