

datapackage.json

```
1 {
2   "name": "glenglat",
3   "version": "1.0.0-rc2",
4   "created": "2024-07-10T07:58:00Z",
5   "title": "Global englacial temperature database",
6   "profile": "tabular-data-package",
7   "description": "Open-access database of englacial temperature measurements compiled from data submissions and published
literature. It is developed on [GitHub](https://github.com/mjacqu/glenglat) and published to [Zenodo]
(https://doi.org/10.5281/zenodo.11516611).",
8   "keywords": [
9     "glacier",
10    "temperature",
11    "borehole",
12    "ice",
13    "firn",
14    "englacial",
15    "global",
16    "compilation"
17  ],
18  "languages": [
19    "en"
20  ],
21  "licenses": [
22    {
23      "title": "Creative Commons Attribution 4.0 International",
24      "name": "CC-BY-4.0",
25      "path": "https://creativecommons.org/licenses/by/4.0"
26    }
27  ],
28  "contributors": [
29    {
30      "title": "Mylène Jacquemart",
31      "path": "https://orcid.org/0000-0003-2501-7645",
32      "organization": "Laboratory of Hydraulics, Hydrology and Glaciology (VAW), ETH Zurich, Switzerland | Swiss Federal
Research Institute for Forest, Snow and Landscape Research (WSL), Switzerland",
```

```
33     "email": "jacquemart@vaw.baug.ethz.ch",
34     "role": "author | curator"
35 },
36 {
37     "title": "Ethan Welty",
38     "path": "https://orcid.org/0000-0001-8046-2210",
39     "organization": "World Glacier Monitoring Service (WGMS), Department of Geography (GIUZ), University of Zurich (UZH),
Switzerland",
40     "role": "author | curator"
41 },
42 {
43     "title": "Guillem Carcanade",
44     "organization": "Laboratory of Hydraulics, Hydrology and Glaciology (VAW), ETH Zurich, Switzerland",
45     "role": "curator"
46 },
47 {
48     "title": "Lander Van Tricht",
49     "path": "https://orcid.org/0000-0001-7619-8955",
50     "role": "curator"
51 },
52 {
53     "title": "Gwenn Flowers",
54     "path": "https://orcid.org/0000-0002-3574-9324",
55     "role": "contributor"
56 },
57 {
58     "title": "Shin Sugiyama",
59     "path": "https://orcid.org/0000-0001-5323-9558",
60     "role": "contributor"
61 },
62 {
63     "title": "Tika Ram Gurung",
64     "path": "https://orcid.org/0000-0003-4287-6150",
65     "role": "contributor"
66 },
67 {
68     "title": "Rainer Prinz",
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69     "path": "https://orcid.org/0000-0003-4032-773X",
70     "role": "contributor"
71 },
72 {
73     "title": "Martina Barandun",
74     "path": "https://orcid.org/0000-0003-1820-7600",
75     "role": "contributor"
76 },
77 {
78     "title": "Olivier Gagliardini",
79     "path": "https://orcid.org/0000-0001-9162-3518",
80     "role": "contributor"
81 },
82 {
83     "title": "Lonnie G. Thompson",
84     "path": "https://orcid.org/0000-0001-5371-2579",
85     "role": "contributor"
86 },
87 {
88     "title": "张通 [Zhang Tong]",
89     "email": "tzhang@bnu.edu.cn",
90     "organization": "Beijing Normal University (BNU), China",
91     "role": "contributor"
92 },
93 {
94     "title": "Marcus Gastaldello",
95     "email": "marcus.gastaldello@unifr.ch",
96     "organization": "University of Fribourg (UniFr), Switzerland",
97     "role": "contributor"
98 }
99 ],
100 "resources": [
101     {
102         "name": "source",
103         "description": "Sources of information considered in the compilation of this database. Column names and categorical
values closely follow the Citation Style Language (CSL) 1.0.2 specification. Names of people in non-Latin scripts are
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137     "type": "year",
138     "constraints": {
139         "required": true
140     }
141 },
142 {
143     "name": "type",
144     "description": "Item type:\n\n - article-journal: Journal article.\n - book: Book (if the entire book is
relevant).\n - chapter: Book section.\n - document: Document not fitting into any other category.\n - dataset: Collection
of data.\n - map: Geographic map.\n - paper-conference: Paper published in conference proceedings.\n - personal-
