International Civil Aviation Organization

EIGHTH MEETING OF THE ASIA/PACIFIC OPMET MANAGEMENT TASK FORCE (OPMET/M TF/8)

Bangkok, Thailand, 23 – 25 March 2010

Agenda Item 2d: Review inter-regional exchange and new requirements for OPMET information
Status of Am 75 applicable 18 Nov 2010

STATUS AND HIGHLIGHTS OF AMENDMENT 75 TO ANNEX 3

(Prepared by the Secretariat)

SUMMARY

This paper provides a status and highlights of Amendment 75 to Annex 3 applicable 18 November 2010.

1. INTRODUCTION

1.1 Amendment 75 to Annex 3 proposed changes were circulated to States by ICAO for review and comment. Considering technical circumstances related to the implementation of quality management system, the ICAO Air Navigation Commission adjusted the proposal such that MET elements requiring quality management system will become applicable in 2012 versus the remainder of Amendment 75 which becomes applicable 18 November 2010. In addition, the numbering of SIGMET for various phenomena will not change in this Amendment. With these adjustments, the ICAO Council adopted Amendment 75 to Annex 3 on 22 February 2010.

2. AMENDMENT 75 HIGHLIGHTS

2.1 A general overview of the changes associated with Amendment 75 to Annex 3 were partly extracted from the ICAO Council report on the adoption of Amendment 75 to Annex 3. The full **draft** Amendment 75 to Annex 3 (editorials may still be performed, however, no change to substance will occur) is attached.

- improved horizontal, vertical and temporal resolutions for WAFS forecasts
- introduction of an enabling clause for the implementation of improved WAFS forecasts of cumulonimbus clouds, icing and turbulence
- elimination of routine voice reports related to weather
- enabling the provision of graphical MET information in the cockpit

- enhancement of the provision of information on volcanic ash and toxic chemicals

- aerodrome observations enabling the use of fully automatic observing systems for the provisions of local reports and the replacement of km/h by m/s for the SI unit to report wind speed

- implementation of tropical cyclone advisory graphics that include the extent of gale force wind and frequent CB

- no name storms indicated as NN versus current NIL with regards to tropical cyclone advisories and WC SIGMET

- inclusion of the forecast time in the ~~first~~ second line of SIGMET message

- inclusion of “headwind gain” and “headwind loss” information for wind shear warnings

- enable the use of the public Internet for the exchange of MET data that is used for flight planning

- MET elements requiring quality management system will be effective in 2012

3. ACTION BY THE MEETING

3.1 The meeting is invited to note the information in this paper.

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AMENDMENT 75

TO THE

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

METEOROLOGICAL SERVICE FOR INTERNATIONAL AIR NAVIGATION

ANNEX 3

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

The amendment to Annex 3 contained in this document was adopted by the Council of ICAO on 22 February 2010. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before 12 July 2010 will become effective on that date and will become applicable on 18 November 2010 and 15 November 2012, as specified in the Resolution of Adoption. (State letter AN 10/1.1-10/17 refers).

FEBRUARY 2010

INTERNATIONAL CIVIL AVIATION ORGANIZATION

AMENDMENT 75 TO THE INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

ANNEX 3 — METEOROLOGICAL SERVICE FOR INTERNATIONAL AIR NAVIGATION

RESOLUTION OF ADOPTION

The Council

Acting in accordance with the Convention on International Civil Aviation, and particularly with the provisions of Articles 37, 54 and 90 thereof,

1. *Hereby adopts* on 22 February 2010 Amendment 75 to the International Standards and Recommended Practices contained in the document entitled *International Standards and Recommended Practices, Meteorological Service for International Air Navigation* which for convenience is designated Annex 3 to the Convention;

2. *Prescribes* 12 July 2010 as the date upon which the said amendment shall become effective, except for any part thereof in respect of which a majority of the Contracting States have registered their disapproval with the Council before that date;

3. *Resolves* that the said amendment or such parts thereof as have become effective shall become applicable on 18 November 2010[1].

4. *Requests the Secretary General*:

a) to notify each Contracting State immediately of the above action and immediately after 12 July 2010 of those parts of the amendment which have become effective;

b) to request each Contracting State:

1) to notify the Organization (in accordance with the obligation imposed by Article 38 of the Convention) of the differences that will exist on 18 November 2010[1] between its national regulations or practices and the provisions of the Standards in the Annex as hereby amended, such notification to be made before 18 October 2010[2], and thereafter to notify the Organization of any further differences that arise;

2) to notify the Organization before 18 October 2010[2] of the date or dates by which it will have complied with the provisions of the Standards in the Annex as hereby amended;

c) to invite each Contracting State to notify additionally any differences between its own practices and those established by the Recommended Practices, when the notification of such differences is important for the safety of air navigation, following the procedure specified in subparagraph b) above with respect to differences from Standards.

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[1] 15 November 2012 for paragraph 2.2.2, Chapter 2
[2] 15 October 2012 for paragraph 2.2.2, Chapter 2

NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT

The text of the proposed amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading as shown below:

1. ~~Text to be deleted is shown with a line through it~~	text to be deleted
2. New text to be inserted is highlighted with grey shading	new text to be inserted
3. ~~Text to be deleted is shown with a line through it~~ followed by the new text which is highlighted with grey shading	new text to replace existing text

TEXT OF AMENDMENT 75 TO THE

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

METEOROLOGICAL SERVICE
FOR INTERNATIONAL AIR NAVIGATION

ANNEX 3
TO THE CONVENTION OF INTERNATIONAL CIVIL AVIATION

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Area navigation (RNAV). A method of navigation which permits aircraft operations on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

Note. — Area navigation includes performance-based navigation as well as other operations that do not meet the definition of performance-based navigation.

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Navigation specification. A set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications:

Required navigation performance (RNP) specification. A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.

Area navigation (RNAV) specification. A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.

Note 1.— The Performance-based Navigation (PBN) Manual *(Doc 9613), Volume II, contains detailed guidance on navigation specifications.*

Note 2.— The term RNP as previously defined as "a statement of the navigation performance, necessary for operation within a defined airspace", has been removed from this Annex as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this Annex is now solely used in context of navigation specifications that require performance monitoring and alerting. E.g. RNP 4 refers to the aircraft and operating requirements, including a 4 NM lateral performance with on board performance monitoring and alerting that are detailed in the PBN Manual (Doc 9613).

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Performance-based navigation (PBN). Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Note.— Performance requirements are expressed in navigation specification (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.

CHAPTER 2. GENERAL PROVISIONS

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2.2 Supply, use and quality ~~assurance and use~~ management of meteorological information

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2.2.2 ~~**Recommendation.—** In order to meet the objective of meteorological service for international air navigation, the~~ Each Contracting State ~~should~~ shall ensure that the designated meteorological authority referred to in 2.1.4 establishes and implements a properly organized quality system comprising procedures, processes and resources necessary to provide for the quality management of the meteorological information to be supplied to the users listed in 2.1.2. (This provision is a Recommendation until 15 October 2012; as of that date it becomes a Standard).

2.2.3 **Recommendation.—** *The quality system established in accordance with 2.2.2 should be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards and should be certified by an approved organization.*

Note.— The International Organization for Standardization (ISO) 9000 series of quality assurance standards provide a basic framework for the development of a quality assurance programme. The details of a successful programme are to be formulated by each State and in most cases are unique to the State organization. Guidance on the establishment and implementation of a quality system is given in the Manual on the Quality Management System for the Provision of Meteorological Service to International Air Navigation (*Doc 9873*).

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CHAPTER 3. WORLD AREA FORECAST SYSTEM AND METEOROLOGICAL OFFICES

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3.2 World area forecast centres

3.2.1 A Contracting State, having accepted the responsibility for providing a WAFC within the framework of the world area forecast system, shall arrange for that centre:

a) to prepare ~~for grid points for all required levels~~ gridded global forecasts of:

1) upper wind;

2) upper-air temperature and humidity;

3) geopotential altitude of flight levels;

4) flight level and temperature of tropopause; ~~and~~

5) direction, speed and flight level of maximum wind;

6) cumulonimbus clouds;

7) icing; and

8) turbulence;

Note.— Gridded global forecasts of cumulonimbus clouds, icing and turbulence are currently of an experimental nature, labelled as "trial forecasts" and only distributed through the Internet-based FTP services.

b) to prepare global forecasts of significant weather (SIGWX) phenomena;

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3.3 Meteorological offices

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~~3.3.3 The aerodrome meteorological offices at which flight documentation is required, as well as the areas to be covered, shall be determined by regional air navigation agreement.~~

Editorial Note.— Renumber the subsequent paragraphs accordingly.

3.4 Meteorological watch offices

3.4.1 A Contracting State, having accepted the responsibility for providing air traffic services within a flight information region or a control area, shall establish, on the basis of regional air navigation agreement, one or more meteorological watch offices, or arrange for another Contracting State to do so.

3.4.2 A meteorological watch office shall:

a) maintain continuous watch over meteorological conditions affecting flight operations within its area of responsibility;

. . .

Note.— The information is provided~~, at the request of the delegated authority in a State or~~ by WMO regional specialized meteorological centres (RSMC) for the provision of transport model products for radiological environmental emergency response, at the request of the delegated authority of the State in which the radioactive material was released into the atmosphere, or the International Atomic Energy Agency (IAEA). The information is sent by the RSMC to a single contact point of the national meteorological service in each State. This contact point has the responsibility of redistributing the RSMC products within the State concerned. Furthermore, the information is provided by IAEA to RSMC co-located with VAAC London (designated as the focal point) which in turn notifies the ACCs concerned about the release.

3.4.3 **Recommendation.—** *The boundaries of the area over which meteorological watch is to be maintained by a meteorological watch office should~~, in so far as is practicable~~, be coincident with the boundaries of a flight information region or a control area or a combination of flight information regions*

and/or control areas.

~~3.4.4 **Recommendation.** — *Meteorological watch should be maintained continuously; however, in areas with a low density of traffic, the watch may be restricted to the period relevant to expected flight operations*.~~

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3.6 State volcano observatories

Contracting States that maintain volcano observatories monitoring active volcanoes shall arrange that selected State volcano observatories, as designated by regional air navigation agreement, observing:

. . .

c) volcanic ash in the atmosphere

shall send this information as quickly as practicable to ~~its~~ their associated ACC, MWO and VAAC.

Note.— Pre-eruption volcanic activity in this context means unusual and/or increasing volcanic activity which could presage a volcanic eruption.

3.7 Tropical cyclone advisory centres

A Contracting State having accepted, by regional air navigation agreement, the responsibility for providing a TCAC shall arrange for that centre to:

. . .

b) issue advisory information concerning the position of the cyclone centre, its direction and speed of movement, central pressure and maximum surface wind near the centre~~;~~, in abbreviated plain language to:

. . .

CHAPTER 4. METEOROLOGICAL OBSERVATIONS AND REPORTS

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4.1 Aeronautical meteorological stations and observations

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4.1.4 ~~**Recommendation.** —~~ Each Contracting State ~~should~~ shall arrange for its aeronautical meteorological stations to be inspected at sufficiently frequent intervals to ensure that a high standard of observation is maintained, that instruments and all their indicators are functioning correctly, and that the exposure of the instruments has not changed significantly.

Note.— Guidance on the inspection of aeronautical meteorological stations including the frequency of inspections is given in the Manual on Automatic Meteorological Observing Systems at Aerodromes *(Doc 9837)*.

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4.3 Routine observations and reports

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4.3.2 Reports of routine observations shall be issued as:

a) local routine reports, only for dissemination at the aerodrome of origin~~,~~ (intended for arriving and departing aircraft); and

. . .

4.6 Observing and reporting meteorological elements

4.6.1 Surface wind

4.6.1.1 The mean direction and the mean speed of the surface wind shall be measured, as well as significant variations of the wind direction and speed, and reported in degrees true and ~~kilometres per hour~~ metres per second (or knots), respectively.

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4.7 Reporting meteorological information from automatic observing systems

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4.7.2 **Recommendation.—** *Local routine and special reports from automatic observing systems should be used by States in a position to do so during operational hours of the aerodrome as determined by the meteorological authority in consultation with users based on the availability and efficient use of personnel.*

~~4.7.2~~4.7.3 Local routine and special reports and METAR and SPECI from automatic observing systems shall be identified with the word “AUTO”.

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CHAPTER 5. AIRCRAFT OBSERVATIONS AND REPORTS

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5.3 Routine aircraft observations — designation

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~~5.3.2 When voice communications are used, routine observations shall be made during the en-route phase in relation to those air traffic services reporting points or intervals:~~

~~a) at which the applicable air traffic services procedures require routine position reports; and~~

~~b) which are those separated by distances corresponding most closely to intervals of one hour of flying time.~~

Editorial Note.— Renumber 5.3.3 as 5.3.2

5.3.4~~3~~ In the case of air routes with high-density air traffic (e.g. organized tracks), an aircraft from among the aircraft operating at each flight level shall be designated, at approximately hourly intervals, to make routine observations in accordance with 5.3.1 ~~or 5.3.2, as appropriate~~. The designation procedures shall be subject to regional air navigation agreement.

Editorial Note.— Renumber 5.3.5 as 5.3.4

5.4 Routine aircraft observations — exemptions

Aircraft not equipped with air-ground data link shall be exempted from making routine aircraft observations.

Editorial Note.— Delete paragraphs 5.4.1 and 5.4.2

5.5 Special aircraft observations

Special observations shall be made by all aircraft whenever the following conditions are encountered or observed:

a) moderate or severe turbulence; or

b) moderate or severe icing; or

. . .

5.7 Reporting of aircraft observations during flight

5.7.1 Aircraft observations shall be reported by air-ground data link. Where air-ground data link is not available or appropriate, special and other non-routine aircraft observations during flight shall be reported by

voice communications.

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5.8 Relay of air-reports by ATS units

The meteorological authority concerned shall make arrangements with the appropriate ATS authority to ensure that, on receipt by the ATS units of:

a) ~~routine and~~ special air-reports by voice communications, the ATS units relay them without delay to their associated meteorological watch office; and

b) routine and special air-reports by data link communications, the ATS units relay them without delay to to their associated meteorological watch office and WAFCs~~; and~~.

~~c) special air-reports by data link communications, the ATS units relay them without delay to their associated meteorological watch office and WAFCs.~~

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CHAPTER 6. FORECASTS

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6.2 Aerodrome forecasts

6.2.1 An aerodrome forecast shall be prepared, on the basis of regional air navigation agreement, by the meteorological office designated by the meteorological authority concerned.

Note.— The aerodromes for which aerodrome forecasts are to be prepared and the period of validity of these forecasts are listed in the ***relevant*** *FASID.*

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CHAPTER 7. SIGMET AND AIRMET INFORMATION, AERODROME WARNINGS AND WIND SHEAR WARNINGS AND ALERTS

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7.4 Wind shear warnings and alerts

7.4.3 At aerodromes where wind shear is detected by automated, ground-based, wind shear remote-sensing or detection equipment, wind shear alerts generated by these systems shall be issued. Wind shear alerts shall give concise, up-to-date information related to the observed existence of wind shear involving a headwind/tailwind change of ~~30 km/h~~7.5 m/s (15 kt) or more which could adversely affect aircraft on the final approach path or initial take-off path and aircraft on the runway during the landing roll or take-off run.

7.4.4 **Recommendation.—** *Wind shear alerts should be updated at least every minute. The wind shear alert should be cancelled as soon as the headwind/tailwind change falls below ~~30 km/h~~7.5 m/s (15 kt).*

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CHAPTER 8. AERONAUTICAL CLIMATOLOGICAL INFORMATION

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8.1 General provisions

8.1.1 Aeronautical climatological information required for the planning of flight operations shall be prepared in the form of aerodrome climatological tables and aerodrome climatological summaries. Such information shall be supplied to aeronautical users as agreed between the meteorological authority and those users.

Note.— Climatological data required for aerodrome planning purposes are set out in Annex 14, Volume I, 3.1.4 and ~~in~~ Attachment A.

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CHAPTER 9. SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

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9.1 General provisions

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9.1.3 Meteorological information supplied to operators and flight crew members shall be up to date and include the following information, as established by meteorological authority in consultation with operators concerned:

. . .

f) volcanic ash and tropical cyclone advisory information relevant to the whole route;

Editorial Note.— Renumber the subsequent sub-paragraphs accordingly.

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9.3 Flight documentation

Note.— The requirements for the use of automated pre-flight information systems in providing flight documentation are given in 9.4.

9.3.1 Flight documentation to be made available shall comprise information listed under 9.1.3 a) 1) and 6), b), c), e), f) and, if appropriate, ~~f~~g). However, when agreed between the meteorological authority and operator concerned, flight documentation for flights of two hours' duration or less, after a short stop or turnaround, shall be limited to the information operationally needed, but in all cases the flight documentation shall at least comprise information on 9.1.3 b), c), e), f) and, if appropriate, ~~f~~g).

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CHAPTER 11. REQUIREMENTS FOR AND USE OF COMMUNICATIONS

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11.1 Requirements for communications

11.1.1 Suitable telecommunications facilities shall be made available to permit aerodrome meteorological offices and, as necessary, aeronautical meteorological stations to supply the required meteorological information to air traffic services units on the aerodromes for which those offices and stations are responsible, and in particular to aerodrome control towers, approach control offices and the aeronautical telecommunications stations serving these aerodromes.

~~*Note. — Circuits of the aeronautical fixed service are used for the collection and regional and inter-regional exchanges of operational meteorological information as well as for access to international operational meteorological data banks. Three aeronautical fixed service satellite distribution systems providing for global coverage are used to support the regional and inter- regional exchanges of operational meteorological information. Provisions relating to the satellite distribution systems are given in Annex 10, Volume III, Part 1, 10.1 and 10.2.*~~

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11.1.9 **Recommendation.—** *The telecommunications facilities used for the exchange of operational meteorological information should be the aeronautical fixed service or, for the exchange of non-time critical operational meteorological information, the public Internet, subject to availability, satisfactory operation and bilateral/multilateral and/or regional air navigation agreements.*

Note 1.— Three aeronautical fixed service satellite distribution systems providing for global coverage are used to support the global exchanges of operational meteorological information. Provisions relating to the satellite distribution systems are given in Annex 10, Volume III, Part 1, 10.1 and 10.2.

Note 2.— Guidance material on non-time-critical operational meteorological information and relevant aspects of the public Internet is provided in the Guidelines on the Use of the Public Internet for Aeronautical Applications *(Doc 9855).*

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11.2 Use of aeronautical fixed service communications and the public Internet — meteorological bulletins ~~in alphanumeric format~~

Meteorological bulletins containing operational meteorological information to be transmitted via the aeronautical fixed service or the public Internet shall be originated by the appropriate meteorological office or

aeronautical meteorological station.

Note.— Meteorological bulletins containing operational meteorological information authorized for transmission via the aeronautical fixed service are listed in Annex 10, Volume II, Chapter 4, together with the relevant priorities and priority indicators.

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INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

PART II.

