European Severe Storms Laboratory

TECHNICAL REPORT

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ESWD data format specification

Version 2.00 and 2.00-csv

Revision 1

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1. Introduction

This report describes version 2.00 and 2.00-csv of the ESWD data format, which has been developed for the documentation and exchange of information on severe weather events. The ESWD data format is used operationally in the European Severe Weather Database (ESWD) that is managed and maintained by the European Severe Storms Laboratory (Dotzek et al. 2009; Groenemeijer et al. 2017).

Version 2.00 updates version 1.60 that is described in ESSL Technical Report 2020-11. It is mainly based on changes made during the move to the newly developed ESWD interface.

IMPORTANT: In version 1.60, a large number of fields have been deprecated, and others have changed status from *optional* to *required* or vice versa. Such changes have been indicated in red font.

IMPORTANT: In version 2.00, a large number of fields have been changed or updated. Such changes have been indicated in blue font.

2. Basic principles

2.1 Point data

The ESWD data formats are designed to record georeferenced zero-dimensional data (i.e. point data) as opposed to higher-dimensional geographical objects. An exception to this rule is the possibility to store one-dimensional tornado damage paths. For other events, it is left to the user of the data to cluster them into objects. No other one-dimensional or higher-dimensional objects can be stored in the current data format.

2.2 Text data

The ESWD data format is a text-based format that uses the UTF-8 encoding. Within a database system it may internally be stored in any other format. These formats are not part of the official data format specification described in this document. Pending the availability of resources for this purpose, such specifications may be developed in future in compliance with international standards.

2.3 *csv* and *json* formats

The ESWD data format comes in two types: the *csv* format and the *json* format. The primary distinction between the two types is the way data of a single report is structured.

The *csv* format stores all data in one line, i.e. the data of one report constitutes one single string. The *json* format stores all data in a json structure, making it easier to read both for humans and machines. The *json* structure is exposed via the API; https://eswd.eu/en/api/docs

Note: Starting from 2.00 the *conventional format* has been deprecated.

2.4 Recording events vs. recording observations

The ESWD stores severe weather data in two different ways: For some event types, the data is recorded *per observation* and for others *per event*. The criterion that determines how an event is stored is whether the events are countable without having to introduce some arbitrary definition of what constitutes a single event.

Countable events, that are recorded on a *per event* basis, are:

- lesser whirlwinds
- funnel clouds*
- gust front vortices*
- tornadoes or waterspouts
- avalanches
- damaging lightning strikes

Uncountable events, that are recorded *per observation*, are:

- severe hailfall
- severe wind gust
- heavy rain
- heavy snowfall
- ice accumulations

* These events are deprecated (see below)

2.5 Merging of multiple reports of multiple events

In previous versions, it was possible to merge multiple countable events into one report, e.g. multiple tornadoes. In version 2.00(-csv) and 1.60(-csv) this use is deprecated. In other words, each event must get its own report in the database.

3. Event types and definitions

The types of severe weather covered are listed below. Their definitions follow from the *ESWD Event Reporting Criteria* document. Please note that some event types (funnel clouds, gustnadoes) are deprecated, which means that new reports of these types into the ESWD are discouraged. For each of the events, certain criteria must be met for them to be eligible for inclusion into the ESWD. These criteria can be found in the *ESWD Event Reporting Criteria* document.

AVALANCHE – avalanche

Definition: A rapid flow of (mainly) snow down a slope, which, because of its size, could bury a person or inflict serious damage.

LESSER WHIRLWIND – Lesser whirlwinds (dust devils, sand devils, etc.)

Definition: Lesser whirlwinds are vortices not associated with convective storms. They are typically between a few metres to a few tens of metres in diameter and extending upward from the earth's surface but do not reach any cloud. They are rendered visible by material lifted off the earth's surface.

FUNNEL - funnel cloud

This event type is deprecated. Funnel clouds must no longer be reported to the ESWD.

Definition: 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.

GUSTNADO - gust front vortex (gustnado)

This event type is deprecated. New entries into the ESWD are discouraged. Any wind events that are not clearly tornadoes must now be reported as severe wind events.

Definition: 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

Definition: Hailstones that have a diameter (in the longest direction) of at least 2.0 centimetres, or hailstones that form a layer of 2.0 cm thickness or more on flat parts of the earth's surface.

ICE - Ice Accumulations

Definition: Accumulations of ice on the earth's surface and/or objects (such as power lines) in an amount that causes important disruptions of daily life and/or considerable material damage or economic damage, not including ice accumulations resulting primarily from snowfall. Ice accumulations may result from freezing rain, freezing drizzle, freezing fog or from direct deposition of water vapour, resulting in glaze, frost or rime.

