



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**GUIDANCE MATERIAL
ON WINTER CONDITIONS
FOR THE EUROPEAN REGION**

-First Edition-

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PREPARED BY THE EUROPEAN AND NORTH ATLANTIC OFFICE OF ICAO
(main assistance from MET/ATM TF)

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1. INTRODUCTION

1.1 Having identified local user requirements related to MET information on winter conditions provided in some States in the ICAO EUR Region, and the fact that the emergence of bespoke products and services to support such requirements are currently beyond the scope of Annex 3, the Meteorological/Air Traffic Management Task Force (MET/ATM TF) of the ICAO EUR/NAT Regional Office identified that a non-standardized approach could lead to an impediment to the collaborative decision making (CDM) process in its widest sense¹ in the EUR Region at least. Consequently, the MET/ATM TF has considered the need to achieve a certain degree of consistency and coherence between winter weather conditions products and services within EUR Region, that would be beneficial for operators as a first step in an on-going process towards regional (or global) standardization.

1.2 The MET/ATM TF, established in 2009 by the EUR/NAT Regional Office, agreed from the outset to collate current best practices on winter weather conditions products and services amongst States in the ICAO EUR Region and, based on the feedback received, to develop a draft regional guidance material on winter weather conditions products and services.

2. OBJECTIVE

2.1 The objective of this document is to provide regional guidance on winter weather conditions products and services to be used within the EUR Region and to share the best practices. It is envisaged that the provision of appropriate products and services on the winter weather conditions hazards for Air Traffic Control, Airport Operations and Airline Operations should be part of the routine daily tasks of meteorological service providers. These services should be included in the general user requirements based on solid risk management principles analyzed and adopted by the involved stakeholders and not simply a seasonal or temporal activity addressed by the meteorological services providers only and for a limited period of time.

3. SCOPE

3.1 This document is intended to provide regional-specific guidance on products and services related to winter weather conditions which are currently beyond the scope of ICAO Annex 3 – *Meteorological Service for International Air Navigation*, but for which the MET/ATM TF has identified as being of value for winter weather operations in the EUR Region.

3.2 In the context of this document, winter weather conditions is intended to reflect those weather conditions that are likely to be encountered and causing potential safety hazards on the ground in the period between autumn and spring in the northern hemisphere. This is usually linked astronomically to the period extending from the December solstice to the March equinox. However, in northern and/or higher regions of Europe this period could already start in October and extends to April.

¹ CDM in the context of winter conditions has a broader scope than the traditionally considered Airport CDM (A-CDM) only.

3.3 Within the aviation community, the common sense approach of winter weather conditions is mostly understood as being those situations caused by the presence of meteorological phenomena occurring below or near to an air temperature of 3 °C, including snowfall associated with or without strong winds, freezing precipitation, freezing fog, airframe icing and frost on the ground. All conditions that may impact severely Airport, Air Traffic Control and Airline ground operations,

3.4 From a pragmatic point of view, this guidance document mainly focuses on those aspects related to the phenomena commonly associated with winter weather conditions as discussed above. The scope considered for discussing winter weather conditions in the context of this guidance is limited to the terminal area including the runways, taxi ways and aprons; in essence from 'touchdown to takeoff'. With respect to the reporting of weather phenomena, vicinity weather phenomena as defined in Annex 3 are included. En-route weather is not subject to this guidance document.

4. DEFINITIONS

Note 1: *Definitions of terms which are not self-explanatory in that they do not have accepted dictionary meanings are presented below. A definition does not have an independent status but is an essential part of the paragraph of the Guidance Material in which the term is used, since a change in the meaning of the term would affect the provision.*

Note 2: *Most of the definitions and terms used throughout this Guidance Material are taken from the relevant ICAO Annexes, PANS and Manuals (reference to ICAO Docs is indicated in brackets for each term). However, several terms have been defined specifically for this EUR Document and this is indicated by an “*”.*

When the following terms are used in this Guidance Material, they have the following meaning:

Aerodrome control service. Air traffic service for aerodrome traffic.

Aerodrome traffic. All traffic on the maneuvering area of an aerodrome and all aircraft flying in the vicinity of an aerodrome.

Approach control service. Air traffic control service for arriving or departing controlled flights.

Apron. A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fuelling, parking or maintenance.

Controlled airspace. An airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification.

Note.— Controlled airspace is a generic term which covers ATS airspace Classes A, B, C, D and E as described in Annex 11, 2.6.

Control area. A controlled airspace that exists in the vicinity of an airport, extending upwards from a specified limit above the earth.

Runway. A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

Taxiway. A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another

Terminal control area: A control area normally established at the confluence of air traffic service routes in the vicinity of one or more major aerodromes.

*** Winter weather conditions.:** the presence of drizzle (DZ), rain (RA), snow (SN), snow grains (SG), ice pellets (PL), ice crystals (IC), hail (GR) small hail and/or snow pellets (GS), fog (FG), mist (BR) with a reported visibility of 1500m or lower, unidentified precipitation (UP) and combinations thereof, occurring below an air temperature of +3 °C or occurring when the difference between the air temperature and dew-point temperature is less than 3 °C.

5. BACKGROUND

5.1 Historically, Aviation weather services have mainly addressed safety issues. Now, within the context of the future air traffic management (ATM) system, the considerable impact of weather on safety and capacity and efficiency and its potential to mitigate some of the environmental impact of aviation must be considered as well. This includes the appropriate reflections on weather impact at the right stage by the right stakeholder to mitigate efficiently for weather in the pre-tactical phase and on the day of operations.

5.2 To reflect the great importance of weather information integration into the future ATM system and to ensure a framework of shared roles and responsibilities between the MET and ATM communities, the EANPG COG set up a Meteorological /Air Traffic Management Task Force (MET/ATM TF). The MET/ATM TF reports directly to the EANPG COG. The MET/ATM TF is comprised of MET and ATM experts assisted by the ICAO Secretariat, Eurocontrol, the European Commission, the International Air Transport Association and the World Meteorological Organization. The first meeting of the MET/ATM TF was in August 2009.

5.3 As the future ATM system evolves, the demands on MET will require improved or new systems, information and products to support it. It is essential that a strategic plan, a roadmap for change, is established to ensure a harmonized and cost effective European approach to interoperability. The following strategic objectives have been identified for the MET/ATM TF:

- Define the scope, content, quality and timeliness of MET information to support the key enabling objectives of ATM in a cost-effective manner;
- Define standards to ensure the harmonization of MET systems supporting ATM;
- Improve the quality of MET information to respond to the ATM; and
- Improve the provision and use of MET information within the ATM system

In this regard, the MET/ATM TF has developed this European Guidance Material on Winter Conditions.

6. ASSESSMENT OF CURRENT PRACTICE

6.1. ICAO MET/ATM survey

6.1.1 The MET/ATM TF conducted a regional survey in order to identify existing winter weather best practices, products and services, etc amongst States in the EUR Region. The survey was carried out amongst the members of the MET/ATM TF. In addition, Northern European States that are member of the EANPG Meteorology Group (METG) were also invited to give their feedback. It was identified that there existed a number of common themes amongst the best practices, but also a lot of variability. The collected information provided an overview of the current winter weather best practices in Europe.

