



Supplement of

**The future of Upernavik Isstrøm through the ISMIP6 framework:
sensitivity analysis and Bayesian calibration of ensemble prediction**

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S1 Additional plots on SSP and AOGCM influence

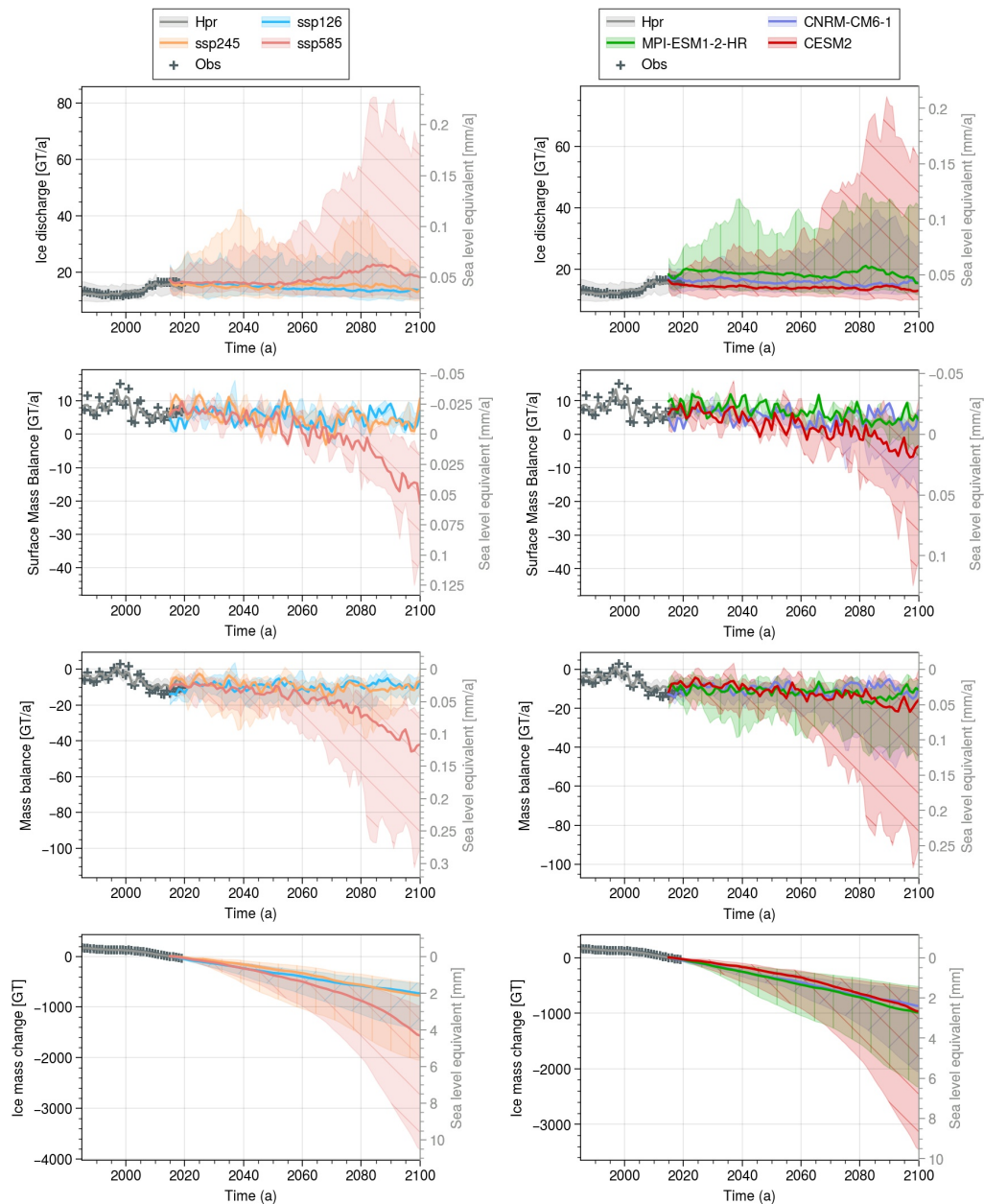


Figure S1. Left: UI ice discharge, SMB, Mass balance and Ice mass change over the period 1985-2100 for the hindcast ensemble (grey), the ssp126 members (blue with /), the ssp245 members (orange with /) and the ssp585 members (red with \). For each ensemble, the mean is represented in solid line and the shading include 95% of the ensemble members. Observation from Mouginot et al. (2019) of the 1985-2019 period are represented by +. Right: Same for members of CNRM-CM6-1 (purple with /), MPI-ESM1-2-HR (green with /) and CESM2 (dark red with \).

