EUROPEAN CLIMATOLOGY OF SEVERE CONVECTIVE STORM ENVIRONMENTAL PARAMETERS: A TEST FOR SIGNIFICANT TORNADO EVENTS

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MOTIVATION

- **Starting point:** A paneuropean, consistent and homogeneous data base of severe convective reports does not exist
- **Fact:** The real climatology of severe convection in Europe is surely much more substantial than existing occurrence records would indicate
- **Idea:** To create a "synthetic climatology" by considering the time and space distributions of meteorological parameters favorable for the development of severe convective storms
- **Validation test:** To cross the above climatology with existing reports of significant (≥ F2) tornadoes, significant (≥3 cm) hail events and significant (≥30 m/s) severe wind events

METEOROLOGICAL DATA

- **Source: Reanalysis data base from ERA40, available at 00, 06, 12 and 18 UTC on standard pressure levels with a spatial resolution of 1.25^0**

- **Parameters:**
  - **CAPE:** Convective available potential energy (1000 hPa parcel)
  - **CAPEN:** Convective inhibition energy (1000 hPa parcel)
  - **H500:** Geopotential height at 500 hPa
  - **LR7050:** Mid-tropospheric (700-500 hPa) lapse rate
  - **PRWA85:** Low-tropospheric (1000-850 hPa) moisture content
  - **SLP:** Sea level pressure
  - **SRH35:** Deep layer (1000-350 hPa) storm relative helicity
  - **SRH85:** Shallow layer (1000-850 hPa) storm relative helicity
  - **T850:** Temperature field at 850 hPa

STATISTICAL PRODUCTS

- **Synthetic climatology: Monthly basis for the period 1971-2000, based on a single daily state (12 UTC):**
  - **MEAN:** Mean value
  - **QT25:** 25% percentile value
  - **QT75:** 75% percentile value
  - **IQR:** Inter-quartile range (QT75-QT25)
  - **THRS1:** Number of days over threshold 1
  - **THRS2:** …….. 2
  - **THRS3:** …….. 3
  - **THRS4:** …….. 4

- **Events (currently only 85 significant tornadoes):**
  - **Meteorological state:** Represented by the closest previous time from ERA40
  - **Occurrence:** Spatial and temporal distributions
  - **Other statistics:** Events within the considered environmental parameter space ?

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FUTURE WORK

- **Aim:** This web page could serve as a seed of an unified climatological data base of severe convection for Europe
- **A more complete physical characterization is needed:** Other environmental parameters associated with the occurrence of severe convection will be added to the list
- **Your collaboration (severe weather reports from your regions) is kindly requested to complete the overall picture:**
  - Significant (≥F2) TORNADO events ?
  - Significant (≥3 cm) HAIL events ?
  - Significant (≥30 m/s) SEVERE WIND events ?

EUROPEAN CLIMATOLOGY ON SEVERE STORMS (http://ecss.uib.es)

THANK YOU !!!

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PLEASE, help us to improve this climatology by sending us from your historical archives:
a) SIGNIFICANT (>F2) **TORNADO EVENTS**
b) SIGNIFICANT (>3 cm) **HAIL EVENTS**
c) SIGNIFICANT (>30 m/s) **SEVERE WIND EVENTS**

ILLUSTRATION OF THE PREFERED DATA FORMAT (85 Significant TORNADO Events; ECSS 2004 León):

DATE/TIME	LOCATION	ST	CO	LAT	LON	FUJ
7101250910	La Rochelle		FR	46.017	-01.017	F4
7305051500	Hanerau-Hademarschen		DE	54.188	10.799	F3
7608191630	Sava		IT	40.240	17.340	F3
7812271045	Aerop. Sevilla		ES	37.416	-05.900	F3
8008032000	Echternach b. Trier		DE	49.808	06.403	F2
8105291230	Sirvintos		LT	55.050	24.950	F2
8208201610	Weinburg		AT	46.750	15.683	F3
8209271800	Villa Luganese		CH	46.055	08.997	F3
8505101550	(?)Lithuania		LT	55.000	25.500	F2
8507211340	Hlubocec		CZ	49.840	17.970	F2
8607061200	Döttingen		CH	47.564	08.244	F2
8607231640	Höfen, Calmbach		DE	48.797	08.575	F3
8608171430	La Charité sur Loire		FR	47.110	03.017	F3
8702271820	Saint-Mard		FR	49.033	02.700	F2