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Bundesamt für Umwelt BAFU
Bundesamt für Meteorologie und Klimatologie MeteoSchweiz
Bundesamt für Landestopografie swisstopo

ECMWF sub-seasonal forecasts in the Swiss national drought warning system:

First Operational Learnings

UEF2026

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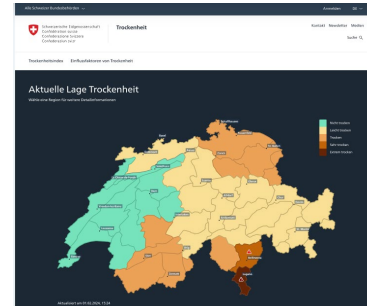


National drought monitoring and warning system

Warnings via official federal warning channels



Web-based national Drought platform



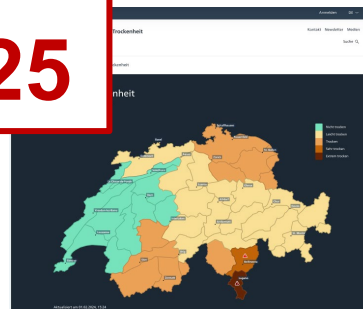
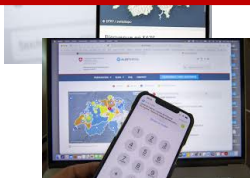


National drought monitoring and warning system

Warnings via official federal warning

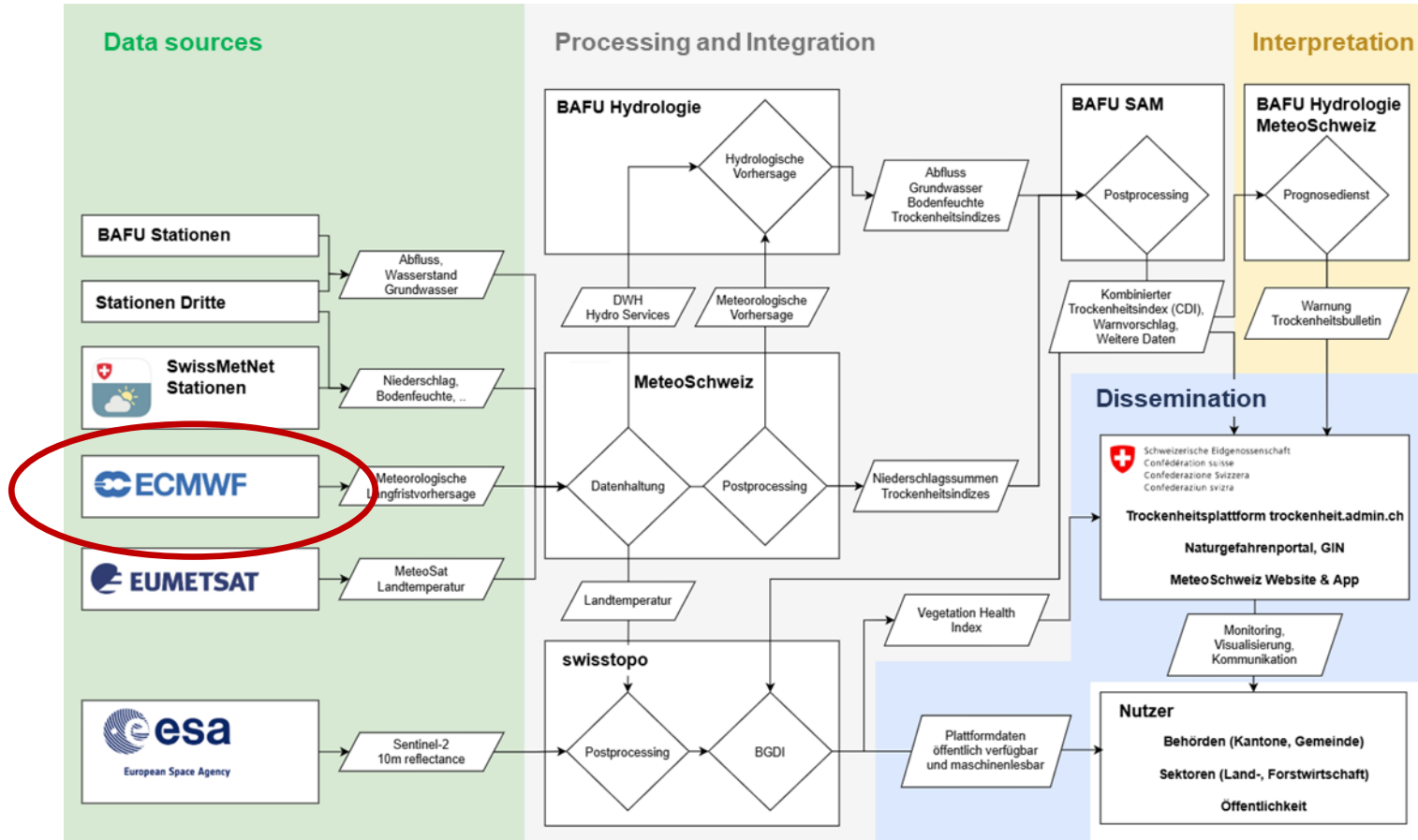
Web-based national Drought platform

**Live since
May 8 2025**





From data to decision support





A journey through the warning chain



A journey through the warning chain

It was early April 2025, Switzerland was already quite dry..

