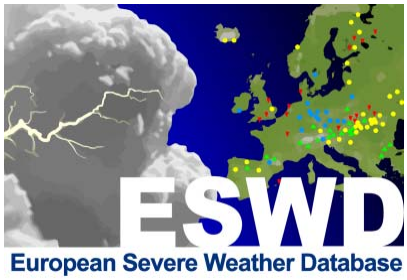
ESSL Technical Report No. 2009-01

ESSL

European Severe Storms Laboratory e.V.

European Severe Weather Database

ESWD



Data format description

Version 01.40-CSV

As of: 22/01/2009 Revision: [1]

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Dissemination Level		
PU	Public	**X**
PO	Restricted to members and partner organizations (including the Advisory Council)	
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ESWD project web site:

http://www.essl.org/projects/ESWD/

ESWD database web site:

http://www.essl.org/ESWD/ or http://www.eswd.eu

ESWD data format description:

http://www.essl.org/reports/tec/ESSL-tech-rep-2009-01.pdf (*this document*)

http://www.essl.org/reports/tec/ESSL-tech-rep-2006-01.pdf (*original format*)

Table of contents

ESWD data format, version 01.40-CSV

1. General remarks

The database format is designed for the documentation of severe weather occurrence in Europe. The current version primarily deals with severe events associated with deep, moist convection and can be expanded in future to encompass more types of severe weather.

1.1. Recording events vs. recording observations

The format is generally *observation-based*. This means that it is designed to handle observations rather than *events*. For example, when multiple reports of a hailstorm are received, all should be recorded in the database rather than combining them in one record. In this way, the amount of subjectivity that can be added by the managers of the database is minimized. The concept behind is that most interpretation of the data is left to the researchers who want to use them. The general rule therefore is:

"Each observation gets its own record in the database..."

Exceptions to this rule are made in case of *TORNADOES (or waterspouts), GUSTNADOES, FUNNELS,* and *DEVILS*. These are phenomena that can better be described per event than per observation. In these cases observations are combined in one record if they concern the same weather event.

"...except when observations address the same tornado (or waterspout), gustnado, funnel or devil."

If no evidence is present that two reports address the same event, the two reports should be retained separately. When two tornado or waterspout reports are closer than 5 kilometres in place and 30 minutes in time, it will likely be reports of the same tornado or waterspout, so that they can be merged into one database record. When there are indications that the reports indeed concern two separate events, they should not be merged. Any merging of reports should be documented in the INFO group.

1.2. Merging of multiple reports of different events

In cases with more than one *TORNADO, GUSTNADO, FUNNEL,* or *DEVIL* vortex occurring, these may be merged into one report. This can be done, for example, when a number of waterspouts are observed at the same time, while no specific information about each of the waterspouts is known. The following conditions must be satisfied for multiple events to be combined into one record:

- the events are less than 30 minutes separated in time,
- the events are less than 5 kilometres away from each other
- there is no information available about each individual event, but only for the set of events.

2. Severe weather types: Definitions

The types of severe weather covered by this version of the data format are:

DEVIL - dust- or sand devil (land devil) or steam devil (water devil)

A vortex not associated with a convective storm, typically between a few metres to a few tens of metres in diameter, extending upward from the earth's surface but not reaching any cloud, visible by material that is lifted off the earth's surface or by water droplets.

Remark: Devils (lesser whirlwinds) result from temperature differences between the surface and the air above. Whirls in the lee of objects, which may meet the criteria above are dynamically driven and are not considered devils.

FUNNEL - funnel cloud

A vortex, typically between a few metres to a few tens of metres in diameter, extending downward from a convective cloud but not reaching the earth's surface, that is visible by condensation of water vapour, normally having a cone or tube shape.

Remark: Funnel clouds and weak tornadoes can be easily confused if the tornado funnel does not fully extend to the ground, e.g. due to lack of boundary-layer moisture. If there is any evidence that the vortex had ground contact, the event should be reported as a tornado.

GUSTNADO - gust front vortex (gustnado)

A vortex occurring along the gust front of a convective storm and being visible by material that is lifted off the earth's surface, typically between a few metres to a few tens of metres in diameter, extending from the earth's surface upward but not extending to a cloud.

HAIL - severe hailfall

Hailstones observed having a diameter (in the longest direction) of 2.0 centimetres or more, or smaller hailstones that form a layer of 2.0 centimetres thickness or more on flat parts of the earth's surface.