APPENDICES AND ATTACHMENTS

APPENDIX 1

FLIGHT DOCUMENTATION – MODEL CHARTS AND FORMS

(SEE PART I, [C.3.1.] 9, APPENDIX 2 AND C.3.3)

MODEL A	OPMET information
MODEL IS	Upper wind and temperature chart for standard isobaric surface Example 1. Arrows, feathers and pennants (Mercator projection) Example 2. Arrows, feathers and pennants (Polar stereographic projection)
MODEL SWH	Significant weather chart (high level) Example. Polar stereographic projection (showing the jet stream vertical extent)
MODEL SWM	Significant weather chart (medium level)
MODEL SWL	Significant weather chart (low level) Example 1 Example 2
MODEL TCG	Tropical cyclone advisory information in graphical format
MODEL VAG	Volcanic ash advisory information in graphical format
MODEL STC	SIGMET for tropical cyclone in graphical format
MODEL SVA	SIGMET for volcanic ash in graphical format
MODEL SGE	SIGMET for phenomena other than tropical cyclone and volcanic ash in graphical format
MODEL SN	Sheet of notations used in flight documentation

ISSUED BY ..... METEOROLOGICAL OFFICE (DATE, TIME UTC) .....

INTENSITY

" – " (light); no indicator (moderate); " + " (heavy, or a tornado/waterspout in the case of funnel cloud(s)) are used to indicate the intensity of certain phenomena.

DESCRIPTORS

MI – shallow	PR – partial	BL – blowing	TS – thunderstorm
BC – patches	DR – low drifting	SH – shower(s)	FZ – freezing (supercooled)

PRESENT WEATHER ABBREVIATIONS

DZ – drizzle	GS – small hail and/or snow pellets	SA – sand
RA – rain	BR – mist	HZ – haze
SN – snow	FG – fog	PO – dust/sand whirls (dust devils)
SG – snow grains	FU – smoke	SQ – squall
IC – ice crystals (diamond dust)	VA – volcanic ash	FC – funnel cloud(s) (tornado or waterspout)
PL – ice pellets	DU – widespread dust	SS – sandstorm
GR – hail		DS – duststorm

EXAMPLES

+SHRA – heavy shower of rain

FZDZ – moderate freezing drizzle

+TSSNGR – thunderstorm with heavy snow and hail

TSSN – thunderstorm with moderate snow

SNRA – moderate snow and rain

SELECTED ICAO LOCATION INDICATORS

CYUL	Montreal Pierre Elliot Trudeau/Intl	HECA	Cairo/Intl	OBBI	Bahrain Intl
		HKJK	Nairobi/Jomo Kenyatta	RJTT	Tokyo Intl
EDDF	Frankfurt/Main	KJFK	New York/John F. Kennedy Intl	SBGL	Rio de Janeiro/Galeão Intl
EGLL	London/Heathrow	LFPG	Paris/Charles de Gaulle	YSSY	Sydney/Kingsford Smith Intl
GMMC	Casablanca/Anfa	NZAA	Auckland Intl	ZBAA	Beijing/Capital

METAR CYUL 240700Z 27018G30KT 5000 SN FEW020 BKN045 M02/M07 Q0995=

METAR EDDF 240950Z 05015KT 9999 FEW025 04/M05 Q1018 NOSIG=

METAR LFPG 241000Z 07010KT 5000 SCT010 BKN040 02/M01 Q1014 NOSIG=

SPECI GMMC 220530Z 24006KT 5000 –TSGR BKN016TCU FEW020CB SCT026 08/07 Q1013=

TAF AMD NZAA 240855Z 2409/2506 24010KT 9999 FEW030 BECMG 2411/2413 VRB02KT 2000 HZ FM 242200 24010KT CAVOK=

TAF ZBAA 240440Z 2406/2506 13004MPS 6000 NSC BECMG 2415/2416 2000 SN OVC040 TEMPO 2418/24211000 SN BECMG 2500/2501 32004MPS 3500 BR NSC BECMG 2503/2504 32010G20MPS CAVOK=

TAF YSSY 240443Z 2406/2506 05015KT 3000 BR SCT030 BECMG 2414/2416 33008KT FM 2422 04020KT CAVOK=

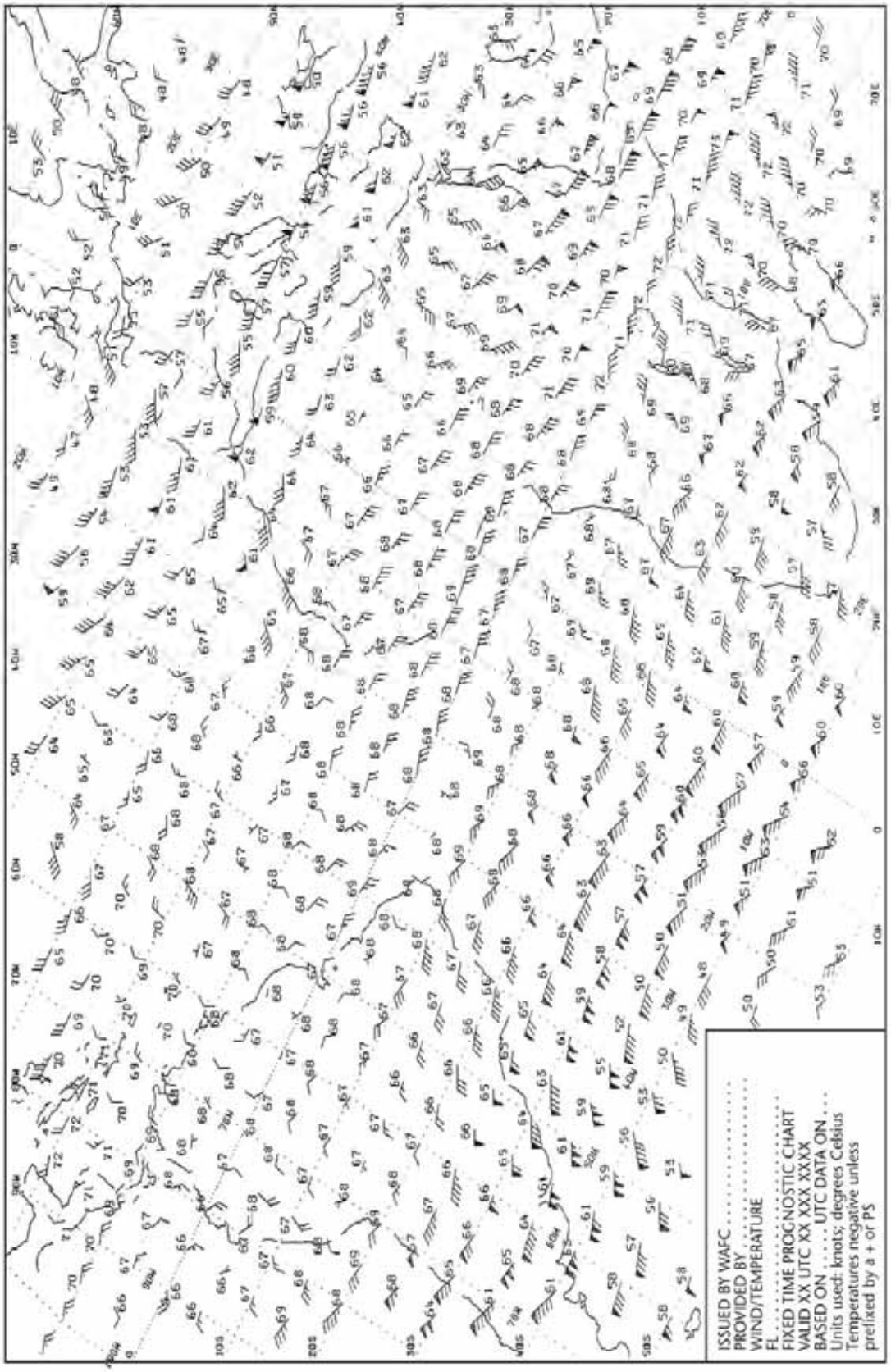
HECC SIGMET 2 VALID 240900/241200 HECA-

HECC CAIRO FIR SEV TURB OBS N OF N27 FL 390/440 MOV E 25KMH NC.

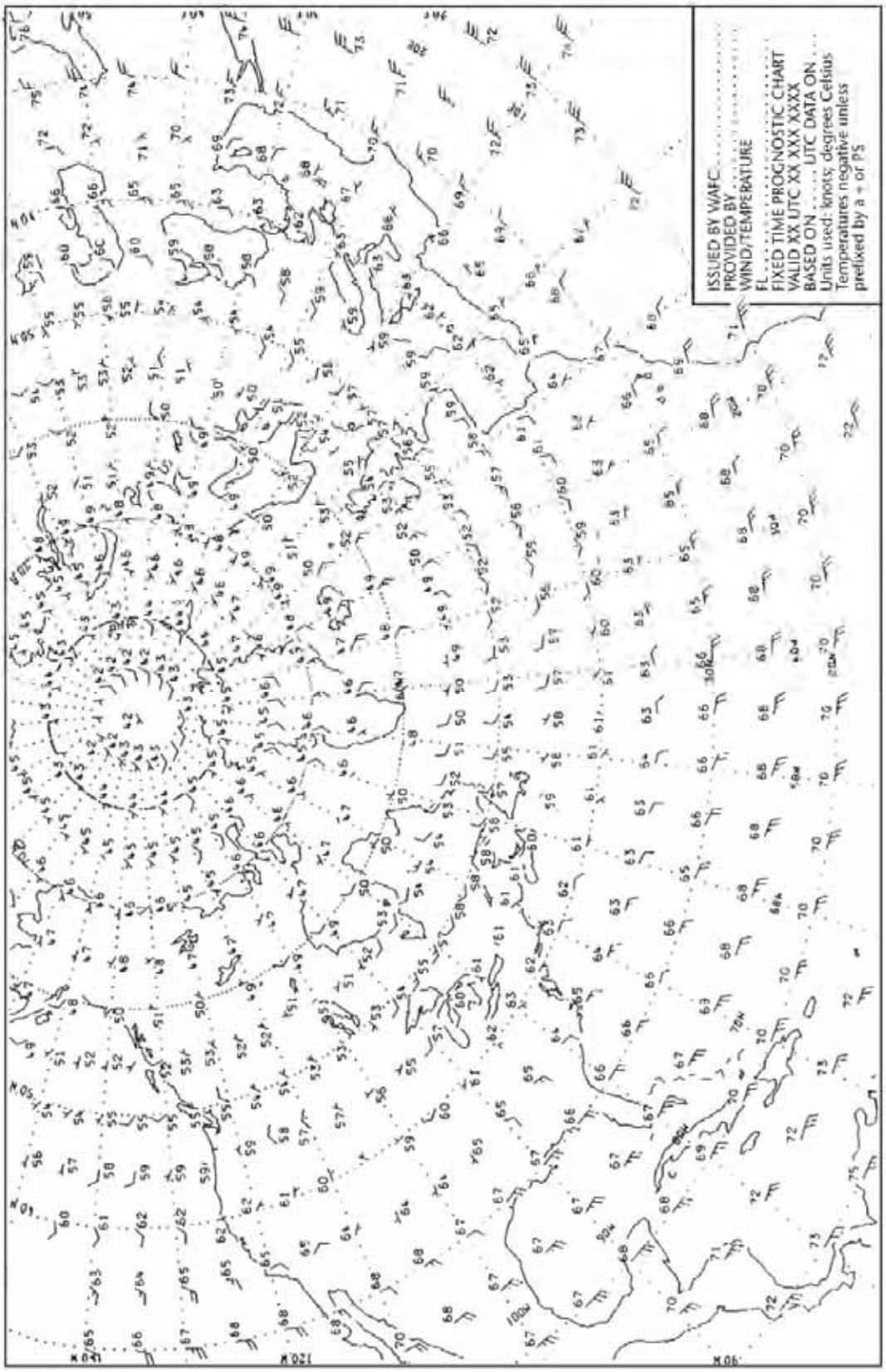
MODEL IS

UPPER WIND AND TEMPERATURE CHART FOR STANDARD ISOBARIC SURFACE

Example 1. Arrows, feathers and pennants (Mercator projection)



MODEL IS

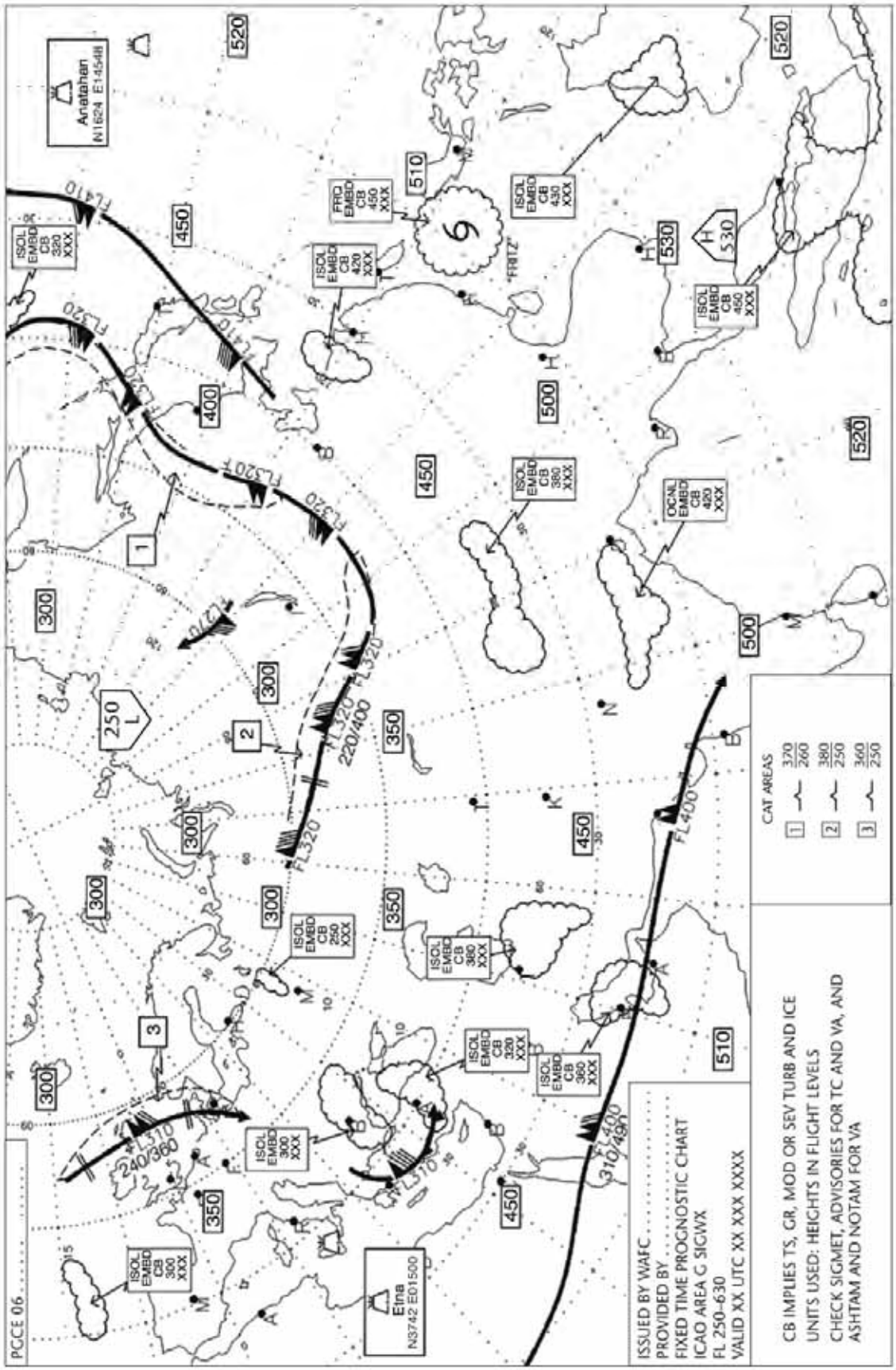


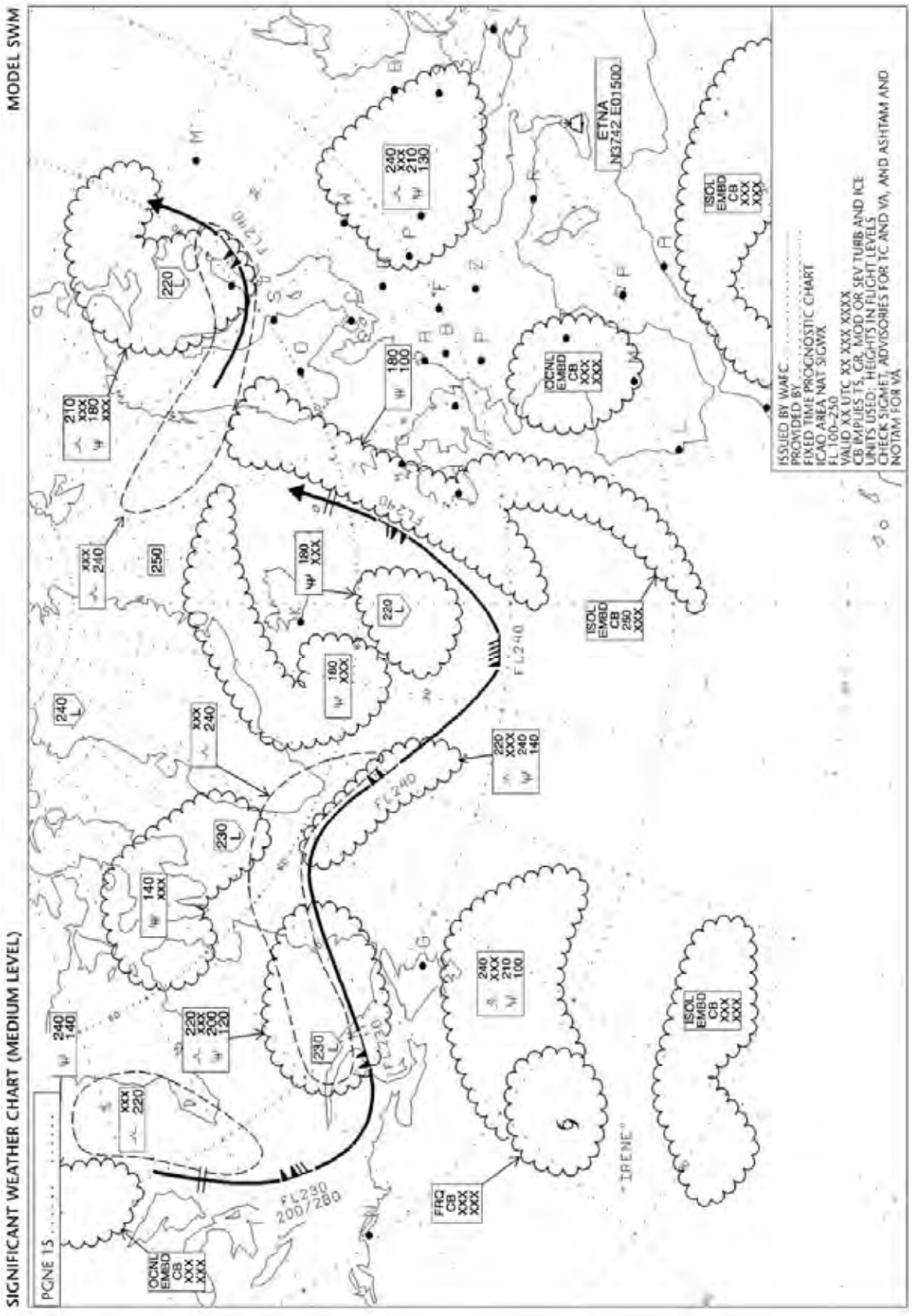
UPPER WIND AND TEMPERATURE CHART FOR STANDARD ISOBARIC SURFACE

Example 2. Arrows, feathers and pennants (Polar stereographic projection)

SIGNIFICANT WEATHER CHART (HIGH LEVEL)

