European Aviation Safety Agency

Acceptable Means of Compliance (AMC)

and

Guidance Material (GM)

to

Part-MET

Specific requirements for providers of meteorological services

Initial Issue

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SUBPART A — ADDITIONAL ORGANISATION REQUIREMENTS FOR PROVIDERS OF METEOROLOGICAL SERVICES (MET.OR)

Section 1 — General requirements

GM1 MET.OR.100 Meteorological data and information

DATA AND INFORMATION RELIABILITY

Owing to the variability of meteorological elements in space and time, to limitations of observing techniques and to limitations caused by the definitions of some of the elements, the specific value of any of the elements given in a forecast is understood to be the most probable value which the element is likely to assume during the period of the forecast. Similarly, when the time of occurrence or change of an element is given in a forecast, this time is understood to be the most probable time.

AMC1 MET.OR.100(a) Meteorological data and information

INFORMATION TO BE PROVIDED

An agreement between the meteorological services provider and the appropriate ATS unit should be established to cover:

(a) the provision in air traffic services units of displays related to integrated automatic systems;

(b) the calibration and maintenance of these displays/instruments;

(c) the use to be made of these displays/instruments by air traffic services personnel;

(d) as and where necessary, supplementary visual observations, such as meteorological phenomena of operational significance in the climb-out and approach areas, if and when made by air traffic services personnel to update or supplement the information supplied by the meteorological station;

(e) meteorological information obtained from aircraft taking off or landing such as on wind shear; and

(f) if available, meteorological information obtained from ground weather radar.

GM1 MET.OR.100(a) Meteorological data and information

OTHER AVIATION ENTITIES

The competent authority determines who may be the ‘other service providers and aviation entities’ that could be provided with the necessary meteorological information.

GM1 MET.OR.110 Meteorological information exchange requirements

GENERAL

Operational meteorological information is disseminated to international OPMET databanks and the centres for the operation of aeronautical fixed service satellite distribution systems.

GM2 MET.OR.110 Meteorological information exchange requirements

OPMET DATABANK

The list of relevant meteorological exchange requirements for OPMET can be found in the FASID tables in ICAO Doc 7754 (EUR ANP).

GM1 MET.OR.110(a) Meteorological information exchange requirements
AREA FORECASTS — LOW-LEVEL FLIGHTS

Area forecasts for low-level flights prepared in support of the issuance of AIRMET information are exchanged between aerodrome meteorological offices and/or meteorological watch offices responsible for the issuance of flight documentation for low-level flights in the flight information regions concerned.

GM1 MET.OR.120 Notification of discrepancies to the world area forecast centres (WAFCs)
REPORTING — SIGNIFICANT DISCREPANCIES

Guidance on reporting significant discrepancies is provided in the Manual of Aeronautical Meteorological Practice (ICAO Doc 8896).

Section 2 — Specific requirements

Chapter 1 — Requirements for aeronautical meteorological stations

GM1 MET.OR.200(a) Meteorological reports and other information
OBSERVATIONS AND REPORTS

The observations form the basis for the preparation of reports. At aerodromes, the routine observations are supplemented by special observations whenever specified changes occur in respect of surface wind, visibility, runway visual range, present weather, clouds and/or air temperature.

AMC1 MET.OR.200(a)(1) Meteorological reports and other information
ROUTINE OBSERVATIONS

Meteorological stations should make routine observations throughout the 24 hours of each day or as determined by the competent authority.

GM1 MET.OR.200(a)(2) Meteorological reports and other information
LOCAL SPECIAL REPORTS

By agreement between the aeronautical meteorological station and the appropriate ATS unit, local special reports may not be disseminated in respect of:

(a) any element for which there is in the local air traffic services unit a display corresponding to the one in the meteorological station, and where arrangements are in force for the use of this display to update information included in local routine reports and local special reports; and

(b) runway visual range, when all changes of one or more steps on the reporting scale in use are being reported to the local air traffic services unit by an observer on the aerodrome.

AMC1 MET.OR.200(a)(3) Meteorological reports and other information
METAR

At aerodromes that are not operational throughout the 24 hours, the issuance of a METAR should commence at least 3 hours prior to the aerodrome resuming operations, or as agreed between the meteorological services provider and the operators concerned to meet pre-flight and in-flight planning requirements for flights due to arrive at the aerodrome as soon as it is opened for use.

AMC2 MET.OR.200(a)(3) Meteorological reports and other information
METAR INTERVALS — NON-SCHEDULED INTERNATIONAL CAT

For aerodromes not serving scheduled international commercial air transport operations, the dissemination of hourly METAR and SPECI, as well as the criteria to provide SPECI, should be agreed between the competent authority and the meteorological services provider.

AMC1 MET.OR.200(c) Meteorological reports and other information
VOLCANIC ACTIVITY REPORT

The report of occurrence of pre-eruption volcanic activity, volcanic eruptions and volcanic ash clouds should be made in the format of a volcanic activity report comprising the following meteorological information in the order indicated:

(a) message type, VOLCANIC ACTIVITY REPORT;

(b) station identifier, location indicator or name of station;

(c) date/time of message;

(d) location of volcano and name, if known; and

(e) concise description of the event including, as appropriate, level of intensity of volcanic activity, occurrence of an eruption and its date and time and the existence of a volcanic ash cloud in the area together with direction of ash cloud movement and height.

AMC1 MET.OR.210 Observing meteorological elements
DISPLAY

Where automated equipment forms part of an integrated semi-automatic observing system, displays of data which are made available to the local ATS units should be a subset of and displayed parallel to those available in the aeronautical meteorological stations or meteorological offices. In those displays, each meteorological element should be annotated to identify, as appropriate, the locations for which the element is representative.

AMC2 MET.OR.210 Observing meteorological elements
PROCESSING OF METEOROLOGICAL OBSERVATIONS

(a) Meteorological observations for regular and alternate aerodromes should be collected, processed and stored in a form suitable for the preparation of aerodrome climatological information.

(b) Aeronautical climatological information should be exchanged on request between meteorological services providers.

Chapter 2 — Requirements for aerodrome meteorological offices

AMC1 MET.OR.215(a) Forecasts and other information
METEOROLOGICAL DATA TYPE

On request by the operator, the meteorological information supplied for flight planning should include data for the determination of the lowest usable flight level.

GM1 MET.OR.215(a) Forecasts and other information
PREPARATION OF FORECASTS

The extent of the aerodrome meteorological office responsibilities to prepare forecasts may relate to the local availability and use of en-route and aerodrome forecast material received from other offices.

GM2 MET.OR.215(a) Forecasts and other information
COMPETENT AUTHORITY

The competent authority identifies the types of forecasts and other meteorological information that need to be provided by the aerodrome meteorological office to flights with which it is concerned.

AMC1 MET.OR.215(c) Forecasts and other information
FORMAT OF FORECASTS

The length of the forecast messages and the number of changes indicated in the forecast should be kept to a minimum.

GM1 MET.OR.215(c) Forecasts and other information
AUTOMATIC CANCELLATION

The issue of a new forecast by an aerodrome meteorological office, such as a routine aerodrome forecast, automatically cancels any forecast of the same type previously issued for the same place and for the same period of validity or part thereof.

GM2 MET.OR.215(c) Forecasts and other information
TAF CONTINUOUS REVIEW GUIDANCE

Guidance on methods to keep Terminal Aerodrome Forecasts (TAF) under continuous review is given in Chapter 3 of the Manual of Aeronautical Meteorological Practice (ICAO Doc 8896).

GM3 MET.OR.215(c) Forecasts and other information
AMENDMENTS TO WARNINGS

If it is known that an existing warning no longer accurately describes the existing or expected future evolution of the phenomena, a new warning, correctly describing the hazard should be issued (avoiding the use of the code word 'AMD', not included in the templates for warnings), followed immediately by the cancellation of the original, erroneous one. The new warning should be issued before the cancellation in order to ensure there is always a warning in force and that the cancellation is not mistakenly understood to mean the hazard has completely dissipated.

GM1 MET.OR.215(d) Forecasts and other information
BRIEFING AND CONSULTATION

(a) Briefing should be understood as being preparatory meteorological information on existing and/or expected meteorological conditions.

(b) Consultation should be understood as discussion, including answers to questions, with a meteorologist or another qualified person of existing and/or expected meteorological conditions relating to flight operations.

(c) The purpose of briefing and consultation is to provide the latest available information on existing and expected meteorological conditions along the route to be flown and at the aerodrome of intended landing, and on alternate aerodromes and other aerodromes as relevant, in order to either explain or amplify the information contained in the flight documentation.

GM2 MET.OR.215(d) Forecasts and other information
PRE-FLIGHT PLANNING

The service for pre-flight planning should be confined to flights originating within the territory of the State concerned.

GM3 MET.OR.215(d) Forecasts and other information
FLIGHT DOCUMENTATION

'Flight documentation', for the purpose of meteorology, is understood as being documents, including charts or forms, containing meteorological information for a flight.

AMC1 MET.OR.215(e) Forecasts and other information
CLIMATOLOGICAL INFORMATION

The aerodrome meteorological office should make available such climatological tables within a time period as agreed between the competent authority and the relevant user.

AMC1 MET.OR.215(f) Forecasts and other information
AIS — NOTAM/ASHTAM AND AIC

The aerodrome meteorological office should provide the relevant aeronautical information service provider with meteorological information:

(a) necessary for the preparation of NOTAM or ASHTAM, including, in particular, information on the establishment, withdrawal and significant changes in operation of aeronautical meteorological services sufficiently in advance of the effective date to permit issuance of NOTAM; and

(b) necessary for the preparation of aeronautical information circulars, including, in particular, meteorological information on expected important changes in aeronautical meteorological procedures, services and facilities provided.

AMC1 MET.OR.215(g) Forecasts and other information
SEARCH AND RESCUE

To facilitate search and rescue operations, the aerodrome meteorological office or meteorological watch office should provide:

(a) complete and detailed meteorological information on the current and forecast meteorological conditions in the search area;

(b) current and forecast conditions en-route, covering flights by search aircraft from and returning to the aerodrome from which the search is being conducted; and

(c) on request from the rescue coordination centre, meteorological information required by ships undertaking search and rescue operations.

GM1 MET.OR.220(a) Aerodrome forecasts
DISSEMINATION OF TAF

TAF and amendments thereto are disseminated to international OPMET databanks and the centres designated for the operation of aeronautical fixed service satellite distribution systems.

GM1 MET.OR.225 Forecasts for landing
RANGE

Landing forecasts are intended to meet the requirements of local users and of aircraft within about one hour's flying time from the aerodrome.

GM1 MET.OR.225(a) Forecasts for landing
PREPARATION

As all the aerodromes do not need to be provided with forecasts for landing, the competent authority determines on which aerodromes these types of forecasts will be provided by the aerodrome meteorological office.

GM1 MET.OR.225(b) Forecasts for landing
TREND FORECAST

A TREND forecast is understood as being a concise statement of the expected significant changes in the meteorological conditions at that aerodrome to be appended to a METAR, and if agreed between the aeronautical meteorological station and the appropriate ATS unit as well in a local routine report and local special report.

GM1 MET.OR.235 Aerodrome warnings and wind shear warnings and alerts
AUTOMATED DETECTION EQUIPMENT

The decision to install an automated wind shear detection equipment should be based on the local meteorological and air traffic considerations. Where such equipment is installed, wind shear alerts should be issued in accordance with MET.OR.235(c).

AMC1 MET.OR.235(b) Aerodrome warnings and wind shear warnings and alerts
WIND SHEAR FOLLOW-UP

Wind shear alerts should be updated at least every minute. They should be cancelled as soon as the headwind/tailwind change falls below 15 kt (7.5 m/s).

GM1 MET.OR.235(d) Aerodrome warnings and wind shear warnings and alerts
WIND SHEAR ALERTS

Wind shear alerts are expected to complement wind shear warnings and together are intended to enhance situational awareness of wind shear.

GM2 MET.OR.235(d) Aerodrome warnings and wind shear warnings and alerts
CANCELLATION OF WARNINGS

The criteria for the cancellation of a wind shear warnings are defined locally for each aerodrome, as agreed between the aerodrome meteorological office, the appropriate ATS units and the operators concerned.

GM1 MET.OR.240(a)(1) Information for use by operator or flight crew
GENERAL

Forecasts of upper-air humidity and geopotential altitude of flight levels are used only in automatic flight planning and do not need to be displayed.

GM1 MET.OR.240(a)(4) Information for use by operator or flight crew
SIGMET

Special air-reports supplied to operators and flight crew members will be those not already used in the preparation of SIGMET.

Chapter 3 — Requirements for meteorological watch offices

AMC1 MET.OR.245(a) Meteorological watch and other information
BOUNDARIES

The boundaries of the area over which meteorological watch is to be maintained by a meteorological watch office should 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.

AMC1 MET.OR.245(f)(3) Meteorological watch and other information
AIRCRAFT IN FLIGHT

If the information requested from an aircraft in flight is not available in the associated meteorological watch office, that meteorological watch office should request the assistance of another meteorological office in providing it.

AMC1 MET.OR.250(a) SIGMET messages
FIR AND CTA

Meteorological watch offices whose area of responsibility encompasses more than one FIR and/or CTA should provide separate SIGMET messages for each FIR and/or CTA.

AMC2 MET.OR.250(a) SIGMET messages
DIGITAL FORMAT

In addition to the issuance of SIGMET information in abbreviated plain language, SIGMET information should be issued in a digital format.

GM1 MET.OR.250(a) SIGMET messages
DISSEMINATION

(a) SIGMET messages are disseminated to meteorological watch offices and WAFCs and to other meteorological offices. SIGMET messages for volcanic ash are also disseminated to VAACs.

(b) SIGMET messages are disseminated to international OPMET databanks and the centres designated for the operation of aeronautical fixed service satellite distribution systems.

AMC1 MET.OR.250(c) SIGMET messages
SOURCE

SIGMET messages concerning volcanic ash clouds and tropical cyclones should be based on advisory information provided by VAACs and Tropical Cyclone Advisory Centres (TCACs), respectively.

AMC1 MET.OR.255(a) AIRMET messages
DIGITAL FORMAT

In addition to the issuance of AIRMET information in abbreviated plain language, AIRMET information should be issued in a digital format.

GM1 MET.OR.255(a) AIRMET messages
DISSEMINATION

(a) AIRMET messages are disseminated to meteorological watch offices in adjacent flight information regions and to other meteorological watch offices or aerodrome meteorological offices, as agreed by the competent authorities concerned.

(b) AIRMET messages are transmitted to international operational meteorological databanks and the centres for the operation of aeronautical fixed service internet-based services.

Chapter 4 — Requirements for volcanic ash advisory centres (VAACs)

GM1 MET.OR.265(a) Volcanic ash advisory centres (VAACs) responsibilities
DISTRIBUTION OF METEOROLOGICAL DATA

The AFTN address to be used by the VAACs is given in the Handbook on the International Airways Volcano Watch (IAVW) (ICAO Doc 9766) which is available on the ICAO IAVWOPSG website.

SUBPART B — TECHNICAL REQUIREMENTS FOR PROVIDERS OF METEOROLOGICAL SERVICES (MET.TR)

Section 1 — General requirements

GM1 MET.TR.115(a) Meteorological bulletins
ALPHANUMERICAL FORMAT

The format of the meteorological bulletins is understood to be that in alphanumerical format.

GM2 MET.TR.115(a) Meteorological bulletins
COMPOSITION AND FILING TIMES OF BULLETINS

(a) Whenever possible, exchanges of operational meteorological information should be made in consolidated bulletins of the same types of meteorological information.

(b) Meteorological bulletins required for scheduled transmissions should be filed regularly and at the prescribed scheduled times.

GM3 MET.TR.115(a) Meteorological bulletins
HEADING

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 in the ICAO Manual of Aeronautical Meteorological Practice (ICAO Doc 8896).

GM1 MET.TR.115(a)(2) Meteorological bulletins
LOCATION INDICATOR

ICAO location indicators are listed in ICAO Doc 7910 - Location Indicators.

Section 2 — Specific requirements

Chapter 1 — Technical requirements for aeronautical meteorological stations

AMC1 MET.TR.200(a) Meteorological reports and other information
TEMPLATE FOR THE LOCAL ROUTINE REPORTS AND LOCAL SPECIAL REPORTS

Local routine reports and local special reports should be issued in abbreviated plain language, in accordance with the below template.

Template for the local routine (MET REPORT) and local special (SPECIAL) reports

Key:

M = inclusion mandatory, part of every message;

C = inclusion conditional, dependent on meteorological conditions;

O = inclusion optional.