Remark: The hailstones of a hail layer should not have been accumulated because of transport by water, wind or by any other means.

PRECIP - heavy precipitation

Damage caused by excessive precipitation is observed, or no damage is observed but precipitation amounts exceptional for the region in question have been recorded, or one of the following limits of precipitation accumulation is exceeded: 30 mm in 1 hour, 60 mm in 6 hours, 90 mm in 12 hours, 150 mm in 24 hours.

TORNADO - tornado, waterspout

A vortex, typically between a few metres to a few kilometres in diameter, extending between a convective cloud and the earth's surface, which may be visible by condensation of water vapour or by material (e.g. dust or water) being lifted off the earth's surface.

WIND - severe wind gust

Measured wind speeds of 25 m/s or higher, or wind damage inflicted by winds that were likely stronger than 25 m/s.

3. Structure of the data format

The structure of the data format can be summarized by the following hierarchy:

FILES contain a header line, followed by a set of RECORDS that contain a string of FIELDS

The data format is compatible with the csv (comma-separated values) standard, although there exists no formal specification of this standard. That is, ESWD-csv is a particular type of csv.

3.1. Files and records

- A database file consists of a number of records preceded by a header line.
- The file must be encoded in UTF-8 encoding (Unicode standard).
- Each record contains information about one event or various events of the same type that occurred simultaneously at the approximately same place and time.
- Records are separated by new line characters

3.2. Records and fields

- A record consists of several fields
- A field contains one physical quantity or one characteristic of an event (see Section).
- Fields of a record are separated by the separation character comma (",") excluding the last element of the line
- Fields may contain a comma, which in that case is enclosed in double quotation marks
- An entry may contain newlines in which case the whole entry is enclosed in quotation marks
- Any white-spaces at the start of a line, just after a separating comma, just before a separating comma, or just before a newline character are ignored.
- An entry may contain a double quote, but it must be stored as its HTML-encoded equivalent: "
- Fields can be *required* (req.) or *optional* (opt.). *Required* means that if the field is left empty, the data do not comply with the data format, which may cause errors in decoding. Events of which required information is not available must not be present in a data file. In case *optional* information is not available, the respective field should be left empty. Optional information should be given when available. Entering the number 0 indicates that the value of a field is zero, not that no information is available.

3.3. Field formats

Fields can contain data in the following formats. It is important to comply with this to ensure that the decoding be carried out without errors.

varchar2(n)	Variable length character string having maximum length *n* bytes.
number	Floating point number
number(n)	Number with precision *n*
date	Valid date range, represented as **YYYY-MM-DD HH:mm:SS**

Fields can be *optional (*opt*), recommended (***rec***)* or *required (***req***).*

Optional fields may be left empty without any consequence.

Where recommended fields are left empty, essential information is missing and the report is probably not useful for scientific analysis. However, software designed to work with the data format should be able to work with this data without producing errors.

Required fields may not be left empty, as this constitutes a violation of the data format specifications and the software will not be able to parse the data. The term “required” corresponds with the requirement “NOT NULL” which some databases use, e.g., Oracle.

4. Description of the fields

field number	name	type/required?	description
1	**ID**	number/**req**	The report's ID number in the ESWD database at ESSL. Although, this is a required field, when importing new data into the ESWD, this field may be left empty as the database will assign this number automatically.
2	**QC_LEVEL**	varchar2(3)/**req**	One of the following: **QC0** as received, or already plausibility-checked **QC1** confirmed report **QC2** event fully verified (usage of QC2 is restricted to ESSL and cooperating NHMSs)
3	**INFO_SOURCE**	number/**rec**	a number representing the sources of the information contained in the report. It is calculated by adding the numbers listed below of the sources that apply **1** information from a newspaper **2** a report on a website **4** a report received by e-mail **8** a television or radio broadcast **16** a report by a weather service **32** a report by a trained spotter **64** a report in scientific literature **128** a report in other literature **256** an eye-witness report **512** an eye-witness report of the damage **1024** a photo or video of the event **2048** photo or video of the damage **4096** a damage survey by a severe weather expert
4	**CONTACT**	varchar2(200)/**rec**	Name and other contact information
5	**E-MAIL**	varchar2(100)/**rec**	The e-mail address of the contact person
6	**NO_REVISION**	number/**req**	an integer representing the number of revision of the entry, where 1 means the submission to the database
7	**PERSON_REVISION**	varchar2(255)/opt	person or organization performing the last revision of the report