S2 Weighting for each SSP

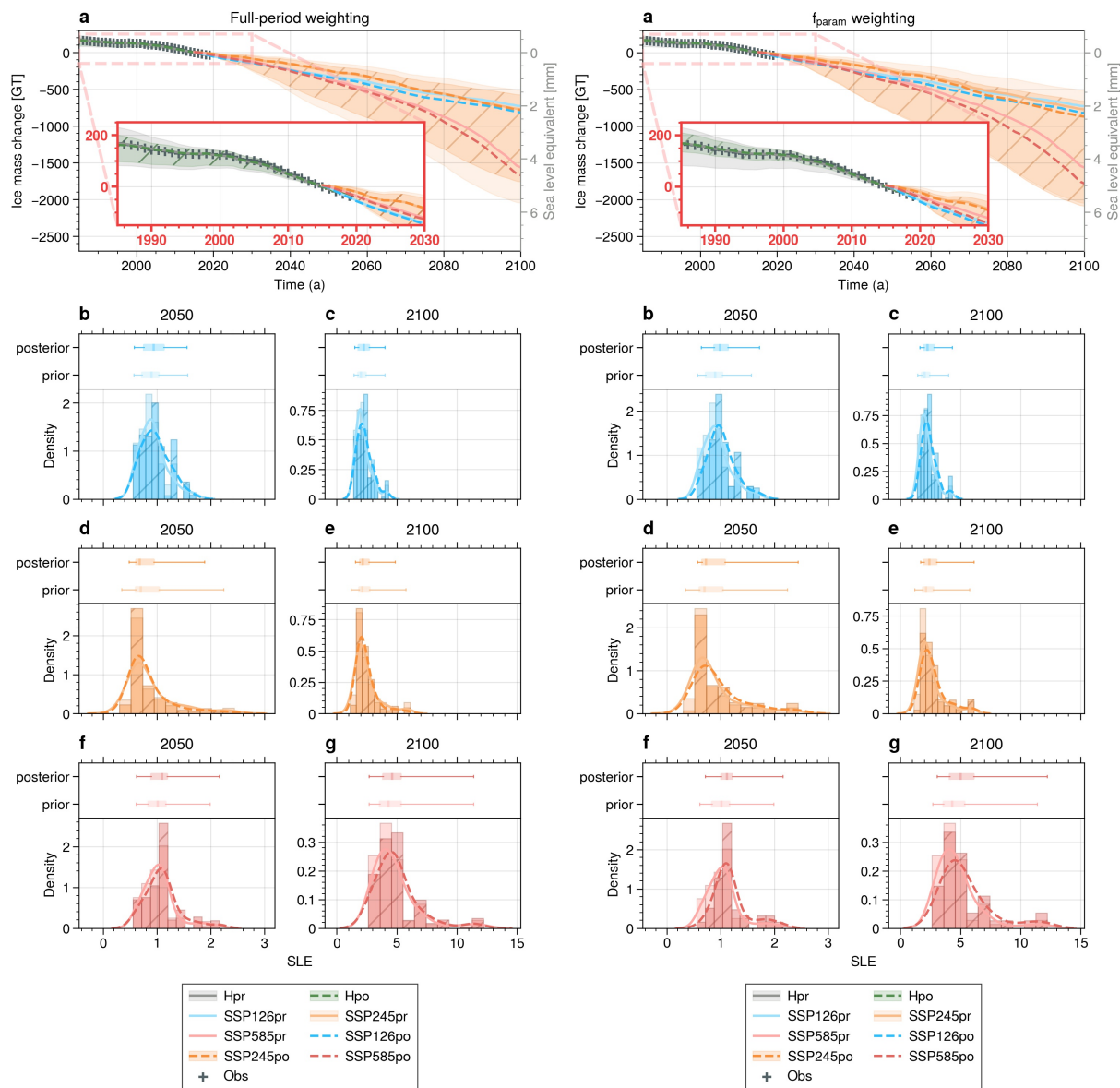


Figure S2. Evolution of UI ice mass loss over the period 1985-2100 for the Hindcast prior (grey), the Hindcast posterior (dark green with /), the SSP1-2.6 prior and posterior (blue), the SSP2-4.5 prior (light orange) and posterior (dark orange with /), and the SSP5-8.5 prior and posterior (red) ensemble simulations for the Full-period (left) and f_{param} (right) weighting. For each ensemble, the median is represented in solid (prior) or dotted (posterior) line and the shading include 95% of the ensemble members. Observation of the 1985-2019 period are represented by +. The red box shows a zoom to 1985-2030 period.

S3 Additional metrics for Bayesian calibration analysis

S3.1 CRPS

	Cumulative ice discharge					Ice discharge					Surface elevation					Surface velocity				
G_min	3.962	1.661	2.027	1.184	0.954	0.539	0.225	0.361	0.091	0.066	16.424	13.136	18.332	12.477	23.336	34.588	35.936	40.3	31.406	17.025
S_min	3.889	1.616	2.209	1.189	0.946	0.534	0.22	0.367	0.088	0.065	16.285	13.17	18.178	12.329	23.369	34.4	35.624	40.3	31.418	16.951
G_med	3.895	1.59	2.423	1.208	0.938	0.534	0.218	0.376	0.084	0.064	16.13	13.299	18.067	12.14	23.454	34.322	35.507	40.465	31.522	16.872
S_med	3.893	1.59	2.472	1.202	0.934	0.533	0.217	0.377	0.084	0.063	16.12	13.306	18.046	12.134	23.446	34.286	35.461	40.481	31.51	16.872
G_max	4.393	1.628	3.381	1.187	0.883	0.556	0.216	0.404	0.077	0.058	16.065	13.812	17.989	11.905	23.656	34.75	35.46	41.72	31.95	16.885
S_max	4.26	1.612	3.237	1.192	0.89	0.55	0.215	0.399	0.078	0.059	16.039	13.748	17.969	11.919	23.621	34.614	35.419	41.492	31.881	16.87