The ECMWF extended-range forecast for the next 6 weeks was just delivered on the MeteoSwiss infrastructure..



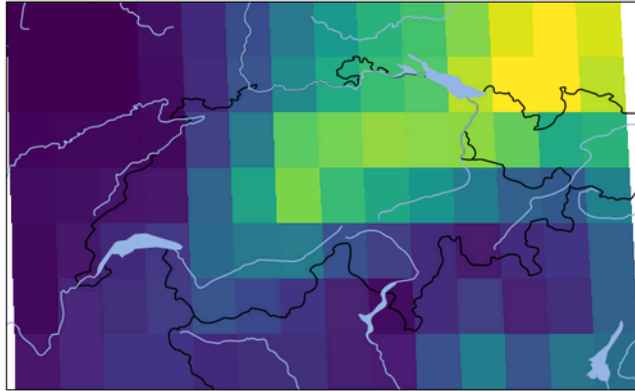
Low water level in Lake Constance on April 2nd, 2025
Photo: keystone



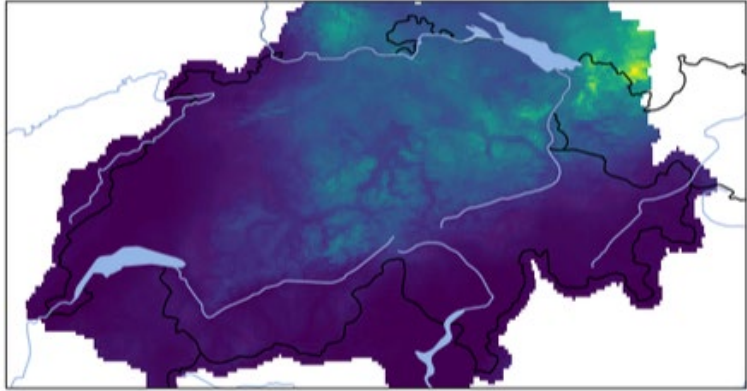
Statistical downscaling



Coarse grid



Fine grid



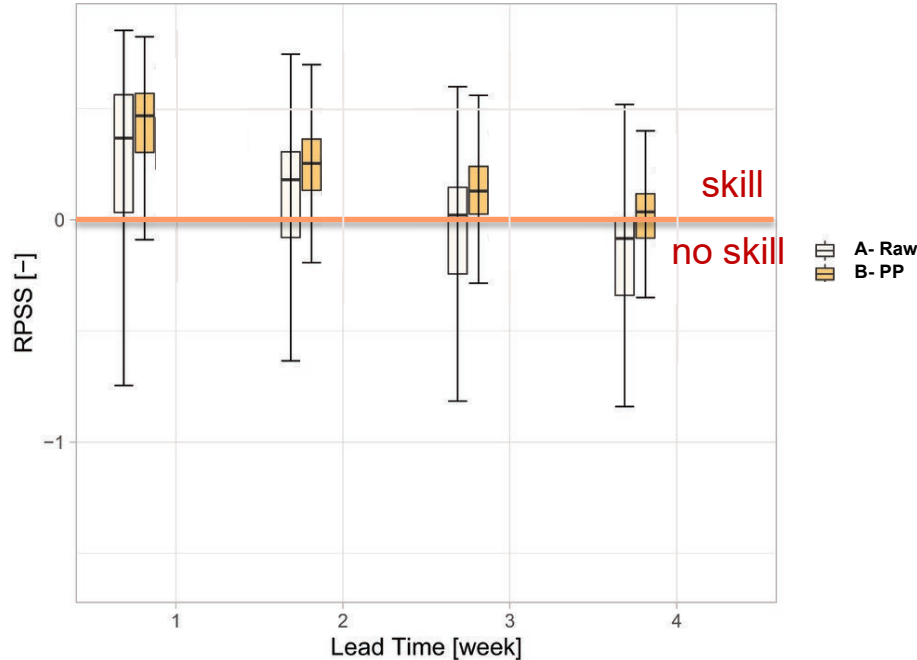
Downscaling (Quantile-Mapping) of ECMWF extended-range precipitation forecasts using a 2km climate observational grid as reference. The observational grid is based on interpolated station data.

The 101 ensemble members of the raw ECMWF forecast are first bias-corrected and downscaled to 2km resolution



Impact of quantile mapping

RPSS of weekly runoff across catchments



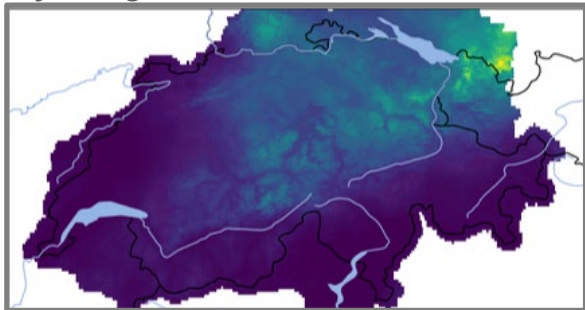
- Bias-correction improves the overall hydrological forecast skill (here shown for runoff)
- Generally, the runoff forecast is **useful until week 4**.