8 TIME_EVENT date/**req** time (GMT/UTC) of the event in the format: **YYYY-MM-DD HH:mm:SS**

9 TIME_CREATION date/**req** time (GMT/UTC) the report was submitted to the database: **YYYY-MM-DD HH:mm:SS**

10 TIME_LAST_REVISION date/**req** time (GMT/UTC) of the report's last revision: **YYYY-MM-DD HH:mm:SS**

11 TIME_ACCURACY varchar2(50)/opt estimate of accuracy of the time given in field 8.

1M	1 minute
5M	5 minutes
15M	15 minutes
1H	1 hour
3H	3 hours
6H	6 hours
12H	12 hours
1D	1 day
GT1D	date not certain

12 COUNTRY varchar2(2)/**req** two-character country code (upper case, see Appendix 1)

13 STATE varchar2(5)/opt national code for state/province These codes are to be determined nationally.

14 PLACE varchar2(255)/**rec** name of nearest town/settlement/ observing station

15 DETAILED_LOCATION varchar(4000)/opt a more detailed description of the event's location

16 NEAREST_CITY varchar(255)/opt location in words (preferably w/ respect to the nearest larger city) (e.g. 5 km S of Amsterdam, 10 km SSE of Stuttgart, near Basle)

17 LATITUDE number/**rec** decimal degrees north (+)/south (-) (e.g. 50.0000 instead of 50°00'00")

18 LONGITUDE number/**rec** decimal degrees, west(-)/east(+)

19 OROGRAPHY number(6)/opt

a number representing the type of topography, i.e. the sum of those types that apply

1	**FLAT**	flat, definition: local terrain height variation <= 50 m
2	**HILLS**	hilly, definition: local terrain height variation > 50 m and <= 500 m
4	**MTS**	mountainous, definition: local terrain height variation > 500 m

20 SURFACE_INITIAL_LOCATION varchar(255)/opt

character of earth's surface at the initial event location. one of the words below:

LAND	land, not specified
WATER	water, not specified
RURAL	rural (crops, grassland, both or unknown)
CROPS	rural, crops.
GRASS	rural, grassland (pastures)
SAND	sand, (semi-)desert, beach, soil covered with very little vegetation)
WILD	wilderness (steppe, dunes, soil covered with some vegetation)
SWAMP	swamp
ROCKS	rocks
URBAN	urban, built-up zone
FOREST	forest
ICE	ice (Glacier or ice-covered water)
RIVER	river, canal
SEA	sea, ocean
LAKE	lake

21 SURFACE_CROSSED number(6)/opt a number representing all types of surface crossed by the feature. I.e. the sum of all numbers associated with the types of land surface that apply:

1	**LAND**	land, not specified
2	**WATER**	water, not specified
4	**RURAL**	rural (crops, grassland, both or unknown)
8	**CROPS**	rural, crops.
16	**GRASS**	rural, grassland (pastures)
32	**SAND**	sand, (semi-)desert, beach, soil covered with very little vegetation)
64	**WILD**	wilderness (steppe, dunes, soil covered with some vegetation)
128	**SWAMP**	swamp
256	**ROCKS**	rocks

512	**URBAN**	urban, built-up zone
1024	**FOREST**	forest
2048	**ICE**	ice (Glacier or ice-covered water)
4096	**RIVER**	river, canal
8192	**SEA**	sea, ocean
16384	**LAKE**	lake

22 TYPE_EVENT varchar2(255)/**req**
the type of event. One of the following:
DEVIL
FUNNEL
GUSTNADO
HAIL
PRECIP
TORNADO
WIND

23 NO_OBJECTS number/opt
the number of events when occurring within the constraints specified in section 1.2
When left empty, 1 is implied.

24 MAX_HAIL_DIAMETER number/opt
size of the largest hailstone found in its longest direction in centimetres

25 MAX_HAILSTONE_WEIGHT number/opt
height weight of a single hailstone in grams

26 AVERAGE_HAIL_DIAMETER number/opt
size of one of the larger hailstones measured in an arbitrary direction in centimetres

27 THICKNESS_HAIL_LAYER number/opt
in centimetres

28 HAILSTONE number(6)/opt
a number representing the characteristics of the hailstones, i.e. the sum of the numbers listed below associated with applicable properties of the hailstone.