ZSxV	3.898	1.587	2.519	1.212	0.934	0.534	0.217	0.379	0.084	0.063	16.102	13.324	18.03	12.107	23.466	34.317	35.49	40.547	31.549	16.864
ZS	4.336	1.594	3.284	1.217	0.874	0.552	0.215	0.399	0.078	0.058	16.004	13.867	17.933	11.848	23.593	34.762	35.403	41.597	31.954	16.898
V	4.004	1.637	2.941	1.177	0.93	0.542	0.218	0.394	0.08	0.062	16.095	13.396	18.018	12.047	23.569	34.386	35.618	41.03	31.671	16.817
ID	4.225	1.487	4.414	1.294	0.865	0.542	0.211	0.43	0.081	0.057	16.492	14.4	18.555	11.87	23.943	35.63	35.42	43.918	32.9	17.18
CID	3.276	1.425	2.972	1.269	0.888	0.522	0.216	0.369	0.086	0.061	16.446	14.049	18.362	12.01	23.856	34.875	35.092	42.159	32.408	17.127
SP_mean	3.715	1.624	1.968	1.174	0.955	0.533	0.224	0.348	0.092	0.066	16.417	13.159	18.254	12.462	23.384	34.583	35.835	40.189	31.604	17.041
SP_Q85	3.607	1.532	2.465	1.25	0.94	0.522	0.218	0.367	0.087	0.064	16.142	13.33	18.044	12.1	23.471	34.288	35.465	40.496	31.724	16.896
P100	3.368	1.305	2.302	1.318	0.817	0.499	0.216	0.316	0.088	0.057	16.217	14.105	18.027	11.946	23.439	35.184	35.421	41.558	33.021	17.238
P90	3.573	1.344	2.516	1.277	0.822	0.501	0.212	0.327	0.084	0.057	16.212	14.075	18.019	11.936	23.508	35.033	35.256	41.419	32.827	17.176
P80	3.869	1.406	2.806	1.238	0.828	0.511	0.211	0.343	0.081	0.056	16.22	14.058	18.031	11.932	23.581	35	35.205	41.493	32.656	17.121
	UI	UI-N	UI-C	UI-S	UI-SS	UI	UI-N	UI-C	UI-S	UI-SS	UI	UI-N	UI-C	UI-S	UI-SS	UI	UI-N	UI-C	UI-S	UI-SS
	zone					zone					zone					zone				

Figure S3. Non-standardised CRPS table. Same legend as figure D1.