communication: Personal communication between individuals.\n - speech: Presentation (talk, poster) at a conference.\n -
report: Report distributed by an institution.\n - thesis: Thesis written to satisfy degree requirements.\n - webpage:
Website or page on a website.",
145     "type": "string",
146     "constraints": {
147         "required": true,
148         "enum": [
149             "article-journal",
150             "book",
151             "chapter",
152             "dataset",
153             "document",
154             "map",
155             "paper-conference",
156             "personal-communication",
157             "speech",
158             "report",
159             "thesis",
160             "webpage"
161         ]
162     }
163 },
164 {
165     "name": "title",
166     "description": "Item title.",
167     "type": "string",
168     "constraints": {
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```
169         "pattern": "[^\\s]+( [^\\s]+)*"
170     }
171 },
172 {
173     "name": "url",
174     "description": "URL (DOI if available).",
175     "type": "string",
176     "constraints": {
177         "pattern": "https?:\\/\\/\\.+"
178     }
179 },
180 {
181     "name": "language",
182     "description": "Language as ISO 639-1 two-letter language code.\\n\\n - de: German\\n - en: English\\n - fr:
French\\n - ko: Korean\\n - ru: Russian\\n - sv: Swedish\\n - zh: Chinese",
183     "type": "string",
184     "constraints": {
185         "required": true,
186         "enum": [
187             "de",
188             "en",
189             "fr",
190             "ko",
191             "ru",
192             "sv",
193             "zh"
194         ]
195     }
196 },
197 {
198     "name": "container_title",
199     "description": "Title of the container (e.g. journal, book).",
200     "type": "string",
201     "constraints": {
202         "pattern": "[^\\s]+( [^\\s]+)*"
203     }
204 },
```

```
205     {
206         "name": "volume",
207         "description": "Volume number of the item or container.",
208         "type": "integer"
209     },
210     {
211         "name": "issue",
212         "description": "Issue number (e.g. `1`) or range (e.g. `1-2`) of the item or container, with an optional letter
prefix (e.g. `F1`).",
213         "type": "string",
214         "constraints": {
215             "pattern": "[a-zA-Z]?[0-9]+(-[0-9]+)?"
216         }
217     },
218     {
219         "name": "page",
220         "description": "Page number (e.g. `1`) or range (e.g. `1-2`) of the item in the container.",
221         "type": "string",
222         "constraints": {
223             "pattern": "[0-9]+(-[0-9]+)?"
224         }
225     },
226     {
227         "name": "version",
228         "description": "Version number (e.g. `1.0`) of the item.",
229         "type": "string",
230         "constraints": {
231             "pattern": "[0-9]+(\\. [0-9]+)*"
232         }
233     },
234     {
235         "name": "editor",
236         "description": "Editor names (e.g. of the containing book) as a pipe-delimited list.",
237         "type": "string",
238         "constraints": {
239             "pattern": "[^\\s]+( [^\\s]+)*"
240         }
    }
```

```
241     },
242     {
243         "name": "collection_title",
244         "description": "Title of the collection (e.g. book series).",
245         "type": "string",
246         "constraints": {
247             "pattern": "[^\\s]+( [^\\s]+)*"
248         }
249     },
250     {
251         "name": "collection_number",
252         "description": "Number (e.g. `1`) or range (e.g. `1-2`) in the collection (e.g. book series volume).",
253         "type": "string",
254         "constraints": {
255             "pattern": "[0-9]+(-[0-9]+)?"
256         }
257     },
258     {
259         "name": "publisher",
260         "description": "Publisher name.",
261         "type": "string",
262         "constraints": {
263             "pattern": "[^\\s]+( [^\\s]+)*"
264         }
265     }
266 ],
267 "primaryKey": [
268     "id"
269 ],
270 "missingValues": [
271     ""
272 ]
273 }
274 },
275 {
276     "name": "borehole",
277     "description": "Metadata about each borehole.",
```