Element	*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

Element	*Detailed content*	*Template(s)*			*Examples*
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 240/4MPS (WIND 240/8KT) WIND RWY 18 TDZ 190/6MPS (WIND RWY 18 TDZ 190/12KT) WIND VRB1MPS WIND CALM (WIND VRB2KT) WIND VRB BTN 350/ AND 050/1MPS (WIND VRB BTN 350/ AND 050/2KT) WIND 270/ABV49MPS (WIND 270/ABV99KT) WIND 120/3MPS MAX9 MNM2 (WIND 120/6KT MAX18 MNM4) WIND 020/5MPS VRB BTN 350/ AND 070/ (WIND 020/10KT VRB BTN 350/ AND 070/) WIND RWY 14R MID 140/6MPS (WIND RWY 14R MID 140/12KT) WIND RWY 27 TDZ 240/8MPS MAX14 MNM5 END 250/7MPS (WIND RWY 27 TDZ 240/16KT MAX28 MNM10 END 250/14KT)
	Runway (O)	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]			
	Runway section (O)	TDZ			
	Wind direction (M)	nnn/	VRB BTN nnn/ AND nnn/ *or* VRB	CALM	
	Wind speed (M)	[ABV]n[n][n]MPS (*or* [ABV]n[n]KT)			
	Significant speed variations (C)	MAX[ABV]nn[n] MNMn[n]			
	Significant directional variations (C)	VRB BTN nnn/ AND nnn/	—		
	Runway section (O)	MID			
	Wind direction (O)	nnn/	VRB BTN nnn/ AND nnn/ *or* VRB	CALM	
	Wind speed (O)	[ABV]n[n][n]MPS (*or* [ABV]n[n]KT)			
	Significant speed variations (C)	MAX[ABV]nn[n] MNMn[n]			
	Significant directional variations (C)	VRB BTN nnn/ AND nnn/	—		
	Runway section (O)	END			
	Wind direction (O)	nnn/	VRB BTN nnn/ AND nnn/ *or* VRB	CALM	
	Wind speed (O)	[ABV]n[n][n]MPS (*or* [ABV]n[n]KT)			
	Significant speed variations (C)	MAX[ABV]nn[n] MNMn[n]			
	Significant directional variations (C)	VRB BTN nnn/ AND nnn/	—		
Visibility (M)	Name of the element (M)	VIS		CAVOK	VIS 350M CAVOK VIS 7KM VIS 10KM VIS RWY 09 TDZ 800M END 1200M VIS RWY 18C TDZ 6KM RWY 27 TDZ 4000M
	Runway (O)	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]			
	Runway section (O)	TDZ			
	Visibility (M)	n[n][n][n]M *or* n[n]KM			
	Runway section (O)	MID			
	Visibility (O)	n[n][n][n]M *or* n[n]KM			
	Runway section (O)	END			
	Visibility (O)	n[n][n][n]M *or* n[n]KM			
Runway visual range (C)	Name of the element (M)	RVR			RVR RWY 32 400M RVR RWY 20 1600M RVR RWY 10L BLW 50M RVR RWY 14 ABV 2000M RVR RWY 10 BLW 150M RVR RWY 12 ABV 1200M RVR RWY 12 TDZ 1100M MID ABV 1400M RVR RWY 16 TDZ 600M MID 500M END 400M RVR RWY 26 500M RWY 20 800M
	Runway (C)	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]			
	Runway section (C)	TDZ			
	Runway visual range (M)	[ABV *or* BLW] nn[n][n]M			
	Runway section (C)	MID			
	Runway visual range (C)	[ABV *or* BLW] nn[n][n]M			
	Runway section (C)	END			
	Runway visual range (C)	[ABV *or* BLW] nn[n][n]M			
Present weather (C)	Intensity of present weather (C)	FBL *or* MOD *or* HVY	—		

Element	*Detailed content*	*Template(s)*			*Examples*
	Characteristics and type of present weather (C)	DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZUP *or* FC *or* FZRA *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* SHUP *or* TSGR *or* TSGS *or* TSRA *or* TSSN *or* TSUP[12] *or* UP	FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG *or* //		MOD RA HVY TSRA HVY DZ FBL SN HZ FG VA MIFG HVY TSRASN FBL SNRA FBL DZ FG HVY SHSN BLSN HVY TSUP //
Cloud (M)	Name of the element (M)	CLD			CLD NSC CLD SCT 300M OVC 600M (CLD SCT 1000FT OVC 2000FT) CLD OBSC VER VIS 150M (CLD OBSC VER VIS 500FT) CLD BKN TCU 270M (CLD BKN TCU 900FT) CLD RWY 08R BKN 60M RWY 26 BKN 90M (CLD RWY 08R BKN 200FT RWY 26 BKN 300FT) CLD /// CB ///M (CLD /// CB ///FT) CLD /// CB 400M (CLD /// CB 1200FT) CLD NCD
	Runway (O)	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]			
	Cloud amount (M) *or* vertical visibility (O)	FEW *or* SCT *or* BKN *or* OVC *or* ///	OBSC	NSC *or* NCD	
	Cloud type (C)	CB *or* TCU *or* ///	—		
	Height of cloud base *or* the value of vertical visibility (C)	n[n][n][n]M (*or* n[n][n][n]FT) *or* ///M (*or* ///FT)	[VER VIS n[n][n]M(*or* VER VIS n[n][n][n]FT)] *or* VER VIS ///M (*or* VER VIS ///FT)		
Air temperature (M)	Name of the element (M)	T			T17 TMS08
	Air temperature (M)	[MS]nn			
Dew-point temperature (M)	Name of the element (M)	DP			DP15 DPMS18
	Dew-point temperature (M)	[MS]nn			
Pressure values (M)	Name of the element (M)	QNH			QNH 0995HPA QNH 1009HPA QNH 1022HPA QFE 1001HPA QNH 0987HPA QFE RWY 18 0956HPA RWY 24 0955HPA
	QNH (M)	nnnnHPA			
	Name of the element (O)	QFE			
	QFE (O)	[RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]] nnnnHPA [RWY nn[L] *or* RWY nn[C] *or* RWY nn[R] nnnnHPA]			
Supplementary information (C)	Significant meteorological phenomena (C)	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			FC IN APCH WS IN APCH 60M-WIND 360/13MPS WS RWY 12 REFZRA CB IN CLIMB-OUT RETSRA
	Location of the phenomena (C)	IN APCH [n[n][n][n]M-WIND nnn/n[n]MPS] *or* IN CLIMB-OUT [n[n][n][n]M-WIND nnn/n[n]MPS] (IN APCH [n[n][n][n]FT-WIND nnn/n[n]KT] *or* IN CLIMB-OUT [n[n][n][n]FT-WIND nnn/n[n]KT]) *or* RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]			
	Recent weather (C)	REFZDZ *or* REFZRA *or* REDZ *or* RE[SH]RA *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 *or* REFZUP *or* RETSUP *or* RESHUP *or* REVA *or* RETS			
Trend forecast (O)	Name of the element (M)	TREND			TREND NOSIG TREND BECMG FEW 600M

Element	*Detailed content*	*Template(s)*					*Examples*
	Change indicator (M)	NOSIG	BECMG *or* TEMPO				(TREND BECMG FEW 2000FT) TREND TEMPO 250/18 MPS MAX25 (TREND TEMPO 250/36KT MAX50) TREND BECMG AT1800 VIS 10KM NSW TREND BECMG TL1700 VIS 800M FG TREND BECMG FM1030 TL1130 CAVOK TREND TEMPO TL1200 VIS 600M BECMG AT1230 VIS 8KM NSW CLD NSC TREND TEMPO FM0300 TL0430 MOD FZRA TREND BECMG FM1900 VIS 500M HVY SNRA TREND BECMG FM1100 MOD SN TEMPO FM1130 BLSN TREND BECMG AT1130 CLD OVC 300M (TREND BECMG AT1130 CLD OVC 1000FT) TREND TEMPO TL1530 HVY SHRA CLD BKN CB 360M (TREND TEMPO TL1530 HVY SHRA CLD BKN CB 1200FT)
	Period of change (C)		FMnnnn *and/or* TLnnnn *or* ATnnnn				
	Wind (C)		nnn/[ABV]n[n][n]MPS [MAX[ABV]nn[n]] (*or* nnn/[ABV]n[n]KT [MAX[ABV]nn])				
	Visibility (C)		VIS n[n][n][n]M *or* VIS n[n]KM			C A V O K	
	Weather phenomenon: intensity (C)		FBL *or* MOD *or* HVY	—	NSW		
	Weather phenomenon: characteristics and type (C)		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	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		
	Name of the element (C)		CLD				
	Cloud amount and vertical visibility (C)		FEW *or* SCT *or* BKN *or* OVC	OBSC	NSC		
	Cloud type (C)		CB *or* TCU	—			
	Height of cloud base *or* the value of vertical visibility (C)		n[n][n][n]M (*or* n[n][n][n]FT)	[VER VIS n[n][n]M (*or* VER VIS n[n][n][n]FT)]			

GM1 MET.TR.200(a) Meteorological reports and other information

RANGES AND RESOLUTIONS — LOCAL ROUTINE REPORTS AND LOCAL SPECIAL REPORTS

(a) The ranges and resolutions for the numerical elements included in the local routine reports and local special reports are shown below.

Ranges and resolutions for the numerical elements included in local routine reports and local special reports

Element elements included in the local routine reports and local special reports		Range	Resolution
Runway:		01–36	1
Wind direction:	°true	010–360	10
Wind speed:	MPS	1– 99*	1
KT		1– 199*	1
Visibility:	M	0– 750	50
	M	800– 4 900	100
	KM	5– 9	1
	KM	10–	0 (fixed value: 10 KM)
Runway visual range:	M	0– 375	25
	M	400–750	50
	M	800–2 000	100
Vertical visibility:	M	0–75	15
	M	90–600	30
	FT	0–250	50
	FT	300–2 000	100
Clouds: height of cloud base:	M	0–75	15
	M	90–3 000	30
	FT	0–250	50
	FT	300–10 000	100
Air temperature;	°C	–80 – +60	1
Dew-point temperature:			
QNH; QFE:	hPa	0500–1 100	1

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

** Under circumstances as specified in AMC1 MET.TR.205(e)(1); otherwise a resolution of 100 ft (30 m) is to be used.

(b) The explanations for the abbreviations can be found in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes (PANS-ABC, ICAO Doc 8400).

GM1 MET.TR.200(a)(2) Meteorological reports and other information
LOCATION INDICATORS

The location indicators and their significations are published in ICAO Doc 7910 - Location Indicators.

AMC1 MET.TR.200(a)(4) Meteorological reports and other information
AUTOMATED REPORTING

Local routine reports and local special reports and METAR from automatic observing systems should be identified with the word 'AUTO'.

GM1 MET.TR.200(a)(4) Meteorological reports and other information
AUTOMATED REPORTING

METAR, local routine reports and local special reports from automatic observing systems may be used as agreed between the aeronautical meteorological stations and the users.

AMC1 MET.TR.200(a)(12) Meteorological reports and other information
SUPPLEMENTARY INFORMATION — SEMI-AUTOMATIC OBSERVING SYSTEM

(a) In local routine reports and local special reports and in METAR when reported by a semi-automatic observing system, the following recent weather phenomena should be reported, up to a maximum of three groups, in the supplementary information:

(1) freezing precipitation;

(2) moderate or heavy precipitation, including showers thereof;

(3) blowing snow;

(4) dust storm, sandstorm;

(5) thunderstorm;

(6) funnel cloud, tornado or water spout; and

(7) volcanic ash.

(b) In local routine reports and local special reports when reported by a semi-automatic observing system, the following significant meteorological conditions, or combinations thereof, should be reported in the supplementary information:

(1) cumulonimbus clouds (CB);

(2) thunderstorm (TS);

(3) moderate or severe turbulence (MOD TURB, SEV TURB);

(4) wind shear (WS);

(5) hail (GR);

(6) severe squall line (SEV SQL);

(7) moderate or severe icing (MOD ICE, SEV ICE);

(8) freezing precipitation (FZDZ, FZRA);

(9) severe mountain waves (SEV MTW);

(10) dust storm, sandstorm (DS, SS);

(11) blowing snow (BLSN); and

(12) funnel cloud (tornado or water spout) (FC).

The location of the condition should be indicated. Where necessary, additional information should be included using abbreviated plain language.

AMC2 MET.TR.200(a)(12) Meteorological reports and other information
SUPPLEMENTARY INFORMATION — AUTOMATIC OBSERVING SYSTEM

In local routine reports and local special reports and in METAR reported by an automatic observing system, the following recent weather phenomena should be reported, up to a maximum of three groups, in the supplementary information:

(a) FZDZ, FZRA and FZUP;

(b) moderate or heavy DZ, RA and SN;

(c) thunderstorm; and

(d) moderate or heavy unknown precipitation (UP).

AMC3 MET.TR.200(a)(12) Meteorological reports and other information
SUPPLEMENTARY INFORMATION — WIND SHEAR

Information on wind shear should be included as supplementary information in local routine reports and local special reports and in METAR, where local circumstances so warrant.

AMC4 MET.TR.200(a)(12) Meteorological reports and other information
SUPPLEMENTARY INFORMATION — SEA-SURFACE TEMPERATURE AND STATE OF THE SEA AND OF THE RUNWAY

In METAR, information on sea-surface temperature and the state of the sea or the significant wave height, from aeronautical meteorological stations established on offshore structures in support of helicopter operations, should be included in the supplementary information.

AMC5 MET.TR.200(a)(12) Meteorological reports and other information
SUPPLEMENTARY INFORMATION — SIGNIFICANT METEOROLOGICAL CONDITIONS

(a) Observations made at aerodromes should include the available supplementary information concerning significant meteorological conditions, particularly those in the approach and climb-out areas.

(b) Where practicable, the information should identify the location of the meteorological condition.

GM1 to AMC1 MET.TR.200(a)(12) Meteorological reports and other information
SUPPLEMENTARY INFORMATION — RECENT WEATHER PHENOMENA

'Recent weather phenomena' is understood as being the weather phenomena observed at the aerodrome during the period since the last issued routine report or last hour, whichever is the shorter, but not at the time of observation.

GM2 to AMC1 MET.TR.200(a)(12) Meteorological reports and other information
SUPPLEMENTARY INFORMATION — LOCAL CIRCUMSTANCES

Local circumstances include but are not necessarily limited to wind shear of non-transitory nature such as might be associated with low-level temperature inversions or local topography.

GM1 MET.TR.200(b) & (c) Meteorological reports and other information
EXAMPLE OF METAR AND LOCAL ROUTINE REPORT

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

MET REPORT YUDO 221630Z WIND 240/4KT VIS 600M RVR RWY 12 TDZ 1000M MOD DZ FG CLD SCT 1000FT OVC 2000FT T17 DP16 QNH 1018HPA TREND BECMG TL1700 VIS 800M FG BECMG AT1800 VIS 10KM NSW

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

METAR YUDO 221630Z 24004KT 0600 R12/1000U DZ FG SCT010 OVC020 17/16 Q1018 BECMG TL1700 0800 FG BECMG AT 1800 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 4 knots; 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 (Runway visual range tendency to be included in METAR only); and moderate drizzle and fog; scattered cloud at 1 000 feet; overcast at 2 000 feet; 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

GM1 MET.TR.200(b) Meteorological reports and other information
EXAMPLE OF LOCAL SPECIAL REPORT

Local special report:

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

Meaning:

Special report for Donlon/International* issued on the 15th of the month at 1115 UTC; surface wind direction 050 degrees; wind speed 25 knots gusting between 10 and 37 knots; visibility 1 200 metres along the runway; Runway visual range above 1 800 metres at the threshold on runway 05; thunderstorm with heavy rain; broken cumulonimbus cloud at 500 feet; air temperature 25 degrees Celsius; dew-point temperature 22 degrees Celsius; QNH 1 008 hectopascals; TREND during next 2 hours; visibility along the runway temporarily 600 metres from 1 115 to 1 200, becoming at 1200 UTC visibility along the runway 8 kilometres, thunderstorm ceases and nil significant weather and nil significant cloud.

** Fictitious location*

GM1 MET.TR.200(c)(1) Meteorological reports and other information
METAR — CODE FORM

The METAR code form is contained in the WMO Publication No 306, Manual on Codes, Volume I.1, Part A — Alphanumeric Codes.

AMC1 MET.TR.200(c)(2) Meteorological reports and other information
METAR — DIGITAL FORM

METAR should be disseminated in a digital form.

GM1 MET.TR.200(c)(2) Meteorological reports and other information
METAR — DIGITAL FORM

(a) When METAR is disseminated in a digital form, this is in addition to the METAR code form.

(b) Guidance on the information exchange model, GML, and the metadata profile is provided in the Manual on the Digital Exchange of Aeronautical Meteorological Information (ICAO Doc 10003).

