

TECHNICAL REPORT 2011 - 01

ESWD data format specification

Version 1.50 and 1.50-csv

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1. Introduction

This report describes a new version of the ESWD data format, which has been developed for the documentation of severe weather occurrences. 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 (e.g. Dotzek et al, 2009).

This document describes Version 1.50, which is an extension of version 1.40 (ESSL Techical Report 2006-01), and Version 1.50-csv, which is an extension of version 1.40-csv (ESSL Techical Report 2009-01).

The current version extends the database with various types of winter weather as well as lightning, and can be expanded further in future to accommodate the storage of additional types of severe weather.

The work that was carried out was in part funded by the project EWENT (Extreme Weather impacts on European Networks of Transport), part of the 7th Framework Programme of the European Union.

Several people have advised the Data Comittee and we express our thanks for this here. In particular we thank Alexander Keul (Universität Salzburg), Patrick Nairz (Lawinenwarndienst Tirol), Kristin Anthony-Malone (Canadian Avalanche Association), and Gerhard Diendorfer (EUCLID) for their input. Finally, posthumously, credit is due to Nikolai Dotzek for his many contributions to and support of the development of the ESWD during his time as ESSL Director.

2. Basic principles

2.1 Point data

The ESWD data formats are designed to record georeferenced 0-dimensional data (i.e. point data) as opposed to higher-dimensional geographical objects. An exception to this rule is the possibility to store 1 dimensional tornado damage paths. Other 1-dimensional or higher dimensional objects cannot 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 that used the ESWD data. data may be stored in an SQL, XML or 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 such as those of the Open Geospatial Consortium, <u>http://www.opengeospatial.org</u>.

2.3 csv and conventional formats

The ESWD data format comes in two types: the *csv format* and the *traditional* or *conventional format*. The traditional format was developed first (Groenemeijer et al., 2004). The primary distinction between the two types is the way data of a single report is structured.

In the *conventional* format this data is stored in 3 or 4 *groups*, or lines of data. The *csv* format stores al data in on one line, i.e. the data of one report consitutes one single string. Another difference is that the *conventional* format makes extensive use of keywords to indicate particular properties of the event that is reported. In contrast, the csv format uses numbers to store such data. More details can be found in the respective sections below.

Both data formats have their benefits. The csv data is the most easily used for transfer to other database systems, and for importing into spreadsheet programs. The conventional format is more human-readable and easier to encode, for example by organizations wishing to transmit data to ESSL's database. In this document both data formats are described.

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 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
- icing hazards

2.5 Merging of multiple reports of multiple events

When multiple events of the same countable event type occur in close spatial and temporral proximity (for example, 3 waterspouts) these may be merged into one report. This should be done only when 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.

3. Event types and definitions

The types of severe weather covered by this version of the data format are listed below.

Some types do not use fixed thresholds, because these differ from region to region. Some mountainous areas used to see accumulations of, for example, 80 mm in 12 hours, but in flatter areas where suchs amounts are uncommon, they may cause major problems. Similarly, 10 cm of snow in Rome has a very different effect than 10 cm of snow in Helsinki.

The criterion of whether a report qualifies to be included is whether important disruptions of daily life and/or considerable material damage or economical damage occurred, or could easily have occurred given the general level of resilience of the region to the events, for example, if it had happened at a slightly different time or location.

AVALANCHE - avalanche

Definition: A rapid flow of snow down a slope.

DEVIL - lesser whirlwind

Definition: 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.

Remarks:

This category includes only those lesser whirlwinds that result from temperature differences between the surface and the air above. Whirls in the lee of objects, i.e. wake vortices which otherwise may meet the criteria above, should not be reported in this category.

Lesser whirlwinds have been reported not only over hot land surface, but also, albeit seldomly, over surfaces like water and and even snow surfaces. Whirls over such surfaces qualify as long as they are not wake vortices

FUNNEL - funnel cloud

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.

Remark:

Funnel clouds and weak tornadoes can be confused easily if the tornado funnel does not fully extend to the ground, e.g. due to lack of 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)

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 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 accumulated because of transport by water, wind or by any other means.

ICE - icing hazards

Definition: Accumulations of ice on the earth's surface and/or objects (such as power lines) in an amount that causes - or is capable of causing - important disruptions of daily life and/or considerable material damage or economical 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.

Remarks:

Glaze is 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 is a fuzzy layer of ice crystals on a cold object, forming by direct deposition of water vapor to solid ice

Rime is 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

LIGHTNING - damaging lightning

Definition: A lightning strike causing important damage to aircraft, vehicles, ships, or injuries casualties to people or animals.

PRECIP - heavy precipitation

Definition: Precipitation in an amount that causes - or is capable of causing - important disruptions of daily life and/or considerable material or economical damage.

SNOW - heavy snowfall

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

TORNADO - tornado, waterspout

Definition: 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

Definition: Measured 3-second averaged wind speeds of 25 m/s or higher at 10 m above the surface, or wind damage inflicted by winds that were likely stronger than 25 m/s.

4. The conventional data format

4.1 conventional structure

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

FILES contain RECORDS that contain GROUPS 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 two newline characters. A record consists of several groups, each marked by a group code. Each group starts on a new line. Every record contains three or four groups: INFO (record information), TIME&PLACE (general time and location), the event group and, possibly a PATH group.

A group consists of a number of fields. Every first field of a group is the group identifier and the second contains the group length. Fields are separated by the character "|". A field contains one physical quantity or one type of information.

4.2 conventional field types

Fields can contain data of the following types. It is important to comply with this in order to be able to decode the data automatically:

format type	description
char	alphabetic characters, spaces, numbers, all punctuation symbols except
paragr.	a combination of n times char, with $n \le 1024$
word	a combination of n times char, with $n \le 64$
integer	<i>1 to 5 numerical characters constituting a positive integer number (max. 32767)</i>
numb.	a numerical character
x numb.	x times a numerical character (this differs from integer because its length is not variable and leading zeroes are therefore retained, but can be read by a program as an integer).
float	numbers that may contain a decimal point.

4.3 conventional field status

Fields can be required (req.), optional (opt.) or deprecated (dep).

Required means that if the field is left empty, the data does not comply with the data format, which may cause errors in decoding. Events of which *required* information is not available may not be added to the database.

Optional fields may be left empty. This information should be given when available. Entering the number 0 indicates that the value of a\the field is zero, not that no information is available.

Deprecated fields are fields that are retained to ensure backward compatibility, but their usage is discouraged for new data.