5 S3.2 MAE

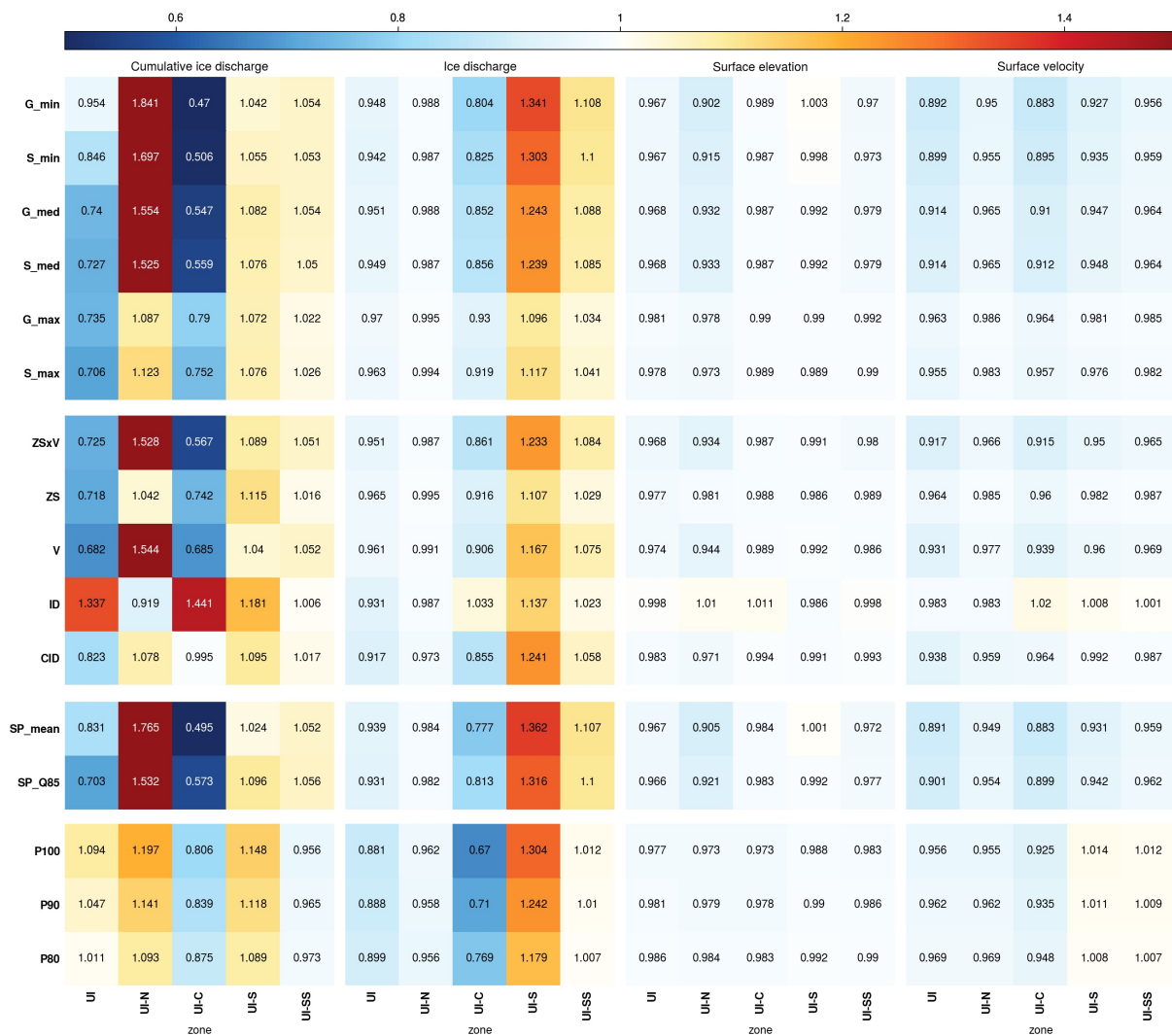


Figure S4. Standardised MAE table. Same legend as figure D1.