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278 "path": "data/borehole.csv",
279 "format": "csv",
280 "dialect": {
281   "header": true,
282   "delimiter": ",",
283   "lineTerminator": "\n",
284   "quoteChar": "\"",
285   "doubleQuote": true
286 },
287 "profile": "tabular-data-resource",
288 "schema": {
289   "fields": [
290     {
291       "name": "id",
292       "description": "Unique identifier.",
293       "type": "integer",
294       "constraints": {
295         "required": true,
296         "unique": true,
297         "minimum": 1
298       }
299     },
300     {
301       "name": "source_id",
302       "type": "string",
303       "description": "Identifier of the source of the earliest temperature measurements. This is also the source of the
borehole attributes unless otherwise stated in `notes`.",
304       "constraints": {
305         "required": true
306       }
307     },
308     {
309       "name": "glacier_name",
310       "description": "Glacier or ice cap name (as reported).",
311       "type": "string",
312       "constraints": {
313         "required": true,
```

```
314         "pattern": "[^\\s]+( [^\\s]+)*"
315     }
316 },
317 {
318     "name": "glims_id",
319     "description": "Global Land Ice Measurements from Space (GLIMS) glacier identifier.",
320     "type": "string",
321     "constraints": {
322         "pattern": "G[0-9]{6}E[0-9]{5}[NS]"
323     }
324 },
325 {
326     "name": "location_origin",
327     "description": "Origin of location (`latitude`, `longitude`):\n\n- submitted: Provided in data submission\n-
published: Reported as coordinates in original publication\n- digitized: Digitized from published map with complete axes\n-
estimated: Estimated from published plot by comparing to a map (e.g. Google Maps, CalTopo)\n- guessed: Estimated with
difficulty, for example by comparing `elevation` to a map (e.g. Google Maps, CalTopo)",
328     "type": "string",
329     "constraints": {
330         "required": true,
331         "enum": [
332             "submitted",
333             "published",
334             "digitized",
335             "estimated",
336             "guessed"
337         ]
338     }
339 },
340 {
341     "name": "latitude",
342     "description": "Latitude (EPSG 4326).",
343     "type": "number",
344     "unit": "degree",
345     "constraints": {
346         "required": true,
347         "minimum": -90,
```

```
348         "maximum": 90
349     }
350 },
351 {
352     "name": "longitude",
353     "description": "Longitude (EPSG 4326).",
354     "type": "number",
355     "unit": "degree",
356     "constraints": {
357         "required": true,
358         "minimum": -180,
359         "maximum": 180
360     }
361 },
362 {
363     "name": "elevation_origin",
364     "description": "Origin of elevation (`elevation`):\n\n- submitted: Provided in data submission\n- published:  
Reported as number in original publication\n- digitized: Digitized from published plot with complete axes\n- estimated:  
Estimated from elevation contours in published map\n- guessed: Estimated with difficulty, for example by comparing location  
(`latitude`, `longitude`) to a map of contemporary elevations (e.g. CalTopo, Google Maps)",
365     "type": "string",
366     "constraints": {
367         "required": true,
368         "enum": [
369             "submitted",
370             "published",
371             "digitized",
372             "estimated",
373             "guessed"
374         ]
375     }
376 },
377 {
378     "name": "elevation",
379     "description": "Elevation above sea level.",
380     "type": "number",
381     "unit": "m",
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```
382     "constraints": {
383         "required": true,
384         "maximum": 9999.0
385     }
386 },
387 {
388     "name": "label",
389     "description": "Borehole name (e.g. as labeled on a plot).",
390     "type": "string"
391 },
392 {
393     "name": "date_min",
394     "description": "Begin date of drilling, or if not known precisely, the first possible date (e.g. 2019 → 2019-01-
01).",
395     "type": "date",
396     "format": "%Y-%m-%d"
397 },
398 {
399     "name": "date_max",
400     "description": "End date of drilling, or if not known precisely, the last possible date (e.g. 2019 → 2019-12-
31).",
401     "type": "date",
402     "format": "%Y-%m-%d"
403 },
404 {
405     "name": "drill_method",
406     "description": "Drilling method:\n\n- mechanical: Push, percussion, rotary, ... \n- thermal: Hot point,
electrothermal, steam, ... \n- combined: Mechanical and thermal",
407     "type": "string",
408     "constraints": {
409         "enum": [
410             "mechanical",
411             "thermal",
412             "combined"
413         ]
414     }
415 },
```

