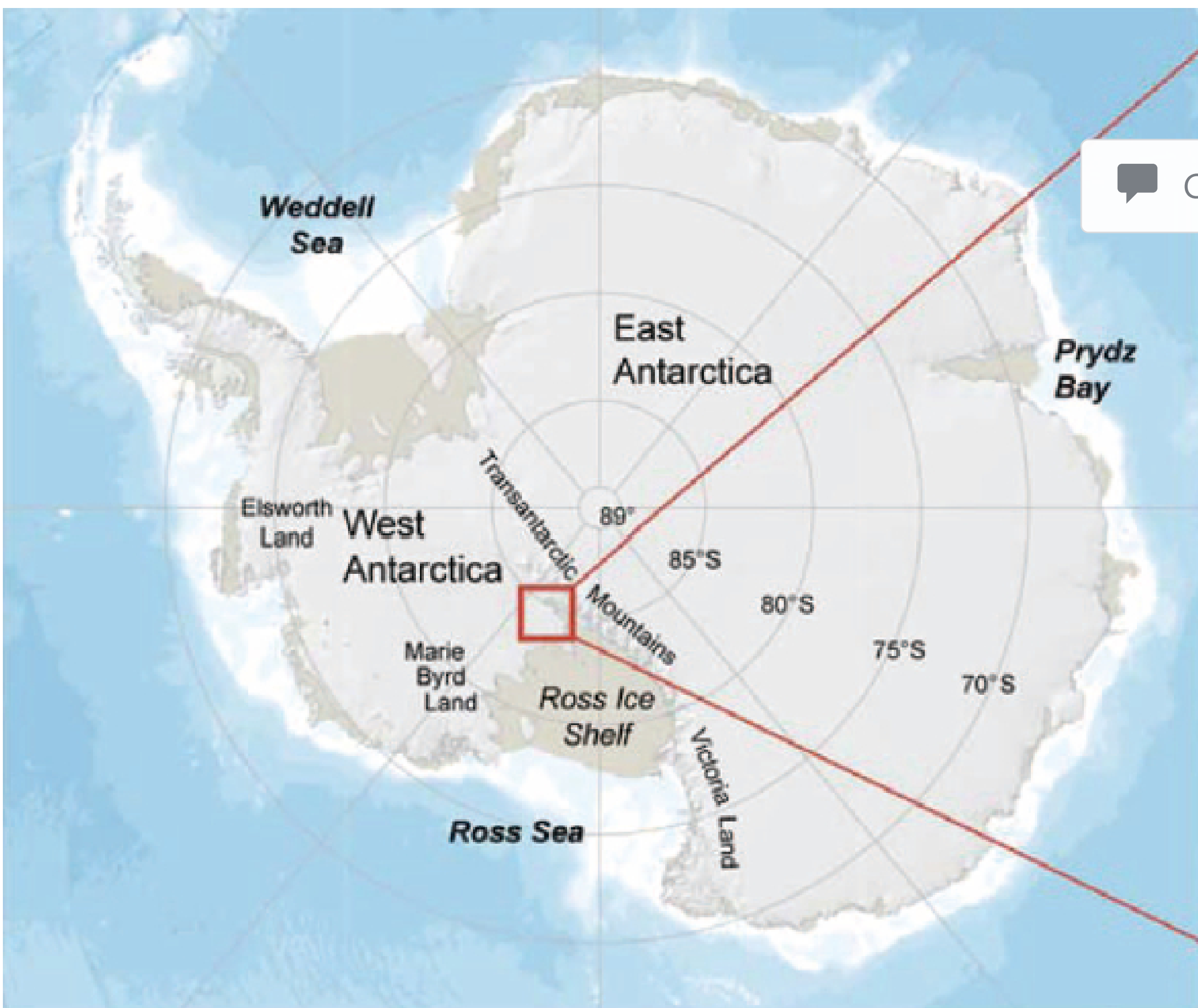


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Big geothermal heat flux may aid West Antarctic Ice base melting

There is a new very interesting [paper](#) by A. Fisher and al. from UC of Santa Cruz on the problem of geothermal heat flux at the base of the West-Antarctic ice sheet. Fisher an his collaborators drilled a 25cm diameter hole through the ice sheet up to the underlying lake Whillans. The red square shows the location of the drilling.