LIGHTNING – damaging lightning

Definition: Any lightning phenomenon which has caused important damage to aircraft, vehicles, ships or structures, or which has injured or killed people or animals. In addition, any "exceptional lightning phenomenon which has caused - or is capable of causing – important damage may be reported.

PRECIP - heavy precipitation

Definition: Heavy rain defined here as rain falling in such large amounts, that significant damage is caused, or no damage is known, but exceptionally high* precipitation amounts have been observed within a period of at most 24 hours. Extreme rainfall on consecutive days must be reported separately in at most 24 hour periods.

SNOW – heavy snowfall

Definition: Snow (or snow grains) and/or snowstorm in an amount that causes important disruptions of daily life and/or considerable material or economical damage.

TORNADO - tornado, waterspout

Definition: A vortex extending between a convective cloud and the earth's surface, in which the wind is strong enough to cause damage to objects. It may be visible by condensation of water (a funnel cloud) and/or by material (e.g. water, in case of a waterspout) that is lifted off the earth's surface.

WIND - severe wind gust

Definition: a gust measured to have a speed of at least 25 m/s or one doing such damage that a wind speed of 25 m/s or higher is likely to have occurred.

4 The *csv* and *json* data formats

4.1 *csv* and *json* structure

The structure of the *csv* data format is a hierarchy with one level less than the *conventional* format which has been deprecated with the 2.00 version.

FILES** contain **RECORDS** that contain **FIELDS

Any data file consists of a number of records. Each record contains information about one event (or various events occurring in close spatiotemporal proximity, *see Section 2.5*).

Records are separated by a newline character. A record consists of multiple fields. A field contains one physical quantity or one type of information.

- 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 cannot contain line break.
- 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. The double quote must be escaped by a double quote before it, i.e. ("") represents (").

The above rules ensure that the files comply with the *de facto* csv (comma separated value) standard, that can be imported into various data processing and spreadsheet programs.

4.2 *csv* and *json* field types

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.

type	description
string	*Variable length character string*
number	*Any valid number, including floating point*
date	*Valid date, represented as* **ISO-8601 date string (YYYY-MM-DDTHH:mm:ssZ)**
bool	*A data type with exactly two possible values:* ***true*** *or* ***false***

4.3 *csv* and *json* field status

Fields can be *optional (***opt***)* or *required (***req**) Some optional fields are *deprecated (**dep**)*.

Optional fields may be left empty without any consequence. The usage of *deprecated* optional fields is discouraged and for new events it is suggested that they be left empty.

Where *required* fields are left empty, essential information is missing and the report cannot be used for scientific analysis. Moreover, the violation of the data format specification may render software unable to parse the data.

4.4 *csv* and *json* fields

The table describes the entire conventional string representing one single report. In this table, the field names have sometimes been broken across two lines.

#	field name	type	status	possible value(s) *and 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**	string	req	*quality level of the report, see Appendix B* *one of the following keywords:* **QC0** *as received* **QC0+** *plausibility checked* **QC1** *confirmed by reliable source* **QC2** *scientific case study*
3	**INFO_SOURCE**	string	req	*one or more of the following keywords:* *(in CSV exports, this field is returned as an array-like string formatted as ["keyword1","keyword2", ...] and in JSON format, this is an array of strings, each string corresponding to an applicable keyword.)* **NWSP** *a newspaper* **WWW** *a web site* **EMAIL** *a report received by e-mail* **TV** *a television or radio broadcast* **WXSVC** *a weather service* **SPTR** *a storm spotter* **LIT** *scientific literature* **OLIT** *other literature* **EYEWTN** *an eyewitness* **DMGEYEWTN** *an eyewitness of the damage* **EVTPHOTO** *a photo or video of the event*

				DMGPHOTO *a photo or video of the damage* **DMGSVY** *a damage survey by a severe weather expert* **GOV** *government-based sources / administrative organisations*
4	**CONTACT**	string	req	name of the person who submitted the report
5	**EMAIL**	string	req	e-mail address of this person, must be a valid email (*accessible by ESWD users*)
6	**ORGANISATION**	string	opt	name of this person's organization
7	**ORGANISATION_ID**	string	opt	identification code of the person making the report within his organization
8	**NO_REVISION**	number	req	an integer representing the number of revision of the entry, where 1 means the submission to the database
9	**PERSON_REVISION**	string	opt	last name and/or organization of person doing the last revision
10	**TIME_EVENT**	date	req	time (UTC) of the event, in ISO-8601 format
11	**TIME_CREATION**	date	req	time (UTC) the report was submitted to the database, in ISO-8601 format
12	**TIME_LAST_REVISION**	date	req	time (UTC) of the report's last revision, in ISO-8601 format
13	**TIME_ACCURACY**	string	req	*one of the following keywords:* *keyword* — *the event has occurred...* **1M** *up to 1 minute earlier or later* **5M** *up to 5 minutes earlier or later...* **15M** *up to 15 minutes earlier or later...* **30M** *up to 30 minutes earlier or later...* **1H** *up to 1 hour earlier or later...* **3H** *up to 3 hours earlier or later...* **6H** *up to 6 hours earlier or later...* **12H** *up to 12 hours earlier or later...* **1D** *up to 24 hours earlier or later...* **2D** *up to 48 hours earlier or later...* **1W** *up to 7 days earlier or later...*