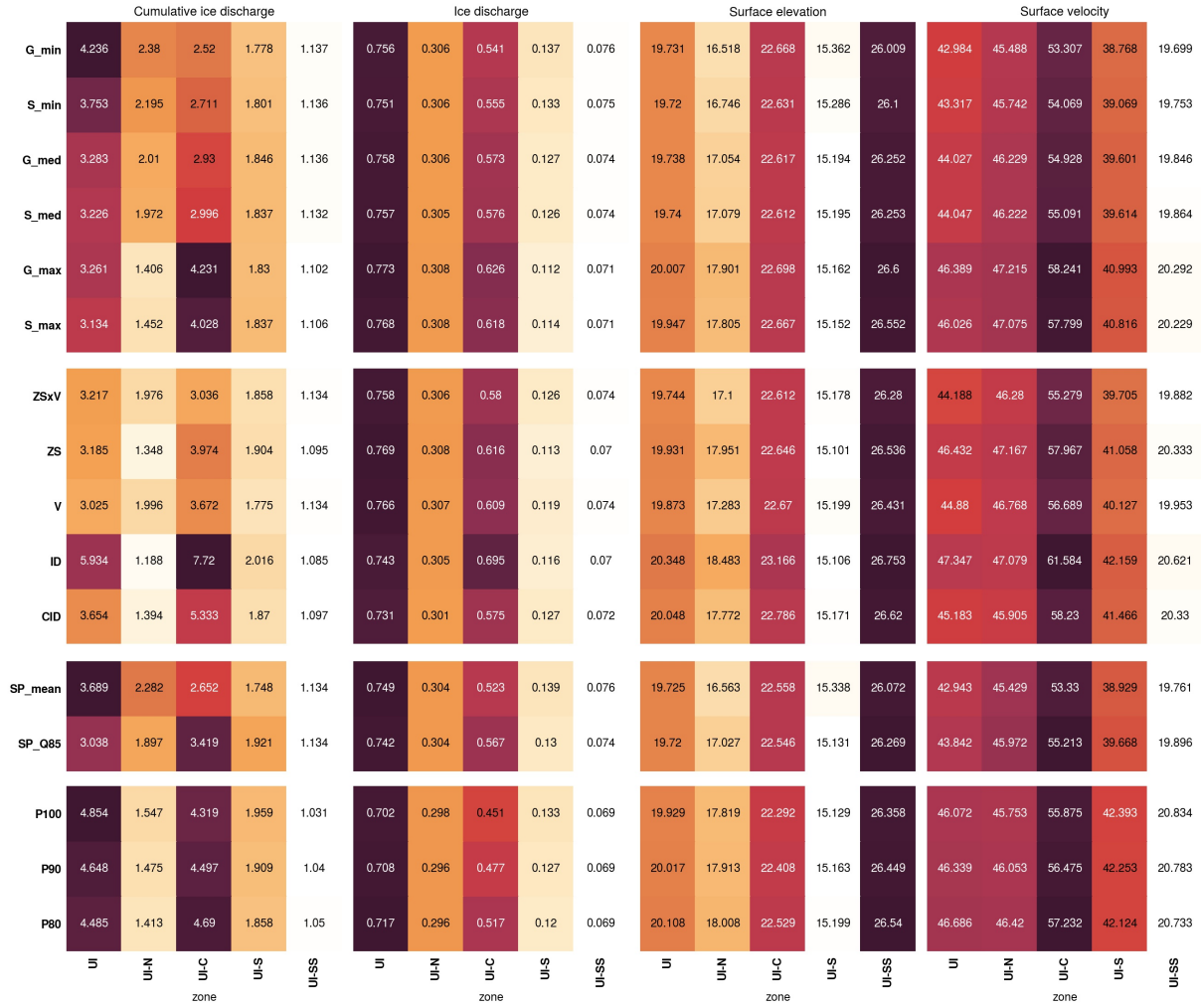


Figure S5. Non-Standardised MAE table. Same legend as figure D1.