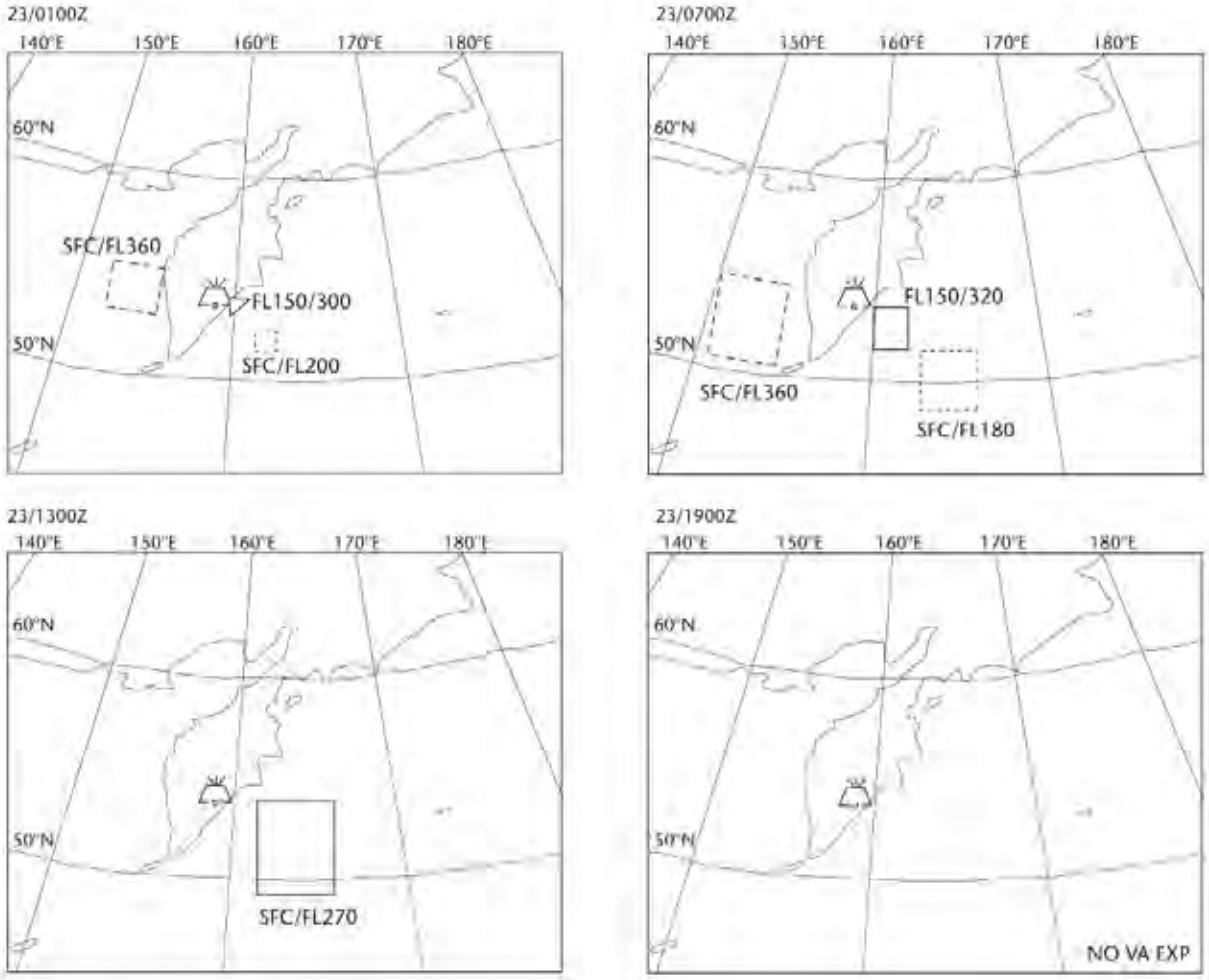
Example. Polar stereographic projection (showing the jet stream vertical extent)



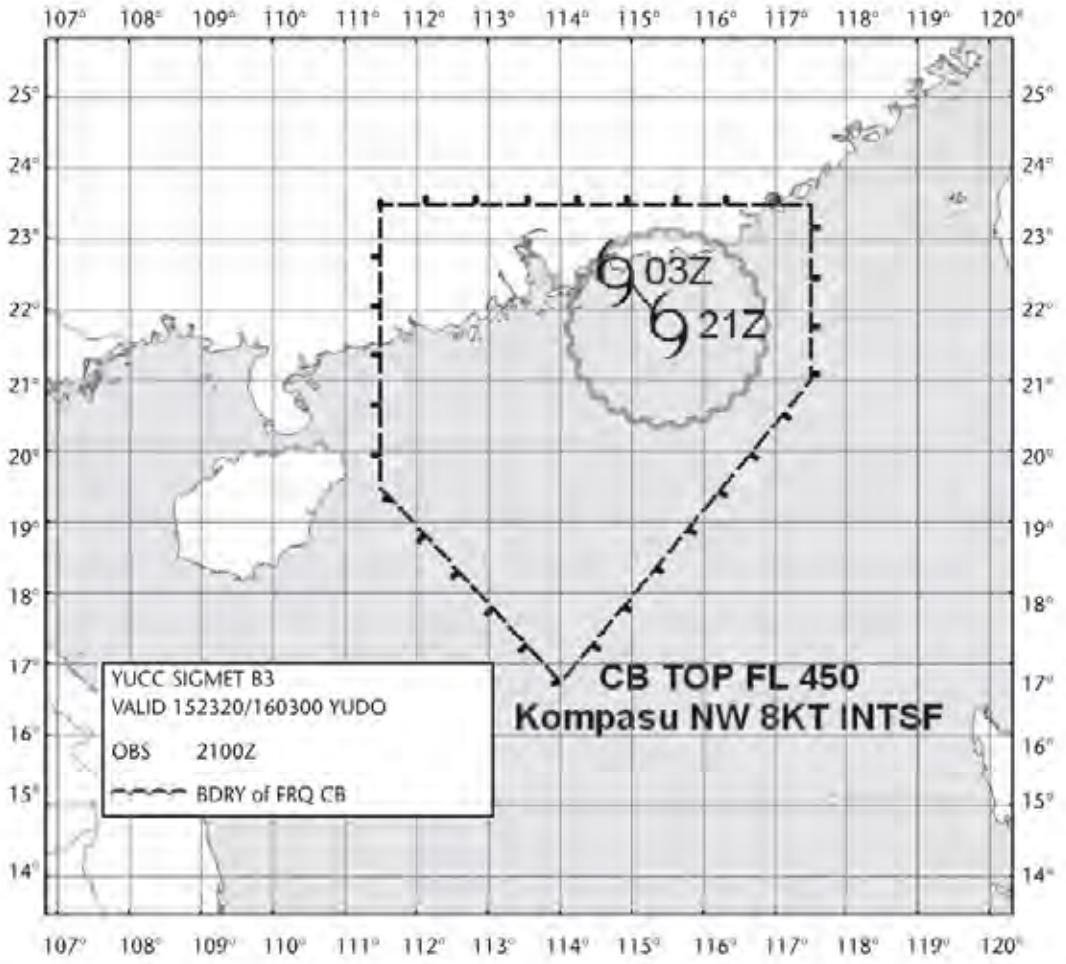

SIGNIFICANT WEATHER CHART (MEDIUM LEVEL)
MODEL SWM
PGNE 15
ETNA
N3742 E01500
"IRENE"
ISSUED BY WAFC
PROVIDED BY
FIXED TIME PROGNOSTIC CHART
ICAO AREA NAT SIGWX
FL100–250
VALID XX UTC XX XXX XXXX
CB IMPLIES TS, GR, MOD OR SEV TURB AND ICE
UNITS USED: HEIGHTS IN FLIGHT LEVELS
CHECK SIGMET, ADVISORIES FOR TC AND VA, AND ASHTAM AND NOTAM FOR VA
FL240
FL230/280
OCNL EMBD CB XXX XXX
ISOL EMBD CB XXX XXX
FRQ CB XXX XXX

TROPICAL CYCLONE ADVISORY INFORMATION IN GRAPHICAL FORMAT

MODEL TCG

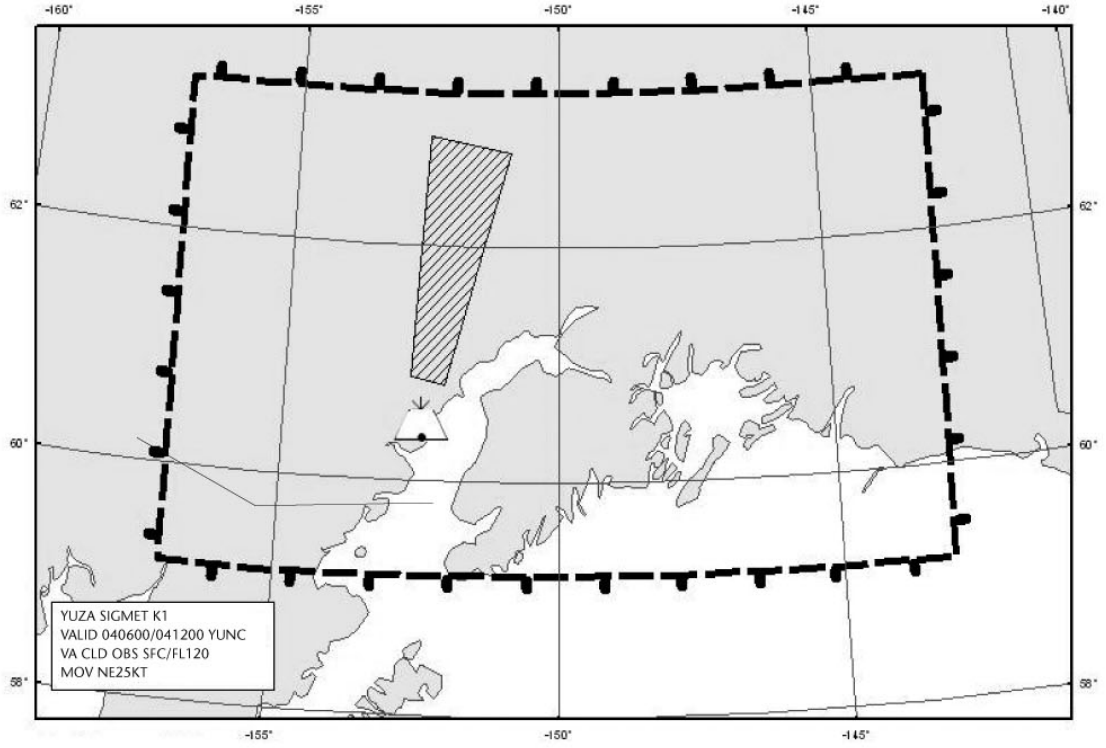


VOLCANIC ASH ADVISORY
DTG: 20080923/0130Z
VAAC: TOKYO
VOLCANO: KARYMSKY 1000-13
AREA: RUSSIAN FEDERATION
SUMMIT ELEV: 1536M
ADVISORY NR: 2008/4
INFO SOURCE: MTSAT-1R, KVERT KEMSD
AVIATION COLOUR CODE: RED
ERUPTION DETAILS: ERUPTED AT 20080923/0000Z FL300 REPORTED
RMK: LATEST REP FM KVERT (0120Z) INDICATES ERUPTION HAS CEASED
TWO DISPERSING VA CLD ARE EVIDENT ON SATELLITE IMAGERY
NXT ADVISORY: 20080923/0730Z



Note: Fictitious FIR.

SIGMET FOR VOLCANIC ASH IN GRAPHICAL FORMAT **MODEL SVA**



Fictitious FIR.

SHEET OF NOTATIONS USED IN FLIGHT DOCUMENTATION — MODEL SN

1. Symbols for significant weather

Tropical cyclone		Drizzle	
Severe squall line*		Rain	
Moderate turbulence		Snow	
Severe turbulence		Shower	Hail
Mountain waves		Widespread blowing snow	
Moderate aircraft icing		Severe sand or dust haze	
Severe aircraft icing		Widespread sandstorm or duststorm	
Widespread fog		Widespread haze	
Radioactive materials in the atmosphere**		Widespread mist	
Volcanic eruption***		Widespread smoke	
Mountain obscuration		Freezing precipitation****	

* In-flight documentation for flights operating up to FL 100. This symbol refers to "squall line".

** The following information should be included at the side of the chart: radioactive materials symbol; latitude/longitude of accident site; date and time of accident; check NOTAM for further information.

*** The following information should be included at the side of the chart: volcanic eruption symbol; name and international number of volcano (if known); latitude/longitude; date and time of the first eruption (if known); check SIGMETs and NOTAM or ASHTAM for volcanic ash.

**** This symbol does not refer to icing due to precipitation coming into contact with an aircraft which is at a very low temperature.

Note: Height indications between which phenomena are expected, top above base as per chart legend.

2. Fronts and convergence zones and other symbols used

Cold front at the surface		FL 270	Position, speed and level of maximum wind
Warm front at the surface			Convergence line
Occluded front at the surface		0°:100	Freezing level
Quasi-stationary front at the surface			Intertropical convergence zone
460	Tropopause high		State of the sea
200	Tropopause low	15	Sea-surface temperature
380	Tropopause level	40	Widespread strong surface wind*

Wind arrows indicate the maximum wind in jet and the flight level at which it occurs. If the maximum wind speed is 60 m/s (120 kt) or more, the flight levels between which winds are greater than 40 m/s (80 kt) is placed below the maximum wind level. In the example, winds are greater than 40 m/s (80 kt) between FL 220 and FL 400.

The heavy line delineating the jet axis begins/ends at the points where a wind speed of 40 m/s (80 kt) is forecast.

* This symbol refers to widespread surface wind speeds exceeding 15 m/s (30 kt).

3. Abbreviations used to describe clouds

3.1 Type

CI = Cirrus	AS = Altostratus	ST = Stratus
CC = Cirrocumulus	NS = Nimbostratus	CU = Cumulus
CS = Cirrostratus	SC = Stratocumulus	CB = Cumulonimbus
AC = Altocumulus		

3.2 Amount

Clouds except CB

FEW = few (1/8 to 2/8)	BKN = broken (5/8 to 7/8)
SCT = scattered (3/8 to 4/8)	OVC = overcast (8/8)

CB only

ISOL = individual CBs (isolated)
OCNL = well-separated CBs (occasional)
FRQ = CBs with little or no separation (frequent)
EMBD = CBs embedded in layers of other clouds or concealed by haze (embedded)

3.3 Heights

Heights are indicated on SWH and SWM charts in flight levels (FL), top over base. When XXX is used, tops or bases are outside the layer of the atmosphere to which the chart applies.

In SWL charts:
(a) Heights are indicated as altitudes above mean sea level;
(b) The abbreviation SFC is used to indicate ground level.

4. Depicting of lines and systems on specific charts

4.1 Models SWH and SWM – Significant weather charts (high and medium)

Scalloped line	=	demarcation of areas of significant weather
Heavy broken line	=	delineation of area of CAT
Heavy solid line interrupted by wind arrow and flight level	=	position of jet stream axis with indication of wind direction, speed in kt or m/s and height in flight levels. The vertical extent of the jet stream is indicated (in flight levels), e.g. FL 270 accompanied by 240/290 indicates that the jet extends from FL 240 to FL 290.
Figures on arrows	=	speed in kt or km/h of movements of frontal system
Flight levels inside small rectangles	=	height in flight levels of tropopause at spot locations, e.g. 390. Low and high points of the tropopause topography are indicated by the letters L or H, respectively, inside a pentagon with the height in flight levels. Display explicit FL for jet depths and tropopause height even if outside forecast bounds.

4.2 Model SWL – Significant weather chart (low level)

X	=	position of pressure centres given in hectopascals
L	=	centre of low pressure
H	=	centre of high pressure
Scalloped lines	=	demarcation of area of significant weather
Dashed lines	=	altitude of 0°C isotherm in feet (hectofeet) or metres. Note: 0°C level may also be indicated by 0°:060, i.e. 0°C level is at an altitude of 6000 ft.
Figures on arrows	=	speed in kt or km/h of movement of frontal systems, depressions or anticyclones
Figure inside the state of the sea symbol	=	total wave height in feet or metres
Figure inside the sea-surface temperature	=	sea-surface temperature in °C
Figures inside the strong surface wind symbol	=	wind in kt or m/s

4.3 Arrows, feathers and pennants

Arrows indicate direction. Number of pennants and/or feathers correspond to speed.

Example: 270°/115 kt (equivalent to 57.5 m/s)
Pennants correspond to 50 kt or 25 m/s
Feathers correspond to 10 kt or 5 m/s
Half-feathers correspond to 5 kt or 2.5 m/s

* A conversion factor of 1 to 2 is used.

APPENDIX 2. TECHNICAL SPECIFICATIONS RELATED TO WORLD AREA FORECAST SYSTEM AND METEOROLOGICAL OFFICES

(See Chapter 3 of this Annex.)

1. WORLD AREA FORECAST SYSTEM

1.1 Formats and codes

WAFCs shall adopt uniform formats and codes for the supply of forecasts ~~and amendments~~.

1.2 Upper-air gridded forecasts

1.2.1 The forecasts of upper wind; upper-air temperature; and humidity; direction, speed and flight level of maximum wind; flight level and temperature of tropopause, areas of cumulonimbus clouds, icing, clear-air and in-cloud turbulence, and geopotential altitude of flight levels shall be prepared four times a day by a WAFC and shall be valid for fixed valid times at 6, 9, 12, 15, 18, 21, 24, 27, 30, 33 and 36 hours after the time (0000, 0600, 1200 and 1800 UTC) of the synoptic data on which the forecasts were based. The dissemination of each forecast shall be in the above order and shall be completed as soon as technically feasible but not later than 6 hours after standard time of observation.

1.2.2 The grid point forecasts prepared by a WAFC shall comprise:

a) wind and temperature data for flight levels 50 (850 hPa), 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa), 270 (350 hPa), 3 00 (300 hPa), 320 (275 hPa), 340 (250 hPa), 360 (225 hPa), 390 (200 hPa), 450 (150 hPa)~~,~~ and 530 (100 hPa);

b) flight level and temperature of tropopause;

c) direction, speed and flight level of maximum wind;

d) humidity data for flight levels 50 (850 hPa), 100 (700 hPa), 140 (600 hPa) and 180 (500 hPa);~~ and~~

e) horizontal extent and flight levels of base and top of cumulonimbus clouds;

f) icing for layers centred at flight levels 60 (800 hPa), 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa) and 300 (300 hPa);

g) clear-air turbulence for layers centred at flight levels 240 (400 hPa), 270 (350 hPa), 300 (300 hPa), 340 (250 hPa), 390 (200 hPa) and 450 (150 hPa);

h) in-cloud turbulence for layers centred at flight levels 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa) and 300 (300 hPa); and

Note 1.— Forecasts referred to in e) to h) are currently of an experimental nature, labelled as "trial forecasts" and only distributed through the Internet-based FTP services.

Note 2.— Layers centred at a flight level referred to in f) and h) have a depth of 100 hPa.

Note 3.— Layers centred at a flight level referred to in g) have a depth of 50 hPa.

~~e~~l) geopotential altitude data for flight levels 50 (850 hPa), 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa), 300 (300 hPa), 320 (275 hPa), 340 (250 hPa), 360 (225 hPa), 390 (200 hPa) ~~and~~, 450 (150 hPa) and 530 (100 hPa).

. . .

1.2.4 The foregoing grid point forecasts shall be prepared by a WAFC in a ~~fixed~~ regular grid with a horizontal resolution of ~~140 km~~ 1.25° of latitude and longitude.