Note: Aspects such as the use of meteorological information from an Airport, ATC or Airline Operations perspective were not addressed during the survey neither provided as feedback. The majority of feedback provided was from a meteorological service provision perspective. Consequently, the feedback and the assessment of the feedback can only provide a consolidated view on meteorological services and products currently available or planned to support ground winter operations. It will provide no explicit insights in the usability or effectiveness of the services and products per user category (Airport, ATC or Airline).

6.2 Assessment

6.2.1 Questions of the survey

- types of phenomenon and situations considered to stand for winter conditions in your State;
- types of dedicated products/services to support winter weather operations issued on a regular basis or on request;
- types of warnings issued for observed or forecast winter conditions;
- airspace addressed for depicting winter conditions (e.g. aerodrome, terminal, en-route);
- runway/apron state winter conditions (other than those included in runway state group in METAR);
- critical thresholds of winter conditions considered within the products/services provided;
- ways of distribution and display of the weather information on the winter conditions;
- planned future developments; and
- any other aspects you may consider related to the products/services dedicated to the winter conditions observed/forecast in your State.

6.3 Results

6.3.1 Taking into account the type of phenomenon and situations considered as winter conditions, the current practices in most of the States in the EUR Region revealed the following. There were some common winter phenomena and situations considered by most States, such as: snowfall associated with or without strong winds, freezing precipitation, freezing fog, slippery conditions (due to ice deposit on runways, platform and taxi), temperature changes below and above the melting point (0 °C threshold)². Some States made differences between the origin of the winter precipitation, such as whether frontal or convective in origin, whilst other States made a difference between different types of ice deposit such as rime, glaze, frost or hoarfrost. From an operational point of view, freezing rain and rain falling on a frozen ground have the same detrimental effect on airport operations. Few countries make difference between the two situations when reporting or forecast slippery conditions.

6.3.2 In spite of the fact that the types of dedicated products to support winter weather operations cover mostly the same weather phenomena and situations, there are some differences in terms of services provided, as follow. The types of products/services reflects more the answer to national requirements than the alignment with some specific international standards or recommended practices. Real-time runway surface observations (surface runway temperature, runway state) are done regularly by most of the States and they are further used to forecast specific parameters depicting slippery runway conditions. Some States have developed mature systems dedicated to winter weather conditions, whilst others have limited only to the ICAO Annex 3 requirements. Depending on regional location, some States offer winter conditions products/ services seasonally (usually from October until the following April) whilst for other States these are part of the daily routine practice as regular weather depiction or as warnings.

6.3.3 There was a quite common practice amongst the States in the EUR Region to forecast winter conditions with high accuracy, from 1 to 7 hours in advance of the event, with an acceptable accuracy for the next 24 hours and an outlook for the following 2 to 5 days. The issuance time of the winter conditions forecasts varied from once per day, usually issued around the midday, up to three times per day; in the majority of cases they were produced during daytime only. Oral regular briefings on the expected winter conditions are quite common in States in the EUR Region and they are addressed mainly to the Airport administration and ATS.

6.3.4 At present there appeared no common practice among the questioned States relating to issuing dedicated winter conditions warnings, with the situation varying from one State to another, with the following aspects. For safety reasons, alerts on winter conditions risks, either as dedicated warnings or warnings encapsulated in routine products were issued by all States, as observed or as forecast products. For the most impacting weather situations, warnings were issued mostly in abbreviated plain language, from 1 hour up to 3 or 4 hours in advance, as briefing (telephone, teleconference. or videoconference) or special messages distributed via telecommunication network (web site, mail or fax.). The imminence of some significant events, such as the start or cessation of snowfall, the falling of the temperature to or below freezing level, freezing rain, etc., are routinely considered by some States.

² The EUROCONTROL Performance Review Unit identified in their work on ATM Airport Performance (ATMAP) that at least 20 major European airports use a threshold of 3°C.

6.3.5 As noted earlier, the survey and feedback mainly addresses the meteorological service provision aspects. From an ATM/Airport perspective, the EUROCONTROL Performance Review Unit (PRU) ATM Airport Performance (ATMAP) activity provides a framework to establish baseline thresholds for warning from a user perspective.

6.3.6 The airspace addressed for reporting winter conditions and associated alerts, varied from the limited area of an aerodrome to the whole flight information region (FIR). The common aspects, as well as the differences, refer to the following issues. By default, the aerodrome area, including runways, taxiways and aprons have been addressed by all the States in reporting observed or forecast winter conditions hazards. A number of States took into account not only the ground conditions within the aerodrome, but also the areas for which terminal and approach control services are provided.

6.3.7 The current provisions of ICAO Annex 3 appeared capable to define the addressed areas for depicting the winter conditions, either as tailored areas within the associated FIR (for GAMET and AIRMET) or as the whole FIR (for SIGMET). The low level significant weather chart was implemented by many States to provide weather information specific to winter conditions.

6.3.8 In spite of the fact that for the runway/apron state the responsibility to make appropriate measurements in the majority of cases belongs to the Airport Operator, it is worthwhile to mention some other aspects of interest. On some aerodromes, measurements on surface temperature, freezing point temperature and deposits (including damp, wet or snow deposits) are performed. This is used by the meteorological service provider as an input for more sophisticated algorithms to forecast the runway and taxiway (slippery) conditions. For the time being however, no other concern related to the runway/apron state beyond the abovementioned was envisaged for consideration by meteorological services providers.

6.3.9 The critical thresholds used by most of the States in EUR Region for reporting the winter conditions refer to:

- the onset or the cessation of snowfall associated or not with strong winds (blowing snow), as well as the onset of frost or freezing precipitation;
- qualitative thresholds (associated sometimes with quantitative thresholds) such as: light, moderate or heavy (e.g. for snowfall);
- quantitative thresholds such as: the falling of the air temperature and its passing through a critical value (usually 0° C), snow amount expressed in cm/hour or cm/6 hour, duration of precipitation event;
- due to the lack of agreed standards or conventions, the values associated with different quantitative critical thresholds for winter conditions vary from State to State; and
- occasionally the occurrence of a forecast winter conditions event was associated with a risk probability (PROB), usually expressed in terms of PROB 40%, 60% or 80%.

6.3.10 However, due consideration could be given to the earlier mentioned ATMAP initiative to include already a consolidated users perspective in defining thresholds for products in support of winter operations.

6.3.11 There are a numerous means used by the States to distribute and display the weather information on winter conditions. In most of the cases, these means reflect the needs of the local users which may be differentiated as follows: Internet website interfaces with dedicated application for winter conditions display are quite common in the majority of the States. Usually the ATC units benefit from direct links with the meteorologists or expert systems via ATN or FTP, with the facility to access the data of interest by different means, such as fax, e-mail and telephone. Videoconference means still proves its usefulness, taking the benefit from the eye-to-eye contact, especially during the routine briefings or on request.

6.3.12 Future developments on winter conditions planned by some States refer mainly to an establishment of collaborative decision making (CDM) portals for all the stakeholders involved in flight operations, containing also winter conditions alerts facilities. Extensive use of the colour codes in graphical display of the winter conditions alerts was planned by different States and the adopting of specific products/ services scheme for the winter conditions hazards, based on the time horizon event approach, from the imminence of the event up to 10 days ahead.