1	**AGGR**	aggregates observed (aggregates formed while in air)
2	**CLEAR**	clear ice
4	**CONE**	cone-shaped hail stones
8	**OBLATE**	oblate ("squeezed ball")
16	**POROUS**	porous (white ice) hail stones
32	**RINGS**	rings of white and clear ice
64	**SPIKES**	spiky stones observed

29 F_SCALE number/opt
maximum intensity of the event on the Fujita-scale for DEVIL, GUSTNADO, TORNADO, WIND

30 T_SCALE number/opt
maximum intensity of the event on the T-scale for DEVIL, GUSTNADO, TORNADO, WIND

31 RATING_BASIS number/opt
a number representing all types of information used for establishing the F or T-scale rating. I.e. the sum of all numbers listed below, that are associated with the types of information used:

1	**DMGEYEWTN**	an eye-witness report of the inflicted damage
2	**DMGSVY**	a damage survey by a severe weather expert
4	**DMGPHOTO**	photograph(s)/video footage of the inflicted damage
8	**DMGTEXT**	a written account of the damage (e.g. in a newspaper)
16	**WIND**	a measured wind speed

32 WIND_SPEED number/opt
strongest measured wind speed (at the event location and event time)

33 TEN_MIN_WIND_SPEED
number/opt
strongest measured 10 minute averaged wind speed (at the event location and event time)

34 FUNNEL_SIGHTED
varchar2(255)/opt
Was the a funnel cloud of the tornado observed visually (not necessarily reaching the ground)?
one of the following:

FNLOBS	funnel observed
NOFNLOBS	funnel not observed

35 SUCTION_VORTICES
varchar2(255)/opt
Have embedded suction vortices been observed? I.e. is this a confirmed that multiple-vortex tornado?
one of the following:

SVTCSOBS	suction vortices observed
NOSVTCSOBS	no suction vortices observed

36 PRECIPITATION_AMOUNT
number/opt
in millimetres (when measured)

37 MAX_6_HOUR_PRECIP
number/opt
(during the 0-6, 6-12, 12-18, or 18-0 UTC interval in which the time given in group TIME&PLACE falls. If the time given is exactly 0, 6, 12 or 18 UTC, the previous 6 hour period is meant)
in millimetres

38 MAX_12_HOUR_PRECIP
number/opt (during the 0-12, 12-0 UTC interval in which the time given in group TIME&PLACE falls. If the time given is exactly 0, or 12 UTC, the previous 12-hour period is meant) in millimetres

39 MAX_24_HOUR_PRECIP
number/opt (during the 0-24 UTC interval in which the time given in group TIME&PLACE falls. If the time given is exactly 0 UTC, the previous 24-hour period is meant) in millimetres

40 CONVECTIVE varchar(255)/opt
Was the precipitation due to deep moist convection?
One of the following:

CONV	convective
PARTLYCONV	partly convective
NONCONV	nonconvective
UNCERTAIN	a blank field implies this has not been determined

41 TOTAL_DURATION
number/opt
rec if field 36 is not null
duration of accumulation of the amount mentioned in field 36

42 TYPE_PRECIP number(6)/opt Should not be set with type PRECIP.
A number representing the combination of accompanying weather phenomena.
The number is the sum of all numbers listed below that apply. Accompanying weather phenomena are those that are known to have occurred within 5 minutes of the event time and within 3 kilometres distance of the event location. As a confirmation that none of those events occurred, the number 256 is given.

1	**HRAIN**	heavy rain
2	**LRAIN**	light or moderate rain
4	**LGHAIL**	hail >= 2.0 cm in diameter
8	**HAIL**	hail < 2.0 cm, but >= 0.5 cm in diameter
16	**GRAINS**	hail < 0.5 cm in diameter, snow pellets or snow grains
32	**HSNOW**	heavy snow
64	**LSNOW**	light or moderate snow
128	**DUST**	dust or sand particles raised by the wind, reducing visibility
256	**DRY**	no dust or precipitation

43 SIZE_ACCOMPANYING_HAIL
number/opt — if LGHAIL or HAIL was reported in field 42, hail size in cm. otherwise this field should be left empty. In case LGHAIL was selected, the hail deserves a report of its own.