~~*Note. — 140 km represents a distance of about 1.25° of latitude.*~~

1.3 Significant weather (SIGWX) forecasts

1.3.1 General provisions

1.3.1.1 Forecasts of significant en-route weather phenomena shall be prepared as SIGWX forecasts four times a day by a WAFC and shall be valid for fixed valid times at 24 hours after the time (0000, 0600, 1200 and 1800 UTC) of the synoptic data on which the forecasts were based. The dissemination of each forecast shall be completed as soon as technically feasible but not later than ~~11~~ 9 hours after standard time of observation.

. . .

1.3.2 Types of SIGWX forecasts

SIGWX forecasts shall be issued as~~: a)~~ high-level SIGWX forecasts for flight levels between 250 and 630~~; and~~.

Note.— ~~b)m~~Medium-level SIGWX forecasts for flight levels between 100 and 250 for limited geographical areas~~, as determined by regional air navigation agreement~~ will continue to be issued until such time that flight documentation to be generated from the gridded forecasts of cumulonimbus clouds, icing and turbulence fully meets user requirements.

1.3.3 Items included in SIGWX forecasts

~~. . . High-level and medium-level~~ SIGWX forecasts shall include the following items:

a) tropical cyclone provided that the maximum of the 10-minute mean surface wind speed is expected to reach or exceed ~~63 km/h~~17 m/s (34 kt);

. . .

i) information on the location of volcanic eruptions that are producing ash clouds of significance to aircraft operations, comprising: volcanic eruption symbol at the location of the volcano and, at the side of the chart, the volcano eruption symbol, the name of the volcano, latitude/longitude, the date and time of first eruption, if known, and a reference to SIGMET and NOTAM or ASHTAM issued for the area concerned; and

j) information on the location of an accidental release of radioactive materials into the atmosphere~~,~~ of significance to aircraft operations, comprising: the radioactivity symbol at the site of the accident and,

at the side of the chart, the radioactivity symbol, latitude/longitude of the site of the accident, date and time of the accident and a reminder to users to check NOTAM for the area concerned.

Note 1.— Medium-level SIGWX forecasts include all the items above.

~~*Note.*~~ *Note 2. — Items to be included in low-level SIGWX forecasts (i.e. flight levels below 100) are included in Appendix 5.*

1.3.4 Criteria for including items in SIGWX forecasts

The following criteria shall be applied for ~~high-level and medium-level~~ SIGWX forecasts:

. . .

a) items a) to f) in 1.3.3 shall only be included if expected to occur between the lower and upper levels of the SIGWX forecast;

. . .

d) where a volcanic eruption or an accidental release of radioactive materials into the atmosphere warrants the inclusion of the volcanic activity symbol or the radioactivity symbol in SIGWX forecasts, the symbols shall be included on ~~high-level and medium-level~~ SIGWX forecasts irrespective of the height to which the ash column or radioactive material is reported or expected to reach; and

e) in the case of co-incident or the partial overlapping of items a), i) and j) in 1.3.3, the highest priority shall be given to item i), followed by items j) and a). The item with the highest priority shall be placed at the location of the event, and an arrow shall be used to link the location of the other item(s) to its associated symbol or text box.

2. METEOROLOGICAL OFFICES

. . .

2.2 Notification of WAFC concerning significant discrepancies

Meteorological offices using WAFS BUFR data shall notify the WAFC concerned immediately if significant discrepancies ~~in accordance with the following criteria~~ are detected or reported in respect of WAFS SIGWX forecasts~~:~~ concerning:

a) icing, turbulence, ~~thunderstorms~~ cumulonimbus clouds that are obscured, frequent, embedded or occurring at a squall line, and sandstorms/duststorms~~:~~; and

~~— newly expected occurrence or non-occurrence; or~~

b) volcanic eruptions or an accidental release of radioactive materials into the atmosphere, of significance to aircraft operations~~:~~.

~~— inclusion or removal of volcanic activity symbol or radiation symbol.~~

. . .

3. VOLCANIC ASH ADVISORIES CENTRES (VAAC)

3.1 Volcanic ash advisory information

3.1.1 ~~**Recommendation.—**~~ The advisory information on volcanic ash issued in abbreviated plain language, using approved ICAO abbreviations and numerical values of self-explanatory nature, ~~should~~ shall be in accordance with the template shown in Table A2-1. When no approved ICAO abbreviations are available, English plain language text, to be kept to a minimum, ~~should~~ shall be used.

3.1.2 ~~**Recommendation.—**~~ The volcanic ash advisory information listed in Table A2-1, when ~~issued~~ prepared in graphical format, ~~should~~ shall be as specified in Appendix 1 and issued using

a) the portable network graphics (PNG) format; or

b) ~~When issued in binary format,~~ the BUFR code form, when exchanged in binary format ~~should be used~~.

. . .

5. TROPICAL CYCLONE ADVISORY CENTRES (TCAC)

5.1 Tropical cyclone advisory information

5.1.1 The advisory information on tropical cyclones shall be issued for tropical cyclones when the maximum of the 10-minute mean surface wind speed is expected to reach or exceed ~~63 km/h~~17 m/s (34 kt) during the period covered by the advisory.

. . .

5.1.3 **Recommendation.—** *~~When the~~The tropical cyclone advisory information listed in Table A2-2, when~~is issued~~ prepared in graphical format, should be as specified in Appendix 1 and issued using*

a) the portable network graphics (PNG) format; or

b) *~~binary format,~~ the BUFR code form ~~should be used~~, when exchanged in binary format.*

. . .

Table A2-1. Template for advisory message for volcanic ash

. . .

Element		Detailed content	Template(s)		Examples	
	. . .					
5	Location of volcano (M)	Location of volcano in degrees and minutes	PSN:	Nnnnn *or* Snnnn Wnnnnn *or* Ennnnn *or* UNKNOWN ~~*or* UNNAMED~~	PSN: PSN:	N4230 E14048 UNKNOWN
	. . .					
13	Observed *or* estimated ash cloud (M)	Horizontal (in degrees and minutes) and vertical extent at the time of observation of the observed *or* estimated ash cloud *or*, if the base is unknown, the top of the observed *or* estimated ash cloud; ~~m~~Movement of the observed *or* estimated ash cloud	OBS VA CLD *or* EST VA CLD:	TOP FLnnn *or* SFC/FLnnn *or* FLnnn/nnn [nnKM WID LINE[2] BTN (nnNM WID LINE BTN)] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn][– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]][3] *or* TOP FLnnn *or* SFC/FLnnn *or* FLnnn/nnn MOV N nnKMH (*or* KT) *or* MOV NE nnKMH (*or* KT) *or* MOV E nnKMH (*or* KT) *or* MOV SE nnKMH (*or* KT) *or* MOV S nnKMH (*or* KT) *or* MOV SW nnKMH (*or* KT) *or* MOV W nnKMH (*or* KT) *or* MOV NW nnKMH (*or* KT)[4] *or* VA NOT IDENTIFIABLE ~~FROM~~FM SATELLITE DATA WIND~~S~~ FLnnn/nnn nnn/nn[n]~~KMH~~MPS(*or* KT)[4] *or* WIND FLnnn/nnn VRBnnMPS (*or* KT) *or* WIND SFC/FLnnn nnn/nn[n]MPS(*or* KT) *or* WIND SFC/FLnnn VRBnnMPS(*or* KT)	OBS VA CLD:	FL150/350 N4230 E14048 – N4300 E14130 – N4246 E14230 – N4232 E14150 – N4230 E14048 SFC/FL150 MOV NE 25KT FL150/350 MOV E 30KT TOP FL240 MOV W 40KMH VA NOT IDENTIFIABLE FM SATELLITE DATA WIND FL050/070 180/12MPS

	Element	*Detailed content*	*Template(s)*		*Examples*	
14	Forecast height and position of the ash clouds (+6 HR) (M)	Day and time (in UTC) (6 hours from the "Time of observation of ash" given in Item 12); Forecast height and position (in degrees and minutes) for each cloud mass for that fixed valid time	FCST VA CLD +6 HR:	nn/nnnnZ SFC *or* FLnnn/[FL]nnn [nnKM WID LINE[2] BTN (nnNM WID LINE BTN)] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn][– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]][3] *or* NO VA EXP *or* NOT AVBL *or* NOT PROVIDED	FCST VA CLD +6 HR:	02/1245Z SFC/FL200 N4230 E14048 – N4232 E14150 – N4238 E14300 – N4246 E14230 FL200/350 N4230 E14048 – N4232 E14150 – N4238 E14300 – N4246 E14230 FL350/600 NO VA EXP NOT AVBL NOT PROVIDED
15	Forecast height and position of the ash clouds (+12 HR) (M)	Day and time (in UTC) (12 hours from the "Time of observation of ash" given in Item 12); Forecast height and position (in degrees and minutes) for each cloud mass for that fixed valid time	FCST VA CLD +12 HR:	nn/nnnnZ SFC *or* FLnnn/[FL]nnn [nnKM WID LINE[2] BTN (nnNM WID LINE BTN)] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn][– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]][3] *or* NO VA EXP *or* NOT AVBL *or* NOT PROVIDED	FCST VA CLD +12 HR:	02/1845Z SFC/FL300 N4230 E14048 – N4232 E14150 – N4238 E14300 – N4246 E14230 FL300/600 NO VA EXP NOT AVBL NOT PROVIDED
16	Forecast height and position of the ash clouds (+18 HR) (M)	Day and time (in UTC) (18 hours from the "Time of observation of ash" given in Item 12); Forecast height and position (in degrees and minutes) for each cloud mass for that fixed valid time	FCST VA CLD +18 HR:	nn/nnnnZ SFC *or* FLnnn/[FL]nnn [nnKM WID LINE[2] BTN (nnNM WID LINE BTN)] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn][– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]][3] *or* NO VA EXP *or* NOT AVBL *or* NOT PROVIDED	FCST VA CLD +18 HR:	03/0045Z SFC/FL600 NO VA EXP NOT AVBL NOT PROVIDED
17	Remarks (M)	Remarks, as necessary	RMK:	*Free text up to 256 characters* *or* NIL	RMK:	~~ASH~~ VA CLD CAN NO LONGER BE DETECTED ON SATELLITE IMAGE

Element	Detailed content	Template(s)	Examples
. . .			

. . .

Editorial Note.— Replace Example A2-1. Advisory message for volcanic ash by the following new example:

FVFE01 RJTD 230130
VA ADVISORY

DTG:	20080923/0130Z
VAAC:	TOKYO
VOLCANO:	KARYMSKY 1000-13
PSN:	N5403 E15927
AREA:	RUSSIA
SUMMIT ELEV:	1536M
ADVISORY NR:	2008/4
INFO SOURCE:	MTSAT-1R KVERT KEMSD
AVIATION COLOUR CODE:	RED
ERUPTION DETAILS:	ERUPTION AT 20080923/0000Z FL300 REPORTED
OBS VA DTG:	23/0100Z
OBS VA CLD:	FL250/300 N5400 E15930 – N5400 E16100 – N5300 E15945 MOV SE 20KT SFC/FL200 N5130 E16130 – N5130 E16230 – N5230 E16230 – N5230 E16130 MOV SE 15KT
FCST VA CLD +6 HR:	23/0700Z FL250/350 N5130 E16030 – N5130 E16230 – N5330 E16230 – N5330 E16030 SFC/FL180 N4830 E16330 – N4830 E16630 – N5130 E16630 – N5130 E16330
FCST VA CLD +12 HR:	23/1300Z SFC/FL270 N4830 E16130 – N4830 E16600 – N5300 E16600 – N5300 E16130
FCST VA CLD +18 HR:	23/1900Z NO VA EXP
RMK:	LATEST REP FM KVERT (0120Z) INDICATES ERUPTION HAS CEASED. TWO DISPERSING VA CLD ARE EVIDENT ON SATELLITE IMAGERY
NXT ADVISORY:	20080923/0730Z

. . .

Table A2-2. Template for advisory message for tropical cyclones

. . .

	Element	*Detailed content*	*Template(s)*		*Examples*	
	. . .					
4	Name of tropical cyclone	Name of tropical cyclone *or* "~~NIL~~NN" for unnamed tropical cyclone	TC:	nnnnnnnnnnn *or* ~~NIL~~ NN	TC:	GLORIA
9	Maximum surface wind	Maximum surface wind near the centre (mean over 10 minutes, in ~~km/h~~m/s (*or* kt))	MAX WIND:	nn[n]~~KMH~~MPS (*or* nn[n]KT)	MAX WIND:	~~90KMH~~22MPS
	. . .					
11	Forecast of maximum surface wind (+6 HR)	Forecast of maximum surface wind (6 hours after the "DTG" given in Item 2)	FCST MAX WIND +6 HR:	nn[n]~~KMH~~MPS (*or* nn[n]KT)	FCST MAX WIND +6 HR:	~~90KMH~~22MPS
	. . .					
13	Forecast of maximum surface wind (+12 HR)	Forecast of maximum surface wind (12 hours after the "DTG" given in Item 2)	FCST MAX WIND +12 HR:	nn[n]~~KMH~~MPS (*or* nn[n]KT)	FCST MAX WIND +12 HR:	~~90KMH~~22MPS
	. . .					
15	Forecast of maximum surface wind (+18 HR)	Forecast of maximum surface wind (18 hours after the "DTG" given in Item 2)	FCST MAX WIND +18 HR:	nn[n]~~KMH~~MPS (*or* nn[n]KT)	FCST MAX WIND +18 HR:	~~85KMH~~21MPS
	. . .					
17	Forecast of maximum surface wind (+24 HR)	Forecast of maximum surface wind (24 hours after the "DTG" given in Item 2)	FCST MAX WIND +24 HR:	nn[n]~~KMH~~MPS (*or* nn[n]KT)	FCST MAX WIND +24 HR:	~~80KMH~~20MPS
	. . .					

Note.—

1. Fictitious location.

Example A2-2. Advisory message for tropical cyclones

TC ADVISORY

DTG:	~~1997~~20040925/1600Z
TCAC:	YUFO
TC:	GLORIA
NR:	01
PSN:	N2706 W07306
MOV:	NW 20KMH
C:	965HPA
MAX WIND:	~~90K~~~~MH~~22MPS
FCST PSN +6 HR:	25/2200Z N2748 W07350
FCST MAX WIND +6 HR:	~~90~~~~KMH~~22MPS
FCST PSN +12 HR:	26/0400Z N2830 W07430
FCST MAX WIND +12 HR:	~~90~~~~KMH~~22MPS
FCST PSN +18 HR:	26/1000Z N2852 W07500
FCST MAX WIND +18 HR:	~~85K~~~~MH~~21MPS
FCST PSN +24 HR:	26/1600Z N2912 W07530
FCST MAX WIND +24 HR:	~~80K~~~~MH~~20MPS
RMK:	NIL
NXT MSG:	~~1997~~20040925/2000Z

APPENDIX 3. TECHNICAL SPECIFICATIONS RELATED TO METEOROLOGICAL OBSERVATIONS AND REPORTS

(See Chapter 4 of this Annex.)

. . .

2. GENERAL CRITERIA RELATED TO METEOROLOGICAL REPORTS

. . .

2.2 Use of CAVOK

When the following conditions occur simultaneously at the time of observation:

a) visibility, 10 km or more, and the lowest visibility is not reported;

Note 1.— In local routine and special reports, visibility refers to the value(s) to be reported in accordance with 4.2.4.2 and 4.2.4.3; in METAR and SPECI, visibility refers to the value(s) to be reported in accordance with 4.2.4.4.

Note 2.— The lowest visibility is reported in accordance with Appendix 3, 4.2.4.4 a).

. . .

2.3 Criteria for issuance of

local special reports and SPECI

. . .

2.3.2 Where required in accordance with 4.4.2 b), SPECI shall be issued whenever changes in accordance with the following criteria occur:

a) when the mean surface wind direction has changed by 60° or more from that given in the latest report, the mean speed before and/or after the change being 5 m/s (10 kt) or more;

b) when the mean surface wind speed has changed by 5 m/s (10 kt) or more from that given in the latest report;

c) when the variation from the mean surface wind speed (gusts) has increased by 5 m/s (10 kt) or more from that at the time of the latest report, the mean speed before and/or after the change being 7.5 m/s (15 kt) or more;

d) 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);

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

— freezing fog
— thunderstorm (without precipitation);

f) when the amount of a cloud layer below 450 m (1 500 ft) changes:

1) from SCT or less to BKN or OVC; or

2) from BKN or OVC to SCT or less.

2.3.~~2~~ 3 **Recommendation.—** *Where required in accordance with 4.4.2 b), SPECI should be issued whenever changes in accordance with the following criteria occur:*

~~*a) when the mean surface wind direction has changed by 60° or more from that given in the latest report, the mean speed before and/or after the change being 20 km/h (10 kt) or more;*~~

~~*b) when the mean surface wind speed has changed by 20 km/h (10 kt) or more from that given in the latest report;*~~

~~*c) when the variation from the mean surface wind speed (gusts) has increased by 20 km/h (10 kt) or more from that given in the latest report, the mean speed before and/or after the change being 30 km/h (15 kt) or more;*~~

~~*d*~~*a) when the wind changes through values of operational significance. The threshold values should be established by the meteorological authority in consultation with the appropriate ATS authority and operators concerned, taking into account changes in the wind which would:*

1) require a change in runway(s) in use; and

2) indicate that the runway tailwind and crosswind components have changed through values representing the main operating limits for typical aircraft operating at the aerodrome;

~~e~~b) *when the visibility is improving and changes to or passes through one or more of the following values, or when the visibility is deteriorating and passes through one or more of the following values:*

1) *800, 1 500 or 3 000 m; and*

2) *5 000 m, in cases where significant numbers of flights are operated in accordance with the visual flight rules;*

Note 1.— In local special reports, visibility refers to the value(s) to be reported in accordance with 4.2.4.2 and 4.2.4.3; in SPECI, visibility refers to the value(s) to be reported in accordance with 4.2.4.4.

Note 2.— Visibility refers to "prevailing visibility" except in the case where only the lowest visibility is reported in accordance with 4.2.4.4 b).

~~f~~c) *when the runway visual range is improving and changes to or passes through one or more of the following values, or when the runway visual range is deteriorating and passes through one or more of the following values: 150, 350, 600 or 800 m;*

~~g~~d) *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)*~~
— *duststorm*
— *sandstorm*
— *funnel cloud (tornado or waterspout);*

~~h~~e) *when the onset or cessation of any of the following weather phenomena ~~or combinations thereof~~ occurs:*
— *ice crystals*
— ~~*freezing fog*~~
— *low drifting dust, sand or snow*
— *blowing dust, sand or snow*
— ~~*thunderstorm (without precipitation)*~~
— *squall;*
— ~~*funnel cloud (tornado or waterspout);*~~

~~i~~f) *when the height of base of the lowest cloud layer of BKN or OVC extent is lifting and changes to or passes through one or more of the following values, or when the height of base of the lowest cloud layer of BKN or OVC extent is lowering and passes through one or more of the following values:*

1) *30, 60, 150 or 300 m (100, 200, 500 or 1 000 ft); and*

2) *450 m (1 500 ft), in cases where significant numbers of flights are operated in accordance with the visual flight rules;*

~~*j) when the amount of a cloud layer below 450 m (1 500 ft) changes:*~~

~~*1) from SCT or less to BKN or OVC; or*~~

~~*2) from BKN or OVC to SCT or less;*~~

Editorial Note.— Renumber the subsequent sub-paragraphs and paragraph accordingly.

