

Current Variables Available in Climate Insights—Global Coverage

Global Climate Indices

The Global Extreme Climate Indices have been calculated using the Global Meteorological Forcing Dataset for land surface modelling (PGFv2). The PGFv2 dataset provides near-surface meteorological data for driving land surface models and other terrestrial modelling systems. It blends reanalysis data with observations and disaggregates in time and space.

More than 30 indices will be ported into Climate Insights on schedule, according to user feedback and market requirements. Most indices are based on the standardised set recommended by the CCI/WCRP/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI), possibly with some adjustments. The indices cover the following types of parameters:

- ◇ Shifts in the number of days where comparatively extreme conditions are observed
- ◇ Growing season length
- ◇ 5th and 95th percentiles of temperature versus baseline conditions
- ◇ Lengths of warm, cold, wet, and dry spells
- ◇ Counts of days where precipitation exceeds a threshold
- ◇ Total precipitation where precipitation exceeds the 95th percentile of the baseline.

Some indices are presented as annual climatology for both baseline and future periods such as growing degree day (GDD) and heating degree day (HDD), while others have been used to carry out further statistical summaries to derive more meaningful parameters, which means that the relevant layers presented in Climate Insights are re-analysis data, instead of the indices themselves. For example, Standardised Precipitation Index (SPI) and Standardized Precipitation Evapotranspiration Index (SPEI) are applied to calculate the probability of droughts for a specific period of interest, while SPI and SPEI themselves are not directly accessible. In addition, all indices are calculated for the future periods based on the ensemble of GCM or RCM projections. The corresponding data layers should be explained from a perspective of statistical probability. The index list will increase as more data is available and more indices are developed; it may also be shortened if any indices prove less useful. At present, only a handful of the high priority indices are available in the application. We are also conscious of the impending update to CMIP6 data. Therefore we have strategically decided to limit current variable development with an emphasis to shortly come for the development of CMIP6 indices. In addition, the raw timeseries data for each index is maintained by CLIMsystems and not directly accessible for end-users.

Current Variables Available or Planned in Climate Insights—Global Coverage

Table 2. The ETCCDI indices available and planned – based on demand - in Climate Insights

ID	Long Name	Index Name	Definition	Units
1	Number of frost days	<i>FD</i>	Annual count of days when TN (daily minimum temperature) < 0°C	days
2	Number of summer days	<i>SU</i>	Annual count of days when TX (daily maximum temperature) > 25°C	days
3	Number of icing days	ID	Annual count of days when TX (daily maximum temperature) < 0 °C	days
4	Number of tropical nights	TR	Annual count of days when TN (daily minimum temperature) > 20 °C	days
5	Growing season length	GSL	Annual* count between the first span of at least 6 days with daily mean temperature TG >5 °C and the first span after July 1st (Jan 1st in SH) of 6 days with TG <5 °C.	days
6	Monthly maximum value of daily maximum temperature	TXx	Monthly maximum value of daily maximum temperature	°C
7	Monthly maximum value of daily minimum temperature	TNx	Monthly maximum value of daily minimum temperature	°C
8	Monthly minimum value of daily maximum temperature	TXn	Monthly minimum value of daily maximum temperature	°C
9	Monthly minimum value of daily minimum temperature	TNn	Monthly minimum value of daily minimum temperature	°C
10	Days for TN10p when TN < 10th percentile	<i>Cold nights</i>	Days when TN < 10th percentile	days
11	Days for TX10p when TX < 10th percentile	<i>Cold days</i>	Days when TX < 10th percentile	days
12	Days for TN90p when TN > 90th percentile	<i>Hot nights</i>	Days when TN > 90th percentile	days
13	Days for TX90p when TX > 90th percentile	<i>Hot days</i>	Days with TX > 90th percentile	days
14	Warm spell duration index	<i>WSDI</i>	Annual count of days with at least 6 consecutive days when TX > 90th percentile	days

Current Variables Available or Planned in Climate Insights—Global Coverage

15	Cold spell duration index	<i>CSDI</i>	Annual count of days with at least 6 consecutive days when TN < 10th percentile	days
16	Daily temperature range	DTR	Daily temperature range	°C
17	Monthly maximum 1-day precipitation	Rx1day	Monthly maximum 1-day precipitation	mm
18	Monthly maximum consecutive 5-day precipitation	Rx5day	Monthly maximum consecutive 5-day precipitation	mm
19	Simple precipitation intensity index	SDII	Average daily precipitation on wet days	mm
20	Annual count of days when PRCP ≥ 10mm	R10mm	Annual count of days when PRCP ≥ 10mm	days
21	Annual count of days when PRCP ≥ 20mm	R20mm	Annual count of days when PRCP ≥ 20mm	days
22	Annual count of days when PRCP ≥ nn mm	Rnnmm	Annual count of days when PRCP ≥ nn mm, where nn is a user-defined threshold	days
23	Maximum length of dry spell	CDD	maximum number of consecutive days with RR < 1mm	days
24	Maximum length of wet spell	CWD	maximum number of consecutive days with RR ≥ 1mm	days
25	Annual total PRCP when RR > 95th percentile	R95p	Annual total PRCP when RR > 95th percentile	mm
26	Annual total PRCP when RR > 99th percentile	R99p	Annual total PRCP when RR > 99th percentile	mm
27	Annual total precipitation on wet days	PRCPTOT	Annual total precipitation on wet days	mm
28	Cooling degree days	<i>CoDD</i>	Cooling degree days tmean(daily mean temperature) > 18°C	°C
29	Heating degree days	<i>HDD</i>	Annual heating degree days Tmean(daily mean temperature) < 17.0°C	°C
30	Growing degree days	<i>GDD4</i>	Annual growing degree days above 4.0 °C	days
31	Heat wave frequency	<i>HWF</i>	Number of heat waves events over a given period	times/year