GM1 MET.TR.200(e)(5) Meteorological reports and other information
NOISE ABATEMENT PROCEDURES

Noise abatement procedures are those in accordance with 7.2.6 of the PANS-ATM (ICAO Doc 4444).

GM1 MET.TR.200(f) Meteorological reports and other information
ISSUANCE OF LOCAL SPECIAL REPORTS

Point (f) in MET.TR.200 relates to the list of criteria to provide local special reports when a meteorological change occurs. The agreement between the meteorological service provider and the competent authority is introduced as these criteria are usually agreed with the competent authority. Also, in introducing this agreement, the nature of the transposed provision (Appendix 3, 2.3.3) of ICAO Annex 3 – a recommendation – remains.

GM1 MET.TR.205(a)(3)(iii)(A) Reporting of meteorological elements
NOISE ABATEMENT PROCEDURE

The noise abatement procedures are those in accordance with 7.2.6 of the PANS-ATM (ICAO Doc 4444).

AMC1 MET.TR.205(b)(3) Reporting of meteorological elements
VISIBILITY — VALUES

In local routine reports and local special reports, when instrumented systems are used for the measurement of visibility:

(a) if the visibility is observed from more than one location along the runway, the values representative of the touchdown zone should be reported first, followed, as necessary, by the values representative of the mid-point and stop-end of the runway, and the locations for which these values are representative should be indicated; and

(b) when there is more than one runway in use and the visibility is observed related to these runways, the available visibility values for each runway should be reported, and the runways to which the values refer should be indicated.

AMC2 MET.TR.205(b)(1) Reporting of meteorological elements
VISIBILITY

In METAR, visibility should be reported as prevailing visibility. 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 % 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;

(b) if the lowest visibility is observed in more than one direction, then the most operationally significant direction should be reported; and

(c) 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.

AMC1 MET.TR.205(c)(1) Reporting of meteorological elements
RUNWAY VISUAL RANGE (RVR) — THRESHOLD LIMIT

(a) 50 m should be considered the lower limit, and 2 000 m the upper limit for RVR.

(b) Outside of these limits, local routine reports and local special reports and METAR should merely indicate that the RVR is less than 50 or more than 2 000 m.

AMC1 MET.TR.205(c)(3) Reporting of meteorological elements
RUNWAY VISUAL RANGE (RVR) — VALUES FOR METAR

(a) When instrumented systems are used for the assessment of RVR, the variations in RVR during the 10-minute period immediately preceding the observation should be included if the RVR values during the 10-minute period have shown a distinct tendency, such that the mean during the first 5 minutes varies by 100 m or more from the mean during the second 5 minutes of the period.

(b) When the variation of the RVR values shows an upward or downward tendency, this should be indicated by the abbreviation ‘U’ or ‘D’, respectively. In cases when actual fluctuations during the 10-minute period show no distinct tendency, this should be indicated using the abbreviation ‘N’.

(c) When indications of tendency are not available, no abbreviations should be included.

AMC1 MET.TR.205(c) Reporting of meteorological elements
RUNWAY VISUAL RANGE (RVR) — TOUCHDOWN ZONE VALUES

In METAR:

(a) only the value representative of the touchdown zone should be reported and no indication of location on the runway should be included; and

(b) where there is more than one runway available for landing, touchdown zone RVR values should be included for all such runways, up to a maximum of four, and the runways to which the values refer should be indicated.

AMC1 MET.TR.205(c)(4)(iii) Reporting of meteorological elements
RUNWAY VISUAL RANGE (RVR) — VALUES REPRESENTATION

(a) RVR assessments should be representative of:

(1) the touchdown zone of the runway intended for Category I instrument approach and landing operations;

(2) the touchdown zone and the mid-point of the runway intended for Category II instrument approach and landing operations; and

(3) the touchdown zone, mid-point and stop-end of the runway intended for Category III instrument approach and landing operations.

(b) Where RVR is determined by human observers, it should be reported to the appropriate local ATS units, whenever there is a change in the value to be reported in accordance with the reporting scale.

(c) The transmission of such reports should normally be completed within 15 seconds after the termination of the observation.

AMC1 MET.TR.205(d) Reporting of meteorological elements
PRESENT WEATHER PHENOMENA — AUTOMATIC OBSERVING SYSTEM

In local routine reports and local special reports and in METAR reported by an automatic observing system, the following types of present weather phenomena should be reported, using their respective abbreviations and relevant criteria, as appropriate:

(a) Precipitation:

(1) drizzle (DZ);

(2) rain (RA);

(3) snow (SN); and

(4) Unidentified precipitation (UP)

(b) Obscurations (hydrometeors);

(c) Fog (FG): reported when visibility is less than 1 000 m ;

(d) Mist (BR): reported when visibility is at least 1 000 m, but not more than 5 000 m;

(e) Obscurations (lithometeors). Haze (HZ) should be used when the obscuration consists predominantly of lithometeors and the visibility is 5 000 m or less; and

(f) Temporary failure of system/sensor: the present weather should be replaced by '//' when it cannot be observed due to a temporary failure of the system/sensor.

AMC2 MET.TR.205(d) Reporting of meteorological elements
PRESENT WEATHER PHENOMENA — SEMI-AUTOMATIC OBSERVING SYSTEM

In local routine reports and local special reports and in METAR reported by a semi-automatic observing system, the following types of present weather phenomena should be reported, using their respective abbreviations and relevant criteria, as appropriate:

(a) Precipitation:

(1) drizzle (DZ);

(2) rain (RA);

(3) snow (SN);

(4) snow grains (SG);

(5) ice pellets (PL);

(6) hail (GR): reported when the diameter of the largest hailstones is 5 mm or more;

(7) small hail and/or snow pellets (GS): reported when the diameter of the largest hailstones is less than 5 mm.

(b) Obscurations (hydrometeors):

(1) fog (FG): reported when visibility is less than 1 000 m, except when qualified by 'MI', 'BC', 'PR' or 'VC'.

(2) mist (BR): reported when visibility is at least 1 000 m, but not more than 5 000 m;

(c) Obscurations (lithometeors)

The following should be used only when the obscuration consists predominantly of lithometeors and the visibility is 5 000 m or less, except 'SA' when qualified by 'DR' and volcanic ash:

(1) sand (SA);

(2) dust (widespread) (DU);

(3) haze (HZ);

(4) smoke (FU); and

(5) volcanic ash (VA).

(d) Other phenomena:

(1) dust/sand whirls (dust devils) (PO);

(2) squall (SQ);

(3) funnel cloud (tornado or waterspout) (FC);

(4) dust storm (DS);

(5) sandstorm (SS).

AMC3 MET.TR.205(d) Reporting of meteorological elements

PRESENT WEATHER PHENOMENA — UNIDENTIFIED PRECIPITATION (UP)

In automated local routine reports and local special reports and in METAR, in addition to drizzle (DZ), rain (RA) and snow (SN), the abbreviation 'UP' should be used for unidentified precipitation when the type of precipitation cannot be identified by the automatic observing system.

AMC1 MET.TR.205(d)(3) Reporting of meteorological elements

PRESENT WEATHER PHENOMENA — ADDITIONAL CHARACTERISTICS

In local routine reports and local special reports and in METAR, only when reported by a semi-automatic observing system, the following characteristics of present weather phenomena, as necessary, should be reported using their respective abbreviations and relevant criteria, as appropriate:

(a) Shower (SH): used to report showers. Showers observed in the vicinity of the aerodrome should be reported as 'VCSH' without qualification regarding type or intensity of precipitation.

(b) Blowing (BL): used with types of present weather phenomena raised by the wind to a height of 6 ft (2 m) or more above the ground.

(c) Low drifting (DR): used with types of present weather phenomena raised by the wind to less than 6 ft (2 m) above ground level.

(d) Shallow (MI): less than 6 ft (2 m) above ground level.

(e) Patches (BC): fog patches randomly covering the aerodrome.

(f) Partial (PR): a substantial part of the aerodrome covered by fog while the remainder is clear.

In automated local routine reports, local special reports and METAR, when showers (SH) referred to above cannot be determined based upon a method that takes account of the presence of convective cloud, the precipitation should not be characterised by 'SH'.

AMC2 MET.TR.205(d)(3) Reporting of meteorological elements
PRESENT WEATHER PHENOMENA — INTENSITY

In local routine reports and local special reports and METAR, the relevant intensity or, as appropriate, the proximity to the aerodrome of the reported present weather phenomena should be indicated as follows:

	(local routine reports and local special reports)	(METAR)
Light	FBL	–
Moderate	MOD	(no indication)
Heavy	HVY	+

— Used with types of present weather phenomena. Light intensity should be indicated only for precipitation.

Vicinity (VC)

— Between approximately 8 and 16 km of the aerodrome reference point and used only in METAR with present weather when not reported under AMC1 MET.TR.205(d)(3) and MET.TR.205(d)(3).

GM1 MET.TR.205(d)(3)(i) Reporting of meteorological elements
PRESENT WEATHER PHENOMENA — TS LIGHTNING DETECTION EQUIPMENT

(a) At aerodromes with human observers, lightning detection equipment may supplement human observations.

(b) 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 (ICAO Doc 9837).

AMC1 MET.TR.205(e)(1) Reporting of meteorological elements
CLOUD — HEIGHT OF CLOUD BASE

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

(a) the cloud amount should be reported using the abbreviations 'FEW' (1 to 2 oktas), 'SCT' (3 to 4 oktas), 'BKN' (5 to7 oktas) or 'OVC' (8 oktas);

(b) cumulonimbus clouds and towering cumulus clouds should be indicated as 'CB' and 'TCU', respectively;

(c) the vertical visibility should be reported in steps of 100 ft (30 m) up to 2 000 ft (600 m);

(d) if there are no clouds of operational significance and no restriction on vertical visibility and the abbreviation 'CAVOK' is not appropriate, the abbreviation 'NSC' should be used;

(e) when several layers or masses of cloud of operational significance are observed, their amount and height of cloud base should be reported in increasing order of the height of cloud base, and in accordance with the following criteria:

(1) the lowest layer or mass, regardless of the amount to be reported as FEW, SCT, BKN or OVC, as appropriate;

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

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

(4) cumulonimbus and/or towering cumulus clouds, whenever observed and not reported in (1) to (3).

(f) when the cloud base is diffuse or ragged or fluctuating rapidly, the minimum height of cloud base or cloud fragments, should be reported; and

(g) when an individual layer (mass) of cloud is composed of cumulonimbus and towering cumulus clouds with a common cloud base, the type of cloud should be reported as cumulonimbus only.

AMC2 MET.TR.205(e)(1) Reporting of meteorological elements
CLOUD — AUTOMATIC OBSERVING SYSTEM

When an automatic observing system is used to report local routine reports and local special reports and METAR:

(a) when the cloud type cannot be observed, the cloud type in each cloud group should be replaced by '///';

(b) when no clouds are detected, it should be indicated by using the abbreviation 'NCD';

(c) when cumulonimbus clouds or towering cumulus clouds are detected and the cloud amount and/or the height of cloud base cannot be observed, the cloud amount and/or the height of cloud base should be replaced by '///'; and

(d) when the sky is obscured and the value of the vertical visibility cannot be determined due to a temporary failure of the system/sensor, the vertical visibility should be replaced by '///'.

AMC1 MET.TR.205(e)(3) Reporting of meteorological elements
CLOUD — HEIGHT OF CLOUD BASE

At aerodromes where low-visibility procedures are established for approach and landing, as agreed between the meteorological station and the appropriate ATS unit, in local routine reports and local special reports, the height of cloud base should be reported in steps of 50 ft up to and including 300 ft (90 m) and in steps of 100 ft (30 m) between 300 ft (90 m) and 10 000 ft (3 000 m), and the vertical visibility in steps of 50 ft (15 m) up to and including 300 ft (90 m) and in steps of 100 ft (30 m) between 300 ft (90 m) and 2 000 ft (600 m).

AMC1 MET.TR.210 Observing meteorological elements
HUMAN OBSERVATION

Observers at an aerodrome should be located, as far as practical, so as to provide data which is representative of the area for which the observations are required.

GM1 MET.TR.210 Observing meteorological elements
HUMAN OBSERVATION

When a semi-automatic observing system is used, the observer should be located, as far as practical, so as to supply data which is representative of the area for which the observations are required.

GM2 MET.TR.210 Observing meteorological elements
OPERATIONALLY DESIRABLE ACCURACY OF OBSERVATION

Element to be observed	*Operationally desirable accuracy of measurement or observation**
Mean surface wind	*Direction: ± 10°* *Speed: ± 0.5 m/s (1 kt) up to 5 m/s (10 kt)* *± 10 % above 5 m/s (10 kt)*
Variations from the mean surface wind	*± 1 m/s (2 kt), in terms of longitudinal and lateral components*
Visibility	*± 50 m up to 600 m* *± 10 % between 600 m and 1 500 m* *± 20 % above 1 500 m*
Runway visual range	*± 10 m up to 400 m* *± 25 m between 400 m and 800 m* *± 10 % above 800 m*
Cloud amount	*± 1 okta*
Cloud height	*± 10 m (33 ft) up to 100 m (330 ft)* *± 10 % above 100 m (330 ft)*
Air temperature and dew-point temperature	*± 1°C*
Pressure value (QNH, QFE)	*± 0.5 hPa*

Element to be observed	*Operationally desirable accuracy of measurement or observation**
Mean surface wind	*Direction: ± 10°* *Speed: ± 0.5 m/s (1 kt) up to 5 m/s (10 kt)* *± 10 % above 5 m/s (10 kt)*
Variations from the mean surface wind	*± 1 m/s (2 kt), in terms of longitudinal and lateral components*
Visibility	*± 50 m up to 600 m* *± 10 % between 600 m and 1 500 m* *± 20 % above 1 500 m*
Runway visual range	*± 10 m up to 400 m* *± 25 m between 400 m and 800 m* *± 10 % above 800 m*
Cloud amount	*± 1 okta*
Cloud height	*± 10 m (33 ft) up to 100 m (330 ft)* *± 10 % above 100 m (330 ft)*
Air temperature and dew-point temperature	*± 1°C*
Pressure value (QNH, QFE)	*± 0.5 hPa*

* The operationally desirable accuracy is not intended as an operational requirement; it is to be understood as a goal that has been expressed by the operators.

AMC1 MET.TR.210(a) Observing meteorological elements

SURFACE WIND

(a) When local routine reports and local special reports are used for departing or arriving aircraft, the surface wind observations for these reports should be representative of conditions along the runway or the touchdown zone respectively.

(b) For METAR, the surface wind observations should be representative of the conditions above the whole runway where there is only one runway and the whole runway complex where there is more than one runway.

GM1 MET.TR.210(a) Observing meteorological elements
SURFACE WIND — TAKE-OFF AND LANDING

Since, in practice, the surface wind cannot be measured directly on the runway, surface wind observations for take-off and landing are expected to be the best practicable indication of the winds which an aircraft will encounter during take-off and landing.

AMC1 MET.TR.210(a)(1) Observing meteorological elements
SURFACE WIND — SITING

(a) Reported surface wind should be representative of a wind at a height of 30 ± 3 ft (10 ± 1 m) above the ground.

(b) Representative surface wind observations should be obtained by the use of sensors appropriately sited.

(c) Sensors for surface wind observations for local routine reports and local special reports should be sited to give the best practicable indication of conditions along the runway and touchdown zones.

(d) At aerodromes where topography or prevalent weather conditions cause significant differences in surface wind at various sections of the runway, additional sensors should be provided.

GM1 MET.TR.210(a)(1) Observing meteorological elements
SURFACE WIND — SITING

Specifications concerning the siting of equipment and installations on operational areas, aiming at reducing the hazard to aircraft to a minimum, are contained in the EASA CS ADR-DSN.T.915 ‘Siting of equipment and installations on operational areas’.

AMC1 MET.TR.210(a)(2) Observing meteorological elements
SURFACE WIND — DISPLAY

The mean values of, and significant variations in, the surface wind direction and speed for each sensor should be derived and displayed by automated equipment.

AMC1 MET.TR.210(a)(3) Observing meteorological elements
SURFACE WIND — AVERAGING

The averaging period for measuring variations from the mean wind speed (gusts) reported in accordance with MET.TR.205(a)(3)(iii) should be 3 seconds for local routine reports, local special reports, METAR, and for wind displays used for depicting variations from the mean wind speed (gusts) in ATS units.

GM1 MET.TR.210(a)(3)(ii) Observing meteorological elements
SURFACE WIND — AVERAGING — MARKED DISCONTINUITY

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

AMC1 MET.TR.210(b)(1) Observing meteorological elements
VISIBILITY — GENERAL

(a) When instrumented systems are used for the measurement of visibility, their output should be updated at least every 60 seconds to permit provision of current representative values.