				HALF_MONTH *up to 15 days earlier or later….* **HALF_YEAR** *Up to 6 months earlier or later…* **GT1D** *more than 24 hours* **uncertain** *uncertain accuracy*
14	**COUNTRY**	string	req	two-character country code according to Appendix A
15	**STATE**	string	opt	first sub-national administrative division such as province, department, land, autonomous region etc.
16	**PLACE**	string	req	name of nearest town, settlement or observing station
17	**PLACE_LOCAL_LANGUAGE**	string	opt	name of nearest town, settlement or observing station in local language, if different from field 16
18	**DETAILED_LOCATION**	string	opt	more precise description of location
19	**NEAREST_CITY**	string	dep	location in words expressed with respect to the nearest larger city
20	**LATITUDE**	number	req	decimal degrees north latitude (south is negative), e.g. 50.5000 is 50º30'00" N
21	**LONGITUDE**	number	req	decimal degrees east longitude (west is negative), e.g. -12.5000 is 12º30'00" W
22	**PLACE_ACCURACY**	string	req	*one of the following keywords:* *keyword* — *the event has occurred...* **1KM** *within 1km of the reported location...* **3KM** *within 3 km of the reported location...* **5KM** *within 5 km of the reported location...*

				10KM *within 10 km of the reported location...*
				20KM *within 20 km of the reported location...*
				50KM *within 50 km of the reported location...*
				100KM *up to 100 km of the reported location...*
				GT100KM *possibly more than 100 km away from the reported location...*
23	**OROGRAPHY**	string	dep	*One or more of the following keywords:* *(in CSV exports, this field is returned as an array-like string formatted as ["keyword1","keyword2", ...] and in JSON format, this is an array of strings, each string corresponding to an applicable keyword.)* **FLAT** *flat, definition: local terrain height variation <= 50 m* **HILLS** *hilly, definition: local terrain height variation > 50 m and <= 500 m* **MTS** *mountainous, definition: local terrain height variation > 500 m*
24	**SURFACE_ INITIAL_ LOCATION**	string	opt	*one of the following keywords:* **LAND** *land surface* **WATER** *a water surface* *This field and the following make it possible to distinguish tornadoes over land from waterspouts.* *the following keywords are deprecated:* **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*
25	**SURFACE_CROSSED**	string	opt	*One or more of the following keywords:* *(in CSV exports, this field is returned as an array-like string formatted as ["keyword1","keyword2", ...] and in JSON format, this is an array of strings, each string corresponding to an applicable keyword.)* **LAND** *land surface* **WATER** *a water surface* *the following options are deprecated:* 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*

26	**TYPE_EVENT**	string	req	*any of the following keywords (those marked with * are deprecated and should not be used for new reports):*

AVALANCHE	*avalanche*
DEVIL	*lesser whirlwind*
FUNNEL	*funnel cloud**
GUSTNADO	*gust front vortex (gustnado)**
HAIL	*severe hailfall*
ICE	*icing hazards*
LIGHTNING	*damaging lightning*
PRECIP	*heavy rainfall*
SNOW	*heavy snowfall*
TORNADO	*tornado or waterspout*
WIND	*severe wind gust*

27	**NO_OBJECTS**	number	dep	*the number of events, e.g. number of waterspouts. This field is deprecated and should not be used for new reports. All events require their own record.*
28	**MAX_HAIL_ DIAMETER**	number	opt	*in centimetres* *for event type HAIL only.*
29	**MAX_ HAILSTONE_ WEIGHT**	number	opt	*in grams* *for event type HAIL only.*
30	**AVERAGE_ HAIL_DIAMETER**	number	dep	*in centimetres* *for event type HAIL only.*
31	**THICKNESS_ HAIL_LAYER**	number	opt	*in centimetres* *for event type HAIL only.*
32	**HAILSTONE**	string	dep	*One or more of the following keywords:* *(in CSV exports, this field is returned as an array-like string formatted as ["keyword1","keyword2", ...] and in JSON format, this is an array of strings, each string corresponding to an applicable keyword.)*