Current Variables Available or Planned in Climate Insights—Global Coverage

32	Heat wave days	HWD	Number of days of heat wave over a given period	days
33	Heat Index Caution days	Caution Days	Number of days of heat index (HI) over 26°C	days
34	Heat Index Extreme Caution days	Extreme Caution Days	Number of days of heat index (HI) over 32°C	days
35	Heat Index Danger days	Danger Days	Number of days of heat index (HI) over 41°C	days
36	Heat Index Extreme danger days	Extreme Danger Days	Number of days of heat index (HI) over 54°C	days
37	SPI Drought probability	Drought probability	Probability of Standardised Precipitation Index (SPI) <-1.0	%
38	SPEI Drought probability	Drought probability	Probability of Standardized Precipitation Evapotranspiration Index (SPEI) <-1.0	%
39	Marine heatwave frequency	MHWF	Number of marine heat waves events over a given period	times/year
40	Marine heatwave days	MHWD	Number of days of heat wave over a given period	days
41	FFDI Category Frequency	FFDI_Cat	Frequencies of FFDI category over a given period	%

* Annual means Jan 1st to Dec 31st in the Northern Hemisphere (NH); July 1st to June 30th in the Southern Hemisphere (SH).

Current Variables Available in Climate Insights—Global Coverage

The following variables and variables under development are presented under three headings: atmosphere, marine and land.

Atmosphere

Monthly Precipitation
Monthly Minimum Temperature
Monthly Maximum Temperature
Monthly Mean Temperature
Monthly Solar Radiation
Monthly Relative Humidity
Monthly Wind
Extreme Precipitation (24 hour)
Extreme Precipitation (48 hour)
Extreme Precipitation (72 hour)
Extreme Precipitation - Germany (24 hour)
Extreme Precipitation - Germany (48 hour)
Extreme Precipitation - Germany (72 hour)
Yearly Cooling Degree Days
Yearly Growing Degree Days
Yearly Heating Degree Days
Yearly Number of Maximum Temperature days > 35.0°C
Yearly Number of Minimum Temperature days < 2.0°C
Snow Depth
Extreme Wind speed
Heat Wave Days
Heat Wave Frequency
One month Standardised Precipitation Index (SPI)
One month Standardized Precipitation Evapotranspiration Index (SPEI)
Three month Standardised Precipitation Index (SPI)
Three month Standardized Precipitation Evapotranspiration Index (SPEI)
Six month Standardised Precipitation Index (SPI)
Six month Standardized Precipitation Evapotranspiration Index (SPEI)
12 month Standardised Precipitation Index (SPI)
12 month Standardized Precipitation Evapotranspiration Index (SPEI)
Heat Index Caution Days
Heat Index Extreme Caution Days
Heat Index Danger Days

Current Variables Available in Climate Insights—Global Coverage

Atmosphere cont.

Warm Spell Duration Index
Days for TX10p when TX < 10th percentile
Days for TN10p when TN < 10th percentile
Cold Spell Duration Index
Temperature Humidity Index (THI) for Cattle

Under Development

Tornadoes
Hail

Marine

Dissolved Iron Concentration at Surface
Total Alkalinity at Surface
Net primary productivity of carbon by phytoplankton
Dissolved Silicate Concentration at Surface
Dissolved Phosphate Concentration at Surface
pH at Surface
Dissolved Oxygen Concentration at Surface
Dissolved Nitrate Concentration at Surface
Sea Surface Temperature
Sea Level Rise
Marine heatwaves frequency
Marine heatwaves days
Ocean temperatures at depth

Land

Net Primary Production
Coastal Extreme Still High Water Level
Coastal Mean Sea Level Rise
Monthly Soil Moisture at 0cm to 10cm
Monthly Soil Moisture at 10cm to 40cm
Monthly Soil Moisture at 40cm to 100cm
Monthly Soil Moisture at 100cm to 200cm
Monthly Soil Temperature at 0cm to 10cm
Monthly Soil Temperature at 10cm to 40cm

Current Variables Available in Climate Insights—Global Coverage

Land cont.

Monthly Soil Temperature at 40cm to 100cm
Monthly Soil Temperature at 100cm to 200cm
Fire Risk - FFDI Category Frequency
Riverine flood depth

Under Development

Coastal inundation