Thermal autopsy reveals Greenland's history

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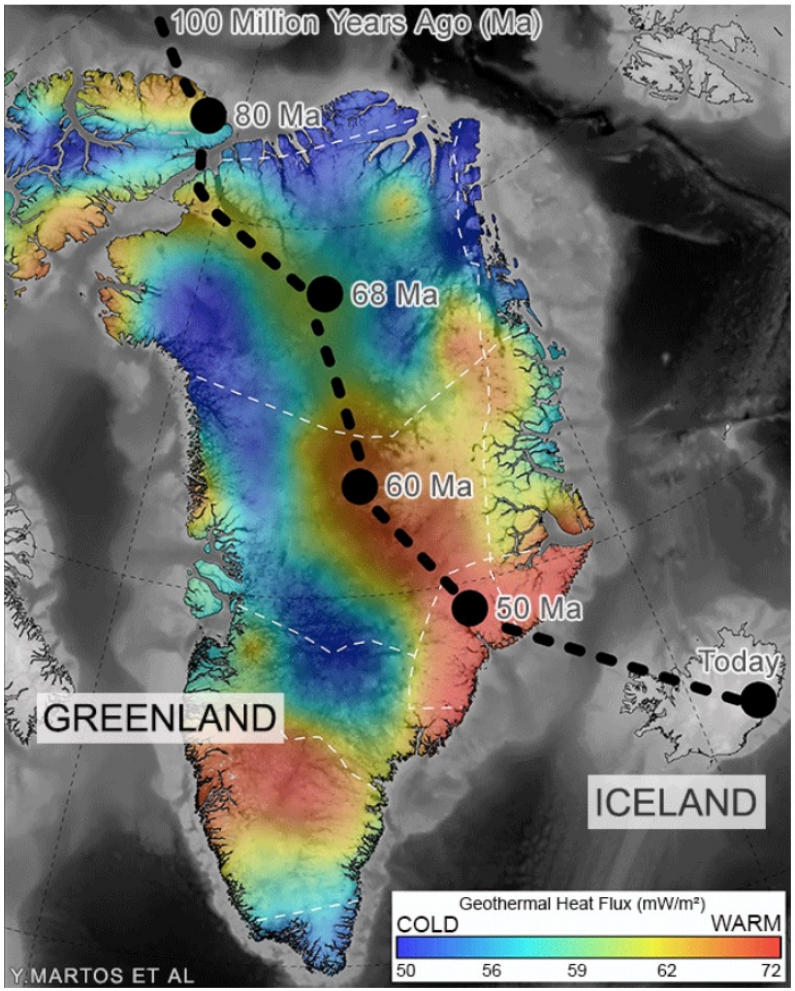
What is the science question? How much heat is currently escaping Earth's interior and how does it affect the dynamics of the Greenland Ice Sheet?

What were your findings? Measuring magnetic fields of Earth's crust using planes and satellites, we identified an unexpected band of warmer than anticipated rock (59 mW/m^2 or higher) stretching north-west to south-east across Greenland. This 'band', together with lithospheric models derived from satellite gravity data, was interpreted as the scar left as the Greenland tectonic plate moved for tens of millions of years over a mantle plume which underlies Iceland today.

What was the impact? Two impacts related to planetary interiors and ice-sheets arise from this study:

- The results allow us to constrain the movement of the tectonic plates since the break-up of supercontinent Pangaea, when all continents were assembled.
- Our novel heat map is key to understanding both the current ice-sheet motion and modeling the future, since this heat controls the melting at the base and contributes to the sliding of the ice.

Why does it matter to non-scientists?
Our results will help provide more accurate and realistic sea-level change predictions that affect human society. Our method also helps track the geological history of other rocky bodies in our solar system and beyond.



Heat scaping the Earth's interior at the rock-ice interface.

Martos, Y. M. (695), Jordan, T. A., Catalan, M., Jordan, T. M., Bamber, J. L., & Vaughan, D. G. (2018). Geothermal heat flux reveals the Iceland hotspot track underneath Greenland. Geophysical Research Letters. doi: 10.1029/2018GL078289