AGGR	*aggregates formed while in air*
CLEAR	*hailstones of clear ice*
CONE	*cone-shaped hailstones*

				OBLATE *hailstones with oblate shape ("squeezed ball")* **POROUS** *porous (white ice) hailstones* **RINGS** *hailstones contain rings of white and clear ice* **SPIKES** *spiky stones* *for event type HAIL only.*
33	**F_SCALE**	number	opt	*maximum intensity of the event on the Fujita- or International Fujita scale.* *for TORNADO, WIND, LESSER WHIRLWIND only.*
34	**T_SCALE**	number	dep	*maximum intensity of the event on the T-scale* *for DEVIL, GUSTNADO, TORNADO, WIND only.*
35	**RATING_BASIS**	string	opt	*One or more of the following keywords representing all types of information used for establishing the F- or T-scale rating:* *(in CSV exports, this field is returned as an array-like string formatted as ["keyword1","keyword2", ...] and in JSON format, this is an array of strings, each string corresponding to an applicable keyword.)* **RATING_DMGEYEWTN** *an eye-witness report of the inflicted damage* **RATING_DMGSVY** *a damage survey by a severe weather expert* **RATING_DMGPHOTO** *photographs / video footage of the inflicted damage* **RATING_DMGTEXT** *a written account of the damage*

				RATING_WIND *a measured wind speed*
36	**WIND_SPEED**	number	opt	the highest measured wind speed attributable to the reported event in m/s *for DEVIL, GUSTNADO, TORNADO, WIND only.*
37	**TEN_MIN_ WIND_SPEED**	number	dep	the highest measured 10 minute-averaged wind speed during the wind or snowstorm event. *for WIND, SNOW only.*
38	**FUNNEL_ SIGHTED**	string	opt	*one of the following keywords:* **FNLOBS** *funnel observed* **NOFNLOBS** *no funnel observed* *for TORNADO only.*
39	**SUCTION_ VORTICES**	string	dep	*one of the following keywords:* **SVTCSOBS** *suction vortices observed* **NOSVTCSOBS** *no suction vortices observed* *for TORNADO only.*
40	**PRECIPITATION_ AMOUNT**	number	opt	precipitation amount or equivalent liquid precipitation amount *in mm for PRECIP, ICE, SNOW only.*
41	**SNOW_FALL_AMOUNT**	number	opt	snow fall amount *in cm for event type SNOW only*
42	**PEAK_ PRECIPITATION_ AMOUNT**	number	opt	the accumulation within a time period during which the precipitation rate was exceptionally high (peak period) may be reported here. *in mm for event type PRECIP only (not SNOW).*
43	**PEAK_SNOW_FALL_ AMOUNT**	number	opt	snow fall amount in peak period *in cm for event type SNOW only.*
44	**PEAK_ PRECIPITATION_ PERIOD**	number	opt	length of precipitation/snow fall peak period *in hours* *for PRECIP, SNOW only.*
45	**MAX_6_HOUR_ PRECIP**	number	opt	*during the 0-6, 6-12, 12-18, or 18-00 UTC interval in which the time given falls. If the time given is exactly 00, 06, 12 or 18 UTC, the previous 6-hour period is meant. precipitation amount or equivalent liquid precipitation in mm.* *for PRECIP, SNOW only.*

46	**MAX_6_HOUR_ SNOW_FALL**	number	opt	*during the 0-6, 6-12, 12-18, or 18-00 UTC interval in which the time given falls. If the time given is exactly 00, 06, 12 or 18 UTC, the previous 6-hour period is meant.* snow fall amount *in cm.* *for event type SNOW only.*
47	**MAX_12_HOUR_ PRECIP**	number	opt	*during the 00-12, 12-00 UTC interval in which the time given falls. If the time given is exactly 00, or 12 UTC, the previous 12-hour period is meant.* *precipitation amount or equivalent liquid precipitation in mm.* *for PRECIP, SNOW only.*
48	**MAX_12_HOUR_ SNOW_FALL**	number	opt	*during the 00-12, 12-00 UTC interval in which the time given falls. If the time given is exactly 00, or 12 UTC, the previous 12-hour period is meant .* snow fall amount *in cm.* *for event type SNOW only.*
49	**MAX_24_HOUR_ PRECIP**	number	opt	*during the 24 hour period in which the given time fall.* *precipitation amount or equivalent liquid precipitation in mm.* *for PRECIP, SNOW only.*
50	**MAX_24_HOUR_ SNOW_FALL**	number	opt	*during the 24 hour period in which the given time fall.* snow fall amount *in cm.* *for event type SNOW only.*
51	**CONVECTIVE**	string	dep	*Did the precipitation fall in connection with deep moist convection? One of the following keywords:* **CONV** *convective* **PARTLYCONV** *partly convective* **NONCONV** *non-convective* **UNCERTAIN** *uncertain* *for PRECIP, ICE, SNOW, WIND only.*