6.3.13 Other aspects reported by the States may be well included under the future development, not as planned ones, but as real potential to improve the services related to the winter conditions. Most of the States recognized the fact that there were many opportunities for improvements, taking into account both the development of the technology and the performances achieved in the NWP domain. There is a general concern for the following future themes:

- site focused expert systems, based on the input data provided automatically by specific sensors;
- the use of fully automated provision of winter conditions alerts implied the need for a risk assessment, and particularly, in a more general context, for issuing AUTO – METAR;
- for the most severe winter conditions, it is emphasized the importance of the forecaster in the CDM loop, taking into account the difficulty in predicting accurately the extreme events, which are the most impacting for flight operations;
- depending on the administrative structure of meteorological service providers in different States, there was a high potential for adding value to the winter conditions products/ services for aviation using the data provided by the national road sensors network; and
- more and more, the State envisaged that the winter conditions products/ services be part of the routine weather assistance offered to aviation, rather than a seasonal preoccupation.

6.4 Best practices relating to winter weather condition products and services

6.4.1 The MET/ATM TF collated existing best practices of winter weather conditions graphical products and services amongst the members of the MET/ATM TF developed by meteorological service provider in consultation with local users. Most graphic products included a forecast temperature diagram and well-chosen weather phenomena for the time were quite common. Differences appeared in the graphical conversion of the meteorological information and in the timely update rate. Additional web-based products were, for example, weather radar plots, satellite images and probabilistic forecasts for snow and freezing rain.

6.4.2 Examples of web based graphic products of winter services are shown below for the airports of

- Oslo Airport Gardermoen and Tromsø Airport Langnes (Norway);
- Schiphol (Netherlands); and
- Hamburg (Germany).

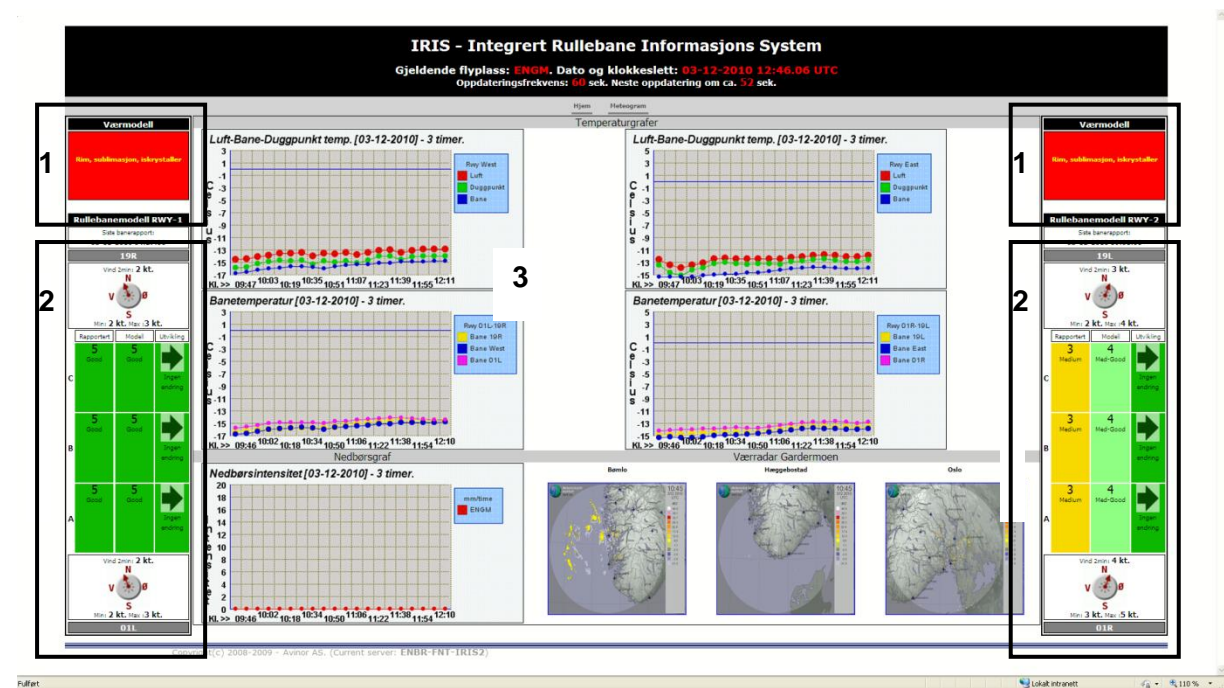


Figure 1 - The IRIS system displaying the weather and runway conditions at Oslo Airport Gardermoen

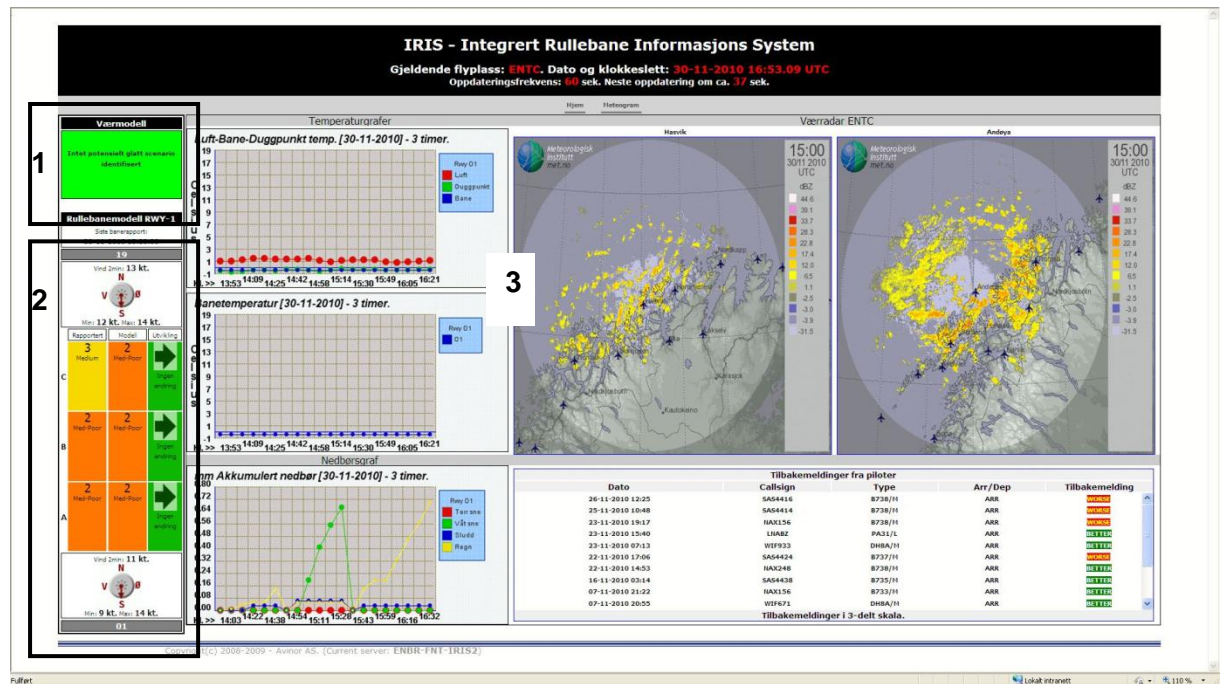


Figure 2 - The IRIS system displaying the weather and runway conditions at Tromsø Airport Langnes