(b) When instrumented systems are used for the measurement of visibility, it should be measured at a height of approximately 7.5 ft (2.5 m) above the runway.

(c) When local routine reports and local special reports are used for departing aircraft, the visibility observations for these reports should be representative of the conditions along the runway.

(d) When local routine reports and local special reports are used for arriving aircraft, the visibility observations for these reports should be representative of the touchdown zone of the runway.

(e) For METAR, the visibility observations should be representative of the aerodrome.

AMC1 MET.TR.210(b)(2) Observing meteorological elements
VISIBILITY — SITING

(a) When instrumented systems are used for the measurement of visibility, representative visibility observations should be obtained by the use of sensors appropriately sited.

(b) Sensors for visibility observations for local routine reports and local special reports should be sited to give the best practicable indications of visibility along the runway and touchdown zone.

AMC1 MET.TR.210(b)(4) Observing meteorological elements
VISIBILITY — AVERAGING

The averaging period for visibility should be 1 minute for local routine reports and local special reports and for visibility displays in ATS units.

GM1 MET.TR.210(b)(4)(ii) Observing meteorological elements
VISIBILITY — AVERAGING — MARKED DISCONTINUITY

A marked discontinuity occurs when there is an abrupt and sustained change in visibility, lasting at least 2 minutes, which reaches or passes through one or more of the following values: 800, 1 500 or 3 000 and, in cases where significant numbers of flights are operated in accordance with the visual flight rules, 5 000 m.

AMC1 MET.TR.210(c) Observing meteorological elements
RUNWAY VISUAL RANGE (RVR) — ASSESSMENT

RVR should be assessed:

(a) at a height of approximately 7.5 ft (2.5 m) above the runway for instrument systems or at a height of approximately 15 ft (5 m) above the runway by a human observer;

(b) at a lateral distance from the runway centre line of not more than 120 m.

GM1 MET.TR.210(c) Observing meteorological elements
RUNWAY VISUAL RANGE (RVR) — ASSESSMENT

A detailed understanding of the assessment of RVR is described in ICAO Doc 9328 Manual on 'RVR — Observing and reporting practices'.

AMC1 MET.TR.210(c)(1) Observing meteorological elements
RUNWAY VISUAL RANGE (RVR) — SITING

(a) The site for observations to be representative of the touchdown zone should be located about 300 m along the runway from the threshold.

(b) The sites for observations to be representative of the mid-point and stop-end of the runway should be located at a distance of 1 000 to 1 500 m along the runway from the threshold and at a distance of about 300 m from the other end of the runway.

(c) The exact position of these sites and, if necessary, additional sites should be decided after considering aeronautical, meteorological and climatological factors such as long runways, swamps and other fog-prone areas.

AMC1 MET.TR.210(c)(2) Observing meteorological elements
RUNWAY VISUAL RANGE (RVR) — RUNWAY LIGHT INTENSITY

(a) Instrumented systems should consider the runway light intensity.

(b) When instrumented systems are used for the assessment of RVR, computations should be made separately for each available runway.

(c) For local routine and special reports, the light intensity to be used for the computation should be:

(1) for a runway with the lights switched on and a light intensity of more than 3 % of the maximum light intensity available, the light intensity actually in use on that runway;

(2) for a runway with the lights switched on and a light intensity of 3 % or less of the maximum light intensity available, the optimum light intensity that would be appropriate for operational use in the prevailing conditions; and

(3) for a runway with lights switched off (or at the lowest setting pending the resumption of operations), the optimum light intensity that would be appropriate for operational use in the prevailing conditions.

(e) In METAR, the RVR should be based on the maximum light intensity available on the runway.

GM1 MET.TR.210(c)(2) Observing meteorological elements
RUNWAY VISUAL RANGE (RVR) — USE OF INSTRUMENTED SYSTEMS

(a) Since accuracy can vary from one instrument design to another, performance characteristics are to be checked before selecting an instrument for assessing the runway visual range.

(b) The calibration of a forward-scatter meter has to be traceable and verifiable to a transmissometer standard, whose accuracy has been verified over the intended operational range.

(c) Guidance on the use of transmissometers and forward-scatter meters in instrumented Runway Visual Range systems is given in the Manual of Runway Visual Range Observing and Reporting Practices (ICAO Doc 9328).

GM2 MET.TR.210(c)(2) Observing meteorological elements
RUNWAY VISUAL RANGE (RVR)

Instrumented systems based on transmissometer or forward-scatter meters must be used to assess RVR on runways intended for Categories II and III instrument approach and landing operations. For Category I instrument approach, other means to assess RVR exist and the assessment of RVR by means of instrumented systems based on transmissometer or forward-scatter meters are therefore not required. However, if the competent authority considers that an instrument system is required at certain aerodromes, it may decide so. Therefore, the requirement in MET.TR.210(c)(2) provides this option, which is consistent with the ICAO Annex 3 approach.

GM1 MET.TR.210(c)(4)(ii)(B) Observing meteorological elements
RUNWAY VISUAL RANGE (RVR) — AVERAGING

A marked discontinuity occurs when there is an abrupt and sustained change in RVR, lasting at least 2 minutes, which reaches or passes through the values 800, 550, 300 and 175 m.

AMC1 MET.TR.210(d)(1) Observing meteorological elements
PRESENT WEATHER — GENERAL

(a) For local routine reports and local special reports, the present weather information should be representative of the conditions at the aerodrome.

(b) For METAR, the present weather information should be representative of the conditions at the aerodrome and, for certain specified present weather phenomena, in its vicinity.

AMC1 MET.TR.210(d)(2) Observing meteorological elements
PRESENT WEATHER — SITING

When instrumented systems are used for observing present weather phenomena listed under AMC2 MET.TR.205(d), MET.TR.205(d)(3) and AMC1 MET.TR.205(d)(3), representative information should be obtained by the use of sensors appropriately sited.

AMC1 MET.TR.210(e) Observing meteorological elements
CLOUDS — GENERAL

(a) Cloud observations for local routine reports and local special reports should be representative of the runway threshold(s) in use.

(b) Cloud observations for METAR should be representative of the aerodrome and its vicinity.

AMC1 MET.TR.210(e)(2) Observing meteorological elements
CLOUDS — SITING

(a) When instrumented systems are used for the measurement of the cloud amount and the height of cloud base, representative observations should be obtained by the use of sensors appropriately sited.

(b) For local routine reports and local special reports, in the case of aerodromes with precision approach runways, sensors for cloud amount and height of cloud base should be sited to give the best practicable indications of the cloud amount and height of cloud base at the threshold of the runway in use. For that purpose, a sensor should be installed at a distance of less than 4 000 ft (1 200 m) before the landing threshold.

AMC1 MET.TR.210(f) Observing meteorological elements
AIR TEMPERATURE AND DEW-POINT TEMPERATURE

Observations of air temperature and dew-point temperature for local routine reports and local special reports and METAR should be representative of the whole runway complex.

AMC1 MET.TR.210(g)(3) Observing meteorological elements
ATMOSPHERIC PRESSURE — REFERENCE LEVEL

(a) The reference level for the computation of QFE should be the aerodrome elevation.

(b) For non-precision approach runways, whose thresholds are 7 ft (2 m) or more below the aerodrome elevation, and for precision approach runways, the QFE, if required, should refer to the relevant threshold elevation.

Chapter 2 — Technical requirements for aerodrome meteorological offices

AMC1 MET.TR.215(a) Forecasts and other information
METEOROLOGICAL INFORMATION FOR OPERATORS AND FLIGHT CREW

Meteorological information provided to operators and flight crew members should be provided by means of one or more of the following:

(a) written or printed material, including specified charts and forms;

(b) data in a digital form;

(c) briefing;

(d) consultation;

(e) display; or

(f) an automated pre-flight information system providing self-briefing and flight documentation facilities while retaining access by operators and aircrew members to consultation, as necessary, with the aerodrome meteorological office.

AMC2 MET.TR.215(a) Forecasts and other information
SPECIFIC INFORMATION FOR HELICOPTER OPERATIONS

(a) Meteorological information for pre-flight planning and in-flight replanning by operators of helicopters flying to offshore structures should include data covering the layers from sea level to flight level 100.

(b) 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-surface temperature, mean sea-level pressure, and the occurrence and expected occurrence of turbulence and icing.

AMC3 MET.TR.215(a) Forecasts and other information
AUTOMATED PRE-FLIGHT INFORMATION SYSTEMS

Automated pre-flight information systems for the supply of meteorological information for self-briefing, pre-flight planning and flight documentation should:

(a) provide for the continuous and timely updating of the system database and monitoring of the validity and integrity of the meteorological information stored;

(b) permit access to the system by operators and flight crew members and also by other aeronautical users concerned through suitable telecommunications means;

(c) use access and interrogation procedures based on abbreviated plain language and, as appropriate, ICAO location indicators, and aeronautical meteorological code data-type designators prescribed by WMO, or based on a menu-driven user interface, or other appropriate mechanisms as agreed between the meteorological authority and the operators concerned; and

(d) provide for rapid response to a user request for information.

GM1 to AMC3 MET.TR.215(a) Forecasts and other information
AUTOMATED PRE-FLIGHT INFORMATION SYSTEMS

(a) ICAO abbreviations and codes and location indicators are given respectively in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes (PANS-ABC, ICAO Doc 8400) and Location Indicators (ICAO Doc 7910).

(b) Aeronautical meteorological code data-type designators are given in the WMO Publication No 386, Manual on the Global Telecommunication System.

GM1 MET.TR.215(b) Forecasts and other information
RESCUE COORDINATION CENTRES

(a) The elements which are not distributed routinely are:

(1) state of ground, and in particular any snow cover or flooding;

(2) sea-surface temperature, state of the sea, ice cover (if any) and ocean currents, if relevant to the search area; and

(3) sea-level pressure data.

(b) On request from the rescue coordination centre, the designated aerodrome meteorological office or meteorological watch office should arrange to obtain details of the flight documentation which was supplied to the missing aircraft, together with any amendments to the forecast which were transmitted to the aircraft in flight.

GM2 MET.TR.215(b) Forecasts and other information
RESCUE COORDINATION CENTRES

Information to be supplied to rescue coordination centres includes:

(a) significant en-route weather phenomena;

(b) cloud amount and type, particularly cumulonimbus; height indications of bases and tops;

(c) visibility and phenomena reducing visibility;

(d) surface wind and upper wind;

(e) state of ground, in particular, any snow cover or flooding;

(f) sea-surface temperature, state of the sea, ice cover if any and ocean currents, if relevant to the search area; and

(g) sea-level pressure data.

AMC1 MET.TR.215(d)(5) Forecasts and other information
HEIGHT INDICATIONS REFERENCES TO EN-ROUTE METEOROLOGICAL CONDITIONS

All references to en-route meteorological conditions, such as height indications of upper winds, turbulence or bases and tops of clouds, should be expressed in flight levels. Height indications referred to en-route meteorological conditions may also be expressed in pressure, altitude or, for low-level flights, in height above ground level.

AMC1 MET.TR.215(e) Forecasts and other information
FLIGHT DOCUMENTATION

(a) Where the forecasts are supplied in chart form, flight documentation for low-level flights, including those in accordance with the visual flight rules, operating up to flight level 100 or up to flight level 150 in mountainous areas or higher, where necessary, should contain the following as appropriate to the flight:

(1) information from relevant SIGMET and AIRMET messages;

(2) upper wind and upper-air temperature charts; and

(3) significant weather charts.

(b) Where the forecasts are not supplied in chart form, flight documentation for low-level flights, including those in accordance with the visual flight rules, operating up to flight level 100 or up to flight level 150 in mountainous areas or higher, where necessary, should contain the following information as appropriate to the flight: SIGMET and AIRMET information.

AMC1 MET.TR.215(e)(1) & (2) Forecasts and other information

FLIGHT DOCUMENTATION — LEGEND FOR THE CHARTS

When the flight documentation related to forecasts of upper wind and upper-air temperature and SIGWX phenomena is presented in the form of charts, it should be in accordance with the below sheet of notations used in flight documentation.

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 in a separate text box on the chart: radioactive materials in the atmosphere symbol; latitude/longitude of release site; and (if known) the name of the site of the radioactive source. In addition, the legend of SIGWX charts on which a release of radiation is indicated should contain "CHECK SIGMET AND NOTAM FOR RDOACT CLD". The centre of the radioactive materials in the atmosphere symbol should be placed on significant weather charts at the latitude/longitude site of the radioactive source.

*** The following information should be included in a separate text box on the chart: volcanic eruption symbol; the name of the volcano (if known); and the latitude/longitude of the eruption.

In addition, the legend of SIGWX charts should indicate "CHECK SIGMET, ADVISORIES FOR TC AND VA, AND ASHTAM AND NOTAM FOR VA". The dot on the base of the volcanic eruption symbol should be placed on significant weather charts at the latitude/longitude site of the volcanic event.

**** 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 concergence zone
H 480	Tropopause high	10	State of the sea
270	Tropopause low	18	Sea-surface temperature
380	Tropopause level	40	Widespread strong surface wind*

FL 320 220/400 FL 310

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.

‡ Symbol used whenever the height of the jet axis changes by +/–3000 ft or the speed changes by +/–20 kt

* 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.
Flight levels inside small rectangles	=	height in flight levels of tropopause at spot locations, e.g. 340. 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

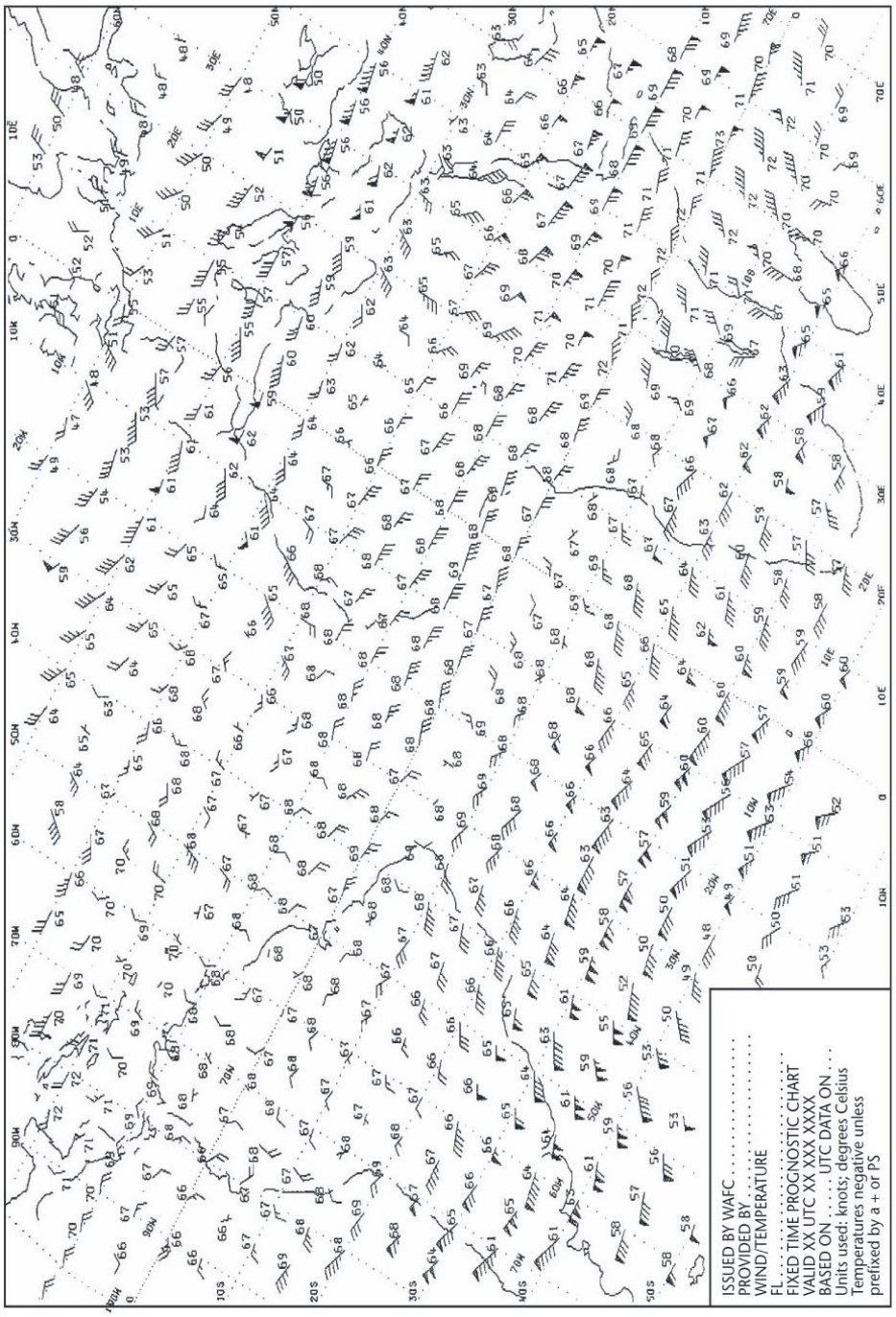
* A conversion factor of 1 to 2 is used.