4.4 conventional group and field descriptions

4.4.1 Group INFO – record information, source, revisions (req.)

#	field name	type	status	possible value(s) and description		
1	group identifier	word	req	INFO		
2	group length	integer	req	14		
3	record version	word	req	V01.50		
4	record length	integer	req	number of group	os of the entire record	
5	QC level	word	req	quality level of t	he report, see Appendix B	
				one of the follow	ving keywords:	
				QC0	as received	
				QC0+	plausibility checked	
				QC1	confirmed by reliable source	
				QC2	fully verified	
6	information sources	word	opt	one or more separated by a c	of the following keywords, omma	
				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	
				ЕУТРНОТО	a photo or videoof the event	
				DMGPHOTO	a photo or video of the damage	
				DMGSVY	a damage survey by a severe weather expert	

7	external URL(s)	paragr.	opt	URL(s) of internet resources that complement the report, separated by a space. <i>Only URL(s) of</i> <i>ESSL and selected partners are allowed, e.g.</i> <i>http://www.meteopics.eu</i>
8	source name(s)	paragr.	req	name of the person who submitted the report
9	source e-mail	word	opt	e-mail address of this person
10	organization name	word	opt	name of this person's organization
11	spotter id	word	opt	identification code of the person making the report within his organization
12	no. of revisions	integer	req	number of revisions of the report
				the initial submission ot the ESWD is 1.
13	name and organization of revisor	word	opt	last name and organization of person doing the last revision
14	date of last revision	numb.	req	given in format yyyymmdd

4.4.2 Group TIME&PLACE - time and place of initial event occurrence (req.)

Remark:

1. All times must be given in UTC time.

#	field name	type	status	possible value(s) and description		
1	group identifier	word	req	TIME&	PLACE	
2	group length	integer	req	21		
3	year	4 numb.	req	year, fori	matted as yyyy	
4	month	2 numb	req	month (J	anuary $= 01$), formatted as mm	
5	day	2 numb.	req	day in me	onth (first day = 01), formatted as dd	
6	weekday	word	dep	one of th	e following keywords:	
				MON	Monday	
				TUE	Tuesday	
				WED	Wednesday	
				THU	Thursday	
				FRI	Friday	
				SAT	Saturday	
				SUN	Sunday	
7	hours	2 numb.	req	hh		
8	minutes	2 numb.	req	mm		
9	time accuracy	word	opt	one of the	e following keywords:	
				keywor d	the event has occurred	
				5M	up to 2.5 minutes earlier or later	
				15M	up to 7.5 minutes earlier or later	
				30M	up to 15 minutes earlier or later	
				1H	up to 30 minutesearlier or later	
				3Н	up to 1.5 hours earlier or later	
				6H	up to 3 hours earlier or later	
				12H	up to 6 hours earlier or later	
				1D	up to 12 hours earlier or later	

GT1D more than 12 hours earlier or later... ...than specified in fields 3-8.

10	country	word	req	two-character country code as specified in Appendix A.	
11	adminsitrative division	word	opt	first sub-national administrative division such as province, department, land, autonomous region etc.	
12	place name	word	req	name of nea station	arest town, settlement or observing
13	place name in local language	word	opt	name of nea station in lo 12	arest town, settlement or observing cal language, if different from field
14	detailed location description	paragr.	opt	description	
15	nearest larger city	word	dep	location in words expressed with respect to the nearest larger city, <i>e.g. 5 km S of Amsterdam</i> , <i>10 km SSE of Stuttgart, near Basel.</i>	
16	latitude	float	req	decimal degrees north latitude (south is negative), e.g. 50.5000 is 50°30'00"	
17	longitude	float	req	decimal degrees east longitude (west is negative	
18	place accuracy	word	opt	one of the fe	ollowing keywords:
				keyword	the event has occurred
				1KM	within 1km of the reported location
				3KM	within 3 km of the reported location
				10KM	within 10 km of the reported location
				20KM	within 30 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
19	orography	word	dep	one or more	e of the following keywords
				FLAT fla va <	nt, definition: local terrain height riation <= 50 m = 50 m
				HILLS hill va	lly, definition: local terrain height riation > 50 m and <= 500 m

				MTS	mountainous, definition:local terrain height variation > 500 m	
20	character of earth's	word	opt	one of the following keywords:		
	surface at the initial event location		(dep)	LAND	land surface <= 50 m	
				WATER	a water surface	
				This field distinguis waterspo	and the following make it possible to the tornadoes over land from uts.	
				The following keywords, or combinations thereof, separated by a comma, 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	
21	all types of earth's surface crossed by the	word	opt	one or bo separated	th of the following keywords, l by a comma:	
	event			LAND	land surface <= 50 m	
				WATER	a water surface	
				Additiona 19 or con comma, n	ally, the deprecated keywords of field a non- nbinations thereof (separated by a non- nay occur).	

4.4.3 Group AVALANCHE

Definition: An avalanche is a rapid flow of <u>snow</u> down a slope.

Remarks:

1. In accordance with the definition of the European Avalanche Warning Services (<u>www.avalanches.org</u>), only avalanches that have a volume greater than 100 m³ or a minimum length of 50 m (level 2 on the EAWS scale) are to be recorded.

#	field name	type	statu s	possible va	lue(s) and description	
1	group identifier	word	req	AVALAN	CHE	
2	group length	integer	req	19		
3	type of avalanche	word	opt	either of the	ese keywords:	
				SLAB	a <u>slab avalanche:</u> 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 <u>loose snow avalanche</u> : 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.	
4	avalanche flow type	word	opt	either of these keywords:		
				DENSE	a <u>dense flow avalanche:</u> an avalanche with a primarily flowing, sliding, slipping motion.	
				POWDER	a <u>powder cloud avalanche</u> : an avalanche in which a large fraction of the snow is suspended by turbulence	
5	snow mass	word	opt	either of the	ese keywords:	
5	characteristics			WETSNOV	N a <u>wet snow avalanche:</u> an avalanche of wet snow; typically a slower avalanche of higher density	
				DRYSNOW	a <u>dry snow avalanche</u> :	
			19	/ 66		

an avalanche of dry snow; typically faster but of lower density than a wet snow avalanche

6	avalanche size	integer	opt	avalanc Europea (<u>www.a</u>	he size an Ava avalanc	expressed or lanche Warni <u>hes.org</u>)	n the scale of the ing Services
				des n	criptio	path length	volume
				2 smc ava	ıll lanche	50 - 100 m	$10^2 - 10^3 m^3$
				3 med ava	lium lanche	100 m - 1 km	$10^3 - 10^4 m^3$
				4 larg ava	ge lanche	1 - 2 km	$10^4 - 10^5 m^3$
				5 very ava	v large lanche	~ 3 km	$> 10^{5} m^{3}$
7	avalanche trigger	word	opt	either o	f these	keywords:	
				NATURAL		release of an avalanche without being triggered by a person, explosives, etc.	
				ARTIF	ICIAL	release of an o external force snow machine people, wildlij	avalanche by an (e.g. explosives, es or machinery, fe).
8	path length	float	opt	in kilon	netres		
9	mean path width	float	opt	in metre	es		
10	max. path width	float	opt	in metre	es		
11	direction of movement	word	opt	directio (from-te	direction of movement indicated as follows (from-to): N-S NNE-SSW, NE-SW, etc.		cated as follows NE-SW , <i>etc</i> .
12	elevation of starting point	float	opt	in metres			
13	elevation difference	float	opt	height c ending	lifferen point o	ce between s f the avalanc	tarting point and he <i>in metres</i>
14	property damage	word	opt	damage specifie	e expres d other	ssed in EUR (currency or	(default unit) or in a quantity
15	crop/forest damage	word	opt	damage expressed in EUR (default unit) or in a			

				specified other currency or quantity, such as m ³ of wood
16	total damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
17	number of people injured	integer	opt	
18	number of people killed	integer	opt	
19	event description / types of damage / other remarks	paragr.	opt	

4.4.4 Group DEVIL – lesser whirlwind

Definition: 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.