Winter weather forecast for Schiphol



KNMI Schiphol Gladheidsverwachting																
dinsdag 07 december 2010																
	dinsdag										woensdag					
Lokale tijd	16	17	18	19	20	21	22	23	00	01	02	03	04	05	06	07
Temperatuur <= 2 °C (kans in %)	90	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Temperatuur < 0 °C (kans in %)	50	70	80	80	80	80	80	85	90	90	90	90	90	90	90	90
Regen (kans in %)																
Sneeuw (kans in %)	5	5	5	5	5	5	5	5	0	0	0	0	0	0	0	0
IJzel (kans in %)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hagel (kans in %)																
Bevriezen van natte weggedeelten (kans in %)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aanvriezen/Rijp (kans in %)	5	10	10	15	15	15	15	15	10	10	10	5	5	5	5	5
									licht		matig			zwaar		
Intensiteit van de sneeuwval en/of ijzel									x							
Toelichting/opmerkingen:																
Opsteltijd: 12:30 lt (verwachting wordt niet bewaakt)																



KNMI PROBABILITY FORECAST SCHIPHOL Tuesday 07 December 14 UTC till Wednesday 08 December 18 UTC

	14	15	16	17	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08
Visibility < 5 km and/or ceiling < 1000 ft (%)	60	80	80	80	80	80	80	80	70	65	50	35	20	15	10				
RVR < 1500 m and/or ceiling < 300 ft (%)	45	55	55	55	55	55	55	55	40	30	20	10	0	0	0				
RVR < 950 m and/or ceiling < 200 ft (%)	10	15	20	20	20	20	20	20	15	10	5	0	0	0	0				
RVR < 350 m (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Wind direction (deg)	030	040	050	050	060	060	060	060	050	050	040	030	020	020	350				
Wind speed (kt)	5	6	6	7	7	8	8	8	8	9	8	9	10	8	6				
Gusts (kt)															15				
Standard deviation wind direction (deg)	20	20	20	15	15	10	15	10	20	20	20	15	20	25	35				
Standard deviation wind speed (kt)	2	1	1	2	2	2	2	2	2	2	1	2	3	3	3				
CB (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Thunderstorm (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Temperature (°C)	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	0	1				
Dewpoint (°C)	-3	-4	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-2	-2	-2				
Snow (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Moderate or heavy snow (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Freezing rain (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

Remarks	Short term	Long term
Visibility and ceiling		Due to VES and CLD
Wind		
Temperature/dewpoint		
Precipitation		
CB in FIR		Increasing risk of ice/cont CB over North Sea in NW part FIR, tops around FL250. Wednesday afternoon move S to Dutch coast.

Last update: short term 12:54 UTC, long term 11:26 UTC



DWD (Germany) Web Winter Service for international Airports (hourly updated)

Winterdienst Hamburg - Windows Internet Explorer

http://www.deutscher-wetterdienst.de/gsb/nord/winterdienst_ch.htm

Meteorological Airport Briefing - LBZ Nord

Deutscher Wetterdienst

Winterdienst Vorhersage EDDH Airport Mittwoch, 05.01.2011 11:36 UTC

letzte Aktualisierung: 05.01.2011 11:38 UTC

Druckversion SW
Druckversion farbig

MAB Berichte
- EDDH
- EDHI
- EDDW
- EDDV

Winterdienst
- EDDH
- EDHI
- EDDW
- EDDV

Analyse Boden

Modell Wetter

RADAR
- Deutschland
- Hamburg
- Hannover
- Emden
- Berlin

KONRAD
- Hamburg
- Hannover
- Emden
- Berlin

Blitzkarte

Wetterentwicklung

Zunächst fließt mit einer südlichen Strömung bodennah feuchte Kaltluft ein. In der Nacht greift von Südwesten ein Frontensystem auf Norddeutschland über und führt milde und wolkenreiche Luft mit sich.

Extremtemperaturen

Lufttemperatur (2 m) Mittwoch bis 18 Uhr UTC Max -1 °C Min -3 °C
In der Nacht von Mi auf Do Max 0 °C Min -4 °C

Belagstemperatur Mittwoch bis 18 Uhr UTC Max -1 °C Min -3 °C
In der Nacht von Mi auf Do Max 0 °C Min -4 °C

Besondere Hinweise

Gefrierende Niederschläge: 2. Nachthälfte zu Donnerstag

Reifablagerungen auf:

- Flugbetriebsflächen: keine
- Luftfahrzeugen: keine

Winterdienst Hamburg - Windows Internet Explorer

http://www.deutscher-wetterdienst.de/gsb/nord/winterdienst_ch.htm

Reifablagerungen auf:

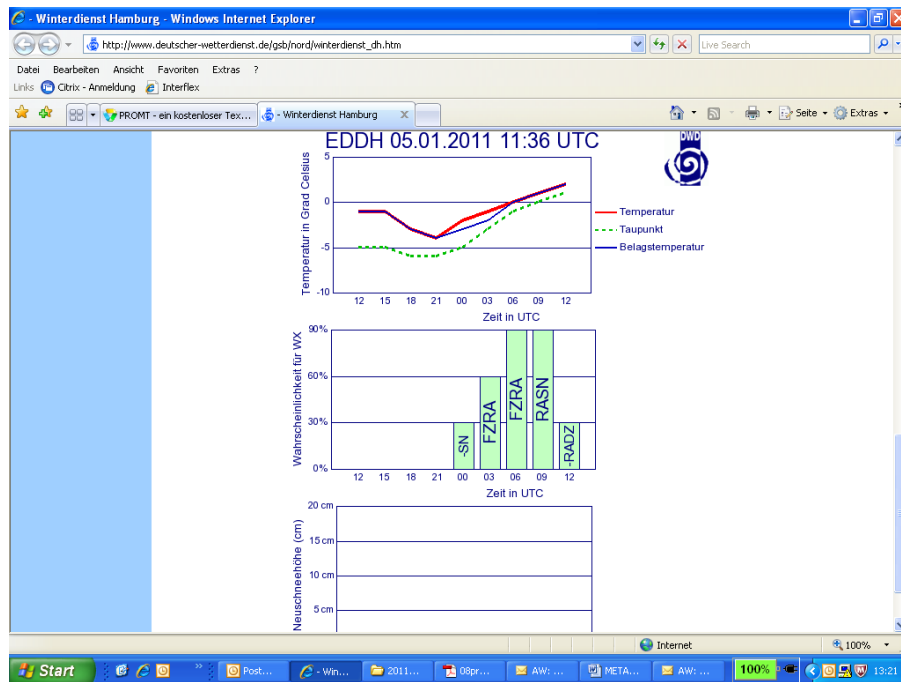
- Flugbetriebsflächen: keine
- Luftfahrzeugen: keine

