

Basal Melt of the Greenland Ice Sheet: The Invisible Mass Budget Term

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What?

An estimate of the basal melt rates of the Greenland Ice Sheet.

How?

We calculate the basal melt based on three heat sources; frictional heat, geothermal heat and viscous heat dissipation from infiltration of surface water.

Results

The current mass loss due to basal melt is $22.3 \pm 5.6 / -4.0$ Gt per year. This is equivalent to the solid ice discharge from Sermeq Kujalleq (Jakobshavn Isbræ).

In total, close to 2/3 of the basal melt is due to frictional heating from fast moving ice. The frictional heat and the viscous heat are expected to increase in the future in response to rising temperatures.

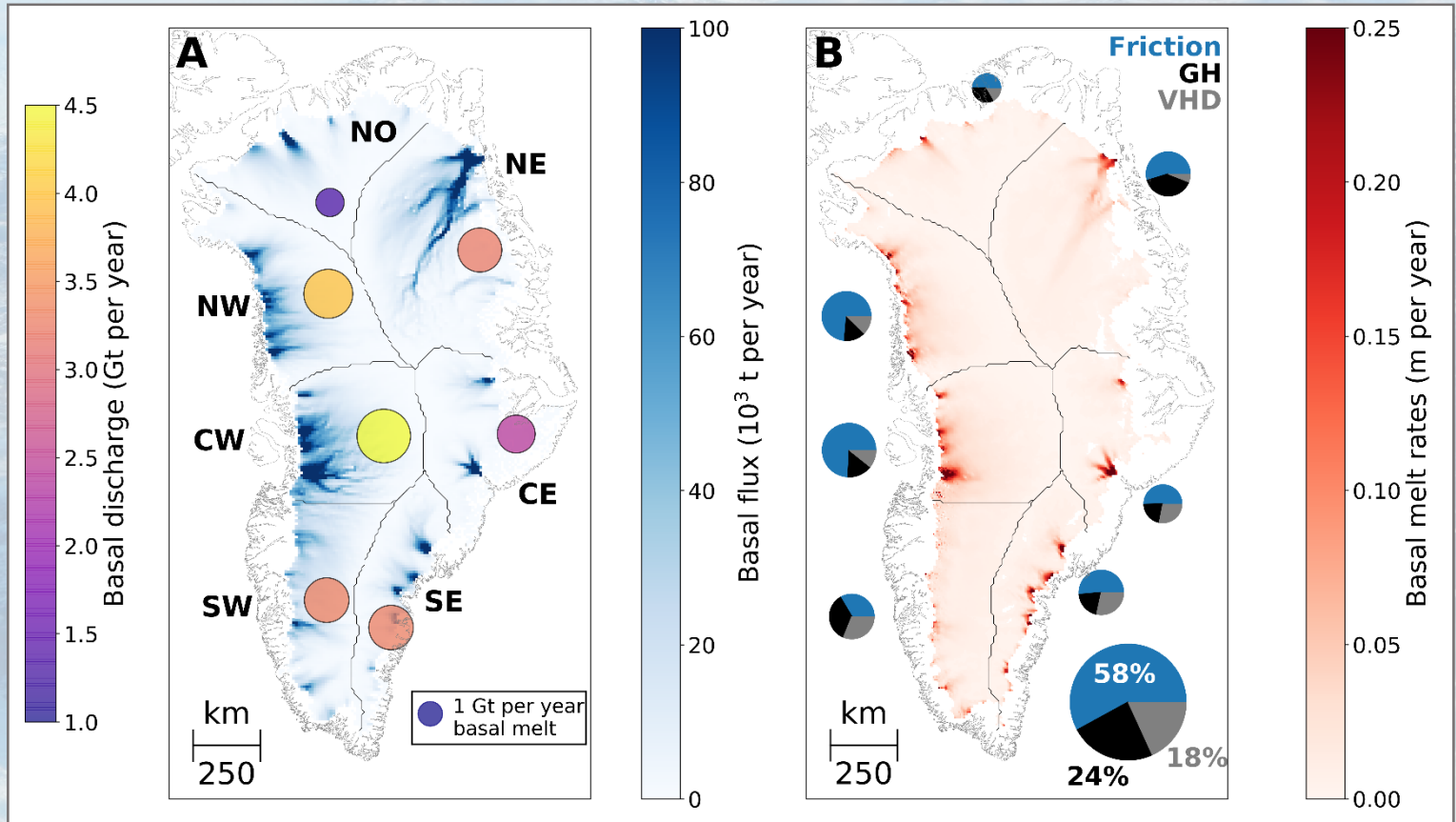


Figure: (A) Basal flux and discharge. Size and colour of circles indicate the total basal discharge from each sector. (B) Basal melt rates. Pie charts show the contribution from the different heat terms: Friction (blue), geothermal (black) and viscous heat (grey).