52	**TOTAL_ DURATION**	number	opt	total event duration *for event type PRECIP, SNOW, ICE in hours, representing the duration of accumulation of the amount mentioned in field 39.* *for DEVIL, FUNNEL, GUSTNADO, TORNADO in minutes.*
53	**TYPE_PRECIP**	string	dep	*Accompanying weather phenomena known to have occurred within 5 minutes of the event time and within 3 kilometres distance of the event location.* *One or more of the following keywords:* *(in CSV exports, this field is returned as an array-like string formatted as ["keyword1","keyword2", ...] and in JSON format, this is an array of strings, each string corresponding to an applicable keyword.)*

HRAIN	*heavy rain*
LRAIN	*light or moderate rain*
LGHAIL	*large hail (2.0 cm in diameter or larger)*
MEDHAIL	*hail (0.5 – 1.9 mm in diameter)*
GRAINS	*graupel, small hail or snow grains (<0.5 mm in diameter)*
HAILUNK	*hail (unknown diameter)*
HSNOW	*heavy snowfall*
LSNOW	*light or moderate snowfall*
DUST	*dust or sand raised by the wind, thereby limiting visibility*
DRY	*no precipitation, dust or sand*

for GUSTNADO, TORNADO, WIND only

54	**SIZE_ ACCOMPANYING_ HAIL**	number	dep	hail diameter in cm *in case LGHAIL, MEDHAIL or GRAINS were reported in field 47. Otherwise, this field should be left empty. In case LGHAIL was selected, the hail should be reported in an additional event report.* *for GUSTNADO, TORNADO, WIND only*
55	**POSSIBILITIES**	string	opt	*Indication of doubts regarding the nature of the event causing wind damage.* *One or more of the following keywords:* *(in CSV exports, this field is returned as an array-like string formatted as ["keyword1","keyword2", ...] and in JSON format, this is an array of strings, each string corresponding to an applicable keyword.).*
56	**PATH_LENGTH**	number	opt	path length *in km* *for AVALANCHE, DEVIL, GUSTNADO, TORNADO and WIND only.*

deprecated: POSSGUSTNADO	*It is possible that the wind damage is caused by a gustnado instead of a tornado, but there is not enough evidence to confirm this.*
deprecated: POSSDEVIL	*It is possible that the wind damage is caused by a lesser whirlwind instead of a tornado, but there is not enough evidence to confirm this.*
deprecated, except for event type WIND: 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)*

57	**MEAN_PATH_ WIDTH**	number	opt	mean path width *in m* *for AVALANCHE, DEVIL, GUSTNADO, TORNADO and WIND only.*
58	**MAX_PATH_ WIDTH**	number	opt	maximum path width *in m* *for AVALANCHE, DEVIL, GUSTNADO, TORNADO and WIND only.*
59	**MAX_ VERTICAL_ DEVELOP**	number	dep	*in percentage of the distance cloud-ground. (e.g. 25% is one quarter of the distance from the cloud to the ground)* *for FUNNEL only.*
60	**DIRECTION_ MOVEMENT**	string	opt	*direction of movement or wind direction (for type WIND only) indicated as follows (from-to): N-S, NNE-SSW, NE-SW, etc.* *for AVALANCHE, DEVIL, GUSTNADO, TORNADO, WIND*
61	**SNOW_HAZARDS**	number	opt	Snowfall characteristics *One or more of the following keywords:* *(in CSV exports, this field is returned as an array-like string formatted as ["keyword1","keyword2", ...] and in JSON format, this is an array of strings, each string corresponding to an applicable keyword.)*