Bildung einer Schneedecke: keine

Überfrierende Nässe: keine

Vorhersage für EDDH	MI	MI	MI	MI	DO	DO	DO	DO	DO
Uhrzeit (UTC)	12	15	18	21	00	03	06	09	12
Windrichtung (Grad)	170	170	160	140	160	180	190	200	210
Windgeschwindigkeit (kt)	10	8	8	8	10	10	10	11	11
Böen > 25 kt									
Wettererscheinung					-SH	FZRA	FZRA	RASN	-RADZ
Eintreffwahrscheinlichkeit					30	60	90	90	30
Temperatur (°C in 2 m)	-1	-1	-3	-4	-2	-1	0	1	2
Taupunkt (°C in 2 m)	-5	-5	-6	-6	-5	-3	-1	0	1
Temp. am Boden (°C in 5 cm)	-1	-2	-4	-5	-3	-1	0	1	1
Belagstemperatur (°C)	-1	-1	-3	-4	-3	-2	0	1	2
Neuschneemenge (cm)	--	--	--	--	<1	--	--	--	--
0-Grad Grenze (hft AGL)	SFC	SFC	SFC	SFC	SFC	SFC/3/30	30	10/20	10/25

EDDH 05.01.2011 11:36 UTC



6.5 Commonly defined thresholds for the assessment of winter weather conditions at 20 major European Airports

6.5.1 The EUROCONTROL Performance Review Unit developed in their work on ATM Airport Performance (ATMAP) together with stakeholders representing 20 major European airports including airlines and ATC providers, an uniform assessment methodology to establish a gradation of the weather during the day of operation between 06h00 and 22h00 (both local time).

6.5.2 The developed algorithm evaluates the weather from METAR reports and classifies the weather in 5 different categories (wind, visibility, dangerous phenomena, precipitations and freezing conditions). The 'freezing conditions' category is reflecting 'winter weather conditions' with a potential impact on operations.

6.5.3 The main criteria to assess the winter weather conditions are temperature (threshold: 3°C) and visible moisture impact on operations as presented in the table below. Depending on the reported temperature and reported phenomenon a gradation is attributed, the so-called 'freezing conditions code'. The lower the number of the code, the lower the anticipated impact on operation is.

6.5.4 More info is available at:

http://www.eurocontrol.int/prc/public/standard_page/doc_reports_airports.html

Freezing conditions Code	Temperature [°C]	Moisture presence	True Temperature & Dew Point [°C]
Code 1	T > 3	NO visible moisture	
	T > 3	visible moisture	

Code 2	$-15 < T \leq 3$	NO visible moisture	TT - DP ≥ 3
Code 3	$-15 < T \leq 3$	DZ, IC, RA, UP, FG, GR, GS, PL	TT - DP < 3
Code 4	$-15 < T \leq 3$	-SN, SG, +RA, RASN, BR	
Code 5	$-15 < T \leq 3$	SN, +SN, SHSN, FZxxx	
	$T \leq -15$	visible moisture	

Table: Freezing conditions category classification

7. Current ICAO provisions on winter conditions (selected text)

7.1 ICAO Provisions

7.1.1 The depiction of winter conditions in terms of the associated weather phenomena (observations, forecasts and/or warnings), as well their impact on aerodrome operations, is reflected in the following ICAO provisions:

- **Annex 3 - Meteorological Service for International Air Navigation:** contains meteorological standards and recommended practices (SARPs) applicable at the global level and subject to regional air navigation agreement;
- **Annex 15 – Aeronautical Information Services:** contains information notifying the presence of removal of hazardous conditions due to snow, slush, ice and standing water on the movement area within an aerodrome/heliport and removal operations;
- **ICAO Doc 8896 – Manual of Aeronautical Meteorological Practice:** contains guidance designed to meet the needs of operational aeronautical meteorologists, particularly those at the working level, as well as the needs of pilots and other aeronautical personnel. The material is based primarily on Annex 3, summarized and enlarged upon, when necessary;
- **EUR ANP, Volume I (Basic ANP) Part VI (MET):** contains elements of the existing planning system, the basic planning principles, operational requirements and planning criteria related to Meteorological Service for International Air Navigation (MET) as developed for the EUR Region;
- **EUR ANP, Volume II, Facilities and Services Implementation Document (FASID) Part VI (MET):** contains a detailed description/list of the facilities and/or services to be provided by States in order to fulfill the requirements of the Basic ANP; and
- **European (EUR) Regional Supplementary Procedures (Doc 7030), Chapter 12 – Meteorology:** complements the statement of requirements for facilities and services contained in the ANP publications with that procedural part to meet those needs which are not covered in the worldwide provisions.

Note: The ICAO documents above implicitly capture technical specifications published by the World Meteorological Organization

7.1.2 The following issues have been considered for winter weather conditions:

- reporting the present weather³ in METAR, SPECI and local reports (routine and special reports);
- runway state information;
- forecasting winter conditions in TAF, take-off and landing forecast; and
- aerodrome warnings.

³ Present weather as prescribed by ICAO Annex 3 §4.6.4 (17th edition); this required reporting practice on weather phenomena incorporates implicitly aspects such as air temperature and surface wind speed by the inclusion of so-called characteristics of the present weather phenomena, i.e. freezing (FZ), blowing (BL), low drifting (DR).

7.2 Reporting present weather associated with the winter conditions

7.2.1 In accordance with the **ICAO Annex 3 – Meteorological Service for International Air Navigation**, the requirements for reporting present weather related to winter conditions in METAR and SPECI messages, as well as in local reports are expressed as Standards (*shall*) or as Recommendations (*should*). From the entire set of requirements contained in the ICAO documentation for reporting the present weather, for the scope of this guidance, only those requirements covering for winter weather conditions have been considered in this document. These are outlined below.

7.2.2 As a minimum, the following weather phenomena *shall* be identified and reported: **precipitation (and its intensity)**, **freezing precipitation (and its intensity)**, **freezing fog**. (paragraph 4.6.4.1, Annex 3 refers).

7.2.3 In reporting the present weather, the following rules should be applied:

- in local reports present weather information *should* be representative of conditions at the aerodrome (paragraph 4.6.4.2, Annex 3); present weather information in METAR and SPECI *should* be representative of conditions at the aerodrome and, for certain specified present weather phenomena, in its vicinity (paragraph 4.6.4.3, Annex 3);
- in local reports, present weather phenomena *shall* be reported in terms of type and characteristics and qualified with respect to intensity, as appropriate (paragraph 4.4.2.1 of Appendix 3, Annex 3); and
- in METAR and SPECI, present weather phenomena *shall* be reported in terms of type and characteristics and are qualified with respect to intensity or proximity to the aerodrome, as appropriate (paragraph 4.4.2.2 of Appendix 3, Annex 3)

The *types* of present weather phenomena of significance to aviation, their respective abbreviations and relevant criteria for their reporting are given in **Table 1** of this document.

The *characteristics* of present weather phenomena that are reported, as necessary, and their respective abbreviations are given in **Table 2**.

The relevant *intensity* and, as appropriate, the *proximity* to the aerodrome of reported present weather phenomena are indicated in **Table 3**. The proximity indicator is used only in METAR.

7.2.4 One or more, up to a maximum of three, of the present weather abbreviations given in Tables 1 and 2 *shall* be used, as necessary, together with an indication, where appropriate, of the characteristics and intensity or proximity to the aerodrome, so as to convey a complete description of the present weather at or near the aerodrome of significance to flight operations. (pct. 4.4.2.8 – App.3, Annex 3). Additional criteria for the reporting of present weather phenomena are in **Table 4**.

