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Quantifying temperature-sliding inconsistency in thermomechanical coupling: a comparative analysis of geothermal heat flux datasets at Totten Glacier

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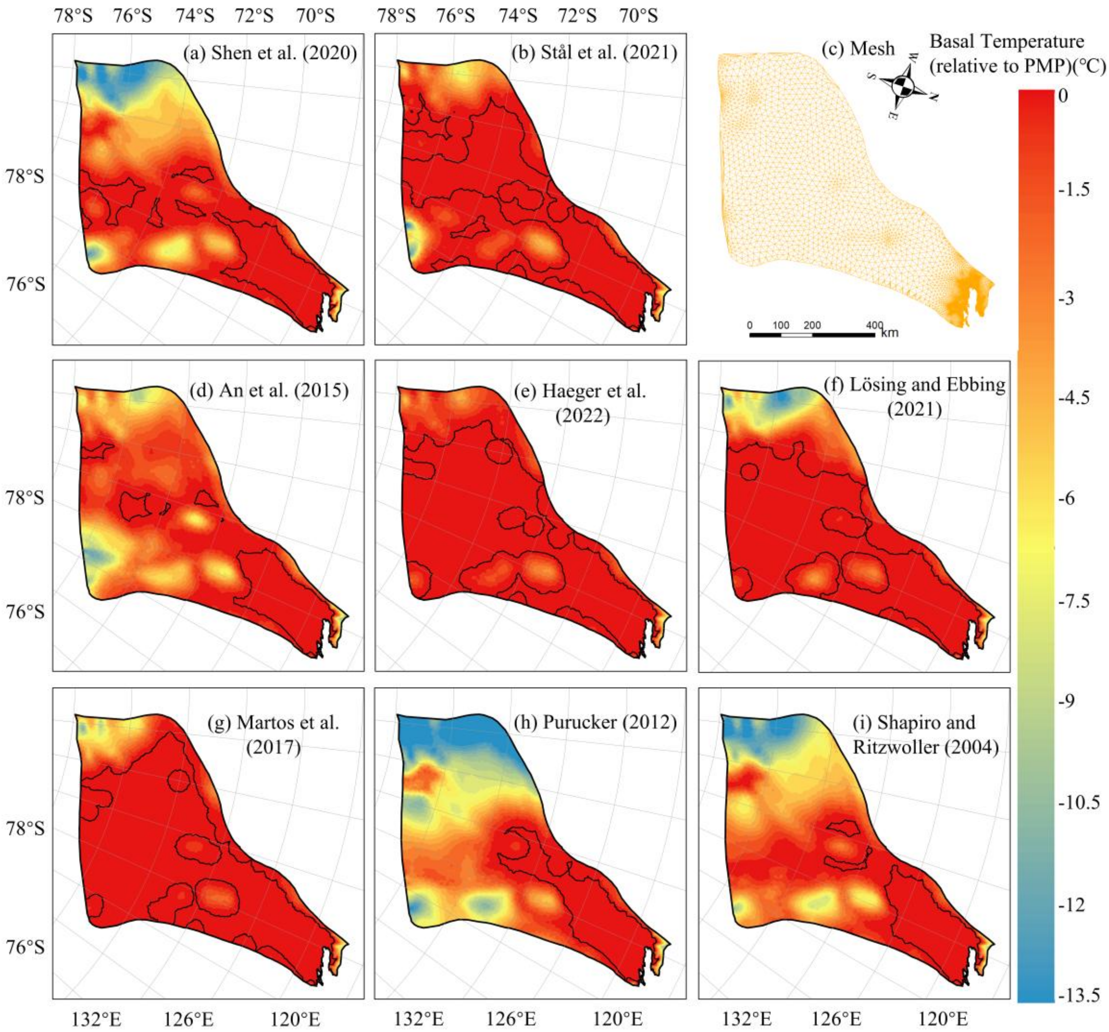

Figure S1. Modelled basal ice temperature **(a-b, d-i)** and the 2D mesh of the footprint **(c)** from Huang et al. (2024). The boundary of the basal ice at the pressure melting point is marked by a thin black contour. This figure is generated from the result in Huang et al. (2024) with permission. The abbreviation PMP stands for pressure melting point.

