

# Indices of Daily Temperature and Precipitation Extremes

Temperature indices:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Index	Description	Formula	ClimDex	Frich	ECA	KT&K	Kiktev	STARDEX	Osborn	Bonsal	KleinT		Interpretation
2	FD	Frost days	No. days $TN < 0^{\circ}C$	☉	☉	☉	☉	☉	☉					Day count; fixed threshold
3	SU	Summer days	No. days $TX > 25^{\circ}C$			☉	☉							Day count; fixed threshold
4	CFD	Consecutive FD	Greatest no. consec. days $TN < 0^{\circ}$			☉								Maximum span of days
5	CSU	Consecutive SU	Greatest no. consec. days $TX > 25^{\circ}$			☉								Maximum span of days
6	HD17	Heating degree days	Sum of $17^{\circ}C - TG$ (days $TG < 17^{\circ}C$ )			☉								Temperature sum
7	ID	Ice days	No. days $TX < 0^{\circ}C$			☉								Day count; fixed threshold
8	TR	Tropical nights	No. days $TN > 20^{\circ}C$			☉								Day count; fixed threshold
9	TN10p or Tmin10p, TX10p	Cold nights / days	No. days $TN < 10$ ptile calculated for each calendar day (on basis of 1961-90) using running 5 day window	☉		☉	☉		☉					Day count; percentile threshold following smoothed annual cycle
10	TG10p	Cold days	See TN10p			☉								See TN10p
11	TN90p	Warm nights	See TN10p	☉	☉	☉	☉	☉						See TN10p
12	TX90p or Tmax90p	Warm days (or day-times)	See TN10p	☉		☉	☉		☉					See TN10p
13	TG90p	Warm days	See TN10p			☉								See TN10p
14	HWDI	Heat wave duration index	No. days in intervals of at least 6 days with $TX > 5^{\circ}C + \text{mean}$ calculated for each calendar day (on basis of 1961-90) using running 5 day window	☉	☉	☉	☉		☉					Count of days in runs of 6 or more days; smoothed annual cycle mean+5°C threshold
15	CWDI	Cold wave duration index	See HWDI, but $TN < -5^{\circ}C + \text{mean}$			☉	☉							See HWDI
16	HWFI, CWF	Warm / cold spell days	See HWDI, but $TG > 90$ ptile instead of $TX > 5^{\circ}C + \text{mean}$			☉						☉		Count of days in runs of 6 or more days; smoothed annual cycle percentile threshold
17	ETR	Extreme temperature range	Difference: $\max(TX) - \min(TN)$	☉	☉	☉								Temperature difference

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1	<b>Index</b>	<b>Description</b>	<b>Formula</b>	<b>ClimDex</b>	<b>Frich</b>	<b>ECA</b>	<b>KT&amp;K</b>	<b>Kiktev</b>	<b>STARDEX</b>	<b>Osborn</b>	<b>Bonsal</b>	<b>KleinT</b>		<b>Interpretation</b>
18	GSL	Growing season length	Count of days between first span of at least 6 days TG > 5°C and first span after 1 Jul/1Jan of 6 days TG < 5°C	☺	☺	☺								Span of days; 6 day threshold 5°C

Precipitation indices:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Index	Description	Formula	ClimDex	Frich	ECA	KT&K	Kiktev	STARDEX	Osborn	Bonsal	KleinT		Interpretation
2	R10mm	Heavy precipitation days	No. days RR $\geq$ 10mm	☺	☺	☺	☺	☺						Day count; fixed threshold
3	R20mm	Very heavy precipitation days	No. days RR $\geq$ 20mm			☺	☺							Day count; fixed threshold
4	RX1day	Highest 1 day precipitation amount	Greatest RR sum for 1 day interval			☺	☺							Precip amount
5	R5D or RX5day	Highest 5 day precipitation amount	Greatest RR sum for 5 day interval	☺	☺	☺	☺	☺	☺					Precip amount
6	CDD	Consecutive dry days	Greatest no. consec. days RR < 1mm	☺	☺	☺		☺	☺					Maximum span of days
7	CWD	Consecutive wet days	Greatest no. consec. days RR $\geq$ 1mm			☺								Maximum span of days
8	R75p, R95p	Moderate / very wet days	No. days RR > 75p tile calculated for wet days (on basis of 1961-90)			☺	☺							Day count; percentile threshold of amounts on wet days only
9	R99p	Extremely wet days	See R75p			☺								See R75p
10	R90N	No. of events > long-term 90th percentile of raindays	See R75p						☺					See R75p
11	R75pTOT, R99pTOT	Precipitation fraction due to R75p / R99p	Quotient of amount on R75p days and total amount			☺								Fraction of total amount due to am. on R75p days
12	R95T or R95pTOT	Precipitation fraction due to R95p	See R75pTOT	☺	☺	☺	☺							See R75pTOT
13	R90T	% of total rainfall from events > long-term P90	See R75pTOT						☺					See R75pTOT
14	SDII	Simple daily intensity index	Quotient of amount on days RR $\geq$ 1mm and no. days RR $\geq$ 1mm	☺	☺	☺		☺	☺			☺		Mean precip amount per wet day
15	Prec90p	90th percentile of rainday amounts (mm/day)	90ptile calculated for wet days						☺					90ptile in distribution at wet days

## Sources

ClimDex: NCDC software used in ETCCDMI workshops ([www.ncdc.noaa.gov/oa/wmo/ccl](http://www.ncdc.noaa.gov/oa/wmo/ccl))

Frich: Frich et al., Climate Research, 2002

ECA: European Climate Assessment ([www.knmi.nl/samenw/eca](http://www.knmi.nl/samenw/eca))

KT&K: Klein Tank and Können, J. Climate, 2003

Kiktev: Kiktev et al., J. Climate, 2003

STARDEX: Stardex EU project ([www.cru.uea.ac.uk/projects/stardex](http://www.cru.uea.ac.uk/projects/stardex))

Osborn: Osborn et al., Int. J. Climatol., 2000

Bonsal: Bonsal et al., J. Climate, 2001

KleinT: Klein Tank et al., Int. J. Climatol., 2002