Table 1: Types of present weather phenomena of significance to aviation, possibly associated with winter weather conditions (excerpt from Table 2-5, ICAO Doc 8896)

Type	Phenomenon	Abbreviation*	Remarks
Precipitation	Freezing Drizzle	FZDZ	Supercooled water precipitation
	Freezing Rain	FZRA	Supercooled water precipitation
	Snow	SN	
	Snow grains	SG	
	Ice pellets	PL	
	Ice crystals (very small ice crystals in suspension, also known as diamond dust)	IC	Reported only when associated visibility is 5 000 m or less
	Hail	GR	Reported when diameter of largest hailstones is 5 mm or more
	Small hail and/or snow pellets	GS	Reported when diameter of largest hailstones is less than 5 mm
	Unknown precipitation	UP	Reported for unidentified precipitation only when automatic observing systems are used
	Freezing Fog	FZFG	Reported when visibility is less than 1000 m, except when qualified by "MI", "BC", "PR" or "VC" Supercooled water droplets

* Used in both local reports and METAR and SPECI.

Table 2: Characteristics of present weather phenomena of significance to aviation, possibly associated with winter weather conditions (excerpt from Table 2-6, ICAO Doc 8896)

Characteristic	Abbreviation*	Remarks
Shower	SH	Used to report showers of rain "SHRA, of snow "SHSN", ice pellets "SHPL", hail "SHGR", small hail and/or snow pellets "SHGS", or combinations thereof, for example, "SHRASN". In METAR, showers observed in the vicinity of the aerodrome should be reported as "VCSH" without qualification regarding type or intensity of precipitation.
Blowing	BL	Used to report SN raised by the wind to a height of 2 m (6 ft) or more above the ground.
Low drifting	DR	Used with SN raised by the wind to less than 2 m (6 ft) above ground level.
Shallow	MI	If used (with fog), no other characteristic is permitted (e.g. FZ)
Patches	BC	Fog patches randomly covering the aerodrome, without mentioning if it is FZ or not
Partial	PR	A substantial part of the aerodrome covered by fog while the remainder is clear; without mentioning if it is FZ or not

* Used in both local reports and METAR.

Table 3: Intensity/proximity of present weather phenomena of significance to aviation, possibly associated with winter weather conditions (excerpt from Table 2-7, ICAO Doc 8896)

<i>Intensity/proximity</i>	<i>Local routine reports</i>	<i>METAR</i>
Light	FBL	-
Moderate	MOD	(no indication)
Heavy used only with: DZ, GR, GS, PL, RA, SG and SN (or in combinations involving these present weather types; in these cases, intensity refers to precipitation)	HVY	+
Vicinity between approximately 8 and 16 km of the aerodrome reference point and used only in METAR with FG, SH, BLSN, when not reported under the characteristics of the present weather phenomena	not used	VC

Table 4: Additional criteria for the reporting of present weather phenomena (excerpt from Table 2-8, ICAO Doc 8896)

<i>Conditions</i>	<i>Local routine reports</i>	<i>METAR</i>
More than one present weather phenomena occurring	Up to a maximum of three phenomena together with an indication, as appropriate of their characteristics and intensity	Up to a maximum of three phenomena together with an indication, as appropriate of their characteristics and intensity or proximity to the aerodrome
Indication of the intensity and characteristics of the present weather phenomena required	Report the present weather in the following order: 1. its intensity; 2. its characteristics; and 3. the present weather phenomenon e.g. "HVY TSRA" (in local reports) and "+TSRA" (in METAR)	
Indication of the proximity of the present weather phenomena required	Do not report	Report the present weather in the following order: 1. its proximity; and 2. the present weather phenomenon e.g. "VCFG" (METAR only)
Two different types of weather phenomena observed	Report in two separate groups	
	The intensity indicator refers to the present weather phenomenon which follows the indicator e.g. "HVY DZ FG": the qualifier "HVY" refers to drizzle	The intensity or proximity indicator refers to the present weather phenomenon which follows the indicator. e.g. "+DZ FG"; the qualifier

<i>Conditions</i>	<i>Local routine reports</i>	<i>METAR</i>
		“HVY” refers to drizzle “DZ VCFG”: the qualifier “VC” refers to fog
Different types of precipitation occurring	Report as one single group in the following order: 1. intensity qualifier referring to the intensity of the total precipitation 2. dominant type of precipitation 3. secondary type of precipitation e.g. “HVY TSRASN” or “FBL SNRA FG” (in local reports) “+TSRASN” or “-SNRA FG” (in METAR)	

7.2.5 Criteria for issuing SPECI for winter conditions weather events:

SPECI shall be issued in accordance with the following criteria:

- when the onset, cessation or change in intensity of any of the following weather phenomena or combinations thereof occurs: **freezing precipitation, moderate or heavy precipitation (including showers thereof), thunderstorm (with precipitation)**;
- when the onset or cessation of any of the following winter weather conditions: **freezing fog**,
(paragraph 2.3.2, Annex 3)

SPECI should be issued in accordance with the following criteria:

- when the onset or cessation of any of the following weather phenomena or combinations thereof occurs: **ice crystals, freezing fog, low drifting snow, blowing snow**.
(paragraph 2.3.3, Annex 3)

7.2.6 Supplementary information on winter weather conditions (extracted from Annex 3 and Doc. 8896)

- In local routine and special reports, METAR and SPECI supplementary information should include information on recent weather, as given in **Table 5**, observed at the aerodrome during the period since the last issued routine report or last hour, whichever is the shorter, but not at the time of observation, as:

- **freezing precipitation**
- **moderate or heavy precipitation (including showers thereof)**
- **blowing snow**

Up to three groups of recent weather information selected from **Table 5** should be included in these reports. (paragraph 4.8.1.1 of Appendix 3, Annex 3)

- In local routine and special reports, the following significant meteorological winter conditions, or combinations thereof, should be reported in supplementary information:

- moderate or severe icing
- freezing precipitation
- blowing snow

- The location of the condition *should* be indicated. Where necessary, additional information should be included using abbreviated plain language (paragraph 4.8.1.2 of Appendix 3, Annex 3)

- Local reports *should* also include available supplementary information on significant meteorological conditions, particularly those in the approach or climb-out area (paragraph 4.6.8, Annex 3). The abbreviations in **Table 6** *should* be used in reporting this supplementary information (paragraph 4.8.1.1 of Appendix 3, Annex 3)

Note.— Observations of supplementary information, in particular the conditions relating to the occurrence of icing, turbulence and, to a large extent, wind shear, should be derived from aircraft observations during the approach and climb-out phases of flights. (For details concerning aircraft observations and air-reports, see Chapter 4 – Annex 3)

Table 5:
Abbreviations to be used in reporting recent weather phenomena in local reports and METAR
(excerpt from Table 2-9, ICAo Doc 8896)

