Supplementary materials to: The Open Global Glacier Data Assimilation Framework (AGILE) v0.1

Patrick Schmitt[1], Fabien Maussion[1,2], Daniel Goldberg[3], and Philipp Gregor[4]

[1]Department of Atmospheric and Cryospheric Sciences, University of Innsbruck, Innsbruck, Austria
[2]School of Geographical Sciences, University of Bristol, Bristol, United Kingdom
[3]School of Geosciences, University of Edinburgh, Edinburgh, United Kingdom
[4]Meteorologisches Institut, Ludwig-Maximilians-Universität München, München, Germany

Correspondence: Patrick Schmitt (patrick.schmitt@uibk.ac.at)

Glacier geometry	Dynamic state	First guess method	MAD_BED [m]	MAD_V_1980 [1e6 m^3]	MAD_V_2020 [1e6 m^3]
Aletsch	retreating	OGGM	8.7	3.55	3.8
		GlabTop	6.4	8.87	6.97
	advancing	OGGM	12.7	11.28	10.1
		GlabTop	22.9	9.52	10.1
	equilibrium	OGGM	1.5	1.88	1.78
		GlabTop	9	5.75	8.15
Artesonraju	retreating	OGGM	2	0.27	0.14
		GlabTop	6.9	0.42	0.2
	advancing	OGGM	0.6	0.47	0.15
		GlabTop	2.3	0.69	0.24
	equilibrium	OGGM	0.2	0.03	0.03
		GlabTop	0.7	0.17	0.06
Baltoro	retreating	OGGM	9	17.86	22.42
		GlabTop	73	216.3	229.82
	advancing	OGGM	6.7	31.26	38.83
		GlabTop	61.3	246.02	270.53
	equilibrium	OGGM	4.7	22.2	26.79
		GlabTop	73.2	228.22	246.4
Peyto	retreating	OGGM	4	0.28	0.12
		GlabTop	4.1	0.29	0.17
	advancing	OGGM	5.9	0.5	0.62
		GlabTop	4.5	1.34	1.34
	equilibrium	OGGM	0.6	0.1	0.09
		GlabTop	3.8	0.61	0.64

Table S1. Performance matrices MAD_BED, MAD_V_1980 and MAD_V_2020 for all glacier geometries, all dynamic states and the two used first guess methods.

Glacier geometry	Dynamic state	Number control variables	Total CPU runtime per iteration [s]	CPU runtime only per gradient calculation [s]
Aletsch	retreating	120	1.29	0.12
	advancing	140	2.49	0.23
	equilibrium	120	1.81	0.23
Artesonraju	retreating	84	1.03	0.08
	advancing	72	1.24	0.11
	equilibrium	56	0.75	0.05
Baltoro	retreating	210	1.34	0.11
	advancing	214	1.78	0.16
	equilibrium	218	1.47	0.14
Peyto	retreating	72	0.71	0.06
	advancing	104	1.03	0.08
	equilibrium	94	0.71	0.05

Table S2. Showing the number of control variables and the CPU runtime for one total iteration (forward model run and gradient calculation) and the CPU runtime only for the gradient calculation for all glacier geometries and dynamic glacier states.

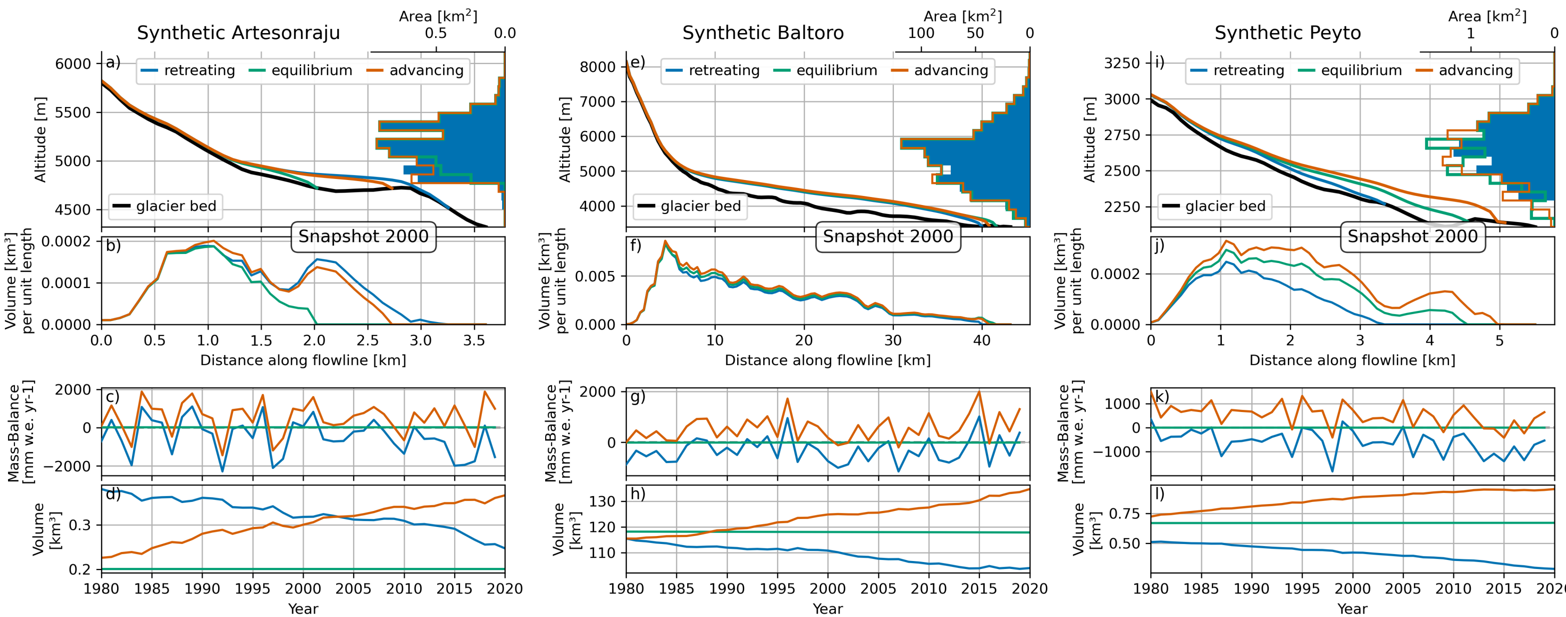

Figure S1. Same as Figure 2 for Artesonraju (a, b, c and d), Baltoro (e, f, g and h) and Peyto (i, j, k and l).