

Mediterranean-Wide Indices of Extremes

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The Mediterranean-wide approach

- ▶ Certain **clear indices** (TCI & FWI) but also other more general requests
- ▶ A standardized set of indices facilitates **communication** between project groups and with stakeholders
- ▶ Region-wide indices of temperature/precipitation important for **gauging the added-value** of compound indices
- ▶ Opportunities for data presentation
- ▶ Region-wide but also **slicing** of data for case-studies

Stakeholder Feedback

- ▶ The majority of users have requested that indices be calculated from the climate data
- ▶ Cooling/Heating Degree Days requested by some of the energy case studies
- ▶ Duration and intensity of rainfall events are required by users associated, for example, with the Energy Case Study

ClimRun Index Definitions

- ▶ Large amount of previous work on extremes indices (STARDEX, ETCCDi, CIRCE)
- ▶ **Core indices** as 'products'
- ▶ **Supplementary indices** to provide further specialized information

16 Core Indices

Temperature

Code	Name	Derivation
CDD	Cooling degree-days	Sum of $T_g - 25C$ for all $T_g > 25C$
HDD	Heating degree-days	Sum of $15C - T_g$ for all $T_g < 15C$
TN90N	Warm nights	Number of days with TN exceeding TN90p
TN10N	Cold nights	Number of days with TN below TN10p
TX90N	Warm days	Number of days with TX exceeding TX90p
TX5N	Cold days	Number of days with TX below TX5p
TR	Tropical nights	Number of days where $TN > 25C$
HD	Hot days	Number of days where $TX > 35C$
WSDI	Warm spell duration index	Sum of days in a span of ≥ 6 days where $TX > TX90p$
CSDI	Cold spell duration index	Sum of days in a span of ≥ 6 days where $TN < TN10p$

Precipitation

Code	Name	Derivation
RX1DAY	Highest 1-day rainfall	Highest rainfall amount in one-day period
RX5DAY	Highest 5-day rainfall	Highest rainfall amount in five-day period
R95pTOT	Precipitation on very wet days	Total rainfall on days where $RR > R95p$
R10mm	Heavy precipitation days	Count of days where $RR \geq 10mm$
CDryDays	Consecutive dry days	Maximum length of dry spell ($RR < 1mm$)
CWetDays	Consecutive wet days	Maximum length of wet spell ($RR \geq 1mm$)

7 Supplementary Indices

Temperature

Code	Name	Derivation
TN10p	Cold night threshold	10th percentile of TN
TN90p	Warm night threshold	90th percentile of TN
TX10p	Cold day threshold	10th percentile of TX
TX90p	Warm day threshold	90th percentile of TX

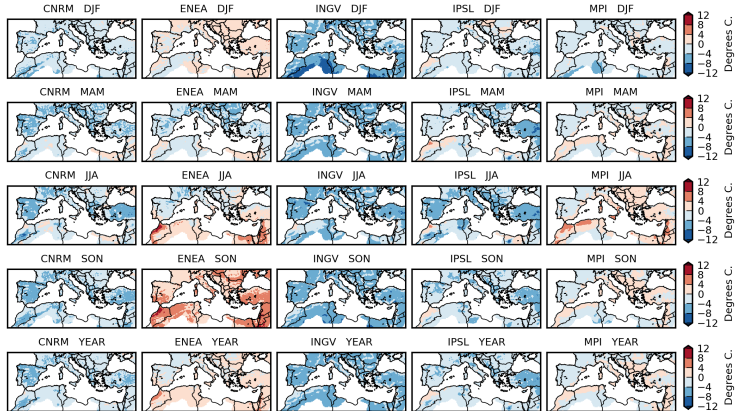
Precipitation

Code	Name	Derivation
Pq95	Very wet day threshold	95th percentile of RR
SDII	Simple daily intensity index	Mean RR on days when rain occurred
RR20mm	Very heavy rainfall days	Count of days where $RR \geq 20\text{mm}$

Model Biases

Biases in mean temperature

Mean Tmax2m Temperature
Model minus observations 1971-2000 average



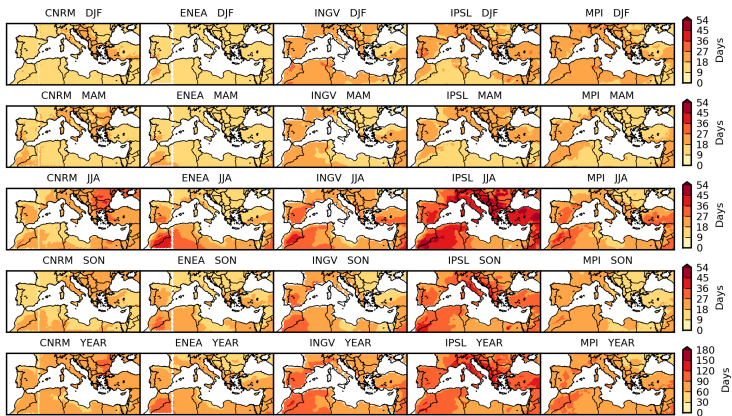
Data Presentation

- ▶ Library of **static images**
 - ▶ 1971-2000 and 2021-50 averages
 - ▶ 2021-50 *minus* 1971-2000 averages
 - ▶ 1971-2000 Models *minus* observations (E-Obs)
 - ▶ Ensemble means/variance
- ▶ Google Earth Overlays

CIRCE Models

Cross-comparison of results

Climrun Index tx90p
2021-2050 average



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GoogleEarth Screenshot

CNRM Aladin 5.2 Med-CORDEX, RCP4.5, 12km
tx90p | 2050