44 POSSIBILITIES
number(6)/opt — A number indicating whether there are doubts about the nature of the event causing wind damage. I.e. this filed should only contain information when the event is reported as a TORNADO, DEVIL, WIND, or GUSTNADO.
The number is the sum of the applicable numbers listed here:

1 POSSGUSTNADO
It is **possible** that the wind damage is caused by a **gustnado**, but there is not enough evidence to confirm this. (please provide information in event description field 23)

2 POSSDEVIL
It is **possible** that the wind damage is caused by a **devil**, but there is not enough evidence to confirm this. (please provide information in event description field, field 55)

4 POSSTORNADO
It is **possible** that the wind damage is caused by a **tornado**, but there is not enough evidence to confirm this. (please provide information in event description field , field 55)

45 PATH_LENGTH number/opt — Path length in km.
This field must not contain information when the event is PRECIP or FUNNEL.

46 MEAN_PATH_WIDTH
number/opt — Mean path width in m.
This field must not contain information when the event is PRECIP or FUNNEL.

47 MAX_PATH_WIDTH
number/opt — Maximal path width in m.
This field must not contain information when the event is PRECIP or FUNNEL.

48 MAX_VERTICAL_DEVELOP
number/opt — Vertical development of a funnel cloud in percentage of the distance between cloud base and the earth's surface. Only given for event type FUNNEL.

49 DIRECTION_MOVEMENT
varchar(255)/opt
direction of movement of the phenomenon (from-to) N-S, NNE-SSW, NE-SW etc.

50 PROPERTY_DAMAGE
varchar(255)/opt
quantitative measure of damage to properties excluding agricultural losses. Preferably the losses expressed in a currency.

51 CROP_FORREST_DAMAGE
varchar(255)/opt
quantitative measure of agricultural losses, including for example losses expressed in a currency.

52 TOTAL_DAMAGE
varchar(255)/opt
quantitative measure of total inflicted damage, preferably the losses expressed in a currency.

53 NO_INJURED
number(10)/opt number of injured persons

54 NO_KILLED
number(10)/opt number of killed people

55 EVENT_DESCRIPTION
varchar(4000)/opt
a description of the event, containing the its most essential aspects

56 CREATOR_ID varchar(50)/opt Identifier of the creator of the report.

57 REVISOR_ID varchar(50)/opt Identifier of the last revisor of the report.

58 LINK_ORG varchar(20)/opt Identifier of the linked (national) database.

59 LINK_ID varchar(20)/opt Field nummer of the associated report in a linked database.

60 DELETED varchar(1)/**req** Character indicating whether the report is deleted.
Y Yes
N No.
All retrieved data from the ESWD server not for synchronization purposes should have “N” here.

Appendix A: Two-character country codes

The two-character codes of countries in Europe, Mediterranean Africa and Asia, Jordan and the Caucasian countries (including WMO Region VI) are given in this list.

AD	Andorra
AL	Albania
AR	Armenia
AT	Austria
AZ	Azerbaijan
BA	Bosnia and Herzegovina
BE	Belgium
BG	Bulgaria
BY	Belarus
CH	Switzerland
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
DZ	Algeria
EE	Estonia
EG	Egypt
ES	Spain
FI	Finland
FR	France
GE	Georgia
GL	Greenland
GR	Greece
HR	Croatia
HU	Hungary
IE	Ireland
IL	Israel
IS	Iceland
IT	Italy
JO	Jordan
KZ	Kazakhstan
LB	Lebanon
LI	Liechtenstein
LT	Lithuania
LU	Luxembourg
LV	Latvia
LY	Libya
MA	Morocco
MC	Monaco
MD	Republic of Moldova
ME	Montenegro
MK	Former Yugoslav Republic of Macedonia
MT	Malta
NL	Netherlands
NO	Norway (incl. Svalbard and Jan Mayen Islands)
PL	Poland
PT	Portugal and Azores
RO	Romania
RS	Serbia and Kosovo
RU	Russian Federation
SE	Sweden
SI	Slovenia
SK	Slovakia
SM	San Marino
SY	Syria
TN	Tunisia
TR	Turkey
UA	Ukraine
UK	United Kingdom (incl. Channel Islands, Gibraltar etc.)
VA	Vatican City State