DRIFT	*drifting snow occurred (snow blowing below eye-height), but no blowing snow*
BLOW	*blowing snow occurred (snow blowing above eye-height)*
SNDRIFT	*a combination of falling and drifting snow, but no blowing snow*
SNBLOW	*a combination of falling and blowing snow*
WHITEOUT	*whiteout conditions occurred, i.e. a reduction of visibility reduces near zero and/or disappearance of horizon as well as reference points because of diffuse light conditions in cloudy snow cover environments or extreme blowing snow or extreme*

snowfall or dense fog in snow cover environments

62	**MEAN_HEIGHT_SNOW_CORNICES**	number	dep	mean height of fresh snow cornices or snow dunes in open areas *in centimetres* *for SNOW only.*
63	**MAX_HEIGHT_SNOW_CORNICES**	number	dep	maximum height of fresh snow cornices or snow dunes in open areas *in centimetres* *for SNOW only*
64	**ICE_HAZARDS**	string	opt	*One or more of the following keywords:* *(in CSV exports, this field is returned as an array-like string formatted as ["keyword1","keyword2", ...] and in JSON format, this is an array of strings, each string corresponding to an applicable keyword.)* **GLAZE** — *a coating of ice, generally clear and smooth, formed by the freezing of a film of supercooled water. Also known as clear ice or black ice.* **FROST** — *fuzzy layer of ice crystals on a cold object, forming by direct deposition of water vapor to solid ice* **RIME** — *a white or milky and opaque granular deposit of ice formed by the rapid freezing of supercooled water drops as they impinge upon an exposed object* *for ICE only*
65	**THICKNESS_ICE_COVER**	number	opt	*in millimetres* *for ICE only*
66	**THICKNESS_RIME_COVER**	number	opt	*in millimetres* *for ICE only*
67	**AVALANCHE_TYPE**	string	opt	*either of these keywords:* **SLAB** — *a slab avalanche: the simultaneous release of a cohesive snow layer (slab) characterized by a distinct fracture line (or crown fracture) at the top of the avalanche.*

				LOOSE *a loose snow avalanche: an avalanche of dry or wet snow with no or low cohesion starting from a point fanning out downhill and leaving an inverted V-shaped scar.*
				for AVALANCHE only
68	**AVALANCHE_ FLOW_TYPE**	string	opt	*either of these keywords:* **DENSE** *a dense flow avalanche: an avalanche with a primarily flowing, sliding, slipping motion.* **POWDER** *a powder cloud avalanche: an avalanche in which a large fraction of the snow is suspended by turbulence*
				for AVALANCHE only
69	**SNOW_MASS_ TYPE**	string	opt	*either of these keywords:* **DRYSNOW** *a wet snow avalanche: an avalanche of wet snow; typically a slower avalanche of higher density* **WETSNOW** *a dry snow avalanche: an avalanche of dry snow; typically faster but of lower density than a wet snow avalanche*
				for AVALANCHE only
70	**AVALANCHE_ SIZE**	number	opt	avalanche size expressed on the scale of the European Avalanche Warning Services (www.avalanches.org) **2** *small avalanche* — *50 - 100 m* — *10^2 - 10^3 m^3* **3** *medium avalanche* — *100 m - 1 km* — *10^3 - 10^4 m^3* **4** *large avalanche* — *1 - 2 km* — *10^4 – 10^5 m^3* **5** *very large avalanche* — *~ 3 km* — *> 10^5 m^3*
				for AVALANCHE only

71	**AVALANCHE_TRIGGER**	string	opt	*either of these keywords:* **NATURAL** *release of an avalanche without being triggered by a person, explosives, etc.* **ARTIFICIAL** *release of an avalanche by an external force (e.g. explosives, snow machines or machinery, people, wildlife).* *for AVALANCHE only*
72	**ELEVATION_START**	number	opt	*in metres* *for AVALANCHE only*
73	**ELEVATION_DIFFERENCE**	number	opt	height difference between starting point and ending point of the avalanche *in metres* *for AVALANCHE only*
74	**LIGHTNING_DAMAGE_TO**	string	opt	All objects directly struck by the lightning strike. *One or more of the following keywords:* *(in CSV exports, this field is returned as an array-like string formatted as ["keyword1","keyword2", ...] and in JSON format, this is an array of strings, each string corresponding to an applicable keyword.)* **AIRCRAFT** *e.g. an aeroplane or helicopter* **ANIMAL** *cattle or other large animals* **BUILDING** *built-up structures* **OVERHEAD** *overhead lines of transport infrastructure (catenary)* **PERSON** *persons or groups of persons* **POWERLINE** *powerline* **SHIP** *any vessels in water* **VEGITATION** *vegitation (i.e. causing wildfires)*