Impact of bias-correction (quantile mapping) of the meteorological forecast for runoff forecast skill (Chang et al. 2023, J. Hydromet)



Multivariate drought index

Post-processed forecast for hydrological Switzerland



MeteoSwiss

Drought indices

- SPI 1
- SPI 3
- SPI 24

Federal Office for Environment

Hydrological model

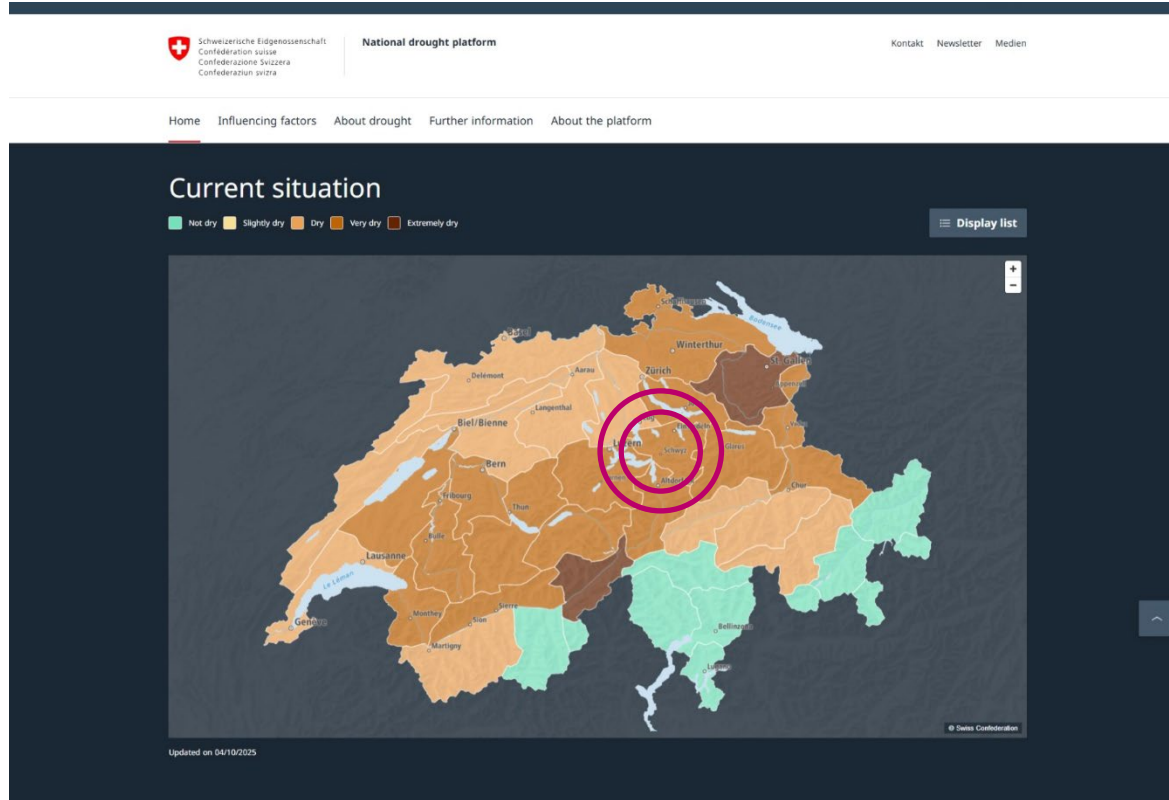
- Streamflow
- Soil moisture

Combined Drought Index (CDI)

The meteorological forecast is then transformed into various drought-relevant metrics which are displayed on the platform



Drought platform





Drought platform

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National drought platform

Kontakt Newsletter Medien

Home Influencing factors About drought Further information About the platform

Glarus Alps

Current status: very dry. It is becoming less dry.

■ Very dry ■ Key

Current situation Annual comparison Series

Drought index Total precipitation Discharge Lake level Soil moisture Vegetation Groundwater

Observations (6 months back)

Forecast (4 weeks)