3. DISSEMINATION OF METEOROLOGICAL REPORTS

3.1 METAR and SPECI

. . .

3.1.3 ~~**Recommendation.—**~~ SPECI representing a deterioration in conditions ~~should~~ shall be disseminated immediately after the observation. ~~A SPECI representing an improvement in conditions should be disseminated only after the improvement has been maintained for 10 minutes; it should be amended before dissemination, if necessary, to indicate the conditions prevailing at the end of that 10-minute period.~~ A SPECI representing a deterioration of one weather element and an improvement in another element ~~should~~ shall be disseminated immediately after the observation.

3.1.4 **Recommendation.—** *A SPECI representing an improvement in conditions should be disseminated only after the improvement has been maintained for 10 minutes; it should be amended before dissemination, if necessary, to indicate the conditions prevailing at the end of that 10-minute period.*

. . .

4. OBSERVING AND REPORTING OF METEOROLOGICAL ELEMENTS

. . .

4.1 Surface wind

4.1.1 Siting

4.1.1.1 **Recommendation.—** *Surface wind should be observed at a height of ~~approximately 10 m (30 ft)~~ 10 ± 1 m (30 ± 3 ft) above the ~~runway(s)~~ground.*

. . .

4.1.3 Averaging

4.1.3.1 The averaging period for surface wind observations shall be:

a) 2 minutes for local routine and special reports and for wind displays in air traffic services units; and

b) 10 minutes for METAR and SPECI, except that when the 10-minute period includes a marked discontinuity in the wind direction and/or speed, only data occurring after the discontinuity shall be used for obtaining mean values; hence, the time interval in these circumstances ~~should~~ shall be correspondingly reduced.

Note.— A marked discontinuity occurs when there is an abrupt and sustained change in wind direction of 30° or more, with a wind speed of ~~20 km/h~~5m/s (10 kt) before or after the change, or a change in wind speed of ~~20 km/h~~5 m/s (10 kt) or more, lasting at least 2 minutes.

. . .

4.1.5 Reporting

4.1.5.1 In local routine and special reports and in METAR and SPECI, the surface wind direction and speed shall be reported in steps of 10 degrees true and ~~1 kilometre per hour~~ 1 metre per second (or 1 knot), respectively. Any observed value that does not fit the reporting scale in use shall be rounded to the nearest step in the scale.

4.1.5.2 In local routine and special reports and in METAR and SPECI:

a) the units of measurement used for the wind speed shall be indicated;

b) variations from the mean wind direction during the past 10 minutes shall be reported as follows, if the total variation is 60° or more:

1) when the total variation is 60° or more and less than 180° and the wind speed is ~~6 km/h~~1.5 m/s (3 kt) or more, such directional variations shall be reported as the two extreme directions between which the surface wind has varied;

2) when the total variation is 60° or more and less than 180° and the wind speed is less than ~~6 km/h~~ 1.5 m/s (3 kt), the wind direction shall be reported as variable with no mean wind direction; or

. . .

c) variations from the mean wind speed (gusts) during the past 10 minutes shall be reported when the maximum wind speed exceeds the mean speed by:

1) ~~10 km/h~~2.5 m/s (5 kt) or more in local routine and special reports when noise abatement procedures are applied in accordance with paragraph ~~7.2.3~~ 7.2.6 of the PANS-ATM (Doc 4444); or

2) ~~20 km/h~~5 m/s (10 kt) or more otherwise;

d) when a wind speed of less than ~~2 km/h~~0.5 m/s(1 kt) is reported, it shall be indicated as calm;

e) when a wind speed of ~~200 km/h~~ 50 m/s (100 kt) or more is reported, it shall be indicated to be more than ~~199 km/h~~ 49 m/s (99 kt); and

. . .

4.2 Visibility

. . .

4.2.4 Reporting

4.2.4.2 In local routine and special reports, visibility along the runway(s) shall be reported together with the units of measurement used to indicate visibility.

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4.2.4.4 **Recommendation.**— *In METAR and SPECI, visibility should be reported as prevailing visibility, as defined in Chapter 1. When the visibility is not the same in different directions and*

a) when the lowest visibility is different from the prevailing visibility, and 1) less than 1 500 m or 2) less than 50 per cent of the prevailing visibility and less than 5 000 m; the lowest visibility observed

should also be reported and, when possible, its general direction in relation to the aerodrome reference point indicated by reference to one of the eight points of the compass. If the lowest visibility is observed in more than one direction, then the most operationally significant direction should be reported; and

b) when the visibility is fluctuating rapidly, and the prevailing visibility cannot be determined, only the lowest visibility should be reported, with no indication of direction.

~~4.2.4.5 **Recommendation**. — *In automated METAR and SPECI, when visibility sensors are sited in such a manner that no directional variations can be given, the visibility value reported should be followed by the abbreviation "NDV".*~~

. . .

4.3 Runway visual range

4.3.4 Averaging

Where instrumented systems are used for the assessment of runway visual range, their output shall be updated at least every 60 seconds to permit the provision of current, representative values. The averaging period for runway visual range values shall be:

. . .

Note.— A marked discontinuity occurs when there is an abrupt and sustained change in runway visual range, lasting at least 2 minutes, which reaches or passes through the values included in criteria for the issuance of SPECI reports given in 2.3.2 f).

. . .

4.4 Present weather

. . .

4.4.2 Reporting

. . .

4.4.2.4 **Recommendation.—** *In automated local routine and special reports and METAR and SPECI, in addition to the precipitation types listed under 4.4.2.3 a), the abbreviation UP should be used for unidentified precipitation when the type of precipitation cannot be identified by the automatic observing system.*

4.4.2.5 In local routine and special reports and in METAR and SPECI, the following characteristics of present weather phenomena, as necessary, shall be reported, using their respective abbreviations and relevant criteria, as appropriate:

Thunderstorm — Used to report a thunderstorm with precipitation in accordance with the templates shown in Tables A3-1 and A3-2. When thunder is heard or lightning is detected at the aerodrome during the 10-minute period preceding the time of observation but no precipitation is observed at the aerodrome, the abbreviation "TS" shall be used without qualification. TS

Freezing — Supercooled water droplets or precipitation, used with types of present weather phenomena in accordance with the templates shown in Tables A3-1 and A3-2. FZ

Note.— At aerodromes with human observers, lightning detection equipment may supplement human observations. For aerodromes with automatic observing systems, guidance on the use of lightning detection equipment intended for thunderstorm reporting is given in the Manual on Automatic Meteorological Observing Systems at Aerodromes *(Doc 9837).*

4.4.2.~~5~~ 6 **Recommendation.—** *In local routine and special reports and in METAR and SPECI, the following characteristics of present weather phenomena, as necessary, should be reported, using their respective abbreviations and relevant criteria, as appropriate:*

~~*Thunderstorm — Used to report a thunderstorm with precipitation in accordance with the templates shown in Tables A3-1 and A3-2. When thunder is heard or lightning is detected at the aerodrome during the 10-minute period preceding the time of observation but no precipitation is observed at the aerodrome, the abbreviation "TS" should be used without qualification.* TS~~

Shower — Used to report showers in accordance with the templates shown in Tables A3-1 and A3-2. Showers observed in the vicinity of the aerodrome (see 4.4.2.6) should be reported as "VCSH" without qualification regarding type or intensity of precipitation. *SH*

~~*Freezing — Supercooled water droplets or precipitation, used with types of present weather phenomena in accordance with the templates shown in Tables A3-1 and A3-2.* FZ~~

Blowing — Used in accordance with the templates shown in Tables A3-1 and A3-2 with types of present weather phenomena raised by the wind to a height of 2 m (6 ft) or more above the ground. *BL*

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Editorial Note.— Renumber 4.4.2.6 as 4.4.2.7

4.4.2.~~7~~8 ~~**Recommendation.—**~~ In local routine and special reports and in METAR and SPECI:

a) one or more, up to a maximum of three, of the present weather abbreviations given in 4.4.2.3, ~~and~~ 4.4.2.5 and 4.4.2.6 ~~should~~ 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 of significance to flight operations;

b) the indication of intensity or proximity, as appropriate, ~~should~~ shall be reported first followed respectively by the characteristics and the type of weather phenomena; and

c) where two different types of weather are observed, they ~~should~~ shall be reported in two separate groups, where the intensity or proximity indicator refers to the weather phenomenon which follows the indicator. However, different types of precipitation occurring at the time of observation ~~should~~ shall be reported as one single group with the dominant type of precipitation reported first and preceded by only one intensity qualifier which refers to the intensity of the total precipitation.

4.5 Clouds

. . .

4.5.3 Reference level

~~**Recommendation.**~~ The height of cloud base ~~should normally~~ shall be reported above aerodrome elevation. When a precision approach runway is in use which has a threshold elevation 15 m (50 ft) or more below the aerodrome elevation, local arrangements ~~should~~ shall be made in order that the height of cloud bases reported to arriving aircraft ~~should~~ shall refer to the threshold elevation. In the case of reports from offshore structures, the height of cloud base ~~should~~ shall be given above mean sea level.

4.5.4 Reporting

. . .

4.5.4.2 **Recommendation.**— *At aerodromes where low-visibility procedures are established for approach and landing, as agreed between the meteorological authority and the appropriate ATS authority, in local routine and special reports the height of cloud base should be reported in steps of 15 m (50 ft) up to and including 90 m (300 ft) and in steps of 30 m (100 ft) between 90 m (300 ft) and 3 000 m (10 000 ft), and the vertical visibility in steps of 15 m (50 ft) up to and including 90 m (300 ft) and in steps of 30 m (100 ft) between 90 m (300 ft) and 600 m (2 000 ft). Any observed value which does not fit the reporting scale shall be rounded down to the nearest lower step in the scale.*

Editorial Note.— Renumber existing 4.5.4.2 and 4.5.4.3 as 4.5.4.3 and 4.5.4.4

. . .

~~4.5.4.4~~ 4.5.4.5 **Recommendation.**— *In automated local routine and special reports and METAR and SPECI:*

. . .

4.7 Atmospheric pressure

4.7.1 Display

When automated equipment is used for the measurement of atmospheric pressure, QNH and, if required in

accordance with 4.7.3.2 b), QFE displays relating to the barometer shall be located in the meteorological station with corresponding displays in the appropriate air traffic services units. When QFE values are displayed for more than one runway, as specified in 4.7.3.2 d), the displays shall be clearly marked to identify the runway to which the QFE value displayed refers.

. . .

4.8 Supplementary information

4.8.1 Reporting

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4.8.1.3 **Recommendation.—** *In automated local routine and special reports and METAR and SPECI, in addition to the recent weather phenomena listed under 4.8.1.1, recent unknown precipitation should be reported in accordance with the template shown in Table A3-2 when the type of precipitation cannot be identified by the automatic observing system.*

. . .

Table A3-1. Template for the local routine (MET REPORT) and local special (SPECIAL) reports

. . .

Element as specified in Chapter 4	*Detailed content*	*Template(s)*			*Examples*
Identification of the type of report (M)	Type of report	MET REPORT *or* SPECIAL			MET REPORT SPECIAL
Location indicator (M)	ICAO location indicator (M)	nnnn			YUDO[1]
Time of the observation (M)	Day and actual time of the observation in UTC	nnnnnnZ			221630Z
Identification of an automated report (C)	Automated report identifier (C)	AUTO			AUTO
Surface wind (M)	Name of the element (M)	WIND			WIND 240/~~15KMH~~4MPS (WIND 240/8KT)
	Runway (O)[2]	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]			WIND RWY 18 TDZ 190/~~22KMH~~6MPS (WIND RWY 18 TDZ 190/~~11KT~~12KT)
	Runway section (O)[3]	TDZ			
	Wind direction (M)	nnn/	VRB BTN nnn/ AND nnn/ *or* VRB	C A L M	WIND VRB~~4KMH~~1MPS WIND CALM (WIND VRB2KT) WIND VRB BTN 350/ AND 050/ ~~4KMH~~1MPS (WIND VRB BTN 350/ AND 050/2KT)
	Wind speed (M)	[ABV]-n[n][n]~~KMH~~MPS (*or* [ABV]-n[n]KT)			WIND 270/ABV-~~199KMH~~49MPS (WIND 270/ABV-99KT)
	Significant speed variations (C)[4]	MAX-[ABV]nn[n] MNM-n-[n]			WIND 120/~~12KMH~~3MPS MAX~~35~~9 MNM~~8~~2 (WIND 120/6KT MAX18 MNM4)
	Significant directional variations (C)[5]	VRB BTN nnn/ AND nnn/	—		WIND 020/~~20KMH~~5MPS VRB BTN 350/ AND 070/ (WIND 020/10KT VRB BTN 350/ AND 070/)
	Runway section (O)[3]	MID			WIND RWY 14R MID 140/ ~~22KMH~~6MPS (WIND RWY 14R MID 140/~~11KT~~12KT)
	Wind direction (O)[3]	nnn/	VRB BTN nnn/ AND nnn/ *or* VRB	C A L M	
	Wind speed (O)[3]	[ABV]-n[n][n]~~KMH~~MPS (*or* [ABV]-n[n]KT)			
	Significant speed variations (C)[4]	MAX-[ABV]nn[n] MNM-n-[n]			
	Significant directional variations (C)[5]	VRB BTN nnn/ AND nnn/	—		
	Runway section (O)[3]	END			WIND RWY 27 TDZ 240/~~32KMH~~8MPS MAX~~54~~14 MNM~~29~~5 END 250/~~28KMH~~7MPS (WIND RWY 27 TDZ 240/16KT MAX~~27~~28 MNM10 END 250/14KT)
	Wind direction (O)[3]	nnn/	VRB BTN nnn/ AND nnn/ *or* VRB	C A L M	
	Wind speed (O)[3]	[ABV]-n[n][n]~~KMH~~MPS (*or* [ABV]-n[n]KT)			
	Significant speed variations (C)[4]	MAX-[ABV]nn[n] MNM-n-[n]			
. . .					
Present weather (C)[9, 10]	Intensity of present weather (C)[9]	FBL *or* MOD *or* HVY	—		

Element as specified in Chapter 4	*Detailed content*	*Template(s)*				*Examples*
	Characteristics and type of present weather (C)[9,11]	DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZUP[12] *or* FC[13] *or* FZRA *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* SHUP[12] *or* TSGR *or* TSGS *or* TSRA *or* TSSN *or* TSUP[12] *or* UP[12]	IC *or* FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG		MOD RA HVY TSRA HVY DZ FBL SN HVY TSRASN FBL SNRA FBL DZ FG HVY SHSN BLSN HVY TSUP HZ FG VA MIFG
Cloud (M)[12] [14]	Name of the element (M)	CLD				
	Runway (O)[2]	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]				CLD NSC
	Cloud amount (M) *or* vertical visibility (O)[9]	FEW *or* SCT *or* BKN *or* OVC *or* ///[12]	OBSC	NSC *or* NCD[12]		CLD SCT 300M OVC 600M (CLD SCT 1000FT OVC 2000FT) CLD OBSC VER VIS 150M (CLD OBSC VER VIS 500FT)
	Cloud type (C)[9]	CB *or* TCU *or* ///[12]	—			CLD BKN TCU 270M (CLD BKN TCU 900FT)
	Height of cloud base *or* the value of vertical visibility (C)[9]	nn[n][n]M (*or* nnn[n]FT)	[VER VIS nn[n]M (*or* VER VIS nnn[n]FT)]			CLD RWY 08R BKN 60M RWY 26 BKN 90M (CLD RWY 08R BKN 200FT RWY 26 BKN 300FT) CLD /// CB 400M (CLD /// CB 1200FT) CLD NCD
• • •						
Supplementary information (C)[9]	Significant meteorological phenomena (C)[9]	CB *or* TS *or* MOD TURB *or* SEV TURB *or* WS *or* GR *or* SEV SQL *or* MOD ICE *or* SEV ICE *or* FZDZ *or* FZRA *or* SEV MTW *or* SS *or* DS *or* BLSN *or* FC[13] [15]				FC IN APCH WS IN APCH 60M-WIND~~-~~360/~~50~~KMH13MPS WS RWY 12
	Location of the phenomen~~on~~a (C)[9]	IN APCH [nnnnM-WIND nnn/nn~~KMH~~MPS] *or* IN CLIMB-OUT [nnnnM-WIND nnn/nn~~KMH~~MPS] (IN APCH [nnnnFT-WIND nnn/nnKT] *or* IN CLIMB-OUT [nnnnFT-WIND nnn/nnKT]) *or* RWY nn[n]				
	Recent weather (C)[9, 10]	REFZDZ *or* REFZRA *or* REDZ *or* RE[SH]RA *or* RERASN *or* RE[SH]SN *or* RESG *or* RESHGR *or* RESHGS *or* REBLSN *or* RESS *or* REDS *or* RETSRA *or* RETSSN *or* RETSGR *or* RETSGS *or* REFC *or* REPL or REUP[12] *or* REFZUP[12] *or* RETSUP[12] *or* RESHUP[12] *or* REVA *or* RETS				REFZRA CB IN CLIMB-OUT RETSRA
Trend forecast (O)[14] [16]	Name of the element (M)	TREND				
	Change indicator (M)[15] [17]	NOSIG	BECMG *or* TEMPO			TREND NOSIG TREND BECMG FEW 600M (TREND BECMG FEW 2000FT)
	Period of change (C)[9]		FMnnnn *and/or* TLnnnn *or* ATnnnn			
	Wind (C)[9]		nnn/[ABV]n[n][n]~~KMH~~MPS [MAX[ABV]nn[n]] (*or* nnn/~~-~~[ABV]n[n]KT [MAX[ABV]nn])			TREND TEMPO 250/~~70KMH~~18 MPS MAX~~-~~~~10~~25 (TREND TEMPO 250/~~35~~36KT MAX~~-~~50)

Element as specified in Chapter 4	*Detailed content*	*Template(s)*				*Examples*
	Visibility (C)[9]		VIS nn[n][n]M *or* VIS n[n]KM		C A V O K	TREND BECMG AT1800 VIS 10KM NSW TREND BECMG TL1700 VIS 800M FG TREND BECMG FM1030 TL1130 CAVOK
	Weather phenomenon: intensity (C)[9]		FBL *or* MOD *or* HVY	—	NSW	TREND TEMPO TL1200 VIS 600M BECMG AT1230 VIS 8KM NSW CLD NSC
	Weather phenomenon: characteristics and type (C)[9, 10, ~~12~~11]		DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZRA *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* TSGR *or* TSGS *or* TSRA *or* TSSN	IC *or* FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG		TREND TEMPO FM0300 TL0430 MOD FZRA TREND BECMG FM1900 VIS 500M HVY SNRA TREND BECMG FM1100 MOD SN TEMPO FM1130 BLSN
. . .						

11. Precipitation types listed under 4.4.2.3 a) may be combined in accordance with 4.4.2.7 c) and Appendix 5, 2.2.4.~~2~~4.1. Only moderate or heavy precipitation to be indicated in trend forecasts in accordance with Appendix 5, 2.2.~~4.2~~4.1.
12. For automated reports only.
13. Heavy used to indicate tornado or waterspout, moderate used to indicate funnel cloud not reaching the ground.

Editorial Note.—Renumber the subsequent footnotes accordingly.

. . .

Table A3-2. Template for METAR and SPECI

. . .

