

A general theory of rock glacier creep based on in-situ and remote sensing observations

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1 | SUPPORTING INFORMATION

TABLE 1 Dataset used for the analysis of rock glacier thickness, driving stresses and creep rates. ^aFrom borehole investigations. Point information. ^bFrom InSar analysis. ^cFrom terrestrial surveys or in-situ GPS stations. ^cFrom morphological analysis. Derived from the steep front and/or the lateral margins.

Num	Rock glacier	Thickness [m]	Slope angle [°]	Creep rate [m a ⁻¹]	Reference
1	Dirru	15 ^{b,c}	27	5.50	Cicoira et al. (2019b) ¹
2	Furgwangghorn 5	15 ^a	28	2.90	Buchli et al. (2018) ²
3	Furgwangghorn 7	17 ^a	20	5.20	Buchli et al. (2018) ²
4	Guggla	17 ^c	22	4.00	Delaloye, pers. com., (2020)
5	HuHH1	17 ^c	21	1.00	Müller et al. (2016) ³
6	HuHH3	20 ^c	22	1.70	Müller et al. (2016) ³
7	Kaiserberg	27 ^b	9	0.50	Hausman et al. (2012) ⁴
8	Las Liebres	25 ^b	15	1.10	Monnier and Kinnard (2016) ⁵
9	Laurichard	20 ^b	20	1.00	Bodin et al. (2018) ⁶
10	Lazaun	25 ^a	15	1.20	Krainer et al. (2015) ⁷
11	Andes #1	22 ^a	9	0.07	Arenson (per. com. 2020) ⁸
12	Andes #2	18 ^a	11	0.05	Arenson (per. com. 2020) ⁸
13	Andes #3	12 ^a	13	0.23	Arenson (per. com. 2020) ⁸
14	Andes #4	22 ^a	11	0.14	Arenson (per. com. 2020) ⁸
15	Andes #5	14 ^a	8	0.01	Arenson (per. com. 2020) ⁸
16	Muragl 3	15 ^a	18	1.40	Arenson (per. com. 2020) ⁹
17	Muragl 4	16 ^a	18	1.20	Arenson (per. com. 2020) ⁹
18	Murtél	29 ^a	12	0.10	Arenson (per. com. 2020) ⁹
19	Ölgrube	31 ^b	13	1.10	Hausmann et al. (2012) ⁴
20	Pierre Brune 1	15 ^{a,b}	25	6.00	Marcer (pers. com. 2019)
21	Pierre Brune 2	23 ^{a,b}	16	1.00	Marcer (pers. com. 2019)
22	Reichenkar	23 ^b	13	2.50	Hausmann et al. (2007) ¹⁰
23	Rittigraben	20 ^a	20	1.50	Kenner et al. (2017) ¹¹
24	Schafberg 1	14 ^a	23	0.03	Arenson et al. (2002) ⁹
25	Schafberg 1	25 ^a	16	0.20	Arenson et al. (2002) ⁹
26	Steintälli	27 ^c	12	0.40	Cicoira (unpublished 2018)
27	Tsarmine	17 ^c	22	6.0	Delaloye (pers. com. 2020) ¹²
28	Valdallacqua	22 ^c	15	1.00	Cicoira (unpublished 2019)

TABLE 2 Dataset used for the analysis of rock glacier creep at the regional scale comprising observations of creep rates and surface slope angle. ^aFrom aerial imagery (Satellites or UAVs). Feature tracking analysis. ^bFrom InSar analysis. ^cFrom terrestrial surveys or in-situ GPS stations.

Count	Rock glaciers	Reference
324	French inventory ^a	Marcer et al. (2019) ¹³
30	Kaunertal inventory ^a	Groh and Blöthe (2019) ¹⁴
17	Permos ^c	PERMOS (2019) ¹⁵
15	University of Fribourg ^{b,c}	Delaloye (pers. com. 2020) ¹²
28	Present study ^{a,b,c}	Tab.1

TABLE 3 Dataset used for the analysis of rock glacier creep at the local scale.

Rock glacier	Data source (velocity, thickness)	Reference and availability
Laurichard	TLS, GPR	Bodin et al. (2018) ⁶
Dirru	UAVs, ERT	Cicoira et al. (2019) ^{1:12}
Pierre Brune	UAVs, ERT	Marcer et al. (2020) ¹⁶

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