				VEHICLE *any vehicles on land, such as cars, lorries, etc.*
				for LIGHTNING only
75	**PEAK_ CURRENT**	number	opt	*in kA (kiloampere)* *for LIGHTNING only*
76	**POLARITY**	string	opt	polarity of the lightning strike as determined by a lightning detection network *either of these keywords:* **POS** *a discharge between a cloud and the ground that lowers positive charge to the ground* **NEG** *a discharge between a cloud and the ground that lowers negative charge to the ground* *for LIGHTNING only*
77	**EXCEPT_ ELEC_ PHENOM**	string	opt	*One or more of the following keywords:* *(in CSV exports, this field is returned as an array-like string formatted as ["keyword1","keyword2", ...] and in JSON format, this is an array of strings, each string corresponding to an applicable keyword.)* **BALL** *ball lightning* **OELP** *other expectionallightning phenomenon, explained in field 12*
78	**PROPERTY_ DAMAGE**	string	dep	*damage expressed in EUR (default unit) or in a specified other currency or quantity*
79	**CROP_ FOREST_ DAMAGE**	string	dep	*damage expressed in EUR (default unit) or in a specified other currency or quantity*
80	**TOTAL_ DAMAGE**	string	dep	*damage expressed in EUR (default unit) or in a specified other currency or quantity*
81	**NO_INJURED**	number	opt	
82	**NO_KILLED**	number	opt	
83	**EVENT_ DESCRIPTION**	string	opt	
84	**PATH_START_ LATITUDE**	number	opt	*for AVALANCHE, TORNADO, LESSER WHIRLWIND*

85	**PATH_START_ LONGITUDE**	number	opt	*for AVALANCHE, TORNADO, LESSER WHIRLWIND*
86	**PATH_START_ DATETIME**	date	opt	*for AVALANCHE, TORNADO, LESSER WHIRLWIND*
87	**PATH_END_ LATITUDE**	number	opt	*for AVALANCHE, TORNADO, LESSER WHIRLWIND*
88	**PATH_END_ LONGITUDE**	number	opt	*for AVALANCHE, TORNADO, LESSER WHIRLWIND*
89	**PATH_END_ DATETIME**	date	opt	*for AVALANCHE, TORNADO, LESSER WHIRLWIND*
90	**EXT_URL**	string	opt	*URL(s) of internet resources that complement the report, separated by a space. Only URL(s) of ESSL and selected partners are allowed*
91	**REFERENCE**	string	req	reference(s) to the source(s) of the report starting from 2.00 at least one reference is required
92	**IMPACTS**	string	opt	coded impacts of this event. See Appendix C.
93	**CREATOR_ID**	string	opt	identifier of the creator of the report
94	**REVISOR_ID**	string	opt	identifier of the revisor of the report
95	**LINK_ORG**	string	opt	identifier of the linked (national) database
96	**LINK_ID**	string	opt	field number of the associated report in a linked database
97	**DELETED**	bool	req	Boolean indicating whether the report is deleted. *either of these options:* **true** *Event was deleted* **false** *Event was not deleted* *All retrieved data from the ESWD server not for synchronization purposes should have a false here.*

98	**F_SCALE_METHOD**	string	opt	The method used for the F_SCALE rating. New events shall only use the International Fujita Scale. either of these options: **F** *Fujita scale* **IF** *International Fujita Scale*
99	**DI_OF_MAX_IF**	string	opt	The damage indicator on which the maximum intensity rating (highest IF-scale rating) of an event is based
100	**DOD_OF_MAX_IF**	string	opt	The degree of damage on which the maximum intensity rating (highest IF-scale rating) of an event is based
101	**NO_MISSING**	number	opt	Number of people that went missing during the event.

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Appendix A: Two-character country codes

The two-character codes of countries in WMO Region VI are given in this list. The list is similar to the ISO 3166-1 standard.

AD	Andorra	GL	Greenland	MT	Malta
AL	Albania	GR	Greece	NL	Netherlands
AM[iii]	Armenia	HR	Croatia	NO	Norway
AT	Austria	HU	Hungary	PL	Poland
AZ	Azerbaijan	IE	Ireland	PS	Palestine
BA	Bosnia and Herzegovina	IL	Israel	PT	Portugal
BE	Belgium	IS	Iceland	RO	Romania
BG	Bulgaria	IT	Italy	RS	Serbia[v]
BY	Belarus	JO	Jordan	RU	Russian Federation
CH	Switzerland	KG	Kyrgyzstan	SE	Sweden
CY	Cyprus	KZ	Kazakhstan	SI	Slovenia
CZ	Czech Republic	LB	Lebanon	SK	Slovakia
DE	Germany	LI	Liechtenstein	SY	Syria
DK	Denmark	LT	Lithuania	TM	Turkmenistan
DZ	Algeria	LU	Luxembourg	TN	Tunisia
EE	Estonia	LV	Latvia	TR	Türkiye
EG	Egypt	LY	Lybia	UA	Ukraine
ES	Spain[i]	MA	Morocco	UZ	Uzbekistan
FI	Finland	MC	Monaco	VA	Holy See
FR	France	MD	Moldova	XK	Kosovo
GB[iv]	United Kingdom[ii]	ME	Montenegro		
GE	Georgia	MK	North Macedonia		

i) including its dependencies in North Africa

ii) including its dependencies in Europe

iii) Was changed from AR to AM to align with ISO Standards

iv) Was changed from UK to GB to align with ISO Standards

v) Kosovo was moved to its own country code

Appendix B: Quality control levels

The meaning of the three quality-control (QC) levels in the ESWD and the underlying regulations for their assignment are summarized within the following table.