Remarks:

- 1. This category includes only those lesser whirlwinds that result from temperature differences between the surface and the air above. Whirls in the lee of objects, i.e. wake vortices which otherwise may meet the criteria above, should not be reported in this category.
- 2. Lesser whirlwinds have been reported not only over hot land surface, but also, albeit seldomly, over surfaces like water and and even snow surfaces. Whirls over such surfaces qualify as long as they are not wake vortices
- 3. An F- or T-scale rating shall be provided only when a reasonably accurate estimate can be given.

#	field name	type	statu s	possible value(s	and description
1	group identifier	word	req	DEVIL	
2	group length	integer	req	18	
3	number of whirlwinds	integer	opt	blank implies 1	
4	F-scale	integer	opt	max. intensity or	n the Fujita-scale
5	T-scale	integer	opt	max. intensity on the T-scale	
6	F/T rating basis	word	opt	the basis for the rating indicated by one of more of the following keywords, separated by comma:	
				DMGEYEWTN	an eye-witness report of the inflicted damage
				DMGSVY	a damage survey by a severe weather expert
				DMGPHOTO	photographs / video footage of the inflicted damage
				DMGTEXT	a written account of the damage (e.g. in a newspaper)
				WIND	a measured wind speed

7	wind speed	float	opt	in m/s. only measured wind speeds should be given here, no estimates
8	total event duration	float	opt	in minutes
9	path length	float	opt	in kilometres
10	mean path width	float	opt	in metres
11	max. path width	float	opt	in metres
12	direction of	word	opt	direction indicated as follows (from-to):
	movement			N-S NNE-SSW, NE-SW, etc.
13	property damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
14	crop/forest damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity, such as m^3 of wood
15	total damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
16	number of people injured	integer	opt	
17	number of people killed	integer	opt	
18	event description / types of damage / other remarks	paragr.	opt	

4.4.5 Group FUNNEL - funnel cloud

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.

Remark:

1. Funnel clouds and weak tornadoes can be easily confused if the tornado funnel does not fully extend to the ground. If any evidence exists that the vortex associated with the funnel cloud had ground contact, the event should be reported as a TORNADO.

#	field name	type	statu s	possible value(s) and description
1	group identifier	word	req	FUNNEL
2	group length	integer	req	7
3	number of funnel clouds	integer	opt	blank implies 1
4	total event duration	float	opt	in minutes
5	max. vertical development	integer	opt	in percentage of the distance cloud-ground. (e.g. 25% is one quarter of the distance from the cloud to the ground)
6	direction of	word	opt	direction indicated as follows (from-to):
	movement			N-S NNE-SSW, NE-SW, etc.
7	event description / types of damage / other remarks	paragr.	opt	

4.4.6 Group GUSTNADO - gust front vortex (gustnado)

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.

Remarks:

- 1. In case of uncertainty whether a gustnado really has occurred, do not use this group. If it is certain that either a tornado or a gustnado occurred, use the TORNADO group. If a straight-line wind gust could have occurred instead, choose the WIND group.
- 2. Provide an F- or T-scale rating only when a reasonably accurate estimate can be given.

#	field name	type	status	possible value(s) and description	
1	group identifier	word	req	GUSTNADO	
2	group length	integer	req	20	
3	number of gustnadoes	integer	opt	blank implies 1	
4	F-scale	integer	opt	max. intensity or	n the Fujita-scale
5	T-scale	integer	opt	max. intensity or	n the T-scale
6	F/T rating basis	word	opt	the basis of the rating should be indicated by one or more of the following keywords, separated by a comma:	
				DMGEYEWTN	an eye-witness report of the inflicted damage
				DMGSVY	a damage survey by a severe weather expert
				DMGPHOTO	photographs / video footage of the inflicted damage
				DMGTEXT	a written account of the damage (e.g. in a newspaper)
				WIND	a measured wind speed
7	wind speed	float	opt	in m/s only measured w the field, no estir	vind speeds should be given in nates.
8	total event duration	float	opt	in minutes	
9	type of precipitation	word	opt	all types of precipitation that are known to have occurred within 5 minutes of the event time and	

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

within 3	kilometres distance of the event, i.e.
one or m	ore of the following values separated
by a com	nma:

10	size of accompanying hail	float	opt	in centimetres. the hail should have occurred within 5 minutes of the event time and within 3 kilometres distance of the event
11	path length	float	opt	in kilometres
12	mean path width	float	opt	in metres
13	max. path width	float	opt	in metres
14	direction of movement	word	opt	direction of movement indicated as follows (from-to): N-S NNE-SSW, NE-SW, etc.
15	property damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
16	crop/forest damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity, such as m ³ of wood
17	total damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
18	number of people injured	integer	opt	
19	number of people	integer	opt	

killed

20 event description / paragr. opt types of damage / other remarks

4.4.7 Group HAIL - severe hailfall

Definition: 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:

1. The hail layer thickness should be measured where effects of local accumulation by transport of hail stones by water, wind or by any other means are negligible.

#	field name	type	status	possible value	(s) and description
1	group identifier	word	req	HAIL	
2	group length	integer	req	14	
3	max. hail diameter	float	opt	in centimetres	
4	max. hailstone weight	float	opt	in grams	
5	average hailstone diameter	float	opt	in centimetres	
6	thickness of accumulated hail layer	float	opt	in centimetres ((see Remark 1)
7	hail stone characteristics	word	opt	all of the following hailstone characteristics that apply, i.e. one or more of the following values separated by a comma:	
				AGGR	aggregates formed while in air
				CLEAR	hailstones of clear ice
				CONE	photographs / video footage of the inflicted damage
				OBLATE	hailstones with oblate shape ("squeezed ball")
				POROUS	porous (white ice) hailstones
				RINGS	hailstones contain rings of white and clear ice
				SPIKES	spiky stones
8	local event duration	float	opt	the time a particular place was affected by hailfall, in minutes	
9	property damage	word	opt	damage express	sed in EUR (default unit) or in a

				specified other currency or quantity
10	crop/forest damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
11	total damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
12	number of people injured	integer	opt	
13	number of people killed	integer	opt	
14	event description / types of damage / other remarks	paragr.	opt	

4.4.8 Group ICE – Icing hazards

Definition: Accumulations of ice on the earth's surface and/or objects (such as power lines) in an amount that causes - or is capable of causing - important disruptions of daily life and/or considerable material or economical 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*.