S3.3 STD

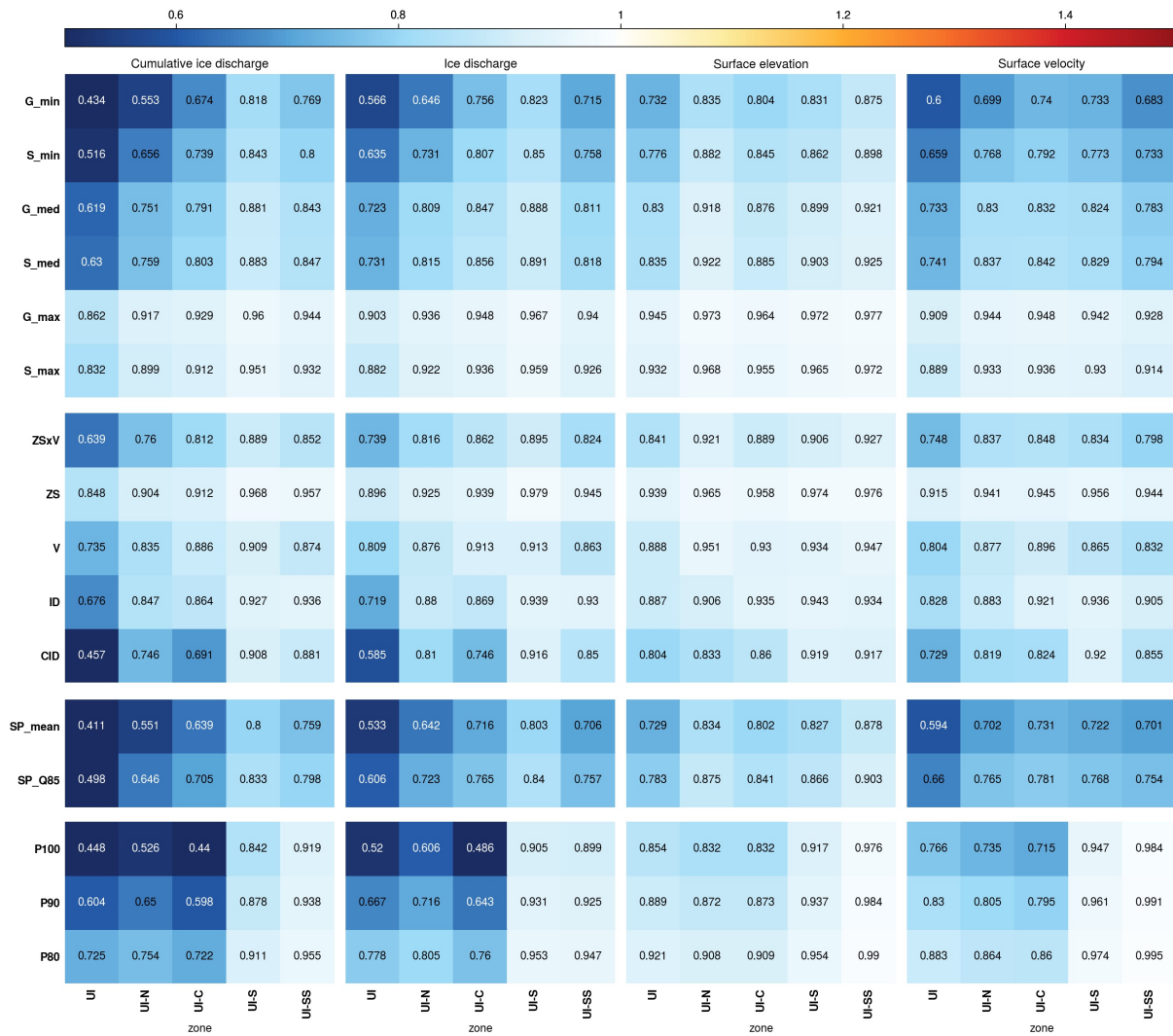


Figure S6. Standardised MAE table. Same legend as figure D1.