```
416     {
417         "name": "ice_depth",
418         "description": "Starting depth of ice. Infinity (INF) indicates that ice was not reached.",
419         "type": "number",
420         "unit": "m"
421     },
422     {
423         "name": "depth",
424         "description": "Total borehole depth (not including drilling in the underlying bed).",
425         "type": "number",
426         "unit": "m"
427     },
428     {
429         "name": "to_bed",
430         "description": "Whether the borehole reached the glacier bed.",
431         "type": "boolean",
432         "trueValues": [
433             "True"
434         ],
435         "falseValues": [
436             "False"
437         ]
438     },
439     {
440         "name": "temperature_accuracy",
441         "description": "Thermistor accuracy or precision (as reported). Typically understood to represent one standard
deviation.",
442         "type": "number",
443         "unit": "°C"
444     },
445     {
446         "name": "notes",
447         "description": "Additional remarks about the study site, the borehole, or the measurements therein. Sources are
referenced by their `id`.",
448         "type": "string",
449         "constraints": {
450             "pattern": "[^\\s]+( [^\\s]+)*"
```

```
451     }
452   },
453   {
454     "name": "curator",
455     "description": "Names of people who added the data to the database, as a pipe-delimited list. Additional details
about each can be found under `contributors`.",
456     "type": "string",
457     "constraints": {
458       "required": true,
459       "pattern": "[^\\s]+( [^\\s]+)*"
460     }
461   }
462 ],
463 "missingValues": [
464   ""
465 ],
466 "primaryKey": [
467   "id"
468 ],
469 "foreignKeys": [
470   {
471     "fields": [
472       "source_id"
473     ],
474     "reference": {
475       "resource": "source",
476       "fields": [
477         "id"
478       ]
479     }
480   }
481 ]
482 }
483 },
484 {
485   "name": "profile",
486   "description": "Date and time of each measurement profile.",
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488   "data/profile.csv",  
489   "data/prinz2022-nunatarssuaq/profile.csv",  
490   "data/flowers2022-little-kluane/profile.csv",  
491   "data/flowers2022-south/profile.csv",  
492   "data/gurung2022-rikha-samba/profile.csv",  
493   "data/lee2019-jarvis/profile.csv",  
494   "data/carturan2023-ortles/profile.csv"  
495 ],  
496 "format": "csv",  
497 "dialect": {  
498   "header": true,  
499   "delimiter": ",",  
500   "lineTerminator": "\n",  
501   "quoteChar": "\"",  
502   "doubleQuote": true  
503 },  
504 "profile": "tabular-data-resource",  
505 "schema": {  
506   "fields": [  
507     {  
508       "name": "borehole_id",  
509       "description": "Borehole identifier.",  
510       "type": "integer",  
511       "constraints": {  
512         "required": true  
513       }  
514     },  
515     {  
516       "name": "id",  
517       "description": "Borehole profile identifier (starting from 1 for each borehole).",  
518       "type": "integer",  
519       "constraints": {  
520         "required": true,  
521         "minimum": 1  
522       }  
523     },
```

```
524     {
525         "name": "source_id",
526         "description": "Source identifier.",
527         "type": "string",
528         "constraints": {
529             "required": true
530         }
531     },
532     {
533         "name": "measurement_origin",
534         "description": "Origin of measurements (`measurement.depth`, `measurement.temperature`):\n\n- submitted: Provided
as numbers in data submission\n- published: Numbers read from original publication\n- digitized: Digitized from published
plot(s) with Plot Digitizer",
535         "type": "string",
536         "constraints": {
537             "required": true,
538             "enum": [
539                 "submitted",
540                 "published",
541                 "digitized"
542             ]
543         }
544     },
545     {
546         "name": "date_min",
547         "description": "Measurement date, or if not known precisely, the first possible date (e.g. 2019 → 2019-01-01).",
548         "type": "date",
549         "format": "%Y-%m-%d"
550     },
551     {
552         "name": "date_max",
553         "description": "Measurement date, or if not known precisely, the last possible date (e.g. 2019 → 2019-12-31).",
554         "type": "date",
555         "format": "%Y-%m-%d",
556         "constraints": {
557             "required": true
558         }
559     }
560 }
```