GM1 MET.TR.215(e)(1) & (2) Forecasts and other information
MODEL CHARTS

This guidance provides examples of model charts.

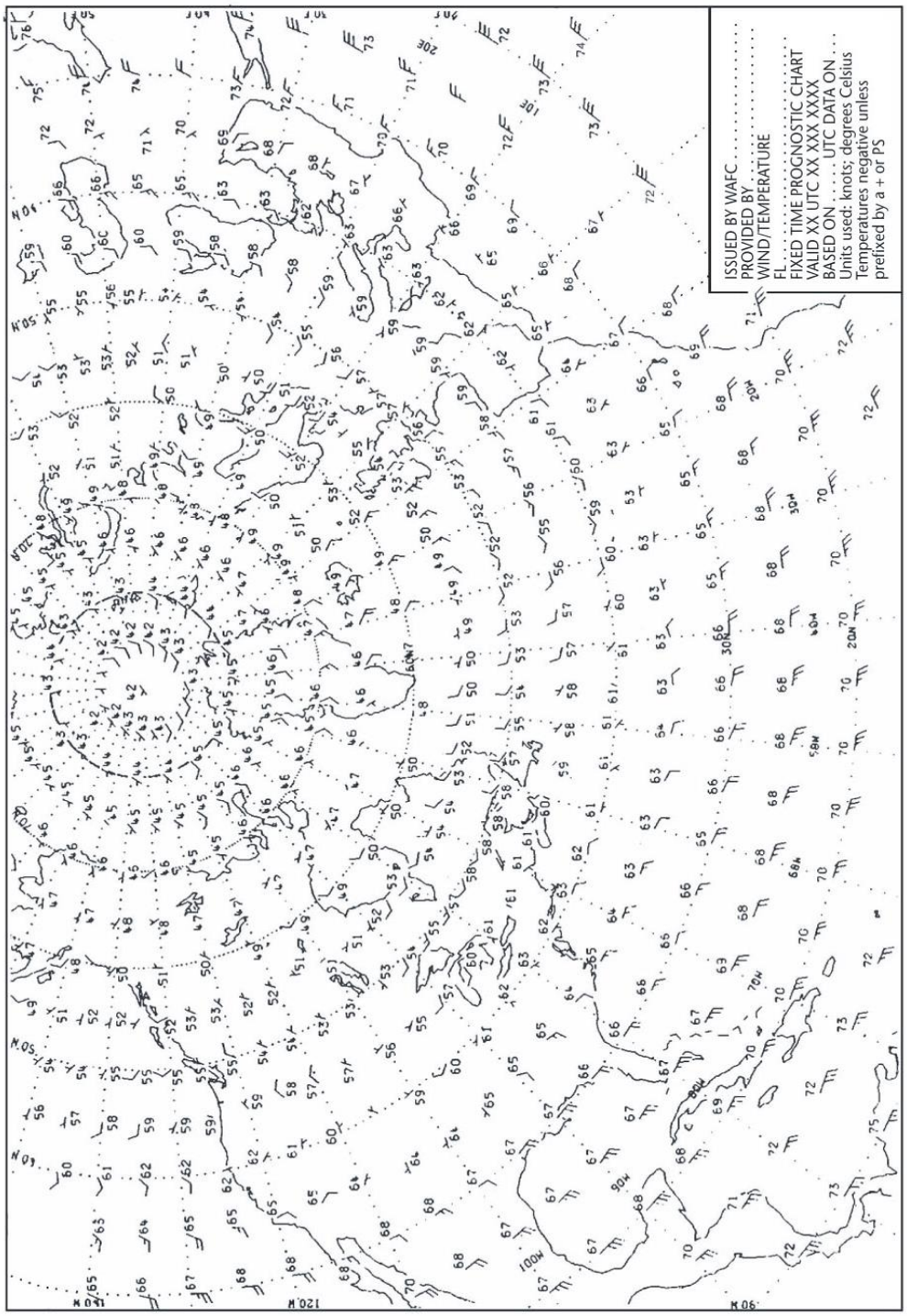
(a) UPPER WIND AND TEMPERATURE CHART FOR STANDARD ISOBARIC SURFACE (MODEL IS)

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

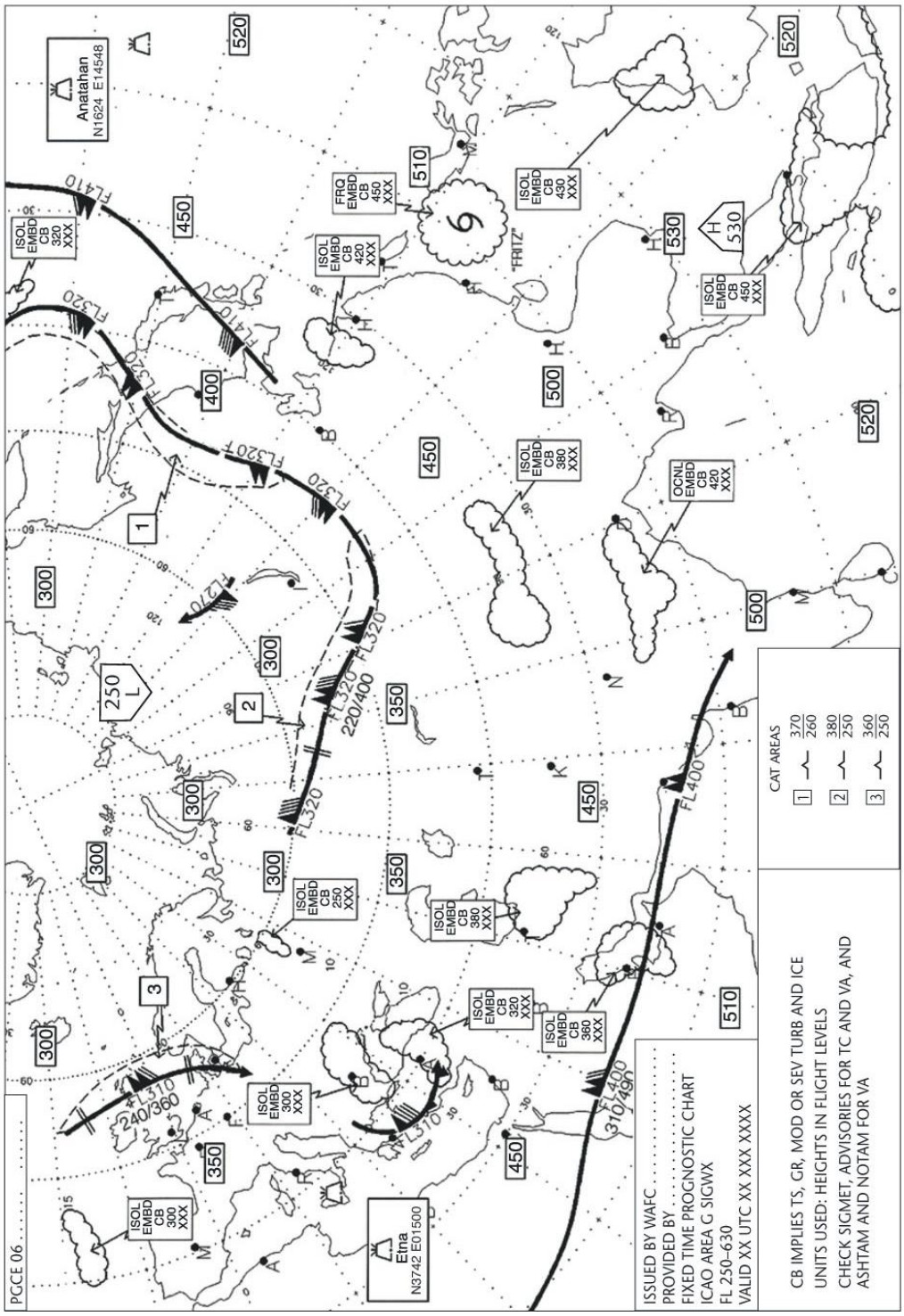


(b) UPPER WIND AND TEMPERATURE CHART FOR STANDARD ISOBARIC SURFACE MODEL IS

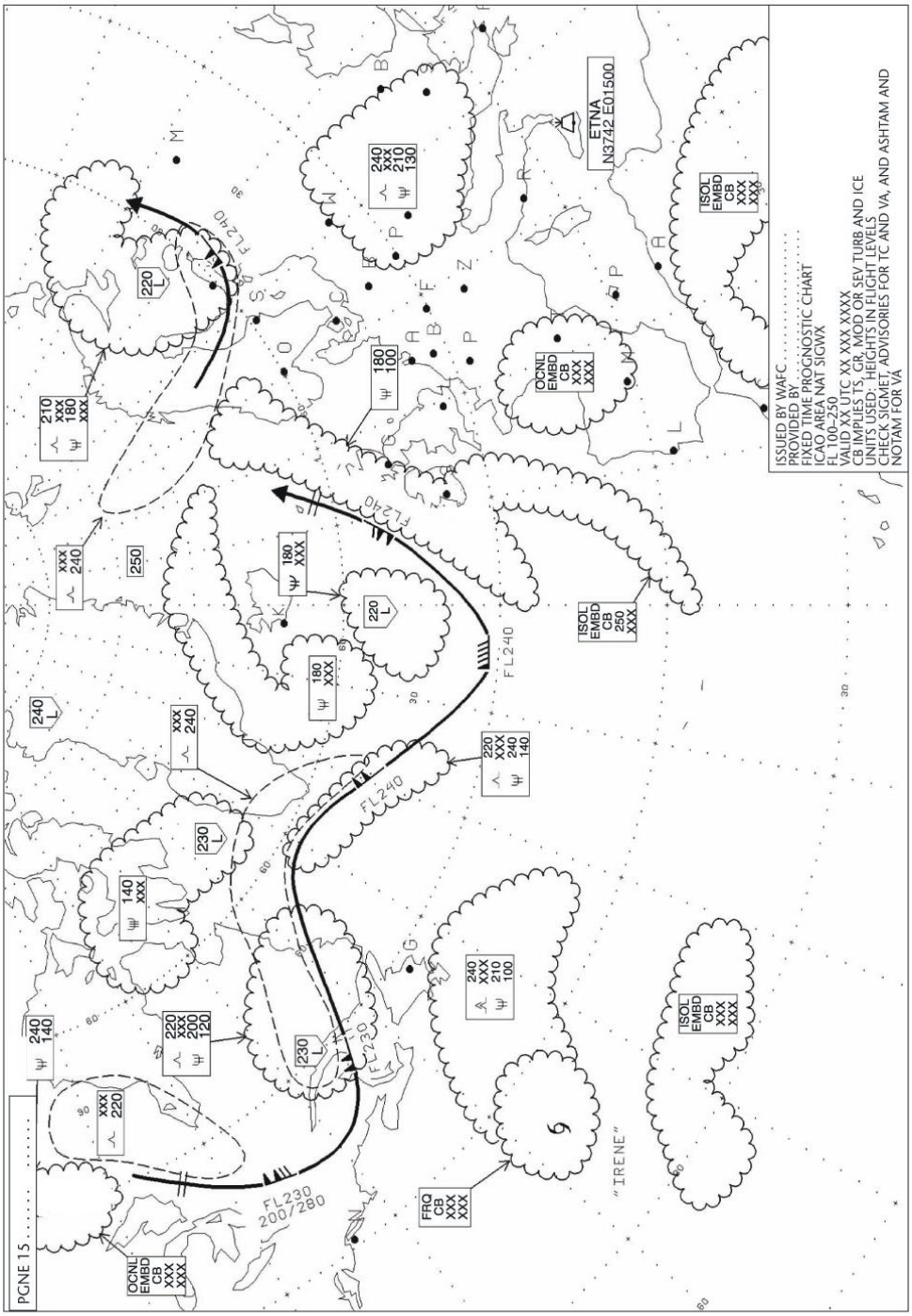
Example 2. Arrows, feathers and pennants (Polar stereographic projection)



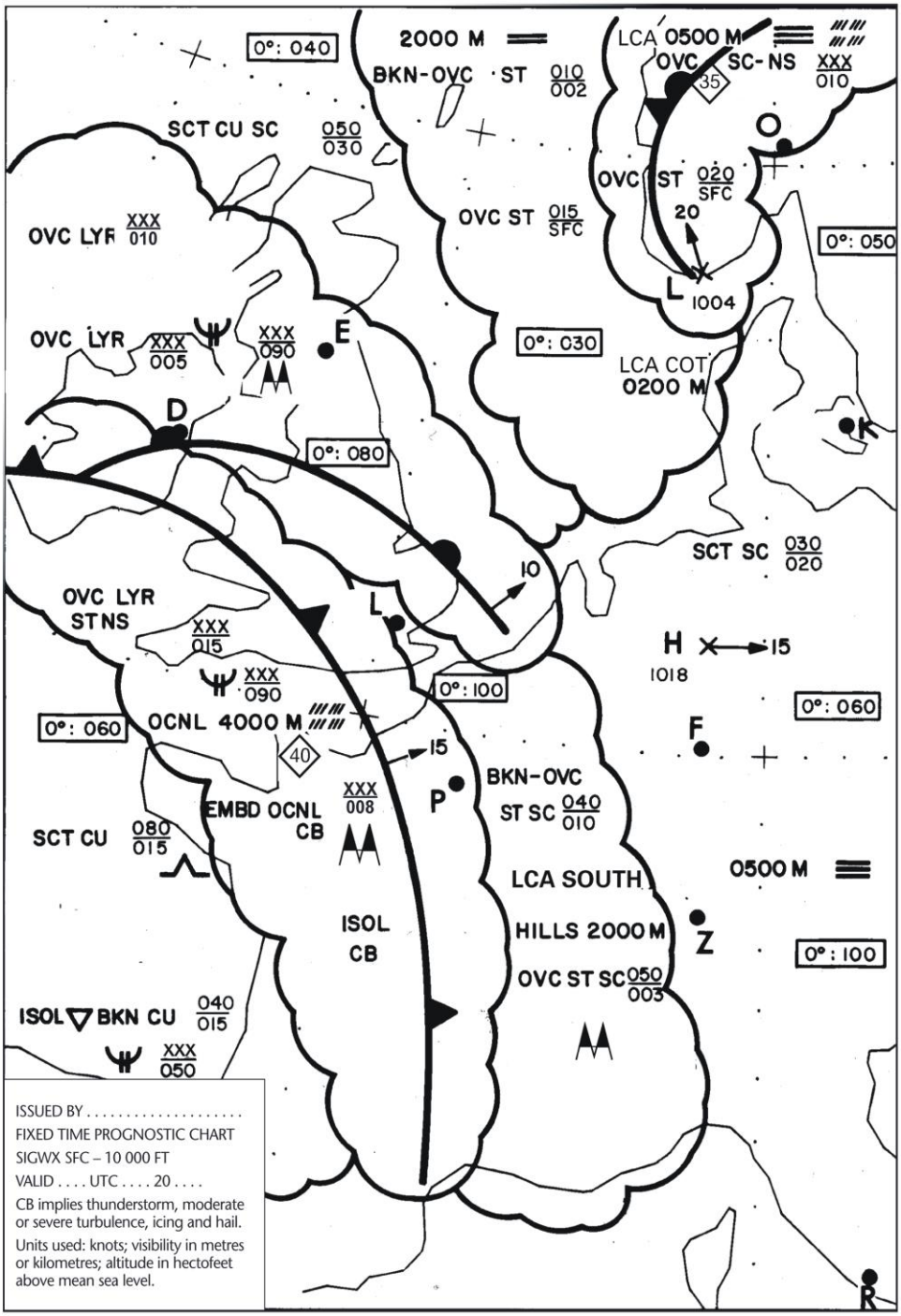
(c) SIGNIFICANT WEATHER CHART (HIGH LEVEL)
MODEL SWH
Example. Polar stereographic projection (showing the jet stream vertical extent)