Abreviation	Phenomenon/Decode
REFZDZ	Recent freezing drizzle
REFZRA	Recent freezing rain
RESN	Recent snow (moderate or heavy)
RERASN	Recent rain and snow (moderate or heavy)
RESG	Recent snow grains (moderate or heavy)
REPL	Recent ice pellets (moderate or heavy)
RESHSN	Recent snow showers (moderate or heavy)
RESHGS	Recent showers of small hail and/or snow pellets
REBLSN	(moderate or heavy)
RETSSN	Recent blowing snow
RETSGR	Recent thunderstorm with snow
REUP	Recent thunderstorm with small hail
REFZUP	Recent unidentified precipitation (only when automatic observing systems are used)
REFZUP	Recent freezing rain with unidentified precipitation
REFZUP	(only when automatic observing systems are used)
REFZUP	Recent thunderstorm with unidentified precipitation
REFZUP	(only when automatic observing systems are used)
REFZUP	Recent showers of unidentified precipitation
REFZUP	(only when automatic observing systems are used)

Table 6:
Supplementary information for inclusion in local reports (excerpt from Table 2-10, ICAO Doc 8896)

Abreviation	Condition/Decode
MOD ICE	Moderate icing
SEV ICE	Severe icing
FZDZ	Freezing drizzle
FZRA	Freezing rain
BLSN	Blowing snow
b) Location	b) Location
IN APPCH	In the approach
IN CLIMB-OUT	In the climb-out
RWY	Runway
Note.— Additional information may be included using abbreviated plain language.	Note.— Additional information may be included using abbreviated plain language.

7.2.7 Runway state

7.2.7.1 When required, information on the state of the runway should be included as supplementary information in all METAR and SPECI (paragraph 4.8.1.5 of Appendix 3, Annex 3; and EUR ANP, VOLUME I, BASIC ANP, PART VI – METEOROLOGY, paragraph 10).

7.2.7.2 Reporting of runway state information (extracted from EUR ANP, VOLUME II, FASID, PART III - AERODROME OPERATIONAL PLANNING (AOP), Attachment A) Information on the runway state at aerodromes that are used regularly by scheduled air services and that are closed at night or do not have night operations, should be promulgated as follows:

- a) whenever snowfall or freezing conditions are forecast or have been observed, the aerodrome meteorological office concerned should advise the airport operator in sufficient time so as to permit the promulgation of appropriate information on the runway state at least two hours before the aerodrome reopens;
- b) when such conditions exist, appropriate information on the runway state should be promulgated two hours before the aerodrome is reopened for operations; and
- c) information issued in accordance with b) above should be updated immediately, if this is required in view of rapidly changing conditions.

7.2.7.3 Runway state information

- a) Information on runway conditions from all aerodromes should be disseminated in a ten-figure code group over the EUR RODEX (European Regional OPMET Data Exchange) system after the routine meteorological message. For parallel runways, this ten-figure code group will be supplemented by an additional character L, C or R (**Note:** as described in the Attachment A of the Guidance); and
- b) Information on runway conditions should be expressed by means of the figure group addressing the following items: **the runway designator**,

the runway deposits, the extent of runway contamination, the depth of deposit and the friction coefficient or braking action.

7.2.8 SNOWTAM

7.2.8.1 Information concerning snow, slush, ice and standing water on aerodrome/heliport pavements shall, when reported by means of a SNOWTAM, contain the information in the order shown in the SNOWTAM Format in Appendix 2, Annex 15 (paragraph 5.2.3, Annex 15). A SNOWTAM is a special series NOTAM notifying the presence or removal of the above mentioned hazardous conditions by means of a specific format.

7.2.8.2 The type of deposits over the total runway length considered, when reported by means of a SNOWTAM, is: clear and dry, damp, wet or wet patches, rime or frost covered (depth normally less than 1 mm), dry snow, wet snow, slush, ice, compacted or rolled snow, frozen ruts or ridges (App. 2, Annex 15).

Note: Detailed definitions of the various types of snow on the ground, namely slush, dry snow, wet snow and compacted snow, when reported by a SNOWTAM, are given in the Appendix 2 of Annex 15.

7.2.8.3 If present, the height and the distance from the edge of the runway of critical snow banks are also reported by a SNOWTAM (Appendix 2, Annex 15).

7.3 Forecast on winter conditions

7.3.1 With reference to TAF, one or more, up to a maximum of three, of the following weather phenomena or combinations thereof, together with their characteristics and, where appropriate, intensity, shall be forecast if they are expected to occur at the aerodrome:

- freezing precipitation
- freezing fog
- moderate or heavy precipitation (including showers thereof)
- low drifting snow
- blowing snow
- thunderstorm (with or without precipitation)
- other weather phenomena given in paragraph 4.4.2.3 of Appendix 3, Annex 3, as agreed by the meteorological authority with the ATS authority and operators concerned (paragraph 1.2.3 of Appendix 5, Annex 3)

7.3.2 The forecast maximum and minimum temperature together with their respective dates and times of occurrence should be included in the 24 and 30-hour TAF for certain aerodromes as agreed between the meteorological authority and the operators concerned (extracted from EUR ANP, VOLUME I, BASIC ANP, PART VI – METEOROLOGY, paragraph 16).

7.3.3 The criteria used for the inclusion of change groups in TAF or for the amendment of TAF shall be based on any of the following weather phenomena or combinations thereof being forecast to begin or end or change in intensity:

- freezing precipitation

- moderate or heavy precipitation (including showers)
- thunderstorm (with precipitation) (paragraph 1.3.1 of Appendix 5, Annex 3)

7.3.4 The criteria used for the inclusion of change groups in TAF or for the amendment of TAF when any of the following weather phenomena or combinations thereof are forecast to begin or end should be based on the following:

- ice crystals
- freezing fog
- low drifting snow
- blowing snow
- thunderstorms (without precipitation)
(paragraph 1.3.2 of Appendix 5, Annex 3)

7.3.5 Landing forecast

7.3.5.1 A **landing forecast** shall be prepared by the meteorological office designated by the meteorological authority concerned as determined by regional air navigation agreement; such forecasts are intended to meet the requirements of local users and of aircraft within about one hour flying time from the aerodrome (paragraph 6.3.1, Annex 3).

7.3.5.2 Landing forecasts shall be prepared in the form of a **trend forecast** (paragraph 6.3.2, Annex 3).

7.3.5.3 A trend forecast shall consist of a concise statement of the expected significant changes in the meteorological conditions at that aerodrome to be appended to a local routine or local special report, or a METAR or SPECI. The period of validity of a trend forecast shall be 2 hours from the time of the report which forms part of the landing forecast (paragraph 6.3.2, Annex 3).

7.3.5.4 A **trend forecast** shall indicate:

- the expected onset, cessation or change in intensity of one or more of the following weather phenomena or combination thereof:

- freezing precipitation
- moderate or heavy precipitation (including showers)
- thunderstorm (with precipitation)
- other weather phenomena, as agreed by the meteorological authority with the ATS authority and operators concerned, from the followings: **snow, snow grains, ice pellets, ice crystals (very small ice crystals in suspension, also known as diamond dust)** - reported only when associated visibility is 5000 m or less, small hail and/or snow pellets - reported when diameter of largest hailstones is less than 5 mm (paragraph 2.2.4.1 of Appendix 5, Annex 3)

- the expected onset or cessation of one or more of the following weather phenomena or combinations thereof:

- ice crystals
- freezing fog

- low drifting dust, sand or snow
- blowing dust, sand or snow
- thunderstorm (without precipitation) (paragraph 2.2.4.12 of Appendix 5, Annex 3)

- the total number of phenomena reported shall not exceed three (paragraph 2.2.4.3 of Appendix 5, Annex 3).