#	field name	type	status	possible va	alue(s) and description
1	group identifier	word	req	ICE	
2	group length	integer	req	14	
3	ice hazards	word	opt	all of the following that apply, i.e. one or more of the following keywords separated by a comma:	
				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
4	thickness of glaze cover	float	opt	in millimet	res
5	thickness of rime or frost cover	float	opt	in millimetres	
6	frozen precipitation amount	float	opt	measured amount of precipitation that has contributed to the ice layer <i>in millimetres water equivalent</i>	
7	duration of precipitation	float	opt	duration of <i>in hours</i>	f the precipitation
8	convective nature	word	opt	Did the pre deep moist values:	ecipitation fall in connection with convection? One of the following

			CONV	convective
			PARTLYCONV	partly convective
			NONCONV	nonconvective
			UNCERTAIN	uncertain
property damage	word	opt	damage expresse specified other c	ed in EUR (default unit) or in a urrency or quantity
crop/forest damage	word	opt	damage expresse specified other c	ed in EUR (default unit) or in a urrency or quantity
total damage	word	opt	damage expresse specified other c	ed in EUR (default unit) or in a urrency or quantity
number of people injured	integer	opt		
number of people killed	integer	opt		
event description / types of damage / other remarks	paragr.	opt		

4.4.9 Group LIGHTNING – damaging lightning

Definition: Lightning strike causing important damage to aircraft, vehicles, ships, or injuries casualties to people or animals.

#	field name	type	statu s	possible value	(s) and description
1	group identifier	word	req	LIGHTNING	
2	group length	integer	req	12	
3	objects struck	word	req	All objects dire strike. <i>One or n</i> <i>separated by a</i>	ectly struck by this lightning nore of the following keywords, comma:
				AIRCRAFT	e.g. an aeroplane or helicopter
				ANIMAL	cattle or other large animals
				BUILDING	build-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.
4	peak current	float	opt	peak current me network <i>in kA (kiloampe</i>	easured by lightning detection ere)
5	polarity	word	opt	polarity of the l a lightning dete	lightning strike as determined by ection network
				either of the fol	lowing keywords:
				POS a ti	discharge between a cloud and he ground that lowers positive harge to the ground
				NEG a ti c	discharge between a cloud and he ground that lowers negative harge to the ground
6	exceptional electrical phenomenon	float	opt	One or more of	the following keywords:

7

8

9

10

11

12

			BALL	ball lightning
			OELP	other expectionallightning phenomenon, explained in field 12
property damage	word	opt	damage ex specified o	apressed in EUR (default unit) or in a other currency or quantity
crop/forest damage	word	opt	damage ex specified o	apressed in EUR (default unit) or in a other currency or quantit
total damage	word	opt	damage ex specified o	apressed in EUR (default unit) or in a other currency or quantity
number of people injured	integer	opt		
number of people killed	integer	opt		
event description / types of damage / other remarks	paragr.	opt		

4.4.10 Group PRECIP - heavy precipitation

Definition: Precipitation in an amount that causes - or is capable of causing - important disruptions of daily life and/or considerable material or economical damage.

#	field name	type	statu s	possible value(s) and description	
1	group identifier	word	req	PRECIP	
2	group length	integer	req	16	
3	precipitation amount	float	opt	in millimetres	
4	duration of accumulation	float	opt	in hours required if field 3 is provided	
5	precipitation amount in peak period	float	opt	the accumulation within a time period during which the precipitation rate was exceptionally high (peak period) may be reported here, <i>in</i> <i>millimetres</i>	
6	duration of peak period	float	opt	duration of the peak period, in hours	
7	max. 6 hour accumulated precipitation	float	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.	
8	max. 12 hour accumulated precipitation	float	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.	
9	max. 24 hour accumulated precipitation	float	opt	during the 24 hour period in which the given time falls	
10	convective nature	word	opt	<i>Did the precipitation fall in connection with deep moist convection? One of the following values:</i>	
				CONV convective	
				PARTLYCONV partly convective	
				NONCONV nonconvective	
				UNCERTAIN uncertain	
11	property damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity	
12	crop/forest damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantit	

13	total damage	word	opt
14	number of people injured	integer	opt
15	number of people killed	integer	opt
16	event description / types of damage / other remarks	paragr.	opt

damage expressed in EUR (default unit) or in a specified other currency or quantity

4.4.11 Group SNOW - heavy snowfall and/or snowstorm

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

#	field name	type	statu s	possible value(s) and description
1	group identifier	word	req	SNOW
2	group length	integer	req	24
3	snowfall amount	float	opt	in centimetres
4	snow water equivalent	float	opt	the water equivalent of snow fall, in millimeters
5	duration of accumulation of the amount in field 3	float	opt	in hours required if field 3 is provided
6	snowfall amount in peak period	float	opt	the accumulation within a time period during which the snowfall rate was exceptionally high (peak period) may be reported here, <i>in</i> <i>centimetres</i>
7	snow water equivalent in peak period	float	opt	the snow water equivalent of snow accumulation within a time period during which the snowfall rate was exceptionally high (peak period) may be reported here, <i>in millimeters</i>
8	duration of peak period	float	opt	duration of peak period, in hours required if field 5 is provided
9	max. 6 hour accumulated snow	float	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, in centimeters
10	max. 6 hour snow water equivalent	float	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, in millimeters
11	max. 12 hour accumulated snow	float	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, in centimeters
12	max. 12 hour snow water equivalent	float	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, in milli	meters	
13	max. 24 hour accumulated snow	float	opt	during the 24 hour period in which the given time falls, in centimeters		
14	max. 24 hour snow water equivalent	float	opt	during the 24 hour period in which the given time falls, in millimeters		
15	characteristics	haracteristics word opt Applicab One or m given. set		Applicable cha One or more o given, separate	characteristics of the snowfall. re of the following values should be trated by a comma:	
				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	
16	mean height of dunes or cornices	float	opt	mean height of dunes in open a	fresh snow cornices or snow areas <i>in centimetres</i>	
17	max height of dunes or cornices	float	opt	maximum heig snow dunes in	th of fresh snow cornices or open areas in centimetres	
18	convective nature	word	opt	Did the precipt deep moist con values:	itation fall in connection with vection? One of the following	
				CONV	convective	
				PARTLYCON	<i>V</i> partly convective	
				NONCONV	nonconvective	
				UNCERTAIN	uncertain	

19	property damage	word	opt
20	crop/forest damage	word	opt
21	total damage	word	opt
22	number of people injured	integer	opt
23	number of people killed	integer	opt
24	event description / types of damage / other remarks	paragr.	opt

damage expressed in EUR (default unit) or in a specified other currency or quantity
damage expressed in EUR (default unit) or in a specified other currency or quantit
damage expressed in EUR (default unit) or in a specified other currency or quantity

4.4.12 Group TORNADO - tornado, waterspout

Definition: 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.