Drought index

Updated on 04/10/2025

Month	Day	Drought Index
Oct	13	143
Oct	14	144
Oct	15	145
Oct	16	146
Oct	17	147
Oct	18	148
Oct	19	149
Oct	20	150
Oct	21	151
Oct	22	152
Oct	23	153
Oct	24	154
Nov	1	155
Nov	2	156
Nov	3	157
Nov	4	158
Nov	5	159
Nov	6	160
Nov	7	161
Nov	8	162
Nov	9	163
Nov	10	164
Nov	11	165
Nov	12	166
Nov	13	167
Nov	14	168
Nov	15	169
Nov	16	170
Nov	17	171
Nov	18	172
Nov	19	173
Nov	20	174
Nov	21	175
Nov	22	176
Nov	23	177
Nov	24	178
Nov	25	179
Nov	26	180
Nov	27	181
Nov	28	182
Nov	29	183
Nov	30	184
Dec	1	185
Dec	2	186
Dec	3	187
Dec	4	188
Dec	5	189
Dec	6	190
Dec	7	191
Dec	8	192
Dec	9	193
Dec	10	194
Dec	11	195
Dec	12	196
Dec	13	197
Dec	14	198
Dec	15	199
Dec	16	200
Dec	17	201
Dec	18	202
Dec	19	203
Dec	20	204
Dec	21	205
Dec	22	206
Dec	23	207
Dec	24	208
Dec	25	209
Dec	26	210
Dec	27	211
Dec	28	212
Dec	29	213
Dec	30	214
Jan	1	215
Jan	2	216
Jan	3	217
Jan	4	218
Jan	5	219
Jan	6	220
Jan	7	221
Jan	8	222
Jan	9	223
Jan	10	224
Jan	11	225
Jan	12	226
Jan	13	227
Jan	14	228
Jan	15	229
Jan	16	230
Jan	17	231
Jan	18	232
Jan	19	233
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Jan	21	235
Jan	22	236
Jan	23	237
Jan	24	238
Jan	25	239
Jan	26	240
Jan	27	241
Jan	28	242
Jan	29	243
Jan	30	244
Feb	1	245
Feb	2	246
Feb	3	247
Feb	4	248
Feb	5	249
Feb	6	250
Feb	7	251
Feb	8	252
Feb	9	253
Feb	10	254
Feb	11	255
Feb	12	256
Feb	13	257
Feb	14	258
Feb	15	259
Feb	16	260
Feb	17	261
Feb	18	262
Feb	19	263
Feb	20	264
Feb	21	265
Feb	22	266
Feb	23	267
Feb	24	268
Feb	25	269
Feb	26	270
Feb	27	271
Feb	28	272
Feb	29	273
Feb	30	274
Mar	1	275
Mar	2	276
Mar	3	277
Mar	4	278
Mar	5	279
Mar	6	280
Mar	7	281
Mar	8	282
Mar	9	283
Mar	10	284
Mar	11	285
Mar	12	286
Mar	13	287
Mar	14	288
Mar	15	289
Mar	16	290
Mar	17	291
Mar	18	292
Mar	19	293
Mar	20	294
Mar	21	295
Mar	22	296
Mar	23	297
Mar	24	298
Mar	25	299
Mar	26	300
Mar	27	301
Mar	28	302
Mar	29	303
Mar	30	304
Apr	1	305
Apr	2	306
Apr	3	307
Apr	4	308
Apr	5	309
Apr	6	310
Apr	7	311
Apr	8	312
Apr	9	313
Apr	10	314
Apr	11	315
Apr	12	316
Apr	13	317
Apr	14	318
Apr	15	319
Apr	16	320
Apr	17	321
Apr	18	322

Total precipitation

Updated on 04/11/2025

Discharge

Linth - Weesen, Biäsche - 2104

Updated on 04/11/2025

Status on 10.4.2025



Drought platform

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National drought platform

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Glarus Alps

Current status: very dry. It is becoming less dry.

Very dry Key

Current situation Annual comparison Series

Drought index Total precipitation Discharge Lake level Soil moisture Vegetation Groundwater

Drought index

Back to region selection

Current status: very dry. It is becoming less dry.

Month	Drought Index
Oct	133
Nov	144
Dec	146
Jan	147
Feb	148
Mar	149
Apr	150
May	151
Jun	152
Jul	153
Aug	154
Sep	155
Oct	156
Nov	157
Dec	158
Jan	159
Feb	160
Mar	161
Apr	162
May	163
Jun	164
Jul	165
Aug	166
Sep	167
Oct	168
Nov	169
Dec	170
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May	283
Jun	284
Jul	285
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Feb	292
Mar	293
Apr	294
May	295
Jun	296
Jul	297
Aug	298
Sep	299
Oct	300

Diagram details Updated on 04/10/2025

Total precipitation

More about this influencing factor

Drought norm Minimum value

Month	Total Precipitation (mm)
Oct	143
Nov	144
Dec	145
Jan	146
Feb	147
Mar	148
Apr	149
May	150
Jun	151
Jul	152
Aug	153
Sep	154
Oct	155
Nov	156
Dec	157
Jan	158
Feb	159
Mar	160
Apr	161
May	162
Jun	163
Jul	164
Aug	165
Sep	166
Oct	167
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Jan	290
Feb	291
Mar	292
Apr	293
May	294
Jun	295
Jul	296
Aug	297
Sep	298
Oct	299
Nov	300

Diagram details Updated on 04/11/2025

Discharge

More about this influencing factor

Linth - Weesen, Biäsche - 2104

Drought norm Minimum value

Month	Discharge (m³/s)
Oct	43
Nov	44
Dec	45
Jan	46
Feb	47
Mar	48
Apr	49
May	50
Jun	51
Jul	52
Aug	53
Sep	54
Oct	55
Nov	56
Dec	57
Jan	58
Feb	59
Mar	60
Apr	61
May	62
Jun	63
Jul	64
Aug	65
Sep	66
Oct	67
Nov	68
Dec	69
Jan	70
Feb	71
Mar	72
Apr	73
May	74
Jun	75
Jul	76
Aug	77
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Oct	79
Nov	80
Dec	81
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Feb	83
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Nov	92
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Apr	97
May	98
Jun	99
Jul	100
Aug	101
Sep	102
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Dec	189
Jan	190
Feb	191
Mar	192
Apr	193
May	194
Jun	195
Jul	196
Aug	197
Sep	198
Oct	199
Nov	200

Diagram details Updated on 04/11/2025

Status on 10.4.2025



Communication



A drought lies ahead.