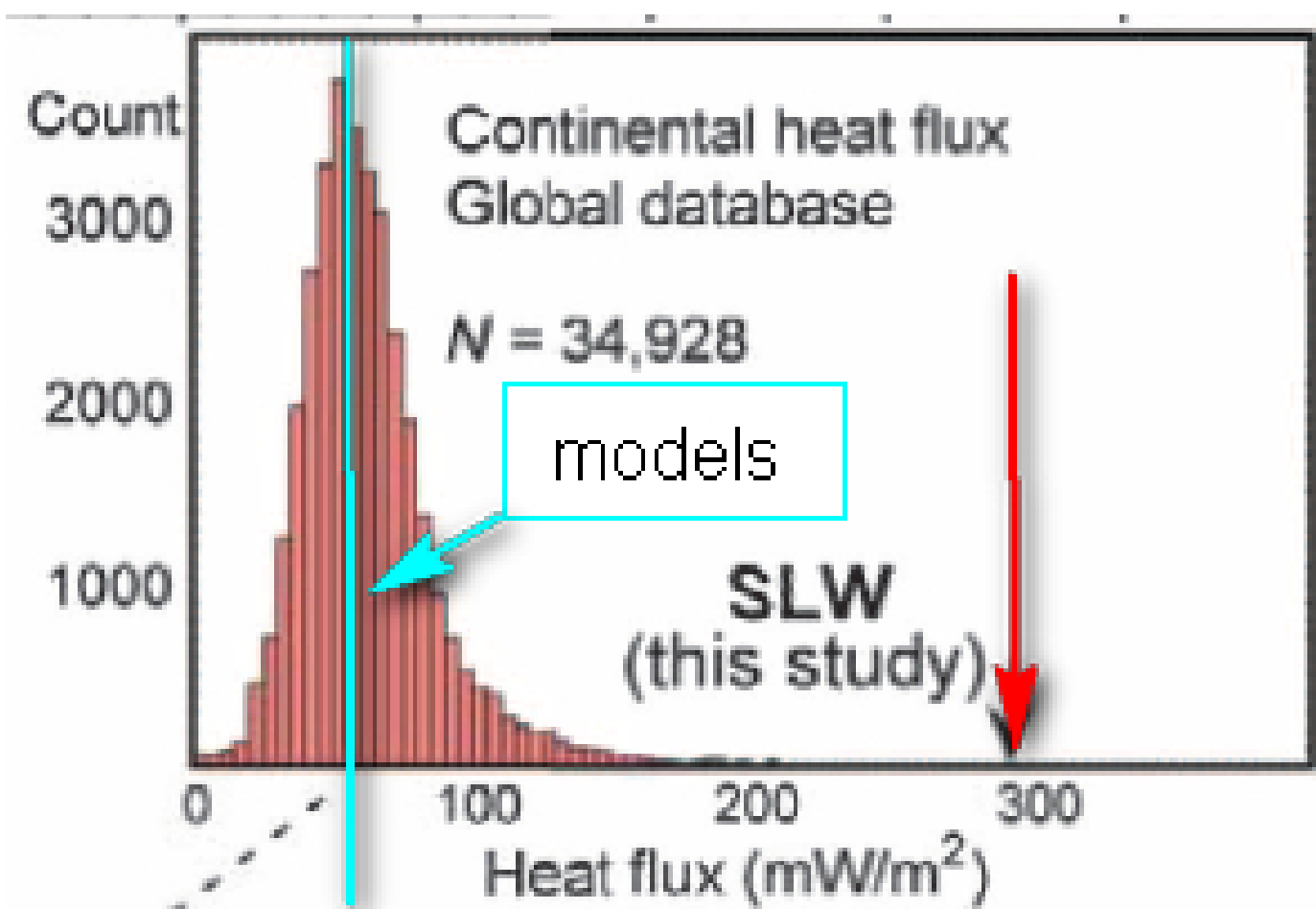
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They lowered a heavy 200 kg probe with thermistor sensors through the bore hole and the lake water into the mud at the bottom of the lake. This probe partially entered the mud , so that one thermistor was located about 0.8m deep in the mud (TS1), and the other(TBW) just at the interface between the soil and the bottom of the lake. The next table shows the data for two measurements (GT-1 and GT-2):

	GT-1	GT-2	Uncertainty
Date, time (local)	31 Jan 2013, 1035	31 Jan 2013, 1600	—
T_{BW} (°C)	−0.555	−0.556	±0.01
T_{S1} (°C)	0.387	−0.390	±0.01
z_{S1} (m)	0.81	0.78	±0.08
$\Delta T/\Delta z$ (°C/m)	0.207	0.213	+0.04, −0.07
λ (W/m K)	1.36	1.36	±0.12
q (mW/m ²)	280	290	80

The important quantity is the heat-flux q , which is about 280 mW/m2. One part of the heat-flux goes up through the ice sheet, and another one (180 W/m2) essentially causes the ice at the base to melt. This number of 180 seems low, but it corresponds to a melt of approx. 10% of the ice created by snow fall!