Remarks:

- 1. Use this group for events that have most likely been caused by tornadoes or by either tornadoes or gustnadoes. If a straight-line wind gust could have occurred instead, choose the WIND group. For events that clearly have not been tornadoes but gustnadoes, use the group GUSTNADO.
- 2. Provide an F- or T-scale rating only when a reasonably accurate estimate can be given.

#	field name	type	statu s	possible value(s	and description
1	group identifier	word	req	TORNADO	
2	group length	integer	req	23	
3	number of tornadoes	integer	opt	if not given, 1 is	implied
4	F-scale	integer	opt	maximum intens scale	sity expressed on the Fujita
5	T-scale	integer	opt	maximum intens	sity expressed on the T-scale
6	rating basis	word	opt	the basis of the rating should be indicated b one or more of the following keywords, separated by a comma:	
				DMGEYEWTN	an eye-witness report of the inflicted damage
				DMGSVY	a damage survey by a severe weather expert
				DMGPHOTO	photographs / video footage of the inflicted damage
				DMGTEXT	a written account of the damage (e.g. in a newspaper)
				WIND	a measured wind speed
7	wind speed	float	opt	the highest meas the tornado in m	sured wind speed attributable to
8	funnel sighted	word	req	was the a funnel observed (not ne ground)?	cloud of the tornado visually ecessarily reaching the

				One of the fo	ollowin	eg keywords:
				FNLOBS	fu	nnel observed
				NOFNLOBS	no	funnel observed
9	suction vortices observed	word	opt	Have suction embedded in circulation, i vortex tornad	i vortic the la indicat do?	ces been observed that were rger tornadic parent ing that this was a multi-
				One of the fo	ollowin	eg keywords:
				SVTCSOBS	su	uction vortices observed
				NOSVTCSO	BS no	osuction vortices observed
10	type of precipitation	word	opt	all types of p occurred wit within 3 kilo one or more by a comma:	recipit hin 5 r metres of the	tation that are known to have ninutes of the event time and distance of the event, i.e. following values separated
				HRAIN	heavy	rain
				LRAIN	light d	or moderate rain
				LGHAIL	large (2.0 c	hail m in diameter or larger)
				MEDHAIL	hail (0.5 –	1.9 mm in diameter)
				GRAINS	graup grains	el, small hail or snow s (<0.5 mm in diameter)
				HAILUNK	hail (i	unknown diameter)
				HSNOW	heavy	snowfall
				LSNOW	light o	or moderate snowfall
				DUST	dust o therel	or sand raised by the wind, by limiting visibility
				DRY	no pre	ecipitation, dust or sand
11	size of accompanying hail	float	opt	in centimetre within 5 min kilometres di	es (the utes of istance	hail should have occurred <i>f</i> the event time and within 3 <i>e</i> of the event)
12	possibilities	word	opt	none, either	or boti	h of the following keywords:
				POSSGUST	NADO	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. (please provide information in event description field 23)

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. (please provide information in event description field 23)

13	total event duration	float	opt	in minutes
14	path length	float	opt	in kilometres
15	mean path width	float	opt	in metres
16	max. path width	float	opt	in metres
17	direction of	word	opt	direction indicated as follows (from-to):
	movement			N-S NNE-SSW, NE-SW, etc.
18	property damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
19	crop/forest damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity, such as m ³ of wood
20	total damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
21	number of people injured	integer	opt	
22	number of people killed	integer	opt	
23	event description / types of damage / other remarks	paragr.	opt	

4.4.13 Group WIND - severe wind gust

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

Remark:

1. Provide an F- or T-scale rating only when a reasonably accurate estimate can be given.

#	field name	type	status	possible value(s) and description
1	group identifier	word	req	WIND	
2	group length	integer	req	22	
3	F-scale	integer	opt	maximum intens	ity expressed on the Fujita
4	T-scale	integer	opt	maximum intens	ity expressed on the T-scale
5	rating basis	word	opt	the basis of the rating should be indicated one or more of the following keywor separated by a comma:	
				DMGEYEWTN	an eye-witness report of the inflicted damage
				DMGSVY	a damage survey by a severe weather expert
				DMGPHOTO	photographs / video footage of the inflicted damage
				DMGTEXT	a written account of the damage (e.g. in a newspaper)
				WIND	a measured wind speed
6	wind speed	float	opt	the highest meas the reported even	rured wind gust attributable to nt in m/s
7	10 min. average wind speed	float	opt	the highest meas speed	rured 10 minute-averaged wind
8	local event duration	float	opt	the duration of the location	he event at a particular fixed
9	convective nature	word	opt	Was the gust ass convection? One	ociated with deep moist e of the following values:
				CONV	convective
				PARTLYCONV	partly convective
				NONCONV	nonconvective

				UNCERTAI	N u	ncertain
10	0 type of precipitation word opt		all types of precipitation that are known to have occurred within 5 minutes of the event time and within 3 kilometres distance of the event, i.e. one or more of the following values separated by a comma:			
				HRAIN	heavy	rain
				LRAIN	light c	or moderate rain
				LGHAIL	large (2.0 ci	hail n in diameter or larger)
				MEDHAIL	hail (0.5 –	1.9 mm in diameter)
				GRAINS	graup grains	el, small hail or snow c (<0.5 mm in diameter)
				HAILUNK	hail (ı	inknown diameter)
				HSNOW	heavy	snowfall
				LSNOW	light c	or moderate snowfall
				DUST	dust o thereb	r sand raised by the wind, y limiting visibility
				DRY	no pre	ecipitation, dust or sand
11	size of accompanying hail	float	opt	in centimetro within 5 min kilometres di	es (the utes oj istance	e hail should have occurred f the event time and within 3 f of the event)
12	possibilities	word	opt	one or more of the following keyword separated by a comma:		following keywords, ma:
				POSSTORN	ADO	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)
				POSSGUST	NADO	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. (please provide information in event description field 23)
				POSSDEVIL	ı	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. (please provide information in event description field 23)

13	path length	float	opt	in kilometres (in case a damage path was observed)
14	mean path width	float	opt	in metres
15	max. path width	float	opt	in metres
16	direction of movement	word	opt	direction indicated as follows (from-to): N-S NNE-SSW, NE-SW, etc.
17	property damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
18	crop/forest damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity, such as m ³ of wood
19	total damage	word	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
20	number of people injured	integer	opt	
21	number of people killed	integer	opt	
22	event description / types of damage / other remarks	paragr.	opt	

4.4.14 Group SIMPLEPATH - path of phenomenon (opt.)

To indicate paths of tornadoes or lesser whirwinds, this group simplepath can be used.