Which areas of the country should be warned, which not?



What is a useful message to communicate?





Warning strategy



In Switzerland, federal authorities must use **standard warning scale** for all natural hazards

Level 2: Call to action. Follow the situation actively, spare water resources, prepare implementation of measures.

Level 4: Exceptional situation. Extreme drought with large-scale effects. Inform yourself about measures in your area and follow them.

Die Gefahrenstufen der Naturgefahrenfachstellen des Bundes

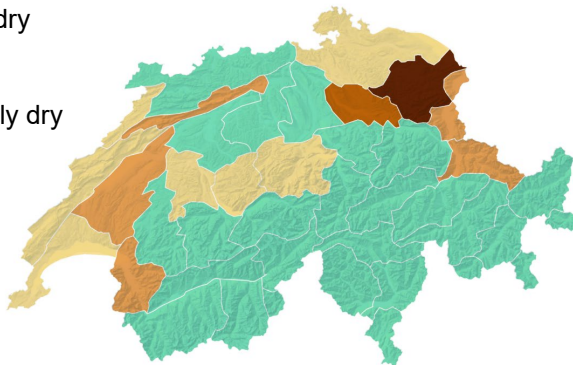
Symbol	Gefahrenstufe (Farbe)	Bedeutung der Gefahrenstufe
5	Stufe 5 (dunkelrot)	Sehr grosse Gefahr
4	Stufe 4 (rot)	Grosse Gefahr
3	Stufe 3 (orange)	Erhebliche Gefahr
2	Stufe 2 (gelb)	Mässige Gefahr
1	Stufe 1 (grün)	Keine oder geringe Gefahr



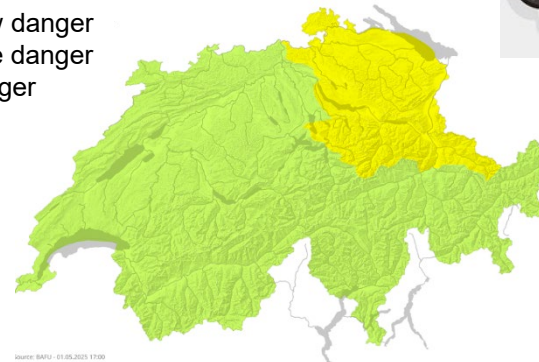
CDI and drought warnings



- Not dry
- Slightly dry
- Dry
- Very dry
- Extremely dry



- No or low danger
- Moderate danger
- High danger



- 5 levels
- Automatically calculated and predicted for each week
- Provides an assessment of the rarity of a multifactorial water deficit
- Provides a basis for decision-making
- Updated daily

- 3 levels (traffic light system)
- Evaluated by experts
- Takes into account the duration and intensity of an event
- Can consider other factors depending on the situation (e.g., low sea levels, lack of snow)



Situation assessment



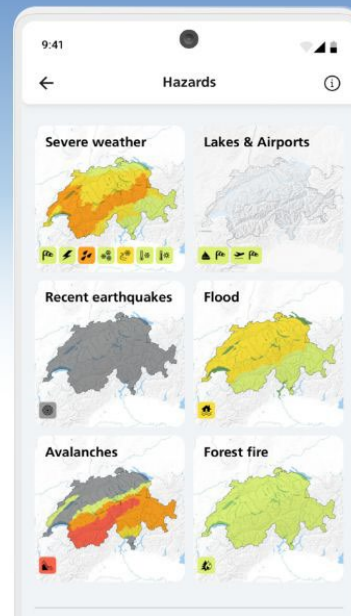
- Even though the system is automatized, forecasters take the final decision on what warning level is issued
- Warning levels are only updated **weekly** to avoid interfering with mitigation efforts (drought measures do not change every day)



Delivery

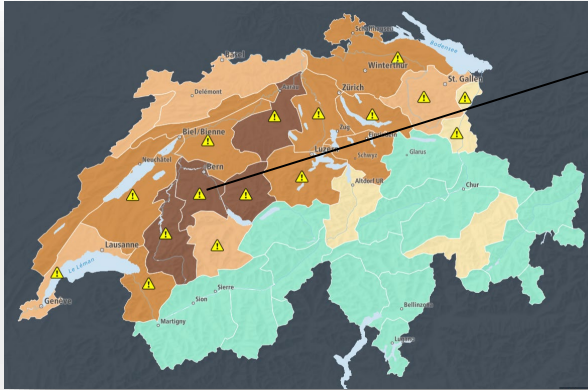
- Warnings are published on the MeteoSwiss App, and the other usual channels
- Users are alerted according to their location and preferences
- Broad user base ensures the transmission of the alert (2.5 Mio visits per day, Swiss population 9 Mio)
- At level 4, federally funded media are legally mandated to relay federal warnings

Hazard maps for severe weather and natural hazards.