7.3.6 Forecasts for take-off

7.3.6.1 A forecast for take-off should refer to a specified period of time and should contain information on expected conditions over the runway complex in regard to surface wind direction and speed and any variations thereof, temperature, pressure (QNH), and any other elements as agreed locally (paragraph 6.4.2, Annex 3).

7.3.6.2 A forecast for take-off should be supplied to operators and flight crew members on request within the 3 hours before the expected time of departure (paragraph 6.4.3, Annex 3).

7.3.6.3 Meteorological offices preparing forecasts for take-off should keep the forecasts under continuous review and, when necessary, should issue amendments promptly (paragraph 6.4.4, Annex 3).

7.3.6.4 The format of the forecast should be as agreed between the meteorological authority and the operator concerned. The order of the elements and the terminology, units and scales used in forecasts for take-off should be the same as those used in reports for the same aerodrome (paragraph 3.1 of Appendix 5, Annex 3).

7.3.6.5 The criteria for the issuance of amendments to forecasts for take-off for surface wind direction and speed, temperature and pressure and any other elements agreed locally should be agreed between the meteorological authority and the operators concerned. The criteria should be consistent with the corresponding criteria for special reports established for the aerodrome (paragraph 2.3.1 of Appendix 3, Annex 3), respectively:

- when the onset, cessation or change in intensity of any of the following weather phenomena occurs:

- freezing precipitation
- moderate or heavy precipitation (including showers thereof)
- thunderstorm (with precipitation);

- when the onset or cessation of any of the following weather phenomena occurs:

- freezing fog
 - thunderstorm (without precipitation)
- (paragraph 3.2 of Appendix 3, Annex 3).

7.4 Aerodrome Warnings on winter conditions

7.4.1 Aerodrome warnings shall be issued by the meteorological office designated by the meteorological authority concerned and shall give concise information of meteorological conditions which could adversely affect aircraft on the ground,

including parked aircraft, and the aerodrome facilities and services. (paragraph 7.3.1, Annex 3).

7.4.2 Aerodrome warnings shall be issued in accordance with the template provided in Annex 3, Appendix 6, Table A6-2, when required by operators and/or aerodrome services and shall be disseminated in accordance with local arrangements to those concerned, by the meteorological office designated to provide service for that aerodrome (paragraph 5.1.1 of Appendix 6, Annex 3).

7.4.3 They normally should relate to the occurrence or expected occurrence of one or more of the following phenomena:

- **snow (including the expected or observed snow accumulation)**
- **freezing precipitation**
- **hoar frost or rime**
- **frost**
- **other phenomena as agreed locally.**

(paragraph 5.1.3 of Appendix 6, Annex 3)

7.4.4 The use of text additional to the abbreviations listed in the template in Table A6-2 should be kept to a minimum. The additional text should be prepared in abbreviated plain language using approved ICAO abbreviations and numerical values. If no ICAO approved abbreviations are available, English plain language text should be used (paragraph 5.1.4 of Appendix 6, Annex 3).

7.4.5 Where quantitative criteria are required for the issue of aerodrome warnings, e.g. expected maximum wind or expected total snow fall, these should be established by agreement between the meteorological office and the users of the warnings (paragraph 5.2 of Appendix 6, Annex 3).

8. Next steps:

There is a need to consider the current and future regional-specific MET capabilities related to the winter weather conditions against current and future ATM requirements. There is also a need to achieve a level of consistency and coherence between the meteorological service provision within the EUR Region.

An overview of existing provisions, meteorological capabilities and limitations for the EUR Region are reflected below.

8.1 Reporting the present weather on winter conditions:

8.1.1 Current provisions:

- the most significant weather phenomena related to the winter conditions which may be of interest for aviation are well described and reported through the current provisions of ICAO;
- quantitative determination of depth of deposit as well as qualitative description on the type and its effect on runway friction are routinely available, not necessarily as individual meteorological products, but included in the runway state group as well as in the SNOWTAM message.

8.1.2 Additional capabilities:

- data provided from road sensors networks can be used to provide additional input to the winter weather forecasts;
- measurements from runway temperature sensors can be used to forecast runway friction conditions;
- reporting the freezing rain conditions when the air temperature is above zero (e.g. wet ground might freeze due to clearing clouds in the morning).

8.1.3 Current limitations:

- the representativeness of individual measurements on the runway/taxiway with respect to the whole runway complex.

8.2 Forecasting winter conditions:

8.2.1 Current provisions:

- the most significant weather phenomena related to the winter conditions weather with impact for aviation have been already encompassed into the current provisions of ICAO.

8.2.2 Additional capabilities:

- information from numerical weather prediction models on forecasting the onset and duration of precipitation is available, but this is not fully exploited in the aeronautical domain;

- longer term forecast, for 3 to 5 days, which depict weather winter conditions are available, with good performance at least for qualitative information;
- there could be significant benefit in the use of probabilistic forecast to inform risk management and mitigation decision making on a 1-5 day timescale⁴.

8.2.3 Current limitations:

- models are often less good at determining the precipitation intensity and type (e.g. rain to snow transition, equivalent snow accumulation etc.);
- There is no current requirement in ICAO Annex 3 for forecasts with a longer lead time than 36 hours.

8.3 Aerodrome warnings

8.3.1 Current provisions:

- aerodrome warnings include the most significant weather phenomena related to the winter conditions. They have some flexibility to permit local agreements between the providers of the weather services and the users of this information, in accordance with their specific needs;
- the use of the abbreviated plain language to issue an aerodrome warning offers a multitude of possibilities to describe weather winter conditions, either related to the occurrence or expected occurrence of the specific phenomena.

8.3.2 Additional capabilities

- the lead time for an aerodrome warning could be extended up to 6 or 12 hours, and even up to 24 hours;
- an outlook up to 24 hours related to the evolution and/or expected winter weather conditions occurrence might be included in an aerodrome warning, for planning purposes;
- the aerodrome warnings could be disseminated by the AFTN with an appropriate WMO header.

8.3.3 Current limitations:

- flexibility in the aerodrome warning can lead to a variation of approach to service provision, which makes it difficult to use by the aeronautical community and for verification;
- aerodrome warnings are currently disseminated only in accordance with local arrangements and only to those concerned;
- in accordance with the example given in *Table A6-2 of Annex 3*, the validity time for an aerodrome warning may be 3 hours, by way of example. However,

⁴ This assumes that all stakeholder processes but especially the airport planning process will be based on risk management and related mitigation whilst enabling probabilistic airport capacity to be assessed and slot allocation to be improved.

there is no specific provision related to the validity time of an aerodrome warning.

9. Considerations for Future Work

- Runway surface temperature assessment and reporting
- Outlook forecast on the occurrence of winter conditions
- Standardization of aerodrome warnings, including the expansion of the forecast period
- Improved observed and forecasting capabilities in respect of precipitation amount
- Improved coordination and exercises between Met service provider and stakeholders concerned with winter operations
- Winter weather forecasts are provided whenever winter conditions are expected, rather than as defined by the airport's published winter operations period

- END -