#	field name	type	status	possible value(s) and description
1	group identifier	word	req	РАТН
2	group length	integer	req	10
3	start latitude	float	req	
4	start longitude	float	req	
5	start hour	2 numb.	opt	hh
6	start minutes	2 numb.	opt	mm
7	end latitude	float	req	
8	end longitude	float	req	
9	end hour	2 numb.	opt	hh
10	end minutes	2 numb.	opt	mm

5 The csv data format

5.1 csv structure

The structure of the *csv* data format is a hierarchy with one level less than the *conventional* format.

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 90 fields separated by the character "|". 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 can not 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.

5.2 *csv* 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
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

5.3 csv field status

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

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.

5.3 csv 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	possił	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	varchar2(3)	req	QC0/ See Aj	QC0/QC0+/QC1/QC2 See Appendix B				
3	INFO_SOURCE	number	req	the su	m of all applica	ble options:			
				1	NWSP	a newspaper			
				2	WWW	a web site			
				4	EMAIL	a report received by e- mail			
				8	TV	a television or radio broadcast			
				16	WXSVC	a weather service			
				32	SPTR	a storm spotter			
				64	LIT	scientific literature			
				128	OLIT	other literature			
				256	EYEWTN	an eyewitness			
				512	DMGEYEWT N	an eyewitness of the damage			
				102 4	EVTPHOTO	a photo or videoof the event			
				204 8	DMGPHOTO	a photo or video of the damage			
				409 6	DMGSVY	a damage survey by a severe weather expert			
4	CONTACT	varchar2(200)	req	name	of the person w	ho submitted the report			
5	E-MAIL	varchar2(50)	req	e-mail address of this person					

6	ORGANISATION	varchar2(255)	opt	name of this person's organization		
7	ORGANISATION _ID	varchar2(255)	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	varchar2(255)	opt	last name the last re	e and organization of person doing evision	
10	TIME_EVENT	date	req	time (UT YYYY-N	C) of the event, formatted as: MM-DD HH:mm:SS	
11	TIME_CREATION	date	req	time (UTC) the report was submitted to the database, formatted as: YYYY-MM-DD HH:mm:SS		
12	TIME_LAST_ REVISION	date	req	time (UTC) of the report's last revision, formatted as: YYYY-MM-DD HH:mm:SS		
13	TIME_ ACCURACY	varchar2(50)	opt	one of the following keywords: keywor the event has occurred d		
				5M	up to 2.5 minutes earlier or later	
				15M	up to 7.5 minutes earlier or later	
				30M	up to 15 minutes earlier or later	
				1H	up to 30 minutesearlier or later	
				3Н	up to 1.5 hours earlier or later	
				6H	up to 3 hours earlier or later	
				12H	up to 6 hours earlier or later	
				1D	up to 12 hours earlier or later	
				GT1D	more than 12 hours earlier or later	
					than specified in fields 3-8.	
14	COUNTRY	varchar2(2)	req	two-char Appendiz	acter country code according to x A	
15	STATE	varchar2(50)	opt	first sub-national administrative division such as province, department, land, autonomous region etc.		

16	PLACE	varchar2(255)	req	name of r observing	nearest town, settlement or g station
17	PLACE_ LOCAL_ LANGUAGE	varchar2(255)	opt	name of nearest town, settlement or observing station in local language, if different from field 16	
18	DETAILED_ LOCATION	varchar(4000)	opt	descriptio	on
19	NEAREST_ CITY	varchar(255)	opt/dep	location i the neares	n words expressed with respect to st larger city
20	LATITUDE	number	req	decimal degrees north latitude (south is negative), e.g. 50.5000 is 50°30'00" N	
21	LONGITUDE	number	req	decimal d negative)	legrees east longitude (west is , e.g12.5000 is 12°30'00" W
22	PLACE_	varchar2(50)	opt	one of the	e following keywords:
	ACCURACY			keywor d	the event has occurred
				1KM	within 1km of the reported location
				3KM	within 3 km of the reported location
				10KM	within 10 km of the reported location
				20KM	within 30 km of the reported location
				100KM	up to 100 km of the reported location
				GT100 KM	possibly more than 100 km away from the reported location
23	OROGRAPHY	number	opt/dep	the sum o	f all applicable options:
				1 flat, a heigh <= 5	lefinition: local terrain t variation <= 50 m 50 m
				2 hilly, heigh 500 n	<i>definition: local terrain</i> <i>it variation > 50 m and <=</i> <i>n</i>
				4 moun terrat	tainous, definition:local in height variation > 500 m
24	SURFACE_	varchar(255)	opt	one of the	e following keywords:
	INITIAL_ LOCATION		(aep)	LAND	land surface <= 50 m

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)				
SWAM P	swamp				
ROCKS	rocks				
URBAN	urban, built-up zone				
FORES T	forest				
ICE	ice (glacier or ice-covered water)				
RIVER	river, canal				
SEA	sea, ocean				
LAKE	lake				

25	SURFACE_
	CROSSED

number

opt (dep)

the sum of all applicable options:							
1	LAND	land surface					
2	WATER	a water surface					
the following options are deprecated:							
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	FORES T	forest
				2048	ICE	ice (glacier or ice-covered water)
				4096	RIVER	river, canal
				8192	SEA	sea, ocean
				1638 4	LAKE	lake
26	TYPE_EVENT	varchar2(255)	req	any of t	he follow	ving keywords:
				AVAL	ANCHE	avalanche
				DEVIL	1	lesser whirlwind
				FUNNI	EL	funnel cloud
				GUSTI	NADO	gust front vortex (gustnado)
				HAIL		severe hailfall
				ICE		icing hazards
				LIGHT	INING	damaging lightning
				PRECI	Р	heavy rainfall
				SNOW		heavy snowfall
				TORN	ADO	tornado or waterspout
				WIND		severe wind gust
27	NO_OBJECTS	number	opt	the nun vicinity When la set for o	iber of ev constrai eft empty, countable	vents occurring within the nts specified in section 2.5. 1 is implied. CAn only be e events.
28	MAX_HAIL_	number	opt	in centi	metres	
	DIAMETER			for ever	nt type H.	AIL only.
29	MAX_	number	opt	in gram	ıs	
	HAILSTONE_ WEIGHT			for ever	it type H.	AIL only.
30	AVERAGE_ HAIL_DIAMETER	number	opt	in centi	metres	

				for event type HAIL only.				
31	THICKNESS_	number	opt	in ce	entimetres			
	HAIL_LAYER			for event type HAIL only.				
32	HAILSTONE	number	opt	the sum of all applicable options:				
				1	AGGR	aggregates formed while in air		
				2	CLEAR	hailstones of clear ice		
				4	CONE	photographs / video footage of the inflicted damage		
				8	OBLATE	hailstones with oblate shape ("squeezed ball")		
				16	POROUS	porous (white ice) hailstones		
				32	RINGS	hailstones contain rings of white and clear ice		
				64	SPIKES	spiky stones		
				for e	event type HAIL	only.		
33	F_SCALE	number	opt	maximum intensity of the event on the Fujita- scale. for DEVIL, GUSTNADO, TORNADO, WIND only.				
34	T_SCALE	number	opt	maximum intensity of the event on the T-scale for DEVIL, GUSTNADO, TORNADO, WIND only.				
35	RATING_BASIS	number	opt	All types of information used for establish the F- or T-scale rating. <i>The sum of all applicable options:</i>				
				1	DMGEYEWTN	an eye-witness report of the inflicted damage		
				2	DMGSVY	a damage survey by a severe weather expert		
				4	DMGPHOTO	photographs / video footage of the inflicted damage		
				8	DMGTEXT	a written account of the damage (e.g. in a newspaper)		
				1	WIND	a measured wind speed		