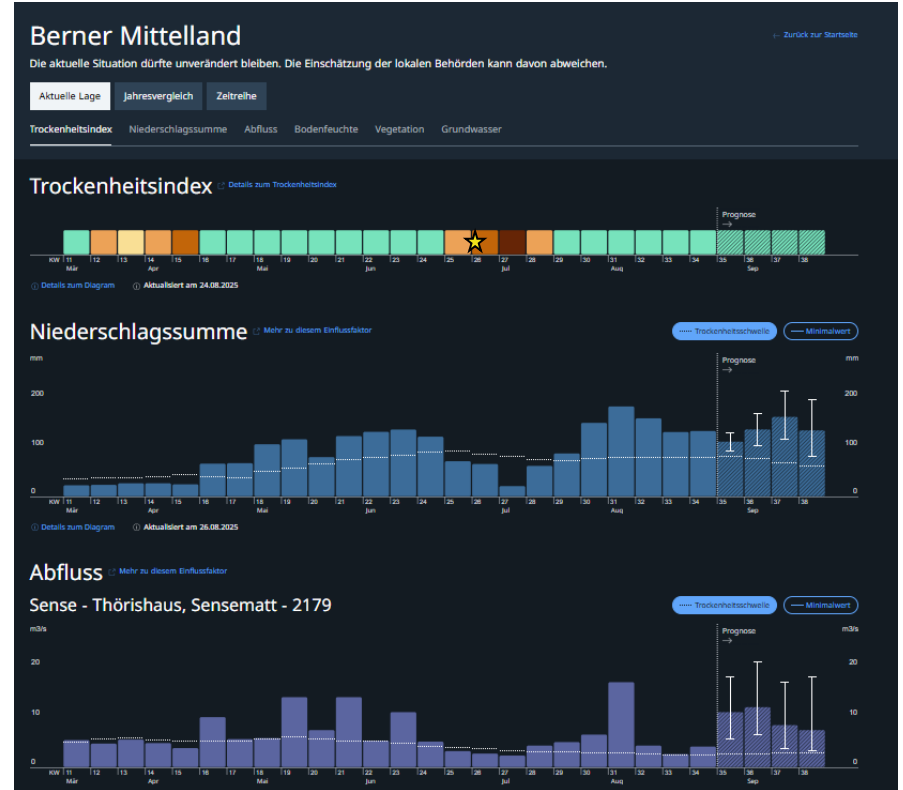
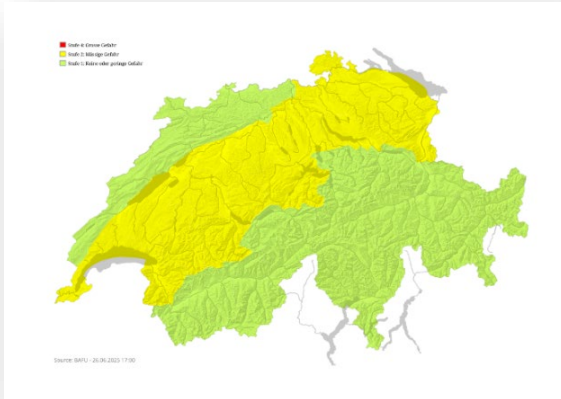