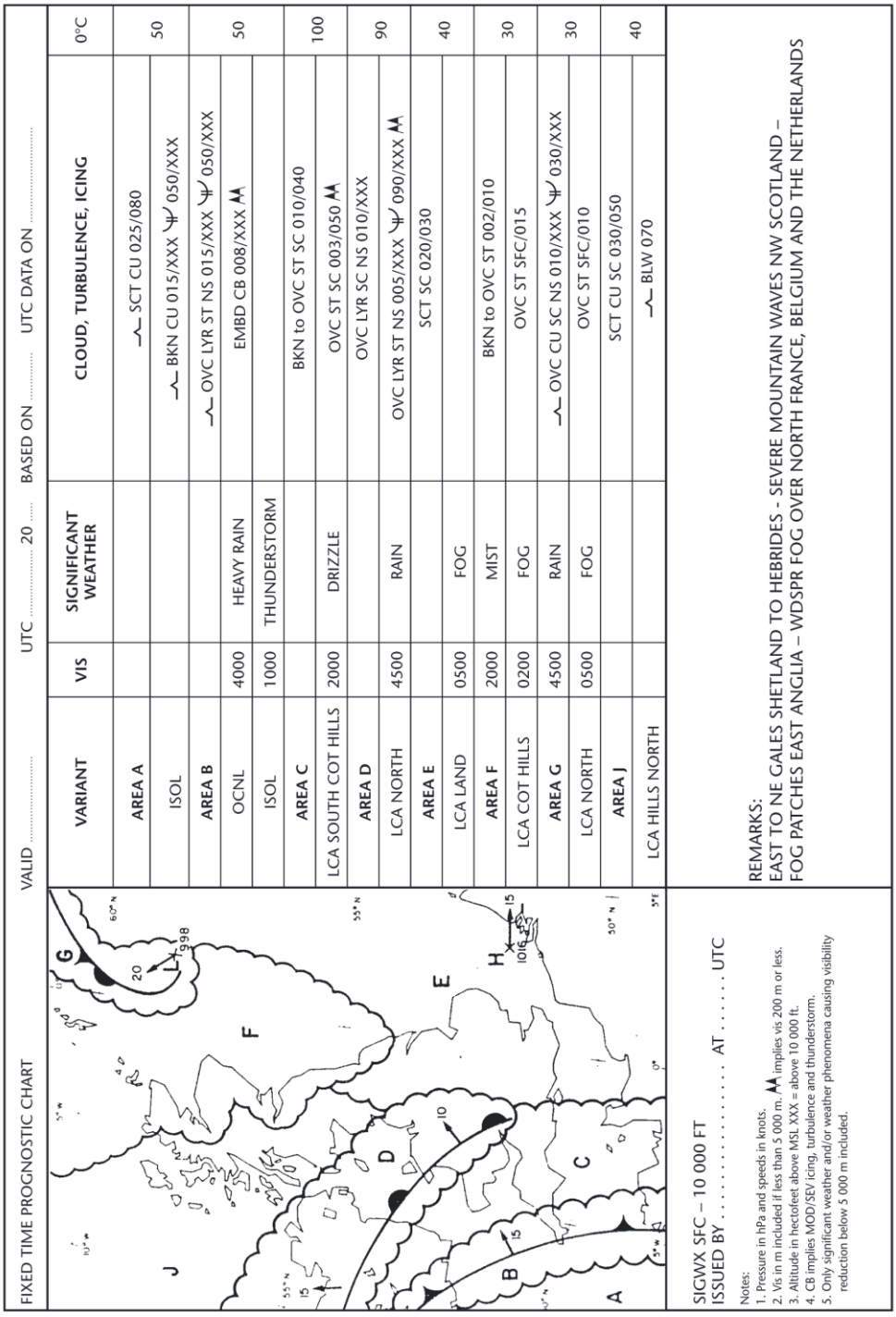
(d) SIGNIFICANT WEATHER CHART (MEDIUM LEVEL)
MODEL SWM



(e) SIGNIFICANT WEATHER CHART (LOW LEVEL)
MODEL SWL
Example 1



(f) SIGNIFICANT WEATHER CHART (LOW LEVEL)
MODEL SWL
Example 2



AMC2 MET.TR.215(e)(1) & (2) Forecasts and other information
FORMAT OF FLIGHT DOCUMENTATION

The location indicators and the abbreviations used should be explained in the flight documentation.

AMC1 MET.TR.215(f) Forecasts and other information
CHARTS

Charts included in flight documentation should have a high standard of clarity and legibility and should have the following physical characteristics:

(a) For convenience, the largest size of charts should be about 42 × 30 cm (standard A3 size) and the smallest size should be about 21 × 30 cm (standard A4 size). The choice between these sizes should depend on the route lengths and the amount of detail that needs to be given in the charts as agreed between the meteorological authorities and the users concerned;

(b) Major geographical features, such as coastlines, major rivers and lakes, should be depicted in a way that makes them easily recognisable;

(c) For charts prepared by computer, meteorological data should take preference over basic chart information, the former cancelling the latter wherever they overlap;

(d) Major aerodromes should be shown as a dot and identified by the first letter of the name of the city the aerodrome serves as given in Table AOP of the EUR air navigation plan;

(e) A geographical grid should be shown with meridians and parallels represented by dotted lines at each 10°-latitude and longitude; dots should be spaced one degree apart;

(f) Latitude and longitude values should be indicated at various points throughout the charts; and

(g) Labels on the charts for flight documentation should be clear and simple and should present the name of the world area forecast centre or, for non-WAFS products, the originating centre, the type of chart, date and valid time and, if necessary, the types of units used in an unambiguous way.

AMC2 MET.TR.215(f) Forecasts and other information
CHARTS

(a) The minimum number of charts for flights between flight level 250 and flight level 630 should include a high-level SIGWX chart (flight level 250 to flight level 630) and a forecast 250 hPa wind and temperature chart.

(b) The actual charts provided for pre-flight and in-flight planning and for flight documentation should be agreed between the meteorological providers and the users concerned.

GM1 MET.TR.215(f) Forecasts and other information
CHARTS — SHORT-HAUL FLIGHTS

For short-haul flights, charts should be prepared covering limited areas at a scale of $1:15 \times 10^6$ as required.

GM1 MET.TR.215(g) Forecasts and other information
CONCATENATED ROUTE-SPECIFIC FORECASTS

(a) The flight documentation related to concatenated route-specific upper wind and upper-air temperature forecasts should be provided as agreed between the meteorological service provider and the operator concerned.

(b) Guidance on the design, formulation and use of concatenated charts is given in the Manual of Aeronautical Meteorological Practice (ICAO Doc 8896).

AMC1 MET.TR.215(i) Forecasts and other information
CLIMATOLOGICAL INFORMATION — PERIOD OF OBSERVATION

Aeronautical climatological information should be based on observations made over a period of at least five years. The period should be indicated in the information supplied.

AMC2 MET.TR.215(i) Forecasts and other information
CLIMATOLOGICAL DATA RELATED TO SITES FOR NEW AERODROMES

Climatological data related to sites for new aerodromes and to additional runways at existing aerodromes should be collected starting as early as possible before the commissioning of those aerodromes or runways.

AMC3 MET.TR.215(i) Forecasts and other information
CLIMATOLOGICAL SUMMARIES

Aerodrome climatological summaries should follow the procedures prescribed by the World Meteorological Organization and should be made available in a form to meet a specific user request.

AMC4 MET.TR.215(i) Forecasts and other information
CLIMATOLOGICAL TABLE

An aerodrome climatological table should indicate:

(a) mean values and variations therefrom, including maximum and minimum values, of meteorological elements; and/or

(b) the frequency of occurrence of present weather phenomena affecting flight operations at the aerodrome; and/or

(c) the frequency of occurrence of specified values of one, or of a combination of two or more, elements.

AMC5 MET.TR.215(i) Forecasts and other information
CLIMATOLOGICAL TABLE

Aerodrome climatological tables should include information required for the preparation of aerodrome climatological summaries.

AMC6 MET.TR.215(i) Forecasts and other information
CLIMATOLOGICAL SUMMARIES

Aerodrome climatological summaries should cover:

(a) frequencies of the occurrence of runway visual range/visibility and/or height of base of the lowest cloud layer of BKN or OVC extent below specified values at specified times;

(b) frequencies of visibility below specified values at specified times;

(c) frequencies of the height of base of the lowest cloud layer of BKN or OVC extent below specified values at specified times;

(d) frequencies of occurrence of concurrent wind direction and speed within specified ranges;

(e) frequencies of surface temperature in specified ranges of 5°C at specified times; and

(f) mean values and variations therefrom, including maximum and minimum values of meteorological elements required for operational planning purposes, including take-off performance calculations.

GM1 MET.TR.215(i) Forecasts and other information
CLIMATOLOGICAL INFORMATION

In cases where it is impracticable to meet the requirements for aeronautical climatological information on a national basis, the collection, processing and storage of observational data may be effected through computer facilities available for international use, and the responsibility for the preparation of the required aeronautical climatological information may be delegated by agreement between the competent authorities concerned.

GM2 MET.TR.215(i) Forecasts and other information
CLIMATOLOGICAL SUMMARIES — MODELS

Models of climatological summaries related to (a) to (e) of AMC6 MET.TR.215(i) are given in the WMO Publication No 49, Technical Regulations, Volume II, C.3.2.

GM3 MET.TR.215(i) Forecasts and other information
CLIMATOLOGICAL DATA FOR AERODROME PLANNING PURPOSES

Climatological data required for aerodrome planning purposes are set out in GM1 ADR-DSN.B.025 'Data to be used'.

GM1 MET.TR.220 Aerodrome forecasts
EXAMPLE OF TAF

TAF for YUDO (Donlon/International)*:

TAF YUDO 151800Z 1600/1618 13005MPS 9000 BKN020 BECMG 1606/1608 SCT015CB BKN020 TEMPO 1608/1612 17006G12MPS 1000 TSRA SCT010CB BKN020 FM161230 15004MPS 9999 BKN020

Meaning of the forecast:

TAF for Donlon/International* issued on the 15th of the month at 1800 UTC valid from 0000 UTC to 1800 UTC on the 16th of the month; surface wind direction 130 degrees; wind speed 5 knots; visibility 9 kilometres, broken cloud at 2 000 feet; becoming between 0600 UTC and 0800 UTC on the 16th of the month, broken cloud at 800 feet; temporarily between 0800 UTC and 1200 UTC on the 16th of the month surface wind direction 170 degrees; wind speed 15 knots gusting to 25 knots; visibility 1 000 metres in a thunderstorm with moderate rain, scattered cumulonimbus cloud at 300 metres and broken cloud at 2 000 feet; from 1230 UTC on the 16th of the month, surface wind direction 150 degrees; wind speed 4 knots; visibility 10 kilometres or more; and broken cloud at 2 000 feet.

** Fictitious location*

GM2 MET.TR.220 Aerodrome forecasts
EXAMPLE OF CANCELLATION OF TAF

Cancellation of TAF for YUDO (Donlon/International):*

TAF AMD YUDO 161500Z 1600/1618 CNL

Meaning of the forecast:

Amended TAF for Donlon/International* issued on the 16th of the month at 1500 UTC cancelling the previously issued TAF valid from 0000 UTC to 1800 UTC on the 16th of the month.

** Fictitious location*

GM3 MET.TR.220 Aerodrome forecasts
ACCURACY OF TAF

Guidance on operationally desirable accuracy of TAF is given below:

Element to be forecast	*Operationally desirable accuracy of forecasts*	*Minimum percentage of cases within range*
	TAF	
Wind direction	± 20°	80 % of cases
Wind speed	± 2.5 m/s (5 kt)	80 % of cases
Visibility	± 200 m up to 800 m ± 30 % between 800 m and 10 km	80 % of cases
Precipitation	Occurrence or non-occurrence	80 % of cases
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)	70 % of cases
Cloud height	± 30 m (100 ft) up to 300 m (1 000 ft) ± 30 % between 300 m (1 000 ft) and 3 000 m (10 000 ft)	70 % of cases
Air temperature	± 1°C	70 % of cases

GM1 MET.TR.220(a)(8) Aerodrome forecasts
VISIBILITY

The visibility included in TAF refers to the forecast prevailing visibility.

AMC1 MET.TR.220(b) Aerodrome forecasts
TAF — DIGITAL FORM

TAF should be disseminated in a digital form.

GM1 MET.TR.220(b) Aerodrome forecasts
TAF — DIGITAL FORM

When TAF is disseminated in a digital form, this is in addition to the TAF code form.

GM2 MET.TR.220(b) Aerodrome forecasts
TAF CODE FORM

The TAF code form is contained in the WMO Publication No 306, Manual on Codes, Volume I.1, Part A — Alphanumeric Codes.

AMC1 MET.TR.220(c) Aerodrome forecasts
PERIOD OF VALIDITY

(a) The periods of validity for 9-hour TAF should commence at 00, 03, 06, 09, 12, 15, 18 and 21 UTC and for 24- and 30-hour TAF at 00, 06, 12 and 18 UTC or 03, 09, 15, and 21 UTC.

(b) The 24- and 30-hour TAF periods of validity should be determined based on the types of operations, as agreed between the aerodrome meteorological office and the operators concerned.

At aerodromes with limited hours of operation, the beginning of the period of validity of a TAF should commence at least 1 hour prior to the aerodrome resuming operations, or more as agreed between the aerodrome meteorological office and the operators concerned, to meet planning requirements for flights that arrive at the aerodromes as soon as it is opened for use.

(c) Routine TAF valid for 9 hours should be issued every 3 hours, and those valid for 24 or 30 hours should be issued every 6 hours.

GM1 MET.TR.220(d) Aerodrome forecasts
FORMAT OF TAF

Guidance on the information exchange model, XML/GML and the metadata profile is provided in the Manual on the Digital Exchange of Aeronautical Meteorological Information (ICAO Doc 10003).

AMC1 MET.TR.220(f) Aerodrome forecasts
TAF — USE OF CHANGE GROUPS

The criteria used for the inclusion of change groups in TAF or amendments to TAF should be based on the following:

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

(b) when the mean surface wind speed is forecasted to change by 10 kt (5 m/s) or more;

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

(d) when the surface wind is forecasted to change through values of operational significance;

(e) when the visibility is forecasted to improve and change to or pass through one or more of the following values, or when the visibility is forecasted to deteriorate and pass through one or more of the following values:

(1) 150, 350, 600, 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;

(f) when any of the following weather phenomena, or combinations thereof, are forecasted to begin or end:

(1) low drifting dust, sand or snow;

(2) blowing dust, sand or snow;

(3) squall; and

(4) funnel cloud (tornado or waterspout);

(g) when the height of base of the lowest layer or mass of cloud of BKN or OVC extent is forecasted to lift and change to or pass through one or more of the following values, or when the height of the lowest layer or mass of cloud of BKN or OVC extent is forecasted to lower and pass through one or more of the following values:

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

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

(h) when the amount of a layer or mass of cloud below 1 500 ft (450 m) is forecasted to change:

(1) from NSC, FEW or SCT to BKN or OVC; or

(2) from BKN or OVC to NSC, FEW or SCT;

(i) when the vertical visibility is forecasted to improve and change to or pass through one or more of the following values, or when the vertical visibility is forecasted to deteriorate and pass through one or more of the following values: 100, 200, 500 or 1 000 ft (30, 60, 150 or 300 m); and

(j) any other criteria based on local aerodrome operating minima, as agreed between the aerodrome meteorological office and the operators.

GM1 MET.TR.220(f)(1) Aerodrome forecasts

TAF — USE OF CHANGE AND TIME INDICATORS

Guidance on the use of change and time indicators in TAF is given below:

Change or time indicator		*Time period*	*Meaning*
FM		ndndnhnhnmnm	Used to indicate a significant change in most weather elements occurring at ndnd day, nhnh hours and nmnm minutes (UTC); all the elements given before 'FM' are to be included following 'FM' (i.e. they are all superseded by those following the abbreviation).
BECMG		nd1nd1nh1nh1/nd2nd2nh2nh2	The change is forecast to commence at nd1nd1 day and nh1nh1 hours (UTC) and be completed by nd2nd2 day and nh2nh2 hours (UTC); only those elements for which a change is forecast are to be given following 'BECMG'; the time period nd1nd1nh1nh1/nd2nd2nh2nh2 should normally be less than 2 hours and in any case should not exceed 4 hours.

TEMPO		nd1nd1nh1nh1/nd2nd2nh2nh2	Temporary fluctuations are forecast to commence at nd1nd1 day and nh1nh1 hours (UTC) and cease by nd2nd2 day and nh2nh2 hours (UTC); only those elements for which fluctuations are forecast are to be given following 'TEMPO'; temporary fluctuations should not last more than one hour in each instance, and in the aggregate, cover less than half of the period nd1nd1nh1nh1/nd2nd2nh2nh2.	
PROBnn	—	nd1nd1nh1nh1/nd2nd2nh2nh2	probability of occurrence (in %) of an alternative value of a forecast element or elements; nn = 30 or nn = 40 only; to be placed after the element(s) concerned	—
	TEMPO	nd1nd1nh1nh1/nd2nd2nh2nh2		probability of occurrence of temporary fluctuations

AMC1 MET.TR.220(g) Aerodrome forecasts
USE OF PROBABILITY INDICATORS

(a) The number of change and probability groups should be kept to a minimum.