6

				for DEVIL, GUSTNADO, TORNADO, WIND only.	
36	WIND_SPEED	number	opt	the highest measured wind speed attributable to the reported event in m/s <i>for DEVIL, GUSTNADO, TORNADO, WIN</i> <i>only</i> .	
37	TEN_MIN_ WIND_SPEED	number	opt	the highest measured 10 minute-averaged wind speed during the wind or snowstorm event. for WIND, SNOW only.	
38	FUNNEL_	varchar2(255)	opt	one of the following keywords:	
	SIGHTED			FNLOBS funnel observed	
				NOFNLOBS nofunnel observed	
				for TORNADO only.	
39	SUCTION_	varchar2(255)	opt	one of the following keywords:	
	VORTICES			SVTCSOBS funnel observed	
				NOSVTCSOB nofunnel observed S	
				for TORNADO only.	
40	PRECIPITATION_ AMOUNT	number	opt	precipitation amount or snow water equivalent in mm for PRECIP, ICE, SNOW only.	
41	SNOW_FALL_AMOUNT	number	opt	snow fall amount <i>in cm for event type SNOW only</i>	
42	PEAK_ PRECIPITATION_ AMOUNT	number	opt	precipitation amount or snow water equivalent in peak period in mm for event type PRECIP, SNOW only.	
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 <i>in hours for PRECIP, SNOW only.</i>	
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 am equivalent in mn for PRECIP_SN	nount or snow water n. OW only	
46	MAX_6_HOUR_ SNOW_FALL	number	opt	during the 0-6, 6 interval in which time given is exa the previous 6-h snow fall amoun	5-12, 12-18, or 18-00 UTC h the time given falls. If the actly 00, 06, 12 or 18 UTC, our period is meant. at in cm.	
				for event type S	NOW only.	
47	MAX_12_HOUR_ PRECIP	number	opt	during the 00-12, 12-00 UTC interval i which the time given falls. If the time given exactly 00, or 12 UTC, the previous 12 period is meant. precipitation amount or snow water equivalent in mm. for PRECIP, SNOW only.		
48	MAX_12_HOUR_ SNOW_FALL	number	opt	during the 00-12 which the time g exactly 00, or 12 period is meant snow fall amour	2, 12-00 UTC interval in viven falls. If the time given is 2 UTC, the previous 12-hour tin cm.	
				for event type SN	NOW only.	
49	MAX_24_HOUR_ PRECIP	number	opt	during the 24 hour period in which the given time fall. precipitation amount or snow water equivalent in mm. for PRECIP_SNOW only		
50	MAX_24_HOUR_ SNOW_FALL	number	opt	<i>during the 24 hour period in which the given time fall.</i> snow fall amount <i>in cm</i> .		
				for event type S	NOW only.	
51	CONVECTIVE	varchar(255)	opt	Did the precipite deep moist conv keywords:	ation fall in connection with ection? One of the following	
				CONV	convective	
				PARTLYCONV	partly convective	
				NONCONV	nonconvective	
				UNCERTAIN	uncertain	

				for Pl	RECIP, ICE,	SNOW, WIND only.	
52	TOTAL_ DURATION	number	opt	total e	event duration	n	
				for ev repre. the an	vent type PRE senting the d nount mentio	ECIP, SNOW, ICE in hours, uration of accumulation of med in field 39.	
				for D. TORN	EVIL, FUNN NADO in min	EL, GUSTNADO, utes.	
53	TYPE_PRECIP	number	opt	A accompanying weather phenomena ki to have occurred within 5 minutes of the event time and within 3 kilometres dista of the event location.			
				The st confir occur	um of all app mation that t red, the num	licable options below. As a none of those events ber 256 should be selected:	
				1	HRAIN	heavy rain	
				2	LRAIN	light or moderate rain	
				4	LGHAIL	large hail (2.0 cm in diameter or larger)	
				8	MEDHAIL	hail (0.5 – 1.9 mm in diameter)	
				16	GRAINS	graupel, small hail or snow grains (<0.5 mm in diameter)	
				32	HAILUNK	hail (unknown diameter)	
				64	HSNOW	heavy snowfall	
				128	LSNOW	light or moderate snowfall	
				256	DUST	dust or sand raised by the wind, thereby limiting visibility	
				512	DRY	no precipitation, dust or sand	
				for G	USTNADO, Z	TORNADO, WIND only	
54	SIZE_ ACCOMPANYING_	number	opt	hail d	iameter in cn	n	

	HAIL			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, TOR	NADO, WIND only	
55	POSSIBILITIES	number	opt	Indication of doubts regarding the nature of the event causing wind damage.			
				The	e sum of all applica	ble options:	
				1	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.	
				2	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.	
				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)	
				for valı TO	WIND and for TO ues >= 4 invalid in RNADO.	RNADO only, with the case of	
56	PATH_LENGTH	number	opt	path <i>for</i> TO	h length <i>in km</i> AVALANCHE, DE RNADO and WINI	VIL, GUSTNADO, O only.	
57	MEAN_PATH_ WIDTH	number	opt	mea for TO	an path width <i>in m</i> AVALANCHE, DE RNADO and WINI	VIL, GUSTNADO, O only.	
58	MAX_PATH_ WIDTH	number	opt	max for TO	ximum path width AVALANCHE, DE RNADO and WINL	in m WIL, GUSTNADO, Donly.	