June 2025: First drought warning

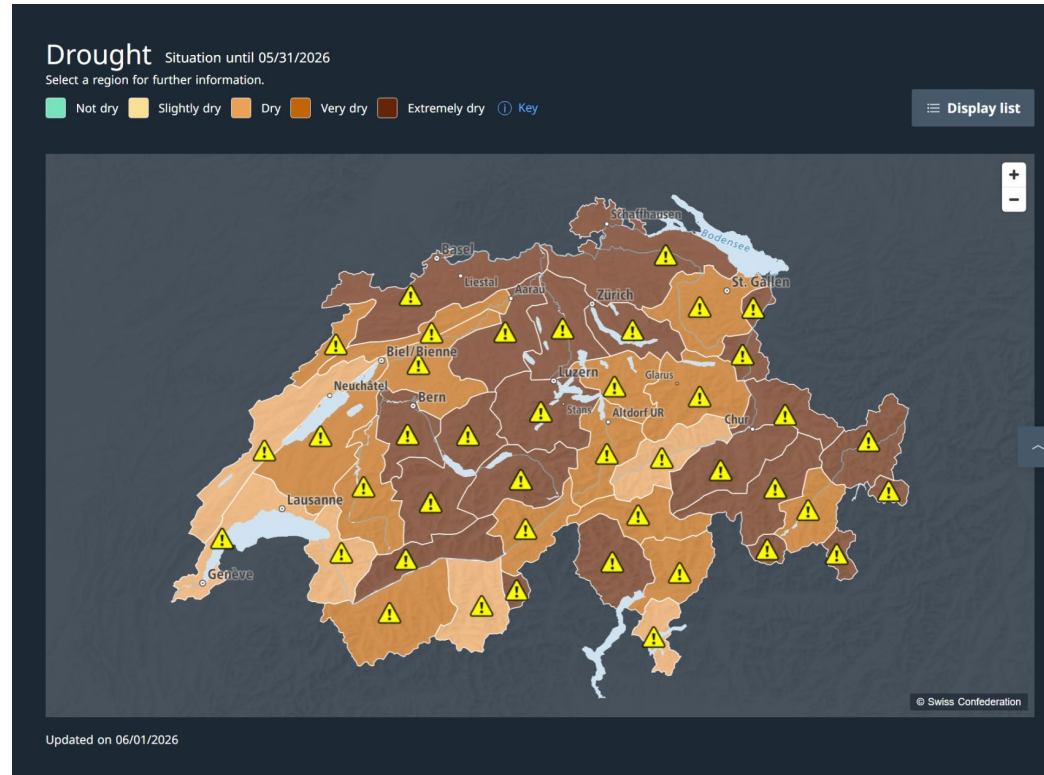


Warning Level 2: 26.6. – 24.7.