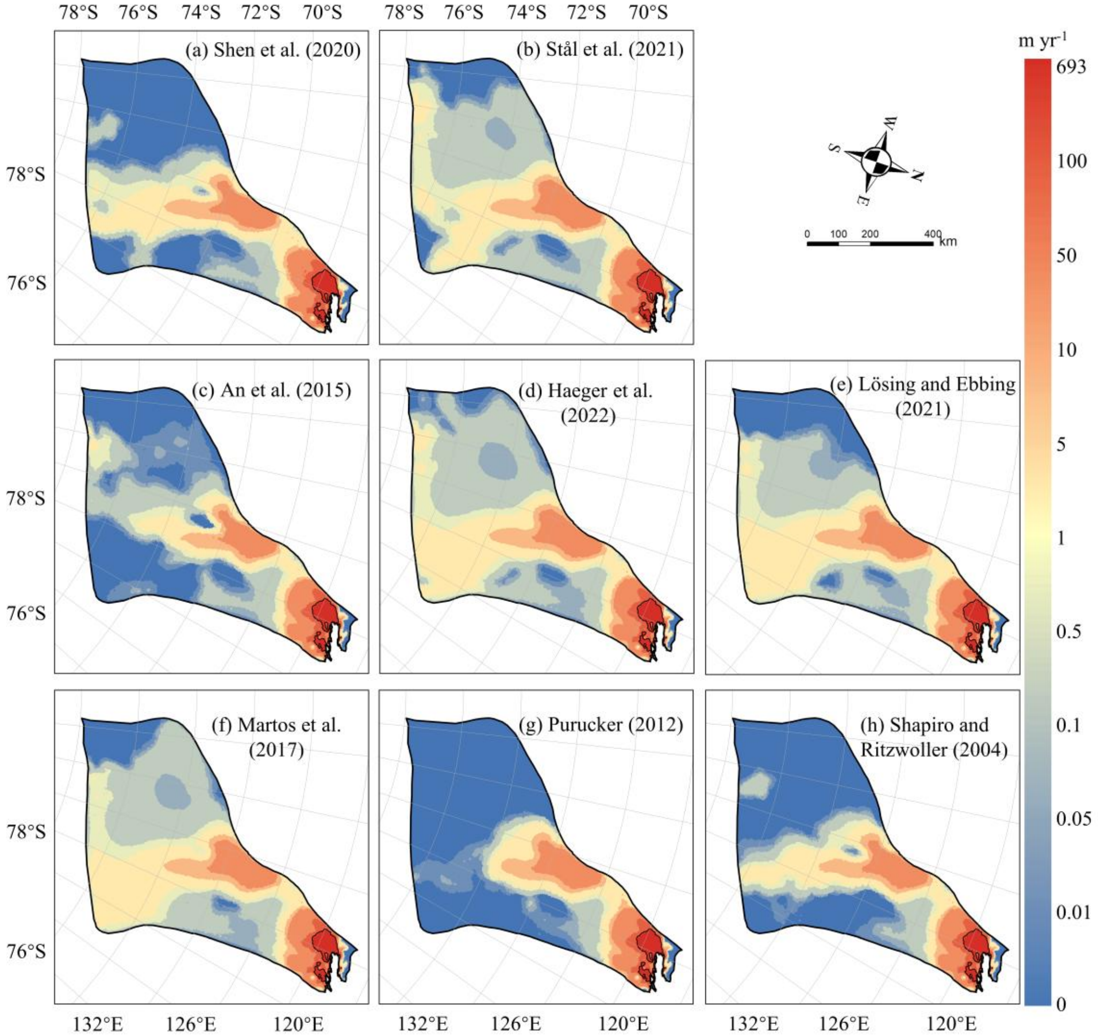

Figure S2. Modelled basal ice velocity **(a-h)** using the GHFs in Figure 2. Regions with the basal ice velocity faster than 100 m yr^{-1} are outlined by a thin black contour. This figure is generated from the result in Huang et al. (2024) with permission.

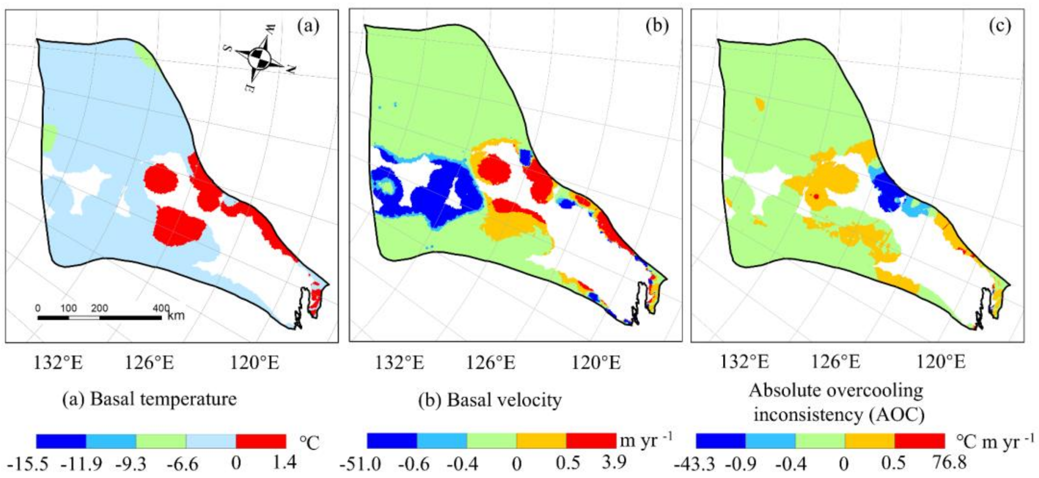

Figure S3. Difference in spatial distribution of **(a)** modelled basal temperature, **(b)**

modelled basal velocity and **(c)** absolute overcooling inconsistency (*AOC*) between employing Purucker et al. (2012) and Shen et al. (2020) GHFs. The colored region is the common cold-bed region identified by both simulation results utilizing Purucker et al. (2012) and Shen et al. (2020) GHFs.