```
559     },
560     {
561         "name": "time",
562         "description": "Measurement time.",
563         "type": "time",
564         "format": "%H:%M:%S"
565     },
566     {
567         "name": "utc_offset",
568         "description": "Time offset relative to Coordinated Universal Time (UTC).",
569         "type": "number",
570         "unit": "h"
571     },
572     {
573         "name": "equilibrated",
574         "description": "Whether temperatures have equilibrated following drilling.",
575         "type": "boolean",
576         "trueValues": [
577             "True"
578         ],
579         "falseValues": [
580             "False"
581         ]
582     },
583     {
584         "name": "notes",
585         "description": "Additional remarks about the profile or the measurements therein. Sources are referenced by their
586         `id`.",
587         "type": "string",
588         "constraints": {
589             "pattern": "[^\\s]+( [^\\s]+)*"
590         }
591     },
592     "missingValues": [
593         ""
594     ],
```

```
595     "primaryKey": [  
596         "borehole_id",  
597         "id"  
598     ],  
599     "foreignKeys": [  
600         {  
601             "fields": [  
602                 "borehole_id"  
603             ],  
604             "reference": {  
605                 "resource": "borehole",  
606                 "fields": [  
607                     "id"  
608                 ]  
609             }  
610         },  
611         {  
612             "fields": [  
613                 "source_id"  
614             ],  
615             "reference": {  
616                 "resource": "source",  
617                 "fields": [  
618                     "id"  
619                 ]  
620             }  
621         }  
622     ]  
623 }  
624 },  
625 {  
626     "name": "measurement",  
627     "description": "Temperature measurements with depth.",  
628     "path": [  
629         "data/measurement.csv",  
630         "data/prinz2022-nunatarssuaq/measurement.csv",  
631         "data/flowers2022-little-kluane/measurement.csv",
```

```
632     "data/flowers2022-south/measurement.csv",
633     "data/gurung2022-rikha-samba/measurement.csv",
634     "data/lee2019-jarvis/measurement.csv",
635     "data/carturan2023-ortles/measurement.csv"
636 ],
637 "format": "csv",
638 "dialect": {
639     "header": true,
640     "delimiter": ",",
641     "lineTerminator": "\n",
642     "quoteChar": "\"",
643     "doubleQuote": true
644 },
645 "profile": "tabular-data-resource",
646 "schema": {
647     "fields": [
648         {
649             "name": "borehole_id",
650             "description": "Borehole identifier.",
651             "type": "integer",
652             "constraints": {
653                 "required": true
654             }
655         },
656         {
657             "name": "profile_id",
658             "description": "Borehole profile identifier.",
659             "type": "integer",
660             "constraints": {
661                 "required": true
662             }
663         },
664         {
665             "name": "depth",
666             "description": "Depth below the glacier surface.",
667             "type": "number",
668             "unit": "m",
```

```
669     "constraints": {
670       "required": true
671     }
672   },
673   {
674     "name": "temperature",
675     "description": "Temperature.",
676     "type": "number",
677     "unit": "°C",
678     "constraints": {
679       "required": true
680     }
681   }
682 ],
683 "missingValues": [
684   ""
685 ],
686 "primaryKey": [
687   "borehole_id",
688   "profile_id",
689   "depth"
690 ],
691 "foreignKeys": [
692   {
693     "fields": [
694       "borehole_id",
695       "profile_id"
696     ],
697     "reference": {
698       "resource": "profile",
699       "fields": [
700         "borehole_id",
701         "id"
702       ]
703     }
704   }
705 ]
```

706			}
707		}	
708]	
709		}	