59	MAX_ VERTICAL_ DEVELOP	number	opt	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	varchar(255)	opt	direction of movement or wind direction (fo 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 <i>The sum of all applicable options:</i>			
				1	DRIFT	drifting snow occurred (snow blowing below eye-height), but no blowing snow	
				2	BLOW	blowing snow occurred (snow blowing above eye- height)	
				4	SNDRIFT	a combination of falling and drifting snow, but no blowing snow	
				8	SNBLOW	a combination of falling and blowing snow	
				16	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	opt	mean dunes	height of fr in open area	esh snow cornices or snow s <i>in centimetres</i>	
				for SI	NOW only.		
63	MAX_HEIGHT_ SNOW_CORNICES	number	opt	maxin snow	num height of dunes in ope	f fresh snow cornices or n areas <i>in centimetres</i>	
				for SI	NOW only		

64	ICE_HAZARDS	number	opt	the sum of all applicable options:			
				1 GLAZE	E 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.		
				2 FROST	<i>fuzzy layer of ice crystals on a cold object, forming by direct deposition of water vapor to solid ice</i>		
				4 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 onl	y		
65	THICKNESS_ ICE_COVER	number	opt	in millimetr for ICE onl	res V		
66	THICKNESS_ RIME_COVER	number	opt	in millimetr for ICE onl	res V		
67	AVALANCHE_	varchar(255)	opt	either of the	ese keywords:		
	ТҮРЕ			SLAB	a <u>slab avalanche:</u> 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 <u>loose snow avalanche</u> : 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 AVALA	NCHE only		
68	AVALANCHE_	varchar(255)	opt	either of the	ese keywords:		
	FLOW_TYPE			DENSE	a <u>dense flow avalanche:</u> an avalanche with a primarily flowing, sliding, slipping motion.		
				POWDER	a <u>powder cloud avalanche</u> : an avalanche in which a large fraction of the snow is suspended		

					by turbulence			
				for AVALA	NCHE only			
69	SNOW_MASS_ TYPE	varchar(255)	opt	either of these keywords:				
				DRYSNO W	a <u>wet snow avala</u> an avalanche of typically a slowe higher density	inche: wet snow; r avalanche of		
				WETSNO W	a <u>dry snow avala</u> an avalanche of a typically faster b density than a wa avalanche	u <u>nche</u> : dry snow; ut of lower et snow		
				for AVALA	NCHE only			
70	AVALANCHE_ SIZE	number	opt	avalanche size expressed on the scale of the European Avalanche Warning Services (www.avalanches.org)				
				descript n	tio path length	volume		
				2 small avalanc	50 - 100 m the	$10^2 - 10^3 m^3$		
				3 medium avalanc	100 m - 1 he km	$10^3 - 10^4 m^3$		
				4 large avalanc	1 - 2 km the	$10^4 - 10^5 m^3$		
				5 very lar avalanc	ge ~ 3 km he	$> 10^5 m^3$		
				for AVALA	NCHE only			
71	AVALANCHE_	varchar(255)	opt	either of these keywords:				
	TRIGGER			NATURAL	 release of an ava being triggered being triggered being triggered. 	lanche without ny a person,		
				ARTIFICI AL	release of an ava external force (e. snow machines o people, wildlife).	lanche by an g. explosives, r machinery,		
				for AVALANCHE only				
72	ELEVATION_	number	opt	in metres				
	START			for AVALANCHE only				

73	ELEVATION_ DIFFERENCE	number	opt	height difference between starting point and ending point of the avalanche <i>in metres</i>		
				for A	VALANCHE o	nly
74	LIGHTNING_ DAMAGE_TO	number(6)	opt	All o strike <i>keyw</i>	struck by the lightning of the following d by a comma:	
				1	AIRCRAFT	e.g. an aeroplane or helicopter
				2	ANIMAL	cattle or other large animals
				4	BUILDING	built-up structures
				8	OVERHEAD	overhead lines of transport infrastructure (catenary)
				16	PERSON	persons or groups of persons
				32	POWERLINE	powerline
				64	SHIP	any vessels in water
				12 8	VEGITATIO N	vegitation (i.e. causing wildfires)
				25 6	VEHICLE	any vehicles on land, such as cars, lorries, etc.
				for L	IGHTNING or	ıly
75	PEAK_	number	opt	opt in kA (kiloampere) for LIGHTNING only		
	CURRENT					ıly
76	POLARITY	varchar(255)	opt	polarity of the lightning strike as determined by a lightning detection network		
				eithe	r of these keyw	vords:
				POS	a disc the gr charge	harge between a cloud and ound that lowers positive e to the ground
				NEC	G a discr the gr chargo	harge between a cloud and ound that lowers negative e to the ground
				for L	IGHTNING or	ıly
77	EXCEPT_	varchar(255)	opt	One	or more of the	following keywords:
	ELEC_ PHENOM			BAL	L ball lig	ghtning
				OEI	P other	expectionallightning

phenomenon, explained in field 12

78	PROPERTY_ DAMAGE	varchar(255)	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
79	CROP_ FOREST_ DAMAGE	varchar(255)	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
80	TOTAL_ DAMAGE	varchar(255)	opt	damage expressed in EUR (default unit) or in a specified other currency or quantity
81	NO_INJURED	number(10)	opt	
82	NO_KILLED	number(10)	opt	
83	EVENT_ DESCRIPTION	varchar(4000)	opt	
84	PATH_START_ LATITUDE	number	opt	for AVALANCHE, DEVIL, GUSTNADO, TORNADO, WIND
85	PATH_START_ LONGITUDE	number	opt	for AVALANCHE, DEVIL, GUSTNADO, TORNADO, WIND
86	PATH_START_ DATETIME	time	opt	for AVALANCHE, DEVIL, GUSTNADO, TORNADO, WIND
87	PATH_END_ LATITUDE	number	opt	for AVALANCHE, DEVIL, GUSTNADO, TORNADO, WIND
88	PATH_END_ LONGITUDE	number	opt	for AVALANCHE, DEVIL, GUSTNADO, TORNADO, WIND
89	PATH_END_ DATETIME	time	opt	for AVALANCHE, DEVIL, GUSTNADO, TORNADO, WIND
90	EXT_URL	varchar(4000)	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	CREATOR_ID	varchar(50)	opt	identifier of the creator of the report
92	REVISOR_ID	varchar(50)	opt	identifier of the revisor of the report
93	LINK_ORG	varchar(20)	opt	identifier of the linked (national) database
94	LINK_ID	varchar(20)	opt	field nummer of the associated report in a linked database
95	DELETED	varchar(1)	req	Character indicating whether the report isb deleted.

either of these options:

Y	yes
Ν	по

All retrieved data from the ESWD server not for synchronization purposes should have an "N" here.

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, but does not follow it completely with respect to smaller dependent territories.

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

i) including its North African dependencies

- ii) the Former Yugoslav Republic of Macedonia
- iii) including its European dependencies

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 new and pending quality control	_
QC0+	plausibility checked	The report is plausible, given the overall meteorological situation in, or data from the affected region and timeframe	VON, NHMS or ESSL
QC1	confirmed by reliable source	Only some aspects of the report are still under discussion	VON, NHMS or ESSL
QC2	fully verified	All information available about this event is verified, consistent and comes from reliable sources.	NHMS or ESSL

VON stands for Voluntary Observing Network, 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.