Element as specified in Chapter 4	*Detailed content*	*Template(s)*			*Examples*
Identification of the type of report (M)	Type of report (M)	METAR, METAR COR, SPECI *or* SPECI COR			METAR METAR COR SPECI
. . .					
Surface wind (M)	Wind direction (M)	nnn	VRB		24015KMH04MPS VRB04KMH1MPS (24008KT) (RB02KT) 19022KMH06MPS (190~~11~~12KT) 00000KMHMPS (00000KT) 140P199KMH49MPS (140P99KT) 12012~~03~~G35KMH09MPS (12006G18KT) 24032~~08~~G54KMH14MPS (24016G~~27~~28KT) 02020KMH05MPS 350V070 (02010KT 350V070)
	Wind speed (M)	[P]nn[n]			
	Significant speed variations (C)[3]	G[P]nn[n]			
	Units of measurement (M)	KMH MPS(*or* KT)			
	Significant directional variations (C)[4]	nnnVnnn	—		
Visibility (M)	Prevailing *or* minimum visibility (M)[5]	nnnn		CAVOK	0350 CAVOK 7000NDV 9999 0800
	Unidirectional visibility (C)[6]	NDV			
	Minimum visibility (C)[7] and Direction of the minimum visibility (C)[7]	nnnn[N] *or* nnnn[NE] *or* nnnn[E] *or* nnnn[SE] *or* nnnn[S] *or* nnnn[SW] *or* nnnn[W] *or* nnnn[NW] N *or* NE *or* E *or* SE *or* S *or* SW *or* W *or* NW			2000 1200NW 6000 2800E 6000 2800
. . .					
Present weather (C)[2, 11]	Intensity *or* proximity of present weather (C)[12]	– *or* +	—	VC	
	Characteristics and type of present weather (M)[13]	DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZRA *or* FZUP[6] *or* FC[14] *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* SHUP[6] *or* TSGR *or* TSGS *or* TSRA *or* TSSN *or* TSUP[6] *or* UP[6]	IC *or* FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG	FG *or* PO *or* FC *or* DS *or* SS *or* TS *or* SH *or* BLSN *or* BLSA *or* BLDU *or* VA	RA HZ VCFG +TSRA FG VCSH +DZ VA VCTS –SN MIFG VCBLSA +TSRASN –SNRA DZ FG +SHSN BLSN UP FZUP TSUP FZUP
. . .					

Element as specified in Chapter 4	*Detailed content*	*Template(s)*		*Examples*
Air and dew-point temperature	Air and dew-point temperatures (M)	[M]nn/[M]nn		17/10 02/M08 M01/M10
. . .				
Supplementary information (C)	Recent weather (C)[2, 11]	REFZDZ *or* REFZRA *or* REDZ *or* RE[SH]RA *or* RERASN *or* RE[SH]SN *or* RESG *or* RESHGR *or* RESHGS *or* REBLSN *or* RESS *or* REDS *or* RETSRA *or* RETSSN *or* RETSGR *or* RETSGS *or* RETS *or* REFC *or* REVA *or* REPL *or* REUP[6] *or* REFZUP[6] *or* RETSUP[6] *or* RESHUP[6]		REFZRA RETSRA
	Wind shear (C)[2]	WS Rnn[L] *or* WS Rnn[C] *or* WS Rnn[R] *or* WS ALL RWY		WS ~~RWY03~~ R03 WS ALL RWY WS R18C
. . .				
Trend forecast (O)[17]	Change indicator (M)[18]	NOSIG	BECMG *or* TEMPO	NOSIG BECMG FEW020
	Period of change (C)[2]		FMnnnn *and/or* TLnnnn *or* ATnnnn	
	Wind (C)[2]		nnn[P]nn[n][G[P]nn[n]]~~KMH~~MPS *(or* nnn[P]nn[G[P]nn]KT)	TEMPO 250~~70~~18G~~100KMH~~25MPS (TEMPO 250~~35~~36G50KT)

. . .

11. One or more, up to a maximum of three groups, in accordance with 4.4.2.7 a), 4.8.1.1 and Appendix 5, 2.2.4.~~2~~4.1.
12. To be included whenever applicable; no qualifier for *moderate* intensity in accordance with 4.4.2.6.
13. Precipitation types listed under 4.4.2.3 a) may be combined in accordance with 4.4.2.7 c) and Appendix 5, 2.2.4.~~2~~4.1. Only moderate or heavy precipitation to be indicated in trend forecasts in accordance with Appendix 5, 2.2.4.~~2~~4.1.
14. Heavy used to indicate tornado or waterspout; moderate (no qualifier) to indicate funnel cloud not reaching the ground.

. . .

Editorial Note.— Renumber the subsequent footnotes accordingly.

. . .

Table A3-4. Ranges and resolutions for the numerical elements included in local reports

Element as specified in Chapter 4		*Range*	*Resolution*
. . .			
Wind speed:	~~KMH~~MPS KT	1 – ~~399~~99* 1 – 199*	1 1
Visibility:	M M KM KM	0 – ~~800~~750 800 – ~~5 000~~4 900 ~~5~~000 – ~~10~~9 10 -	50 100 1 0 (fixed value: 10 KM)
RVR	M M M	0 ~~400~~ – 375 400 ~~800~~ - 750 800 - 2 000	25 50 100
Vertical visibility~~:~~	M M FT FT	0 – ~~600~~75** 90 – 600 0 – 250** 300 – 2 000	15 30 50 100
Clouds: height of cloud base:	M M FT FT	0 – 75** ~~0~~90 – 3 000 0 – 250** ~~0~~300 – 10 000	15 30 50 100
. . .			

~~a)~~ * There is no aeronautical requirement to report surface wind speeds of ~~200~~ 50 ~~km/h~~m/s (100 kt) or more; however, provision has been made for reporting wind speeds up to ~~3~~99 ~~km/h~~m/s (199 kt) for non-aeronautical purposes, as necessary.
**Under circumstances as specified in 4.5.4.2; otherwise a resolution of 30 m (100 ft) is to be used.

Table A3-5. Ranges and resolutions for the numerical elements included in METAR and SPECI

Element as specified in Chapter 4		*Range*	*Resolution*
. . .			
Wind speed:	~~KMH~~MPS KT	00 – ~~399~~99* 00 – 199*	1 1
Visibility:	M M M M	0000 – ~~0800~~0750 0800 – ~~5 000~~4 900 5000 – 9000 ~~9 000 – 9 999~~10 000 -	50 100 1 000 ~~999~~0 (fixed value:9999)
RVR	M M M	0000 - ~~0400~~0375 0400 – ~~0800~~0750 0800 - 2000	25 50 100
. . .			

~~b)~~ * There is no aeronautical requirement to report surface wind speeds of ~~200~~ 50 ~~km/h~~m/s (100 kt) or more; however, provision has been made for reporting wind speeds up to ~~3~~99 ~~km/h~~m/s (199 kt) for non-aeronautical purposes, as necessary.

Example A3-1. Routine report

a) Local routine report (same location and weather conditions as METAR):

MET REPORT YUDO 221630Z WIND 240/~~15KMH~~4MPS VIS 600M RVR RWY 12 TDZ 1000M MOD DZ FG CLD SCT 300M OVC 600M T17 DP16 QNH ~~1018 HPA~~1018HPA TREND BECMG TL1700 VIS 800M FG BECMG AT1800 VIS 10KM NSW

b) METAR for YUDO (Donlon/International):*

METAR YUDO 221630Z 240~~15KMH~~04MPS 0600 R12/1000U DZ FG SCT010 OVC020 17/16 Q1018 BECMG TL1700 0800 FG BECMG AT1800 9999 NSW

Meaning of both reports:

Routine report for Donlon/International* issued on the 22nd of the month at 1630 UTC; surface wind direction 240 degrees; wind speed ~~15 kilometres per hour~~4 metres per second; visibility (along the runway(s) in the local routine report; prevailing visibility in METAR) 600 metres; runway visual range representative of the touchdown zone for runway 12 is 1 000 metres and the runway visual range values have shown an upward tendency during previous 10 minutes (RVR tendency to be included in METAR only); and moderate drizzle and fog; scattered cloud at 300 metres; overcast at 600 metres; air temperature 17 degrees Celsius; dew-point temperature 16 degrees Celsius; QNH 1 018 hectopascals; trend during next 2 hours, visibility (along the runway(s) in the local routine report; prevailing visibility in METAR) becoming 800 metres in fog by 1700 UTC; at 1800 UTC visibility (along the runway(s) in the local routine report; prevailing visibility in METAR) becoming 10 kilometres or more and nil significant weather.

* Fictitious location

Note.— In this example, the primary units ~~"kilometre per hour"~~ "metre per second" and "metre" were used for wind speed and height of cloud base, respectively. However, in accordance with Annex 5, the corresponding non-SI alternative units "knot" and "foot" may be used instead.

Example A3-2. Special report

a) Local special report (same location and weather conditions as SPECI):

SPECIAL YUDO 151115Z WIND 050/25KT MAX37 MNM10 VIS 1200M RVR RWY 05 ABV 1800M HVY TSRA CLD BKN CB 500FT T25 DP22 QNH ~~1008 HPA~~1018HPA TREND TEMPO TL1200 VIS 600M BECMG AT1200 VIS 8KM NSW NSC

. . .

Meaning of both reports:

. . .

Note.— In this example, the non-SI alternative units "knot" and "foot" were used for wind speed and height of cloud base, respectively. However, in accordance with Annex 5, the corresponding primary units "~~kilometre per hour~~metres per second" and "metre" may be used instead.

APPENDIX 4. TECHNICAL SPECIFICATIONS RELATED TO AIRCRAFT OBSERVATIONS AND REPORTS

(See Chapter 5 of this Annex.)

1. CONTENTS OF AIR-REPORTS

Editorial Note.— Amend "temperature" to read "air temperature" all through Appendix 4.

. . .

Editorial Note.— Delete Section 1.3

~~1.4~~ 1.3 Special air-reports by voice communications

When voice communications are used, the elements contained in special air-reports shall be:

Message type designator

Section 1 (Position information)
Aircraft identification
Position or latitude and longitude
Time
~~Flight l~~Level or ~~altitude~~range of levels

Section 3 (Meteorological information)
Condition prompting the issuance of a special air-report, to be selected from the list presented in Table A4-2.

. . .

2. CRITERIA FOR REPORTING

. . .

2.3 Wind speed

. . .

The wind speed shall be reported in ~~kilometres per hour~~ metres per second or knots, rounded to the nearest ~~2 km/h~~1 m/s (1 knot). The units of measurement used for the wind speed shall be indicated.

. . .

2.6 Turbulence

. . .

2.6.2 Interpretation of the turbulence report

Turbulence shall be considered:

a) severe when the peak value of the cube root of EDR exceeds 0.7;

b) moderate when the peak value of the cube root of EDR is above 0.4 and below or equal to 0.7;

c) light when the peak value of the cube root of EDR is above 0.1 and below or equal to 0.4; and

d) nil when the peak value of the cube root of EDR is below or equal to 0.1.

. . .

2.6.3 Special air-reports

Special air-reports on turbulence shall be made during any phase of the flight whenever the peak value of the cube root of EDR exceeds ~~0.7~~0.4. The special air-report on turbulence shall be made with reference to the 1-minute period immediately preceding the observation. Both the average and peak value of turbulence shall be observed. The average and peak values shall be reported in terms of the cube root of EDR. Special air-reports shall be issued every minute until such time as the peak values of the cube root of EDR fall below ~~0.7~~0.4.

3. EXCHANGE OF AIR-REPORTS

3.1 Responsibilities of the meteorological watch offices

~~3.1.1 The meteorological watch offices shall assemble the routine air-reports received by voice communications and shall disseminate them to WAFCs and other meteorological offices in accordance with regional air navigation agreement.~~

~~*Note. — The exchange of collectives on an hourly basis may be found desirable when reports are numerous.*~~

Editorial Note.— Renumber subsequent paragraphs accordingly.

. . .

3.~~1.4~~1.3 When a special air-report is received at the meteorological watch office but the forecaster considers that the phenomenon causing the report is not expected to persist and, therefore, does not warrant issuance of a SIGMET, the special air-report shall be disseminated in the same way that SIGMET messages are disseminated in accordance with Appendix 6, 1.2.1, i.e. to meteorological watch offices, WAFCs, and other meteorological offices in accordance with regional air navigation agreement.

Note. — The template used for special air-reports which are uplinked to aircraft in flight is in Appendix 6, Table A6-1.

. . .

3.4 Format of air-reports

Air-reports shall be exchanged in the format in which they are received~~, except that when voice communications are used, if the position is given by reference to an ATS reporting point, it shall be converted, by the meteorological watch office, into the corresponding latitude and longitude~~.

. . .

Table A4-2. Template for the special air-report (downlink)

. . .

Element as specified in Chapter 5	*Detailed content*	*Template(s)*	*Examples*
Message type designator (M)	Type of ~~the~~ air-report (M)	ARS	ARS
. . .			
Level (M)	Flight level (M)	FLnnn *or* FLnnn to FLnnn	FL330 FL280 to FL310
. . .			
Wind speed (M)	Wind speed in kilometres per hour (*or* knots) (M)	Nnn~~KMH~~MPS (*or* nnnKT)	~~158KMH~~40MPS (0~~79~~80KT)
. . .			
Turbulence (C)	Turbulence in hundredths of $m^{2/3} s^{-1}$ and the time of occurrence of the peak value (C)[1]	EDRnnn/nn	
. . .			
DATA BLOCK 3			
Condition prompting the issuance of a special air-report (M)		SEV TURB [EDRnnn][2] *or* SEV ICE *or* SEV MTW *or* TS GR[3] *or* TS[3] *or* HVY SS[4] *or* VA CLD [FL nnn/nnn] *or* VA[5] [MT nnnnnnnnnnnnnnnnnnnn] *or* MOD TURB [EDRnnn][2] *or* MOD ICE	SEV TURB EDR076 VA CLD FL050/100

. . .

Table A4-3. Ranges and resolutions for the meteorological elements included in air-reports

Element as specified in Chapter 5	*Range*	*Resolution*
Wind direction: °true	000 – 360	1
Wind speed: ~~KMH~~MPS KT	00 – ~~500~~125 00 – 250	~~2~~1 1
. . .		
* Non-dimensional		

. . .

APPENDIX 5. TECHNICAL SPECIFICATIONS RELATED TO FORECASTS

(See Chapter 6 of this Annex.)

1. CRITERIA RELATED TO TAF

. . .

1.2 Inclusion of meteorological elements in TAF

Note.— Guidance on operationally desirable accuracy of forecasts is given in Attachment B.

1.2.1 Surface wind

~~**Recommendation.**~~ —In forecasting surface wind, the expected prevailing direction ~~should~~ shall be given. When it is not possible to forecast a prevailing surface wind direction due to its expected variability, for example, during light wind conditions (less than ~~6 km/h~~1.5 m/s (3 kt)) or thunderstorms, the forecast wind direction ~~should~~ shall be indicated as variable using "VRB". When the wind is forecast to be less than ~~2 km/h~~0.5 m/s (1 kt), the forecast wind speed ~~should~~ shall be indicated as calm. When the forecast maximum speed (gust) exceeds the forecast mean wind speed by ~~20 km/h~~5 m/s (10 kt) or more, the forecast maximum wind speed ~~should~~ shall be indicated. When a wind speed of ~~200 km/h~~50 m/s (100 kt) or more is forecast, it ~~should~~ shall be indicated to be more than ~~199 km/h~~49 m/s (99 kt).

. . .

1.2.3 Weather phenomena

~~**Recommendation.**~~ —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, ~~should~~ 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 dust, sand or snow
— blowing dust, sand or snow
— duststorm
— sandstorm
— thunderstorm (with or without precipitation)
— squall
— funnel cloud (tornado or waterspout)
— other weather phenomena given in Appendix 3, 4.4.2.3, ~~only if they are expected to cause a significant change in visibility~~as agreed by the meteorological authority with the ATS authority and operators concerned.

The expected end of occurrence of those phenomena ~~should~~ shall be indicated by the abbreviation "NSW".

1.2.4 Cloud

Recommendation.— *Cloud amount should be forecast using the abbreviations "FEW", "SCT", "BKN" or "OVC" as necessary. When it is expected that the sky will remain or become obscured and clouds cannot be forecast and information on vertical visibility is available at the aerodrome, the vertical visibility should be forecast in the form "VV" followed by the forecast value of the vertical visibility. When several layers or masses of cloud are forecast, their amount and height of base should be included in the following order:*

a) the lowest layer or mass regardless of amount, to be forecast as FEW, SCT, BKN or OVC as appropriate;

b) the next layer or mass covering more than 2/8, to be forecast as SCT, BKN or OVC as appropriate;

c) the next higher layer or mass covering more than 4/8, to be forecast as BKN or OVC as appropriate; and

d) cumulonimbus clouds and/or towering cumulus clouds, whenever forecast and not already included under a) to c).

Cloud information should be limited to cloud of operational significance; when no cloud of operational significance is forecast, and "CAVOK" is not appropriate, the abbreviation "NSC" should be used.

. . .

1.3 Use of change groups

Note.— Guidance on the use of change and time indicators in TAF is given in Table A5-2.

1.3.1 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 thereof)
— thunderstorm (with precipitation)
— duststorm
— sandstorm.

~~1.3.1~~1.3.2 **Recommendation.—** *The criteria used for the inclusion of change groups in TAF or for the amendment of TAF should be based on the following:*

a) when the mean surface wind direction is forecast to change by 60° or more, the mean speed before and/or after the change being ~~20 km/h~~ 5 m/s (10 kt) or more;

b) when the mean surface wind speed is forecast to change by ~~20 km/h~~ 5 m/s (10 kt) or more;

c) when the variation from the mean surface wind speed (gusts) is forecast to increase by ~~20 km/h~~ 5 m/s (10 kt) or more, the mean speed before and/or after the change being ~~30 km/h~~ 7.5 m/s (15 kt) or more;

. . .

~~*f) when any of the following weather phenomena or combinations thereof are forecast to begin or end or change in intensity:*~~

~~*freezing precipitation*~~
~~*moderate or heavy precipitation (including showers thereof)*~~
~~*thunderstorm (with precipitation)*~~
~~*duststorm*~~
~~*sandstorm;*~~

Editorial Note.—Renumber subsequent paragraphs and sub-paragraphs accordingly.

. . .

2. CRITERIA RELATED TO TREND FORECASTS

. . .

2.2 Inclusion of meteorological elements in trend forecasts

. . .

2.2.2 Surface wind

The trend forecast shall indicate changes in the surface wind which involve:

a) a change in the mean wind direction of 60° or more, the mean speed before and/or after the change being ~~20 km/h~~5 m/s (10 kt) or more;

b) a change in mean wind speed of ~~20 km/h~~ 5 m/s (10 kt) or more; and

. . .

2.2.4 Weather phenomena

2.2.4.1 The trend forecast shall indicate the expected onset, cessation or change in intensity of one or more of the following weather phenomena or combinations thereof:

— freezing precipitation
— moderate or heavy precipitation (including showers thereof)
— thunderstorm (with precipitation)
— duststorm
— sandstorm
— other weather phenomena given in Appendix 3, 4.4.2.3, ~~only if they are expected to cause a significant change in visibility~~as agreed by the meteorological authority with the ATS authority and operators concerned.

. . .

2.3 Use of change groups

. . .