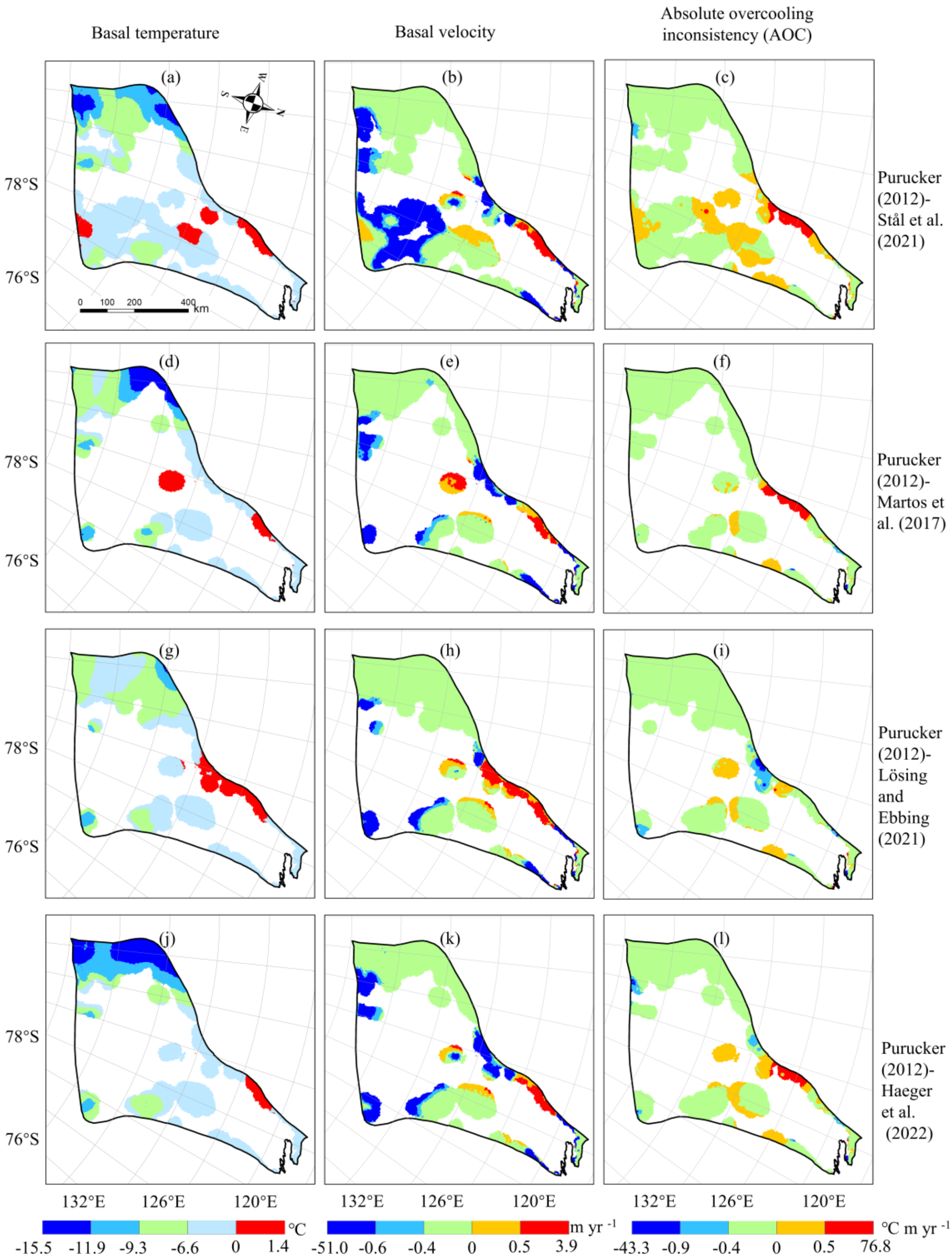

Figure S4. The spatial differences of modelled basal temperature, basal velocity, absolute overcooling inconsistency (*AOC*) (from left to right columns) between utilizing Purucker et al. (2012) GHF and utilizing Stål et al. (2021), Martos et al. (2017), Lösing and Ebbing (2021) and Haeger et al. (2022) (as labeled for each row). The colored regions are the cold beds that they have in common with the simulation result using Purucker et al. (2012) GHF.

Table S1. Summary of input datasets used in ice sheet model.

Input variables	Datset name	Reference
Surface ice velocity	MEaSUREs InSAR-Based Antarctic Ice Velocity Map, version 2	Morlighem et al. (2020)
Surface elevation, bed elevation and ice thickness	MEaSUREs BedMachine Antarctica, version 2	Rignot et al. (2017)
Surface temperature	ALBMAP v1	Le Brocq et al. (2010)
	Antarctic_T2m_reconstruction_2001-2018	Zhang et al. (2022)
GHF maps	—	Shen et al. (2020) Stål et al. (2021) An et al. (2015) Haeger et al. (2022) Lösing and Ebbing (2021) Martos et al. (2017) Purucker (2012) Shapiro and Ritzwoller (2004)
Specularity content	ICECAP basal interface specularity content	Dow et al. (2019)

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