Quality level	Designation	Description	QC performed by
QC0	as received	The report is newly reported by a source whose reliability has not yet been confirmed. Quality control of this report is still pending.	–
QC0+	plausibility checked	The report is judged to be plausible, given the overall meteorological situation in the affected region and time period.	VON, VOP, NHMS or ESSL
QC1	confirmed by reliable source	The occurrence of the report has been confirmed by a reliable source	VON, VOP NHMS or ESSL
QC2	scientific case study	In addition to being confirmed, an expert has performed an in-depth case study of the event, in particular regarding the nature and impacts if the event. Typically, this requires a post-event site survey.	NHMS or ESSL

VON stands for Voluntary Observer Network, VOP stands for Voluntary Observer Persons and NHMS is National HydroMeteorogical Service.

ESWD quality-control levels denote the reliability of the contained information, and do not refer to the mere quantity of information (number of filled database fields). The significant step in report quality takes place from QC0+ to QC1. Both QC1 and QC2 reports are confirmed and suitable for quantitative analysis. However, for some analyses, even the QC0+ reports will still be adequate.

Appendix C: Impact codes

The following table lists all impact codes, their acronyms and the severe weather events for which they may be selected. The respective field contains a string consisting of all applying impact codes separated by a space.

		DEVIL	TORNADO	WIND	PRECIP	HAIL	SNOW	AVALANCHE	LIGHTNING	ICE
	Transport infrastructure									
T1	Road(s) impassable or closed	X	X	X	X	X	X	X	X	X
T2	Road(s) damaged or destroyed		X		X			X		
T3	Bridge(s) damaged or destroyed		X	X	X			X		
T4	Rail-/tram-/subway(s) unusable or closed	X	X	X	X	X	X	X	X	X
T5	Rail-/tram-/subway infrastructure damaged	X	X	X	X	X	X	X	X	X
T6	Rail-/tram-/subway vehicle(s) damaged or destroyed		X	X	X	X	X	X	X	X
T7	Airport(s) closed (for more than an hour)		X	X	X	X	X	X	X	X
T8	Aircraft damaged or destroyed		X	X		X		X	X	
T9	Ship(s) damaged or destroyed		X	X		X			X	
T10	Inhabited place(s) cut off from transport infrastructure		X	X	X	X	X	X		X
	Other infrastructure									
I1	Power transmission damaged or destroyed	X	X	X	X	X	X	X	X	X
I2	Telecommunication infrastructure damaged or destroyed	X	X	X	X	X	X	X	X	X
	Damage to homes / buildings									
H1	Damage (any damage)								X	
H2	Damage to roof(s) and/or chimney(s)	X	X	X		X				X
H3	Roof(s) destroyed	X	X	X		X	X	X		X
H4	Damage to window(s) and/or insulation layer(s)	X	X	X		X				
H5	Wall(s) (partly) collapsed	X	X	X				X		
H6	Building(s) (almost) fully destroyed	X	X	X	X			X	X	
H7	Basement(s) flooded				X					
H8	Flooding of ground floor				X					
H9	Flooding above ground floor				X					

	Damage to road vehicles									
V1	Car(s) damaged (any damage)	X	X	X	X	X	X	X	X	X
V2	Car(s) dented	X	X	X		X				
V3	Car window(s) and/or windshield(s) broken	X	X	X		X				
V4	Car(s) damaged beyond repair	X	X	X	X	X				
V5	Car(s) lifted		X							
V6	Truck(s) and/or trailer(s) overturned		X	X						
	Damage to trees									
W1	Tree(s) damaged					X			X	X
W2	Large tree branch(es) broken	X	X	X			X			
W3	Tree(s) uprooted or snapped	X	X	X	X			X		
W4	Forest(s) damaged or destroyed		X	X			X	X		X
	Damage to agriculture									
A1	Crops/farmland damaged	X	X	X		X	X			
A2	Farmland flooded				X					
A3	Greenhouse(s) damaged or destroyed	X	X	X		X	X			
A4	Animal(s) killed	X	X	X	X	X	X	X	X	X
	Event consequences									
E1	Land- or mudslide(s)				X					
E2	Fire as a consequence of the event	X	X	X					X	
E3	Evacuation order by authorities	X	X	X	X		X	X		X