2.3.2 The change indicator "BECMG" shall be used to describe forecast changes where the meteorological conditions are expected to reach or pass through specified values at a regular or irregular rate. The period during which, or the time at which, the change is forecast to occur shall be indicated, using the abbreviations "FM", "TL", or "AT", as appropriate, each followed by a time group in hours and minutes. When the change is forecast to begin and end wholly within the trend forecast period, the beginning and end of the change shall be indicated by using the abbreviations "FM" and "TL", respectively, with their associated time groups. When the change is forecast to commence at the beginning of the trend forecast period but be completed before the end of that period, the abbreviation "FM" and its associated time group shall be omitted and only "TL" and its associated time group shall be used. When the change is forecast to begin during the trend forecast period and be completed at the end of that period, the abbreviation "TL" and its associated time group shall be omitted and only "FM" and its associated time group shall be used. When the change is forecast to occur at a specified time during the trend forecast period, the abbreviation "AT" followed by its associated time group shall be used. When the change is forecast to commence at the beginning of the trend forecast period and be completed by the end of that period or when the change is forecast to occur within the trend forecast period but the time is uncertain, the abbreviations "FM", "TL" or "AT" and their associated time groups shall be omitted and the change indicator "BECMG" shall be used alone.

. . .

Table A5-1. Template for TAF

. . .

Element as specified in Chapter 6	*Detailed content*	*Template(s)*				*Examples*
Identification of the type of forecast (M)	Type of forecast (M)	TAF *or* TAF AMD *or* TAF COR				TAF TAF AMD
. . .						
Surface wind (M)	Wind direction (M)	nnn *or* VRB[2]				24015KMH04MPS; VRB04KMH01MPS (24008KT); (VRB02KT) 19022KMH05MPS (19011KT)
	Wind speed (M)	[P]nn[n]				00000KMH (00000KT) 140P199KMH49MPS (140P99KT)
	Significant speed variations (C)[3]	G[P]nn[n]				12012G35KMH09MPS (12006G18KT) 24032G54KMH14MPS (24016G28KT)
	Units of measurement (M)	KMH MPS (*or* KT)				
. . .						
Cloud (M)[8]	Cloud amount and height of base or vertical visibility (M)	FEWnnn *or* SCTnnn *or* BKNnnn *or* OVCnnn	VVnnn *or* VV///	NSC		FEW010 VV005 OVC020 W/// NSC SCT005 BKN012 SCT008 BKN025CB
	Cloud type (C)[4]	CB *or* TCU	—			
. . .						
Expected significant	Change or probability	PROB30 [TEMPO] *or* PROB40 [TEMPO] *or* BECMG *or*				

Element as specified in Chapter 6	*Detailed content*	*Template(s)*				*Examples*
changes to one or more of the above elements during the period of validity (C)[4, 10]	indicator (M)	TEMPO *or* FM				
	Period of occurrence or change (M)	nnnn/nnnn				
	Wind (C)[4]	nnn[P]nn[n][G[P]nn[n]]~~KMH~~MPS *or* VRBnn~~KMH~~MPS (*or* nnn[P]nn[G[P]nn]KT *or* VRBnnKT)				TEMPO 0815/0818 250~~70~~17G~~100KMH~~25MPS (TEMPO 0815/0818 250~~35~~34G50KT) TEMPO 2212/2214 170~~25~~06G~~50KMH~~13MPS 1000 TSRA SCT010CB BKN020 (TEMPO 2212/2214 17012G~~25~~26KT 1000 TSRA SCT010CB BKN020) BECMG 3010/3011 00000~~KMH~~MPS 2400 OVC010 (BECMG 3010/3011 00000KT 2400 OVC010)
	Prevailing visibility (C)[4]	nnnn				
	Cloud amount and height of base or vertical visibility (C)[4]	FEWnnn *or* SCTnnn *or* BKNnnn *or* OVCnnn	VVnnn *or* VV///	NSC		FM051230 15015KMH 9999 BKN020 (FM051230 15008KT 9999 BKN020) BECMG 1618/1620 8000 NSW NSC
	Cloud type (C)[4]	CB *or* TCU	—			BECMG 2306/2308 SCT015CB BKN020

Notes.—

. . .

9. To be included in accordance with 1.2.5, consisting of up to a maximum of four temperatures (two maximum temperatures and two minimum temperatures).
10. To be included in accordance with 1.3, 1.4 and 1.5.

. . .

Table A5-3. Ranges and resolutions for the numerical elements included in TAF

. . .

Element as specified in Chapter 6		*Range*	*Resolution*
Wind direction:	° true	000 – 360	10
Wind speed:	~~KMH~~MPS KT	00 – ~~399~~99* 00 – 199*	1 1
Visibility:	M M M M	0000 – ~~0800~~0750 0800 – ~~5 000~~4900 5000 – ~~9 000~~9000 ~~9 000 – 9 999~~10000 -	50 100 1 000 ~~999~~0 (fixed value: 9999)
. . .			
* There is no aeronautical requirement to report surface wind speeds of ~~200~~ 50 ~~km/h~~m/s (100 kt) or more; however, provision has been made for reporting wind speeds up to ~~3~~99 ~~km/h~~m/s (199 kt) for non-aeronautical purposes, as necessary.			

Table A5-4. Template for GAMET

Key: M = inclusion mandatory, part of every message;
C = inclusion conditional, dependent on meteorological conditions;
O = inclusion optional;
= = a double line indicates that the text following it should be placed on the subsequent line.

Element	*Detailed content*	*Template(s)*	*Examples*
Location indicator of FIR/CTA (M)	ICAO location indicator of the ATS unit serving the FIR or CTA to which the GAMET refers (M)	nnnn	YUCC[1]
. . .			

Element	*Detailed content*	*Template(s)*			*Examples*
		Identifier and time	*Content*	*Location*	
. . .					
Surface wind (C)	Widespread surface wind exceeding ~~60 km/h~~15 m/s (30 kt)	SFC WSPD: [nn/nn]	[n]nn ~~KMH~~ MPS *(or* [n]nn KT)	[N of Nnn *or* Snn] *or* [S of Nnn *or* Snn] *or* [W of Wnnn *or* Ennn] *or* [E of Wnnn *or* Ennn] *or* [nnnnnnnnn][2]	SFC WSPD: 10/12 ~~65 KMH~~16 MPS SFC WSPD: 40 KT E OF W110
. . .					
SIGMET (C)	SIGMET messages applicable to the FIR/CTA concerned or a sub-area thereof, for which the area forecast is valid	SIGMET APPLICABLE:	n-[,n]-[,n]		SIGMET APPLICABLE: 3,5
. . .					
Upper winds and temperatures (M)	Upper winds and upper-air temperatures for at least the following altitudes: 600, 1 500 and 3 000 m (2 000, 5 000 and 10 000 ft)	WIND/T:	[n]nnn M (*or* [n]nnn FT) nnn/[n]nn ~~KMH~~MPS (*or* nnn/[n]nn KT) PSnn *or* MSnn	Nnnnn *or* Snnnn Wnnnnn *or* Ennnnn *Or …*	WIND/T: 2000 FT 270/~~70 KMH~~18 MPS PS03 5000 FT 250/~~80 KMH~~ 20 MPS MS02 10000 FT 240/~~85 KMH~~ 22 MPS MS11
. . .					
Sea-surface temperature and state of the sea (O)	Sea-surface temperature and state of the sea if required by regional air navigation agreement	SEA:	Tnn HGT [n]n-M		SEA: T15 HGT 5-M
. . .					

. . .

Example A5-1. TAF

TAF for YUDO (Donlon/International):*

TAF YUDO 160000Z 1606/1624 130~~18KMH~~ 05MPS 9000 BKN020 BECMG 1606/1608 SCT015CB BKN020 TEMPO 1608/1612 170~~25G45KMH~~ 06G12MPS 1000 TSRA SCT010CB BKN020 FM161230 150~~15KMH~~04MPS 9999 BKN020

Meaning of the forecast:

TAF for Donlon/International* issued on the 16th of the month at 0000 UTC valid from 0600 UTC to 2400 UTC on the 16th of the month; surface wind direction 130 degrees; wind speed ~~18 kilometres per hour~~5 metres per second; visibility 9 kilometres, broken cloud at 600 metres; becoming between 0600 UTC and 0800 UTC on the 16th of the month, scattered cumulonimbus cloud at 450 metres and broken cloud at 600 metres; temporarily between 0800 UTC and 1200 UTC on the 16th of the month surface wind direction 170 degrees; wind speed ~~25 kilometres per hour~~6 metres per second gusting to ~~45 kilometres per hour~~12 metres per second; visibility 1 000 metres in a thunderstorm with moderate rain, scattered cumulonimbus cloud at 300 metres and broken cloud at 600 metres; from 1230 UTC on the 16th of the month surface wind direction 150 degrees; wind speed ~~15 kilometres per hour~~4 metres per second; visibility 10 kilometres or more; and broken cloud at 600 metres.

* Fictitious location

Note.— In this example, the primary units "~~kilometre per hour~~metre per second" and "metre" were used for wind speed and height of cloud base, respectively. However, in accordance with Annex 5, the corresponding non-SI alternative units "knot" and "foot" may be used instead.

Example A5-3. GAMET area forecast

YUCC GAMET VALID 220600/221200 YUDO
YUCC AMSWELL FIR/2 BLW FL~~100~~120
SECN I

SFC WSPD:	10/12 ~~65 KMH~~16 MPS
SFC VIS:	06/08 3000 M BR N OF N51
SIGWX:	11/12 ISOL TS
SIG CLD:	06/09 OVC 800/1100 FT AGL N OF N51 10/12 ISOL TCU 1200/8000 FT AGL
ICE:	MOD FL050/080
TURB:	MOD ABV FL090
SIGMETS APPLICABLE:	3,-5

SECN II

PSYS:	06 L 1004 HPA N5130 E01000 MOV NE 25 KT WKN
WIND/T:	2000 FT 270/~~70 KMH~~18 MPS PS03 5000 FT 250/~~80 KMH~~20 MPS MS02 10000 FT 240/~~85 KMH~~22 MPS MS11
CLD:	BKN SC 2500/8000 FT AGL
FZLVL:	3000 FT AGL
MNM QNH:	1004 HPA
SEA:	T15 HGT 5M
VA:	NIL

Meaning: An area forecast for low-level flights (GAMET) issued for sub-area two of the Amswell* flight information region (identified by YUCC Amswell area control centre) for below flight level ~~100~~120 by the Donlon/International* meteorological office (YUDO); the message is valid from 0600 UTC to 1200 UTC on the 22nd of the month.

Section I:

surface wind speeds:	between 1000 UTC and 1200 UTC ~~65 kilometres per hour~~ 16 metres per second;
surface visibility:	between 0600 UTC and 0800 UTC 3 000 metres north of 51 degrees north (due to mist);
significant weather phenomena:	between 1100 UTC and 1200 UTC isolated thunderstorms without hail;
significant clouds:	between 0600 UTC and 0900 UTC overcast base 800, top 1 100 feet above ground level north of 51 degrees north; between 1000 UTC and 1200 UTC isolated towering cumulus base 1 200, top 8 000 feet above ground level;
icing:	moderate between flight level 050 and 080;
turbulence:	moderate above flight level 090 (at least up to flight level ~~100~~ 120);
SIGMET messages:	3 and 5 applicable to the validity period and sub-area concerned.

Section II:

pressure systems:	at 0600 UTC low pressure of 1 004 hectopascals at 51.5 degrees north 10.0 degrees east, expected to move north-eastwards at 25 knots and to weaken;
winds and temperatures:	at 2 000 feet above ground level wind direction 270 degrees; wind speed ~~70 kilometres per hour~~ 18 metres per second, temperature plus 3 degrees Celsius; at 5 000 feet above ground level wind direction 250 degrees; wind speed ~~80 kilometres per hour~~ 20 metres per second, temperature minus 2 degrees Celsius; at 10 000 feet above ground level wind direction 240 degrees; wind speed ~~85 kilometres per hour~~ 22 metres per second, temperature minus 11 degrees Celsius;
clouds:	broken stratocumulus, base 2 500 feet, top 8 000 feet above ground level;
freezing level:	3 000 feet above ground level;
minimum QNH:	1 004 hectopascals;
sea:	surface temperature 15 degrees Celsius; and state of the sea 5 metres;
volcanic ash:	nil.

* Fictitious location~~s~~

APPENDIX 6. TECHNICAL SPECIFICATIONS RELATED TO SIGMET AND AIRMET INFORMATION, AERODROME WARNINGS AND WIND SHEAR WARNINGS AND ALERTS

(See Chapter 7 of this Annex.)

1.1 Format of SIGMET messages

. . .

1.1.4 In accordance with the template in Table A6-1, only one of the following phenomena shall be included in a SIGMET message, using the abbreviations as indicated below:

At cruising levels (irrespective of altitude):

. . .

	tropical cyclone	
—	tropical cyclone with 10-minute mean surface wind speed of ~~63 km/h~~17 m/s (34 kt) or more	TC (+ cyclone name)

. . .

2.1.4 In accordance with the template in Table A6-1, only one of the following phenomena shall be included in an AIRMET message, using the abbreviations as indicated below:

At cruising levels below flight level 100 (or below flight level 150 in mountainous areas, or higher, where necessary):

—	surface wind speed		
	–	widespread mean surface wind speed above ~~60 km/h~~15 m/s (30 kt)	SFC WSPD (+ wind speed and units)

. . .

5. SPECIFICATIONS RELATED TO AERODROME WARNINGS

5.1 Format and dissemination of aerodrome warnings

. . .

5.1.3 **Recommendation.—** *In accordance with the template in Table A6-2, aerodrome warnings should relate to the occurrence or expected occurrence of one or more of the following phenomena:*

. . .

— *tropical cyclone (to be included if the 10-minute mean surface wind speed at the aerodrome is expected to be ~~63 km/h~~17 m/s (34 kt) or more)*

. . .

— *volcanic ash*
— *tsunami*
— *volcanic ash deposition*
— *toxic chemicals*
— *other phenomena as agreed locally.*

. . .

Table A6-1. Template for SIGMET and AIRMET messages and special air-reports (uplink)

. . .

Element as specified in Chapter 5 and Appendix 6	*Detailed content*	*Template(s)*			*Examples*
		SIGMET	*AIRMET*	*SPECIAL AIR-REPORT*[1]	
. . .					
Location indicator of MWO (M)	Location indicator of MWO originating the message with a separating hyphen (M)	nnnn–			YUDO–[3] YUSO–[3]
. . .					
IF THE SIGMET IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.					
Phenomenon (M)[7]	Description of phenomenon causing the issuance of SIGMET/AIRMET (C)	OBSC[8] TS[GR[9]] EMBD[10] TS[GR] FRQ[11] TS[GR] SQL[12] TS[GR] TC nnnnnnnnnn *or* NN[25] SEV TURB[13] SEV ICE[14] SEV ICE (FZRA)[14] SEV MTW[15] HVY DS HVY SS [VA ERUPTION] [MT] [nnnnnnnnnn] [~~LOC~~PSN Nnn[nn] *or* Snn[nn] Ennn[nn] *or* Wnnn[nn]] VA CLD RDOACT CLD	SFC WSPD nn[n]~~KMH~~MPS *(or* SFC WSPD nn[n]KT) SFC VIS nnnnM (nn)[16] ISOL[17] TS[GR][9] OCNL[18] TS[GR] MT OBSC BKN CLD nnn/[ABV]nnnnM (*or* BKN CLD nnn/[ABV]nnnnFT) OVC CLD nnn/[ABV]nnnnM (*or* OVC CLD nnn/[ABV]nnnnFT) ISOL[17] CB[19] OCNL[18] CB FRQ[11] CB ISOL[17] TCU[19] OCNL[18] TCU[19] FRQ[11] TCU MOD TURB[13] MOD ICE[14] MOD MTW[15]	TS TSGR SEV TURB SEV ICE SEV MTW HVY SS VA CLD [FL nnn/nnn] VA [MT nnnnnnnnnn MOD TURB MOD ICE	SEV TURB FRQ TS OBSC TSGR EMBD TSGR TC GLORIA TC NN VA ERUPTION MT ASHVAL ~~LOC~~PSN S15 E073 VA CLD MOD TURB MOD MTW ISOL CB BKN CLD 120/900M (BKN CLD 400/3000FT) OVC CLD 270/ABV3000M (OVC CLD 900/ABV10000FT) SEV ICE RDOACT CLD

Element as specified in Chapter 5 and Appendix 6	*Detailed content*	*Template(s)*			*Examples*
		SIGMET	*AIRMET*	*SPECIAL AIR-REPORT*[1]	
Observed or forecast phenomenon (M)	Indication whether the information is observed and expected to continue, *or* forecast (M)	OBS [AT nnnnZ] FCST [AT nnnnZ]		OBS AT nnnnZ	OBS AT 1210Z OBS FCST AT 1815Z
Location (C)[6]	Location (referring to latitude and longitude (in degrees and minutes) *or* locations *or* geographic features well known internationally)	Nnn[nn] Wnnn[nn] *or* Nnn[nn] Ennn[nn] *or* Snn[nn] Wnnn[nn] *or* Snn[nn] Ennn[nn] *or* N OF Nnn[nn] *or* S OF Nnn[nn] *or* N OF Snn[nn] *or* S OF Snn[nn] *or* [AND] W OF Wnnn[nn] *or* E OF Wnnn[nn] *or* W OF Ennn[nn] *or* E OF Ennn[nn] *or* [N OF, NE OF, E OF, SE OF, S OF, SW OF, W OF, NW OF] [LINE] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] *or* [N OF, NE OF, E OF, SE OF, S OF, SW OF, W OF, NW OF, AT] nnnnnnnnnnnn *or* WI Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – [Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]]		NnnnnWnnnnn *or* NnnnnW~~E~~nnnnn *or* SnnnnWnnnnn *or* SnnnnEnnnnn	S OF N54 N OF N50 N2020 W07005 AT YUSB[3] N2706 W07306 N48 E010 N OF N1515 AND W OF E13530 W OF E1554 N OF LINE S2520 W11510 – S2520 W12010 WI N6030 E02550 – N6055 E02500 – N6050 E02630
Level (C)[6]	Flight level or altitude and extent[20] (C)	[SFC/]FLnnn *or* [SFC/]nnnnM (*or* [SFC/]nnnnFT) *or* FLnnn/nnn *or* TOP FLnnn *or* [TOP] ABV FLnnn ~~*or* [TOP] BLW FLnnn *or* BLW nnnnM (*or* BLW nnnnFT~~ *or* [21] CB TOP [ABV] FLnnn WI nnnKM OF CENTRE (*or* CB TOP [ABV] FLnnn WI nnnNM OF CENTRE) *or* CB TOP [BLW] FLnnn WI nnnKM OF CENTRE (*or* CB TOP [BLW] FLnnn WI nnnNM OF CENTRE) *or* [22] FLnnn/nnn [APRX nnnKM BY nnnKM] [nnKM WID LINE[23] BTN (nnNM WID LINE BTN)] [Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]]] (*or* FLnnn/nnn [APRX nnnNM BY nnnNM] [Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]]])		FLnnn *or* nnnnM (*or* nnnnFT)	FL180 FL050/080 TOP FL390 ~~BLW FL200~~ SFC/FL070 TOP ABV FL100 FL310/450 CB TOP FL500 WI 270KM OF CENTRE (CB TOP FL500 WI 150NM OF CENTRE) FL310/350 APRX 220KM BY 35KM FL390
Movement *or* expected movement (C)[6]	Movement *or* expected movement (direction and speed) with reference to one of the ~~eight~~sixteen points of compass, *or* stationary (C)	MOV N [nnKMH] *or* MOV NNE [nnKMH] *or* MOV NE [nnKMH] *or* MOV ENE [nnKMH] *or* MOV E [nnKMH] *or* MOV ESE [nnKMH] *or* MOV SE [nnKMH] *or* MOV SSE [nnKMH] *or* MOV S [nnKMH] *or* MOV SSW [nnKMH] *or* MOV SW [nnKMH] *or* MOV WSW [nnKMH] *or* MOV W [nnKMH] *or* MOV WNW [nnKMH] *or* MOV NW [nnKMH] *or* MOV NNW [nnKMH] (*or* MOV N [nnKT] *or* MOV NNE [nnKT] *or* MOV NE [nnKT] *or* MOV ENE [nnKT] *or* MOV E [nnKT] *or* MOV ESE [nnKT] *or* MOV SE [nnKT] *or* MOV SSE [nnKT] *or* MOV S[nnKT] *or* MOV		—	MOV E 40KMH (MOV E 20KT) MOV SE STNR

Element as specified in Chapter 5 and Appendix 6	*Detailed content*	*Template(s)*			*Examples*
		SIGMET	*AIRMET*	*SPECIAL AIR-REPORT*[1]	
		SSW [nnKT] *or* MOV SW [nnKT] *or* MOV WSW [nnKT] *or* MOV W [nnKT] *or* MOV WNW [nnKT] *or* MOV NW [nnKT] *or* MOV NNW [nnKT]) *or* STNR			
Changes in intensity (C)[26]	Expected changes in intensity (C)	INTSF *or* WKN *or* NC		—	WKN
Forecast position (C)[20,26]	Forecast position of volcanic ash cloud *or* the centre of the TC at the end of the validity period of the SIGMET message (C)	FCST nnnnZ TC CENTRE Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] *or* FCST nnnnZ VA CLD APRX [nnKM WID LINE[23] BTN (nnNM WID LINE BTN)] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [AND][27]	—	—	FCST 2200Z TC CENTRE N2740 W07345 FCST 1700Z VA CLD APRX S15 E075 – S15 E081 – S17 E083 – S18 E079 – S15 E075

. . .