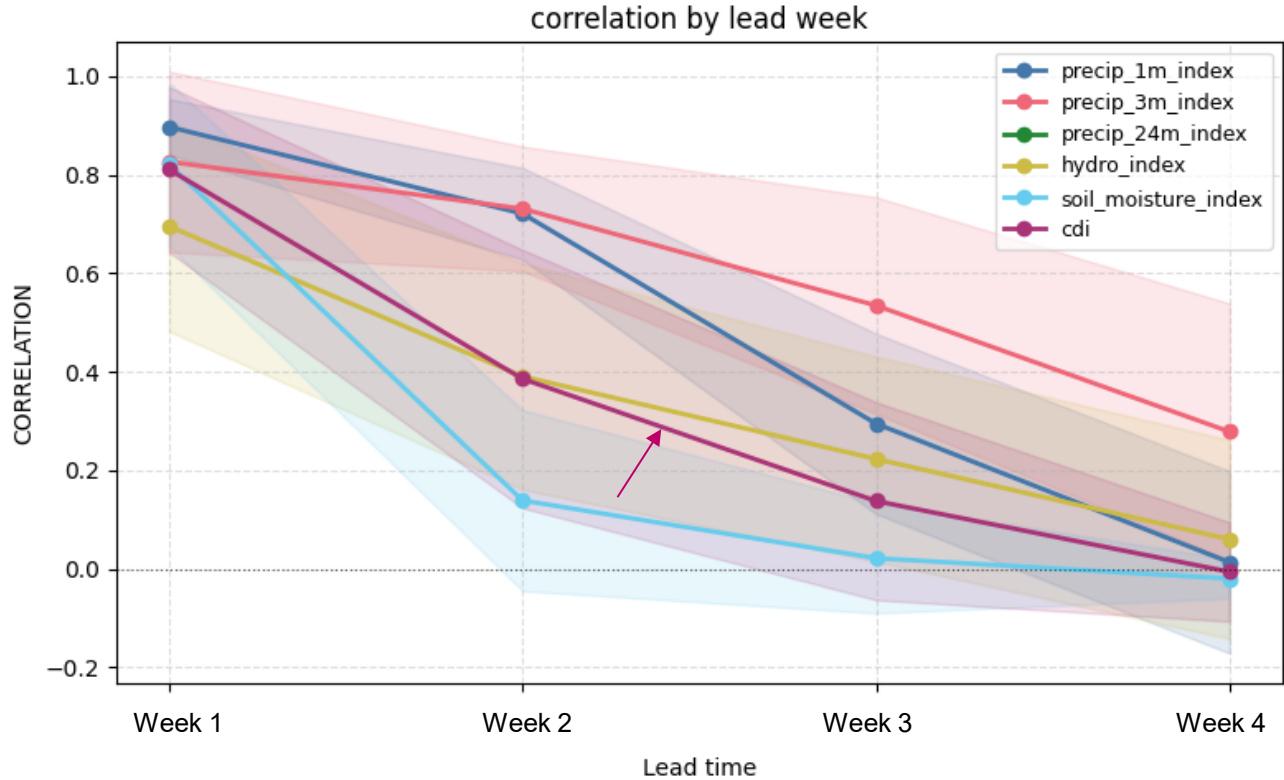


June 2026 warning



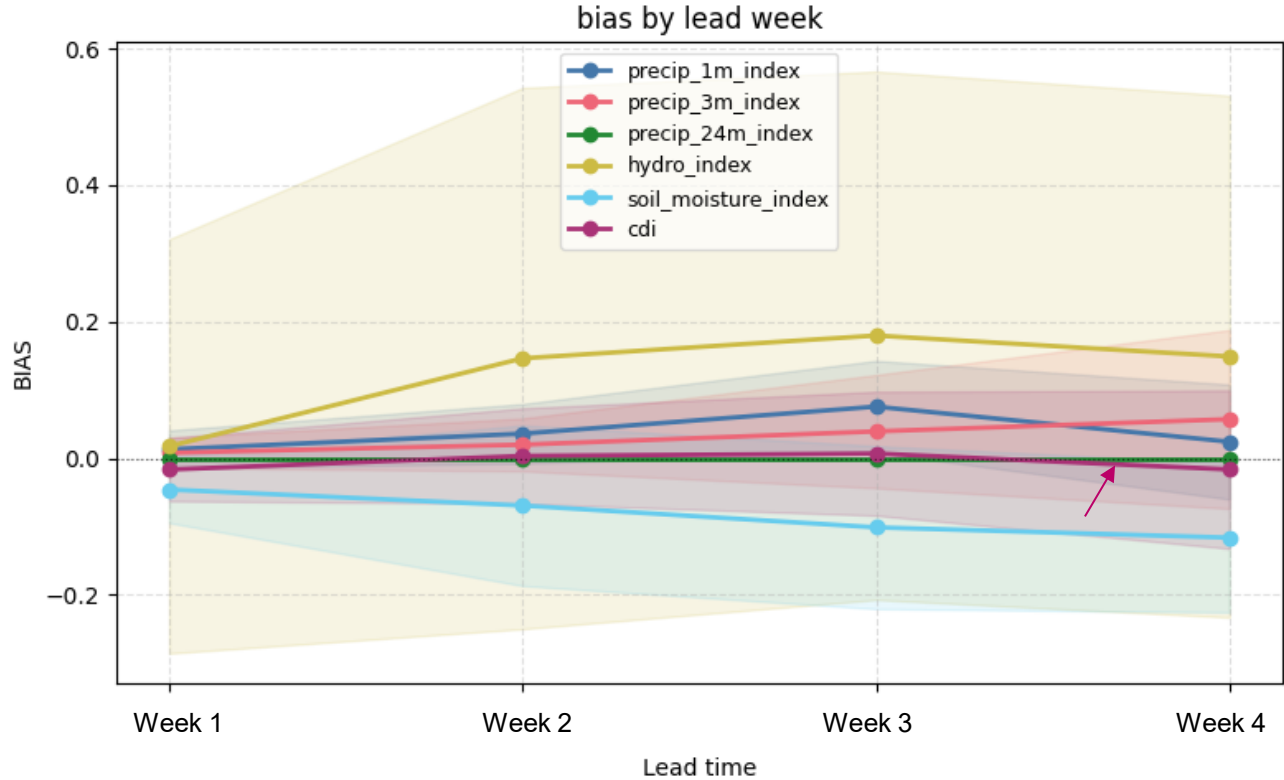


Indicies verification - correlation





Indicies verification - bias





What do users find important?

Importance rating 1–4 · n = 98 participants

	Avg	Rating 1 not important	Rating 2	Rating 3	Rating 4 most important
Drought index overview map	ø 3.11 · Σ 95	4 4.2%	15 15.8%	43 45.3%	33 34.7%
Regional information (e.g. Berner Mittelland)	ø 3.4 · Σ 96	3 3.1%	9 9.4%	31 32.3%	65 67.7%
Extended-range forecast (4 weeks)	ø 3.09 · Σ 97	7 7.2%	16 16.5%	35 36.1%	39 40.2%
Historical data and trends (1991–today)	ø 2.75 · Σ 96	12 12.5%	26 27.1%	32 33.3%	26 27.1%
Drought bulletin & warnings (e.g. MeteoSwiss app)	ø 3.12 · Σ 95	8 8.4%	10 10.5%	40 42.1%	37 38.9%

Regional data and the **4-week forecast** are top-rated:
68% and 40% of users rated them most important.



How helpful are drought warnings?

1 = not helpful · 4 = helpful · n ≈ 91–95 participants

For planning measures

e.g. irrigation, emergency management

2.97

avg score

30.5% rated it helpful (4)

For legitimizing measures

e.g. water withdrawal restrictions

3.21

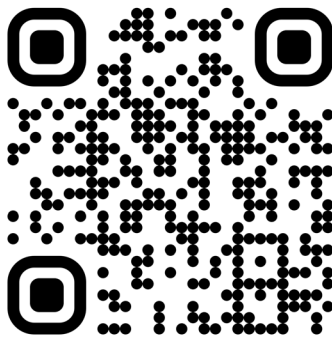
avg score

43.9% rated it helpful (4)



Take-home

- Switzerland's **drought monitoring and early warning system** is in service since **May 8, 2025**



drought.admin.ch

Contact: annie.chang@meteoswiss.ch



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May 2026 warning

Lake Zurich Region

[← Back to home page](#)

Current situation

Annual comparison

Time series

Drought index

Total precipitation

Discharge

Lake level

Soil moisture

Drought level forecast
Slightly dry

Probability of occurrence

6% Not dry

48% Slightly dry

37% Dry

9% Very dry

0% Extremely dry

Week 23

06/01/2026 – 06/07/2026

Forecast
→

Drought index [Drought index details](#)



[Diagram details](#)

Updated on 06/01/2026