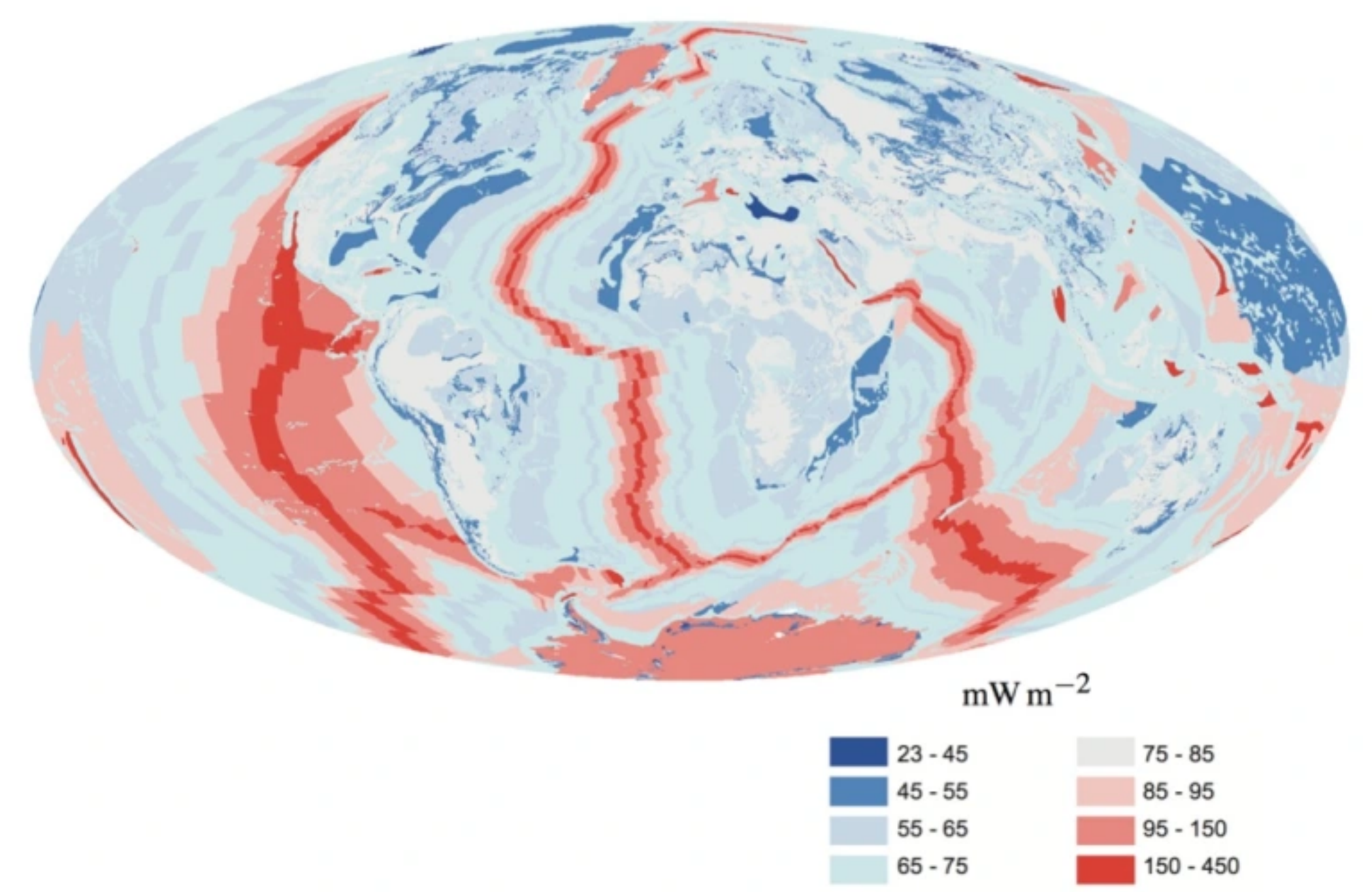
The large **measured** heat-flow comes at a surprise, for usual accepted values for Antarctica (which were derived from various models) are closer to 50 mW/m2.



So we have here again a nice argument not to neglect measurements, and not to rely exclusively on theoretical modelling. This new paper shows a **natural** phenomenon contributing to the WAIS (West Antarctica Ice Sheet) melt, and not the usual suspected culprit of (anthropogenic) global warming. It remains to be seen, if other measurements at other locations deliver results pointing in the same direction.

This paper follows [one of Amanda Lough](#) showing that large volcanoes exist below the WAIS, and that this volcanic activity may also be a contributor to increasing ice melt.

To conclude, here is a figure from [Wikipedia](#) showing the heat fluxes over the full globe: note that this flux is highest at the ocean ridges, as should be expected!



The total heat power streaming from the interior to the surface of the earth is estimated to be about 46 TW; this has to be compared to 17 TW power released by human activity (see the meteoLCD [energy widgets](#)).

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