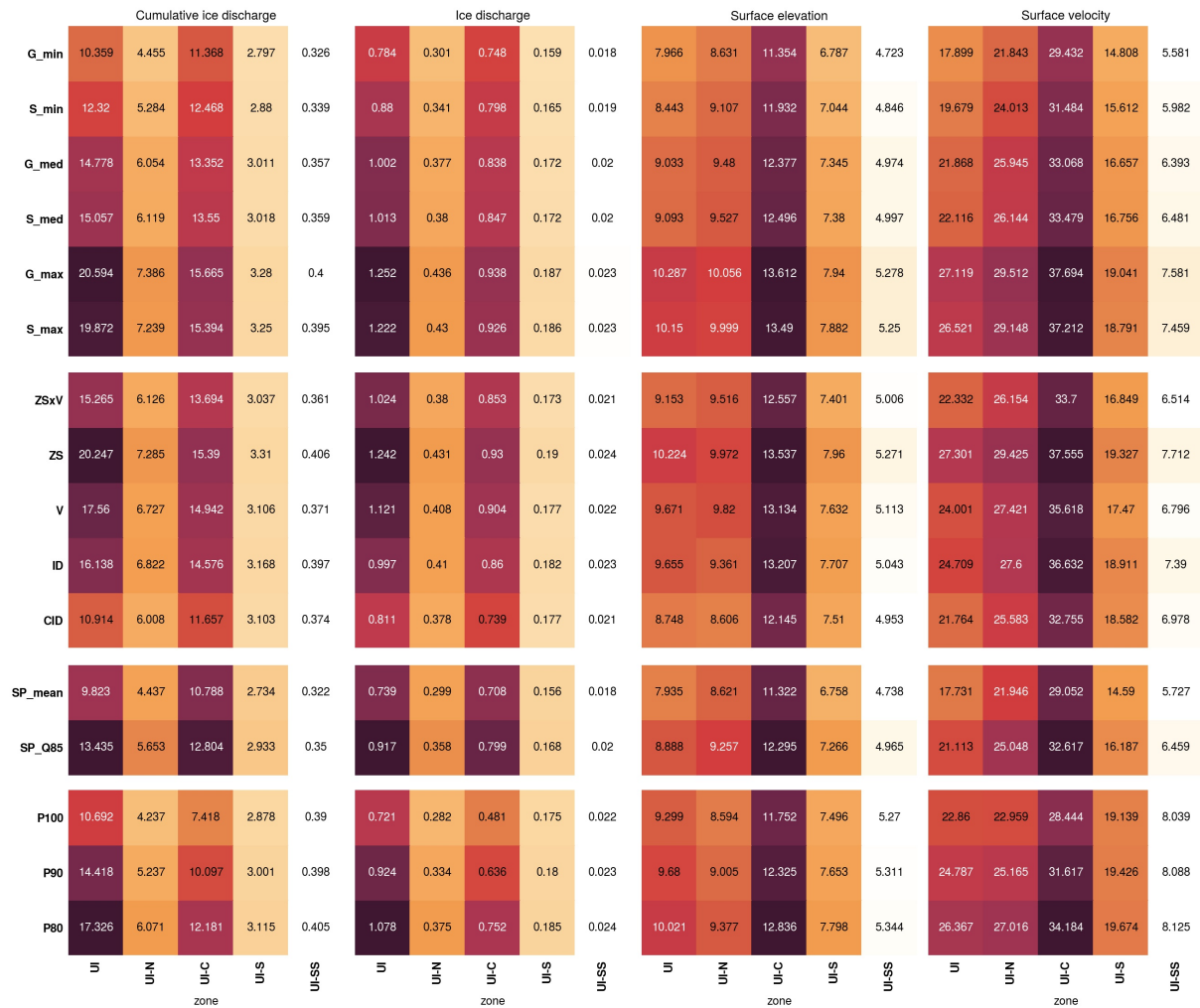


Figure S7. Non-Standardised MAE table. Same legend as figure D1.

References

Mouginot, J., Rignot, E., Björk, A. A., van den Broeke, M., Millan, R., Morlighem, M., Noël, B., Scheuchl, B., and Wood, M.: Forty-six years of Greenland Ice Sheet mass balance from 1972 to 2018, *Proceedings of the National Academy of Sciences*, 116, 9239–9244, <https://doi.org/10.1073/pnas.1904242116>, 2019.