(b) The probability of occurrence of an alternative value of a forecast element or elements should be placed after the element or elements forecast and be followed by the alternative value of the element or elements.

GM1 MET.TR.220(g) Aerodrome forecasts
USE OF PROBABILITY INDICATORS

(a) A probability of an alternative value or change of less than 30 % should not be considered sufficiently significant to be indicated.

(b) A probability of an alternative value or change of 50 % or more should not be considered a probability but, instead, should be indicated, as necessary, by use of the change indicators 'BECMG' or 'TEMPO' or by subdivision of the validity period using the abbreviation 'FM'. The probability group should neither be used to qualify the change indicator 'BECMG' nor the time indicator 'FM'.

AMC1 MET.TR.225(c)(1)(iii) Forecasts for landing
THRESHOLD VALUES

The threshold values should be established by the aerodrome meteorological office in consultation with the appropriate ATS units and operators concerned, taking into account changes in the wind which would:

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

(b) indicate that the runway tailwind and crosswind components will change through values representing the main operating limits for typical aircraft operating at the aerodrome.

GM1 MET.TR.225(c)(2)(iii) Forecasts for landing
VISIBILITY

In TREND forecasts appended to local routine reports and local special reports, visibility refers to the forecast visibility along the runway(s).

AMC1 MET.TR.225(c)(7)(ii) Forecasts for landing
USE OF CHANGE GROUPS — BECMG

(a) When the change is forecast to begin and end wholly within the trend forecast period, the beginning and end of the change should be indicated by using the abbreviations 'FM' and 'TL', respectively, with their associated time groups.

(b) 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 should be omitted and only 'TL' and its associated time group should be used.

(c) 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 should be omitted and only 'FM' and its associated time group should be used.

(d) 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 should be used.

(e) 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 should be omitted and the change indicator 'BECMG' should be used alone.

GM1 MET.TR.225(c)(7)(ii) Forecasts for landing
TREND FORECASTS — USE OF CHANGE INDICATORS

Guidance on the use of change indicators in trend forecasts is given in the table below.

Change indicator	*Time indicator and period*	*Meaning*	
NOSIG	—	no significant changes are forecast	
BECMG	FMn1n1n1n1 TLn2n2n2n2	the change is forecast to	commence at n1n1n1n1 UTC and be completed by n2n2n2n2 UTC
	TLnnnn		commence at the beginning of the trend forecast period and be completed by nnnn UTC
	FMnnnn		commence at nnnn UTC and be completed by the end of the trend forecast period
	ATnnnn		occur at nnnn UTC (specified time)
	—		commence at the beginning of the trend forecast period and be completed by the

			end of the trend forecast period; or the time is uncertain
TEMPO	FMn1n1n1n1 TLn2n2n2n2	temporary fluctuations are forecast to	commence at n1n1n1n1 UTC and cease by n2n2n2n2 UTC
	TLnnnn		commence at the beginning of the trend forecast period and cease by nnnn UTC
	FMnnnn		commence at nnnn UTC and cease by the end of the trend forecast period
	—		commence at the beginning of the trend forecast period and cease by the end of the trend forecast period

AMC1 MET.TR.225(c)(7)(iii) Forecasts for landing
USE OF CHANGE GROUPS — TEMPO

(a) When the change is forecast to begin and end wholly within the trend forecast period, the beginning and end of the change should be indicated by using the abbreviations 'FM' and 'TL' respectively, with their associated time groups.

(b) 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 should be omitted and only 'TL' and its associated time group should be used.

(c) 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 should be omitted and only 'FM' and its associated time group should be used.

(d) 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 should be used.

(e) 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 should be omitted and the change indicator 'TEMPO' should be used alone.

AMC1 MET.TR.230(a) Forecasts for take-off
AMENDMENTS TO FORECASTS

(a) The criteria for the issuance of amendments to forecasts for take-off for surface wind direction and speed, temperature and pressure, and any other elements agreed locally should be agreed between the aerodrome meteorological office and the operators concerned.

(b) The criteria should be consistent with the corresponding criteria for special reports established for the aerodrome.

AMC1 MET.TR.235 Aerodrome warnings and wind shear warnings and alerts

AERODROME WARNINGS — FORMAT

(a) Aerodrome warnings should be issued in accordance with the template below or in another format where required by operators or aerodrome meteorological offices.

Template for aerodrome warnings

Key:

M = inclusion mandatory, part of every message;

C = inclusion conditional, included whenever applicable.

Element	*Detailed content*	*Templates*	*Examples*
Location indicator of the aerodrome (M)	Location indicator of the aerodrome	nnnn	YUCC
Identification of the type of message (M)	Type of message and sequence number	AD WRNG [n]n	AD WRNG 2
Validity period (M)	Day and time of validity period in UTC	VALID nnnnnn/nnnnnn	VALID 211230/211530
IF THE AERODROME WARNING IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.			
Phenomenon (M)	Description of phenomenon causing the issuance of the aerodrome warning	TC nnnnnnnnnn *or* [HVY] TS *or* GR *or* [HVY] SN [nnCM] *or* [HVY] FZRA *or* [HVY] FZDZ *or* RIME *or* [HVY] SS *or* [HVY] DS *or* SA *or* DU *or* SFC WSPD nn[n]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*	TC ANDREW HVY SN 25CM SFC WSPD 20MPS MAX 30 VA TSUNAMI
Observed or	Indication whether the	OBS [AT nnnnZ] *or*	OBS AT 1200Z

forecast phenomenon (M)	information is observed and expected to continue, *or* forecast	FCST	OBS
Changes in intensity (C)	Expected changes in intensity	INTSF *or* WKN *or* NC	WKN

OR

Cancellation of aerodrome warning	Cancellation of aerodrome warning referring to its identification	CNL AD WRNG [n]n nnnnnn/nnnnnn	CNL AD WRNG 2 211230/211530

(b) When the above template is used, the sequence number referred to in the template should correspond to the number of aerodrome warnings issued for the aerodrome since 00.01 UTC on the day concerned.

GM1 MET.TR.235 Aerodrome warnings and wind shear warnings and alerts

RANGES AND RESOLUTIONS — AERODROME WARNINGS

(a) The ranges and resolutions for the numerical elements included in aerodrome warnings are shown below:

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

Elements		*Range*	*Resolution*
Summit elevation:	M	000–8 100	1
	FT	000–27 000	1
Advisory number:	for VA (index)*	000–2 000	1
	for TC (index)*	00–99	1
Maximum surface wind:	MPS	00–99	1
	KT	00–199	1
Central pressure:	hPa	850–1 050	1
Surface wind speed:	MPS	15–49	1
	KT	30–99	1
Surface visibility:	M	0000–0750	50
	M	0800–5 000	100
Cloud: height of base:	M	000–300	30
	FT	000–1 000	100
Cloud: height of top:	M	000–2 970	30
	M	3 000–20 000	300

	FT	000–9 900	100
	FT	10 000–60 000	1 000
Latitudes:	° (degrees)	00–90	1
	(minutes)	00–60	1
Longitudes:	° (degrees)	000–180	1
	(minutes)	00–60	1
Flight levels:		000–650	10
Movement:	KMH	0–300	10
	KT	0–150	5
* Non-dimensional			

(b) The explanations for the abbreviations can be found in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes (PANS ABC, ICAO Doc 8400).

AMC2 MET.TR.235(a) Aerodrome warnings and wind shear warnings and alerts
FORMAT OF AERODROME WARNINGS

(a) The additional text should be prepared in abbreviated plain language using approved ICAO abbreviations and numerical values. If no ICAO-approved abbreviations are available, English plain language text should be used.

(b) When quantitative criteria are necessary for the issuance of aerodrome warnings, the criteria used should be as agreed between the aerodrome meteorological office and the users concerned.

AMC1 MET.TR.235(c) Aerodrome warnings and wind shear warnings and alerts
FORMAT OF WIND SHEAR WARNINGS

(a) The use of text additional to the abbreviations listed in the template in Table 6 of Appendix 1 should be kept to a minimum. The additional text should be prepared in abbreviated plain language using ICAO-approved abbreviations and numerical values.

(b) When an aircraft report is used to prepare a wind shear warning or to confirm a warning previously issued, the corresponding aircraft report, including the aircraft type, should be disseminated unchanged in accordance with the local arrangements to those concerned.

GM1 MET.TR.235(c) Aerodrome warnings and wind shear warnings and alerts
WIND SHEAR TYPES

Following reported encounters by both arriving and departing aircraft, two different wind shear warnings may exist: one for arriving aircraft and one for departing aircraft.

GM2 MET.TR.235(c) Aerodrome warnings and wind shear warnings and alerts
REPORTING THE INTENSITY OF WIND SHEAR

Specifications for reporting the intensity of wind shear are still under development. It is recognised, however, that pilots, when reporting wind shear, may use the qualifying terms 'moderate', 'strong' or 'severe', based to a large extent on their subjective assessment of the intensity of the wind shear encountered.

GM1 MET.TR.235(c) Aerodrome warnings and wind shear warnings and alerts
DETECTION OF WIND SHEAR

Wind shear conditions are normally associated with the following phenomena:

(a) thunderstorms, microbursts, funnel cloud, tornado or waterspout, and gust fronts;

(b) frontal surfaces;

(c) strong surface winds coupled with local topography;

(d) sea breeze fronts;

(e) mountain waves, including low-level rotors in the terminal area;

(f) low-level temperature inversions.

GM1 MET.TR.235(d) Aerodrome warnings and wind shear warnings and alerts
DISSEMINATION OF WIND SHEAR ALERTS

The wind shear alerts are disseminated from automated, ground-based, wind shear remote-sensing or detection equipment in accordance with local arrangements to those concerned.

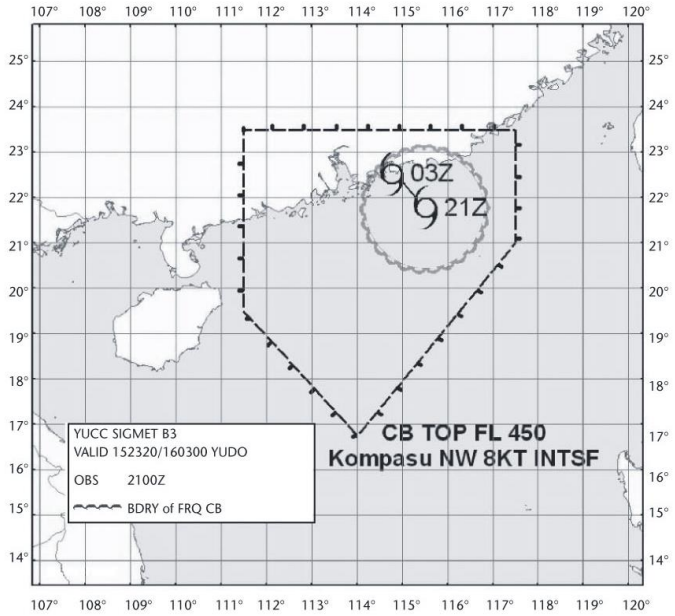
Chapter 3 — Technical requirements for meteorological watch offices

AMC1 MET.TR.250(a) SIGMET messages

FORMAT

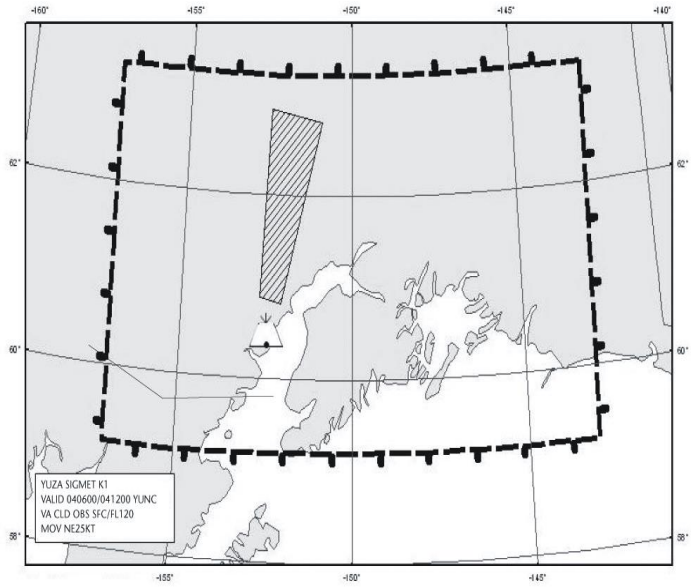
SIGMET, when issued in graphical format, should be as specified below:

(a) **SIGMET FOR TROPICAL CYCLONE — MODEL STC**



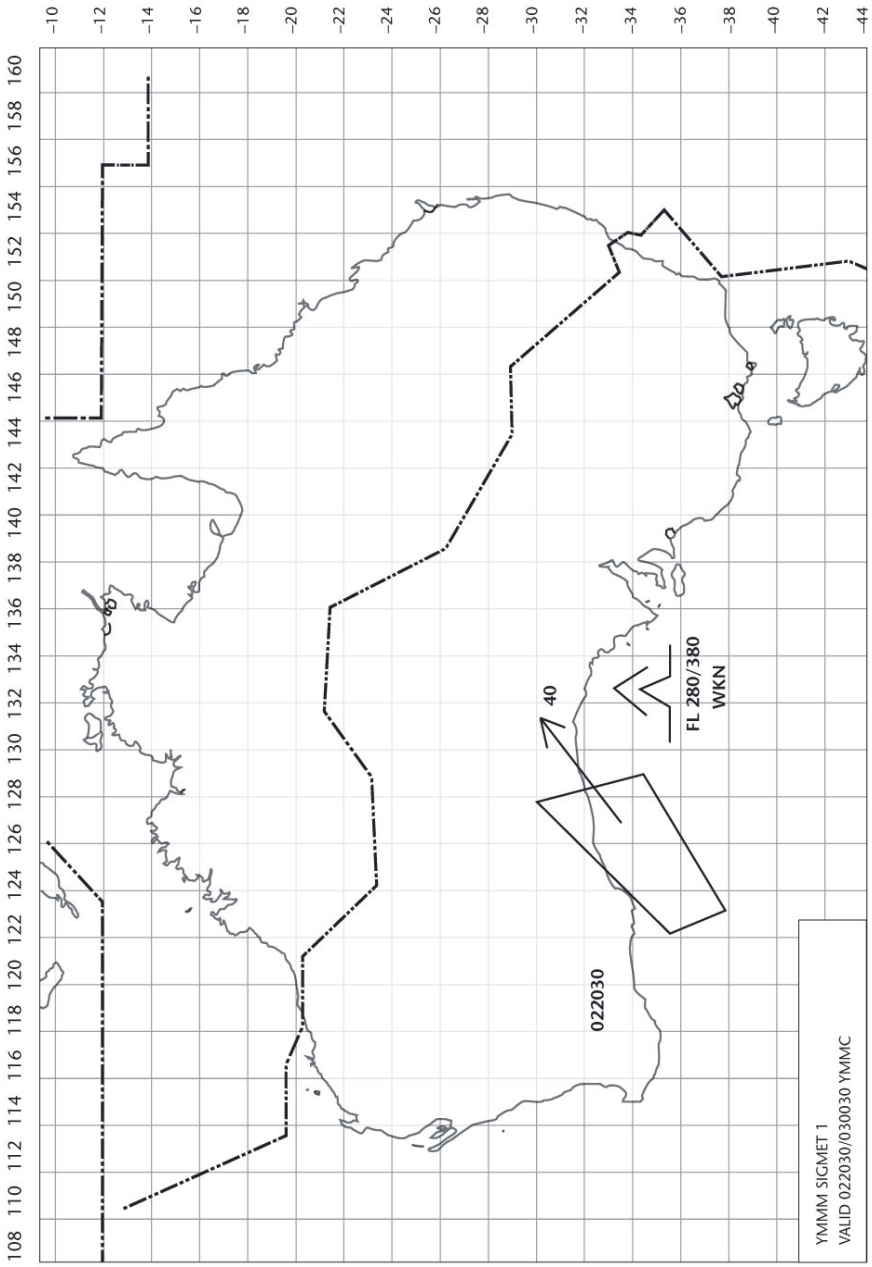
Note: Fictitious FIR.

(b) **SIGMET FOR VOLCANIC ASH — MODEL SVA**



Fictitious FIR.