24. End of the message (as the SIGMET/AIRMET message is being cancelled).
25. Used for unnamed tropical cyclones.
26. In the case of the same phenomenon covering more than one area within the FIR, these elements can be repeated, as necessary.
27. To be used for two volcanic ash clouds or two centres of tropical cyclones simultaneously affecting the FIR concerned.

. . .

Table A6-2. Template for aerodrome warnings

. . .

Element	*Detailed content*	*Template(s)*	*Examples*
. . .			

IF THE AERODROME WARNING IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.			
Phenomenon (M)[2]	Description of phenomenon causing the issuance of the aerodrome warning	TC[3] nnnnnnnnnn *or* [HVY] TS *or* GR *or* [HVY] SN [nnCM][3] *or* [HVY] FZRA *or* [HVY] FZDZ *or* RIME[4] *or* [HVY] SS *or* [HVY] DS *or* SA *or* DU *or* SFC WSPD nn[n]~~KMH~~MPS MAX nn[n] (SFC WSPD nn[n]KT MAX nn[n]) *or* SFC WIND nnn/nn[n]MPS MAX nn[n] (SFC WIND nnn/nn[n]KT MAX nn[n]) *or* SQ *or* FROST *or* TSUNAMI *or* VA[DEPO] *or* TOX CHEM *or* *Free text up to 32 characters* [5]	TC ANDREW HVY SN 25CM SFC WSPD ~~80KMH~~20MPS MAX ~~120~~30 VA TSUNAMI
. . .			

. . .

Table A6-3. Template for wind shear warnings

. . .

Element	*Detailed content*	*Template(s)*	*Example*s
. . .			
Time of origin and validity period (M)	Day and time of issue and, where applicable, validity period in UTC	nnnnnn [VALID TL nnnnnn] *or* [VALID nnnnnn/nnnnnn]	211230 VALID TL 211330 221200 VALID 221215/221315
IF THE WIND SHEAR WARNING IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.			
. . .			
Details of the phenomenon (C)[2]	Description of phenomenon causing the issuance of the wind shear warning	SFC WIND: nnn/nn~~KMH~~MPS (*or* nnn/nnKT) nnnM (nnnFT)-WIND: nnn/nn~~KMH~~MPS (*or* nnn/nnKT) *or* nnKMH (*or* nnKT) ~~ASPEEDL~~LOSS nnKM (*or* nnNM) FNA RWYnn *or* nn (*or* nnKT) ~~ASPEEDG~~GAIN nnKM (*or* nnNM) FNA RWYnn	SFC WIND: 320/~~20KMH~~5MPS 60M-WIND: 360/~~50KMH~~13MPS (SFC WIND: 320/10KT 200FT-WIND: 360/~~25~~26KT) 60KMH ~~ASPEEDLL~~LOSS 4KM FNA RWY13 (30KT ~~ASPEEDL~~LOSS 2NM FNA RWY13)

. . .

Table A6-4. Ranges and resolutions for the numerical elements included in volcanic ash and tropical cyclone advisory messages, SIGMET/AIRMET messages and aerodrome and wind shear warnings

Element as specified in Appendices 2 and 6		*Range*	*Resolution*
Summit elevation:	M FT	000 – 8 100 000 – 27 000	1 1
Advisory number:	for VA (index)* for TC (index)*	000 – 2 000 00 – 99	1 1
Maximum surface wind:	~~KMH~~MPS KT	00 – ~~399~~99 00 – 199	1 1
Central pressure:	hPa	850 – 1 050	1
Surface wind speed:	~~KMH~~MPS KT	~~60~~15 – ~~199~~49 30 – 99	1 1
Surface visibility:	M M	0000 – ~~0800~~0750 0800 – 5 000	50 100
Cloud: height of base:	M FT	000 – 300 000 – 1 000	30 100
Cloud: height of top:	M M FT FT	000 – ~~3 000~~2 970 3 000 – 20 000 000 – ~~10 000~~9 900 10 000 – 60 000	30 300 100 1 000
. . .			
* Non-dimensional			

Example A6-2. SIGMET message for tropical cyclone

YUCC SIGMET 3 VALID 251600/252200 YUDO –
YUCC AMSWELL FIR TC GLORIA OBS AT 1600Z N2706 W07306 CB TOP FL500 WI 150NM OF CENTRE MOV NW 10KT NC FCST 2200Z TC CENTRE N2740 W07345

Meaning:

The third SIGMET message issued for the AMSWELL* flight information region (identified by YUCC Amswell area control centre) by the Donlon/International* meteorological watch office (YUDO) since 0001 UTC; the message is valid from 1600 UTC to 2200 UTC on the 25th of the month; tropical cyclone Gloria was observed at 1600 UTC at 27 degrees ~~06~~6 minutes north and 73 degrees 6 minutes west with cumulonimbus top at flight level 500 within 150 nautical miles of the centre; the tropical cyclone is expected to move northwestwards at 10 knots and not to undergo any changes in intensity; the forecast position of the centre of the tropical cyclone at 2200 UTC is expected to be at 27 degrees 40 minutes north and 73 degrees 45 minutes west.

* Fictitious locations

Example A6-3. SIGMET message for volcanic ash

YUDD SIGMET 2 VALID 211100/211700 YUSO –
YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL ~~LOC~~PSN S1500 E07348 VA CLD OBS AT 1100Z FL310/450 APRX 220KM BY 35KM S1500 E07348 - S1530 E07642 MOV SE 65KMH FCST 1700Z VA CLD APRX S1506 E07500 - S1518 E08112 - S1712 E08330 - S1824 E07836

Meaning:

. . .

Example A6-4. SIGMET message for severe turbulence

YUCC SIGMET 5 VALID 221215/221600 YUDO –
YUCC AMSWELL FIR SEV TURB OBS AT 1210Z AT YUSB FL250 MOV E 40KMH WKN

Meaning:

. . .

Example A6-5. AIRMET message for moderate mountain wave

YUCC AIRMET 2 VALID 221215/221600 YUDO –
YUCC AMSWELL FIR MOD MTW OBS AT 1205Z ~~AND FCST~~ N48 E010 FL080 STNR NC

Meaning:

. . .

. . .

APPENDIX 8. TECHNICAL SPECIFICATIONS RELATED TO SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

(See Chapter 9 of this Annex.)

. . .

2. SPECIFICATIONS RELATED TO INFORMATION FOR PRE-FLIGHT PLANNING AND IN-FLIGHT RE-PLANNING

2.1 Format of upper-air gridded information

Upper-air gridded information supplied by WAFCs for pre-flight and in-flight re-planning shall be in the GRIB code form.

. . .

2.3 Specific needs of helicopter operations

Recommendation.— *Meteorological information for pre-flight planning and in-flight re-planning by operators of helicopters flying to offshore structures should include data covering the layers from sea level to flight level 100. Particular mention should be made of the expected surface visibility, the amount, type (where available), base and tops of cloud below flight level 100, sea state and ~~sea~~ sea-surface temperature, mean sea-level pressure, and the occurrence and expected occurrence of turbulence and icing, as determined by regional air navigation agreement.*

. . .

4. SPECIFICATIONS RELATED TO FLIGHT DOCUMENTATION

4.1 Presentation of information

. . .

4.1.2 METAR and SPECI (including trend forecasts as issued in accordance with regional air navigation agreement), TAF, GAMET, SIGMET ~~and~~, AIRMET and volcanic ash and tropical cyclone advisory information shall be presented in accordance with the templates in Appendices 1, 2, 3, 5 and 6, respectively. ~~METAR, SPECI, TAF, GAMET, SIGMET and AIRMET~~ Such meteorological information received from other meteorological offices shall be included in flight documentation without change.

. . .

6. SPECIFICATIONS RELATED TO INFORMATION FOR AIRCRAFT IN FLIGHT

. . .

6.2 Information for in-flight planning by the operator

Recommendation.— *Meteorological information for planning by the operator for aircraft in flight should be supplied during the period of the flight and should normally consist of any or all of the following:*

. . .

c) SIGMET and AIRMET information and special air-reports relevant to the flight, unless the latter have been the subject of a SIGMET message; ~~and~~

d) upper wind and upper-air temperature information~~.~~;

e) volcanic ash and tropical cyclone advisory information relevant to the flight; and

f) other meteorological information in alphanumeric or graphical form as agreed between the meteorological authority and the operator concerned.

Note.— Guidance on the display of graphical information in the cockpit is provided in the Manual of Aeronautical Meteorological Practice *(Doc 8896).*

. . .

APPENDIX 9. TECHNICAL SPECIFICATIONS RELATED TO INFORMATION FOR AIR TRAFFIC SERVICES, SEARCH AND RESCUE SERVICES AND AERONAUTICAL INFORMATION SERVICES

(See Chapter 10 of this Annex.)

1. INFORMATION TO BE PROVIDED FOR AIR TRAFFIC SERVICES UNITS

. . .

1.3 List of information for the area control centre and flight information centre

The following meteorological information shall be supplied, as necessary, to a flight information centre or an area control centre by its associated meteorological watch office:

. . .

APPENDIX 10. TECHNICAL SPECIFICATIONS RELATED TO REQUIREMENTS FOR AND USE OF COMMUNICATIONS

(See Chapter 11 of this Annex.)

. . .

2. USE OF AERONAUTICAL FIXED SERVICE COMMUNICATIONS AND THE PUBLIC INTERNET

2.1 Meteorological bulletins in alphanumeric format

. . .

2.1.3 Heading of bulletins

Meteorological bulletins containing operational meteorological information to be transmitted via the aeronautical fixed service ~~facilities~~or the public Internet shall contain a heading consisting of:

. . .

d) if required, a three-letter indicator.

Note 1.— Detailed specifications on format and contents of the heading are given in ~~the~~ WMO Publication No. 386, Manual on the Global Telecommunication System*, Volume I and are reproduced in the* Manual of Aeronautical Meteorological Practice *(Doc 8896).*

. . .

2.2 World area forecast system products

2.2.1 Telecommunications for the supply of WAFS products

Recommendation.— *The telecommunications facilities used for the supply of world area forecast system products should be the aeronautical fixed service or the public Internet.*

. . .

2.2.4 Heading of bulletins containing WAFS products

Meteorological bulletins containing WAFS products in digital form to be transmitted via aeronautical fixed service ~~facilities~~ or the public Internet shall contain a heading as given in 2.1.3.

. . .

3. USE OF AERONAUTICAL MOBILE SERVICE COMMUNICATIONS

3.1 Content and format of meteorological messages

3.1.1 The content~~s~~ and format of reports, forecasts and SIGMET information transmitted to aircraft shall be consistent with the provisions of Chapters 4, 6 and 7 of this Annex.

3.1.2 The content~~s~~ and format of air-reports transmitted by aircraft shall be consistent with the provisions of Chapter 5 of this Annex and the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444), Appendix 1.

. . .

ATTACHMENT A. OPERATIONALLY DESIRABLE ACCURACY OF MEASUREMENT OR OBSERVATION

. . .

Element to be observed	*Operationally desirable accuracy of measurement or observation**
. . .	
Mean surface wind	Direction: ± 10° Speed: ± ~~2 km/h~~ 0.5 m/s (1 kt) up to ~~20 km/h~~ 5 m/s (10 kt) ± 10% above ~~20 km/h~~ 5 m/s (10 kt)
Variations from the mean surface wind	± ~~4 km/h~~ 1 m/s (2 kt), in terms of longitudinal and lateral components

. . .

ATTACHMENT B. OPERATIONALLY DESIRABLE ACCURACY OF FORECASTS

. . . .

Element to be forecast	*Operationally desirable accuracy of forecasts*	*Minimum percentage of cases within range*
	TAF	
. . .		
Wind speed	± ~~10 km/h~~ 2.5 m/s (5 kt)	80% of cases
	TREND FORECAST	
. . .		
Wind speed	± ~~10 km/h~~ 2.5 m/s (5 kt)	90% of cases

Element to be forecast	*Operationally desirable accuracy of forecasts*	*Minimum percentage of cases within range*
. . .		
Cloud amount	~~±~~ One category below 450 m (1 500 ft) Occurrence or non-occurrence of BKN or OVC between 450 m (1 500 ft) and 3 000 m (10 000 ft)	90% of cases
. . .		
	FORECAST FOR TAKE-OFF	
Wind direction	± 20°	90% of cases
Wind speed	± ~~10 km/h~~ 2.5 m/s (5 kt) up to ~~50 km/h~~ 12.5 m/s (25 kt)	90% of cases
. . .		
	AREA, FLIGHT AND ROUTE FORECASTS	
Upper-air temperature	± 2°C (Mean for 900 km (500 NM))	90% of cases
Relative humidity	± 20%	90% of cases
Upper wind	± ~~20 km/h~~ 5 m/s (10 kt) (Modulus of vector difference for 900 km (500 NM))	90% of cases
Significant en-route weather phenomena and cloud	Occurrence or non-occurrence Location: ± 100 km (60 NM) Vertical extent: ± 300 m (1 000 ft) Flight level of tropopause: ± 300 m (1 000 ft) Max wind level: ± 300 m (1 000 ft)	80% of cases 70% of cases 70% of cases 80% of cases 80% of cases

ATTACHMENT C. SELECTED CRITERIA APPLICABLE TO AERODROME REPORTS

(The guidance in this table relates to Chapter 4 and Appendix 3.)

	Surface wind				*Visibility (VIS)*			*RVR*[1] *A B C (OBS TIME)* –10 –5 *(Time, MIN)*			*Present weather*	*Cloud*				*Temperature*	*Pressure (QNH, QFE)*		*Supplementary information*
												Amount			*Type*[2]				
Specifications	Directional variations[3]			Speed variations[3]	Directional variations[4]			Past tendency[5]		Variations[5]	No general criteria applicable to all the WX phenomena (for specific criteria, see Appendix 3, 4.4.2)	Layers reported if coverage				No criteria			
	≥ 60° and < 180°		≥ 180°	Exceeding the mean speed by ≥ ~~20 km/h~~5 m/s (10 kt)	General rule	Special cases Minimum VIS ≠ prevailing VIS		$\lvert\bar{R}_{5(AB)} - \bar{R}_{5(BC)}\rvert$		$\lvert\bar{R}_1 - \bar{R}_{10}\rvert$ > MAX [50 m or 20% × $\bar{R}_{10}$]		Lowest layer	Next layer >	Next higher layer >	CB[6] or TCU	Identification	Parameters reported	Updated if changes > agreed magnitude	Parameter to be included
	Mean speed					Minimum VIS < 1 500 m or < 0.5 × prevailing VIS	VIS fluctuating and prevailing VIS cannot be determined	< 100 m	≥ 100 m										
	~~< 6 km/h~~ 1.5 m/s (3 kt)	≥ ~~6 km/h~~1.5 m/s (3 kt)																	
Local routine and special report	2 min VRB + 2 extreme directions[11]	2 min mean + 2 extreme directions[11]	2 min VRB (no extremes)[11]	2 min Minimum and maximum speed	1 min VIS along the runway(s)	N/A	N/A	1 min N/A[8]				Always	2/8	4/8	Always	CB TCU	QNH QFE[9]	Yes	All[10]
METAR/ SPECI	10 min VRB (no extremes)	10 min mean + 2 extreme directions	10 min VRB (no extremes)	10 min Maximum speed[11]	10 min Prevailing VIS	Prevailing VIS and minimum VIS + direction	Minimum VIS	10 min No tendency observed ("N")	Upward ("U") or downward ("D")	1 min Minimum and maximum (instead of 10-minute mean)		Always	2/8	4/8	Always	CB TCU	QNH	No	Recent WX of operational significance and wind shear[12]
								No tendency available, the tendency is to be omitted											
Relevant reporting scales for all messages	Direction in three figures rounded off to the nearest 10 degrees (degrees 1 – 4 down, degrees 5 – 9 up)			Speed in 1 ~~km/h~~m/s or 1 kt Speed < ~~2 km/h~~0.5 m/s (1 kt) indicated as CALM	*If Step applicable* VIS < 800 m : 50 m 800 m ≤ VIS < 5 000 m : 100 m 5 000 m ≤ VIS < 10 km : 1 km VIS ≥ 10 km : None, given as 10 km or covered under CAVOK			*If Step applicable* RVR < 400 m : 25 m 400 m ≤ RVR ≤ 800 m : 50 m 800 m < RVR < 2 000 m : 100 m[13]			N/A	*If Step applicable* Base ≤ 3 000 m (10 000 ft) : 30 m (100 ft) (Reference level: Aerodrome elevation[14] or mean sea level for ~~off-shor~~offshore structures)					Rounded off to whole degrees: up for decimal 5	In whole hPa[15] rounding down for decimals 1 – 9		N/A

1

Notes.—

. . .

3. Considered for the past 10 minutes (exception: if the 10-minute period includes a *marked discontinuity* (i.e. the direction changes ≥ 30° with a speed ≥ ~~20 km/h~~5 m/s *or* the speed changes ≥ ~~20 km/h~~ 5 m/s lasting ≥ 2 minutes), only data after the discontinuity to be used).
4. If several directions, the most operationally significant direction used.
5. Let $\bar{R}_1$ = any 1-minute mean ~~RVR-value~~ RVR value during period AC, $\bar{R}_{10}$ = 10-minute mean ~~RVR-value~~ RVR value during period AC, $\bar{R}_{5(AB)}$ = 5-minute mean RVR-value during period AB and $\bar{R}_{5(BC)}$ = 5-minute mean ~~RVR-value~~ RVR value during period BC.

. . .

12. Also sea-surface temperature and state of the sea from ~~off-shore~~ offshore structures in accordance with regional air navigation agreement.

. . .

— END —