(c) SIGMET FOR PHENOMENA OTHER THAN TROPICAL CYCLONE AND VOLCANIC ASH — MODEL SGE



AMC2 MET.TR.250(a) SIGMET messages
AIRSPACE

In cases where the airspace is divided into a flight information region (FIR) and an upper-flight information region (UIR), the SIGMET message should be identified by the location indicator of the ATS unit serving the FIR.

GM1 MET.TR.250(a) SIGMET messages
FLIGHT INFORMATION REGION

The SIGMET message applies to the whole airspace within the lateral limits of the FIR, i.e. to the FIR and to the UIR. The particular areas and/or flight levels affected by the meteorological phenomena causing the issuance of the SIGMET message are given in the text of the message.

GM2 MET.TR.250(a) SIGMET messages
EXAMPLE OF SIGMET MESSAGES, AND THE CORRESPONDING CANCELLATIONS

SIGMET	**Cancellation of SIGMET**
YUDD SIGMET 2 VALID 101200/101600 YUSO – YUDD SHANLON FIR/UIR OBSC TS FCST S OF N54 AND E OF W012 TOP FL390 MOV E WKN FCST 1600Z S OF N54 AND E OF W010	YUDD SIGMET 3 VALID 101345/101600 YUSO – YUDD SHANLON FIR/UIR CNL SIGMET 2 101200/101600

GM3 MET.TR.250(a) SIGMET messages
EXAMPLE OF 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 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*

GM4 MET.TR.250(a) SIGMET messages
EXAMPLE OF SIGMET MESSAGE FOR VOLCANIC ASH

YUDD SIGMET 2 VALID 211100/211700 YUSO –

YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL PSN S1500 E07348 VA CLD OBS AT 1100Z

APRX 220KM BY 35KM S1500 E07348 — S1530 E07642 FL310/450 MOV SE 35KT FCST 1700Z VA CLD

APRX S1506 E07500 — S1518 E08112 — S1712 E08330 — S1824 E07836

Meaning:

The second SIGMET message issued for the SHANLON* flight information region (identified by YUDD Shanlon area control centre/upper flight information region) by the Shanlon/International* meteorological watch office (YUSO) since 0001 UTC; the message is valid from 1100 UTC to 1700 UTC on the 21st of the month; volcanic ash eruption of Mount Ashval* located at 15 degrees south and 73 degrees 48 minutes east; volcanic ash cloud observed at 1100 UTC in an approximate area of 220 km by 35 km between 15 degrees south and 73 degrees 48 minutes east, and 15 degrees 30 minutes south and 76 degrees 42 minutes east; between flight levels 310 and 450, the volcanic ash cloud is expected to move south-eastwards at 35 knots; at 1700 UTC the volcanic ash cloud is forecast to be located approximately in an area bounded by the following points: 15 degrees 6 minutes south and 75 degrees east, 15 degrees 18 minutes south and 81 degrees 12 minutes east, 17 degrees 12 minutes south and 83 degrees 30 minutes east, and 18 degrees 24 minutes south and 78 degrees 36 minutes east.

** Fictitious locations*

GM5 MET.TR.250(a) SIGMET messages

EXAMPLE OF SIGMET MESSAGE FOR RADIOACTIVE CLOUD

YUCC SIGMET 2 VALID 201200/201600 YUDO —

YUCC AMSWELL FIR RDOACT CLD OBS AT 1155Z WI S5000 W14000 — S5000 W13800 — S5200 W13800 — S5200 W14000 — S5000 W14000 SFC/FL100 STNR WKN

Meaning:

The second 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 1200 UTC to 1600 UTC on the 20th of the month; radioactive cloud was observed at 1155 UTC within an area bounded by 50 degrees 0 minutes south and 140 degrees 0 minutes west to 50 degrees 0 minutes south and 138 degrees 0 minutes west to 52 degrees 0 minutes south and138 degrees 0 minutes west to 52 degrees 0 minutes south and 140 degrees 0 minutes west to 50 degrees 0 minutes south and 140 degrees 0 minutes west and between the surface and flight level 100; the radioactive cloud is expected to remain stationary and to weaken in intensity.

** Fictitious locations*

GM6 MET.TR.250(a) SIGMET messages

EXAMPLE OF SIGMET MESSAGE FOR SEVERE TURBULENCE

YUCC SIGMET 5 VALID 221215/221600 YUDO —

YUCC AMSWELL FIR SEV TURB OBS AT 1210Z N2020 W07005 FL250 MOV E 20KT WKN FCST 1600Z S OF N2020 E OF W06950

Meaning:

The fifth 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 1215 UTC to 1600 UTC on the 22nd of the month; severe turbulence was observed at 1210 UTC 20 degrees 20 minutes north and 70 degrees 5 minutes west at flight level 250; the turbulence is

expected to move eastwards at 20 knots and to weaken in intensity; forecast position at 1600 UTC south of 20 degrees 20 minutes north and east of 69 degrees 50 minutes west.

** Fictitious locations*

AMC1 MET.TR.250(c) SIGMET messages
SEQUENCE NUMBER

The letters to be used as the first character for the sequence number to indicate the specified en-route weather phenomena which may affect the safety of aircraft operations should be:

SIGMET Type	**Specified en-route phenomena**	**Letter to be used in sequence number for specified en-route phenomena**
WC	Tropical cyclone	C
	For WC exchange test purposes	X
WV	Volcanic ash	A
	For WV exchange test purposes	Y
WS	Thunderstorm	T
	Turbulence	U
	Icing	I
	Freezing rain	F
	Mountain wave	M
	Dust storm	D
	Sandstorm	S
	Radioactive cloud	R
	For WS exchange test purposes	Z

AMC2 MET.TR.250(c) SIGMET messages
SEQUENCE NUMBER

The three-character number to be used in the sequence number should correspond to the number of SIGMET messages, dependent on the phenomena as indicated by the first character, issued for the flight information region since 0001 UTC on the day concerned.

AMC1 MET.TR.250(d) SIGMET messages
CRITERIA RELATED TO PHENOMENA

Sandstorm/dust storm should be considered:

(a) heavy whenever the visibility is below 200 m and the sky is obscured; and

(b) moderate whenever the visibility is:

(1) below 20 m and the sky is not obscured; or

(1) between 200 and 600 m.

GM1 MET.TR.250(d) SIGMET messages
CRITERIA RELATED TO PHENOMENA

(a) An area of thunderstorms and cumulonimbus clouds is considered:

(1) obscured (OBSC) if it is obscured by haze or smoke or cannot be readily seen due to darkness;

(2) embedded (EMBD) if it is embedded within cloud layers and cannot be readily recognised;

(3) isolated (ISOL) if it consists of individual features which affect, or are forecast to affect, an area with a maximum spatial coverage less than 50 % of the area concerned (at a fixed time or during the period of validity); and

(4) occasional (OCNL) if it consists of well-separated features which affect, or are forecast to affect, an area with a maximum spatial coverage between 50 and 75 % of the area concerned (at a fixed time or during the period of validity).

(b) An area of thunderstorms is considered frequent (FRQ) if within that area there is little or no separation between adjacent thunderstorms with a maximum spatial coverage greater than 75 % of the area affected, or forecast to be affected, by the phenomenon (at a fixed time or during the period of validity).

(c) Squall line (SQL) indicates a thunderstorm along a line with little or no space between individual clouds.

(d) Hail (GR) is used as a further description of the thunderstorm, as necessary.

(e) Severe and moderate turbulence (TURB) refers only to: low-level turbulence associated with strong surface winds; rotor streaming; or turbulence whether in cloud or not (CAT). Turbulence is not used in connection with convective clouds.

(f) Turbulence is considered:

(1) severe whenever the peak value of the cube root of EDR exceeds 0.7; and

(2) moderate whenever the peak value of the cube root of EDR is above 0.4 and below or equal to 0.7.

(g) Severe and moderate icing (ICE) refers to icing in other than convective clouds. Freezing rain (FZRA) should refer to severe icing conditions caused by freezing rain.

(h) A mountain wave (MTW) is considered:

(1) severe whenever an accompanying downdraft of 600 ft/min (3.0 m/s) or more and/or severe turbulence is observed or forecast; and

(2) moderate whenever an accompanying downdraft of 350–600 ft/min (1.75–3.0 m/s) and/or moderate turbulence is observed or forecast.

AMC1 MET.TR.250(f) SIGMET messages
FORM

SIGMET messages should be disseminated in a digital form, in addition to the abbreviated plain language.

GM1 MET.TR.250(f)(1) SIGMET messages
FORM

Guidance on the information exchange model, GML, and the metadata profile is provided in the Manual on the Digital Exchange of Aeronautical Meteorological Information (ICAO Doc 10003).

GM1 MET.TR.255(a) AIRMET messages
EXAMPLE OF AIRMET MESSAGE FOR MODERATE MOUNTAIN WAVE

YUCC AIRMET 2 VALID 221215/221600 YUDO —

YUCC AMSWELL FIR MOD MTW OBS AT 1205Z N48 E010 FL080 STNR NC

Meaning:

The second AIRMET 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 1215 UTC to 1600 UTC on the 22nd of the month; moderate mountain wave was observed at 1205 UTC at 48 degrees north and 10 degrees east at flight level 080; the mountain wave is expected to remain stationary and not to undergo any changes in intensity.

** Fictitious locations*

GM2 MET.TR.255(a) AIRMET messages
EXAMPLE OF AIRMET MESSAGES, AND THE CORRESPONDING CANCELLATIONS

AIRMET	**Cancellation of AIRMET**
YUDD AIRMET 1 VALID 151520/151800 YUSO – YUDD SHANLON FIR ISOL TS OBS N OF S50 TOP ABV FL100 STNR WKN	YUDD AIRMET 2 VALID 151650/151800 YUSO – YUDD SHANLON FIR CNL AIRMET 1 151520/151800

GM1 MET.TR.255(b) AIRMET messages
FIR

The flight information region may be divided in sub-areas.

GM1 MET.TR.255(c) AIRMET messages
CRITERIA RELATED TO PHENOMENA

In reference to the criteria related to phenomena, please refer to GM1 MET.TR.250(d).

AMC1 MET.TR.255(d) AIRMET messages
CRITERIA RELATED TO PHENOMENA

In reference to sandstorm/dust storm, please refer to AMC1 MET.TR.250(d).

AMC1 MET.TR.260 Area forecasts for low-level flights
AMENDMENT OF LOW-LEVEL FORECASTS

(a) In case the AIRMET/low-level forecast concept is not fully implemented, the criteria for amendments should as a minimum include the weather phenomena hazardous to low-level flights, which constitute the criteria for the issuance of AIRMET.

(b) When low-level forecast is issued as an SIGWX chart or as a wind and temperature (W+T) chart, it should, as appropriate, include the cloud/visibility information in the form of visibility/cloud base category which should be provided for well-defined sub-areas and/or route segments. For each sub-area and/or route segment, the reference height to which the cloud base information refers should be specified.

(c) The graphical part of an SIGWX chart should depict the weather situation at the beginning of the validity period. Significant changes of initial weather parameters should be depicted together with time intervals determining the duration of expected changes.

Chapter 4 — Technical requirements for volcanic ash advisory centres (VAACs)

GM1 MET.TR.265(a) Volcanic ash advisory centres (VAACs) responsibilities
EXAMPLE OF ADVISORY MESSAGE FOR VOLCANIC ASH

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

GM1 MET.TR.265(b)(2) Volcanic ash advisory centres (VAACs) responsibilities
BUFR CODE

The BUFR code form is contained in the WMO Publication No 306, Manual on Codes, Volume I.2, Part B — Binary Codes.

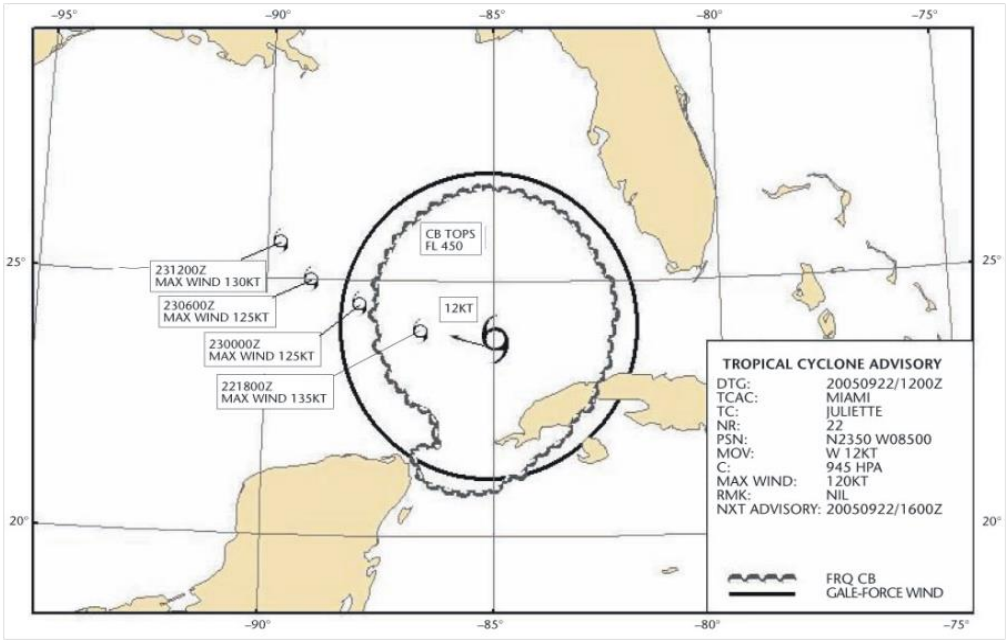
Chapter 5 — Technical requirements for tropical cyclone advisory centres (TCACs)

AMC1 MET.TR.270(b) Tropical cyclone advisory centres (TCACs) responsibilities
FORMAT OF ADVISORY INFORMATION ON TROPICAL CYCLONES

The tropical cyclone advisory information listed in Table 8 of Appendix 1, when prepared in graphical format, should be as specified below and should be issued using:

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

(b) the BUFR code form, when exchanged in binary format.



GM1 MET.TR.270(b) Tropical cyclone advisory centres (TCACs)responsibilities
CODE FOR ADVISORY INFORMATION ON TROPICAL CYCLONES

The BUFR code form is contained in the WMO Publication No 306, Manual on Codes, Volume I.2, Part B — Binary Codes.

GM2 MET.TR.270(b) Tropical cyclone advisory centres (TCACs) responsibilities
EXAMPLE FOR ADVISORY MESSAGE FOR TROPICAL CYCLONES

TC ADVISORY	
DTG:	20040925/1600Z
TCAC:	YUFO
TC:	GLORIA
NR:	01
PSN:	N2706 W07306
MOV:	NW 12KT
C:	965HPA
MAX WIND:	73KT
FCST PSN +6 HR:	25/2200Z N2748 W07350
FCST MAX WIND +6 HR:	73KT
FCST PSN +12 HR:	26/0400Z N2830 W07430
FCST MAX WIND +12 HR:	73KT
FCST PSN +18 HR:	26/1000Z N2852 W07500
FCST MAX WIND +18 HR:	70KT
FCST PSN +24 HR:	26/1600Z N2912 W07530
FCST MAX WIND +24 HR:	60KT
RMK:	NIL
NXT MSG:	20040925/2000Z

Chapter 6 — Technical requirements for world area forecast centres (WAFCs)

AMC1 MET.TR.275(a) World area forecast centres (WAFCs) responsibilities
GRIDDED GLOBAL FORECASTS

The telecommunications facilities used for the supply of world area forecast system products should:

(a) be the aeronautical fixed service or the public Internet;

(b) be continuous; and

(c) not have interruptions exceeding 10 minutes during any period of 6 hours.

GM1 MET.TR.275(a) World area forecast centres (WAFCs) responsibilities
GRIB CODE

The GRIB code form is contained in the WMO Publication No 306, Manual on Codes, Volume I.2, Part B — Binary Codes.

GM2 MET.TR.275(a) World area forecast centres (WAFCs) responsibilities
BUFR CODE

The BUFR code form is contained in the WMO Publication No 306, Manual on Codes, Volume I.2, Part B — Binary Codes.

GM1 MET.TR.275(b)(3) World area forecast centres (WAFCs) responsibilities
GRID POINT FORECASTS

(a) Layers centred at a flight level referred to in MET.TR.275(b)(3)(v) and (vii) have a depth of 100 hPa.

(b) Layers centred at a flight level referred to in MET.TR.275(b)(3)(vi) have a depth of 50 hPa.

AMC1 MET.TR.275(d) World area forecast centres (WAFCs) responsibilities
MEDIUM-LEVEL SIGWX FORECASTS

The medium-level SIGWX forecasts provided for flight levels between 100 and 250 for limited geographical areas should cover the areas as shown in in Table 2 of Appendix 1.