International Civil Aviation Organization

WORKING PAPER (WP/13)

**ICAO ASIA AND PACIFIC (APAC)
THIRTIETH MEETING OF THE
METEOROLOGY SUB-GROUP (MET SG/30)**

Bangkok, Thailand, 20 - 24 July 2026

Agenda Item 4: Regional Guidance Material

UPDATES TO ASIA/PACIFIFC (APAC) REGIONAL SIGMET GUIDE

(Presented by MET SG Ad-hoc group on APAC REGIONAL SIGMET Guide)

SUMMARY

This paper presents additional guidance on VA SIGMET issuance for discussion and possible inclusion into the next edition of the APAC Regional SIGMET Guide.

1. INTRODUCTION

1.1 The Asia/Pacific (APAC) Regional SIGMET Guide (SIGMET Guide) is intended to provide States in the region with guidance on the standardization and harmonization of procedures and formats related to SIGMET information, in compliant with the SIGMET-related Standards and Recommended Practices (SARPs) in the ICAO Annex 3 – Meteorological Services for International Air Navigation, the Asia/Pacific Regional Air Navigation Plan, Procedures for Air Navigation Services — Meteorology (PANS-MET, Doc 10157) and the Manual of Aeronautical Meteorological Practices (Doc 8896).

1.2 This paper presents additional guidance material on VA SIGMET issuance for possible inclusion to the next edition of the APAC Regional SIGMET Guide. In addition, some editorial update requests to the guide were also included.

2. DISCUSSION

2.1 The SIGMET Guide is maintained by the ICAO Asia/Pacific Regional Office and reviewed and updated regularly, under the auspices of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG). This is to maintain alignment with the relevant SIGMET related ICAO SARPs' provisions and regional air navigation procedures. The regular review and update of the SIGMET Guide is an important function conducted under the auspices of APANPIRG and the MET/SG ad hoc group on APAC Regional SIGMET Guide.

2.2 The MET/SG ad hoc group on APAC Regional SIGMET Guide consists of members from Singapore (rapporteur), Australia, Hong Kong China, Japan and Viet Nam. The group has drafted the proposed updates to the SIGMET Guide listed in the following sections of this paper.

Discussion on SIGMET Guidance for volcanic ash not identifiable from satellite

2.3 During MET/S WG/11 in 2021, a question regarding VA SIGMET issuance when "VA NOT IDENTIFIABLE FM SATELLITE" was raised. This ad-hoc group deliberated on this issue, and proposed inclusion of VA SIGMET issuance examples into the APAC Regional SIGMET Guide at MET/SG 27 the same year. The meeting then requested the ad-hoc group to work with the VAACs to further review and refine the proposed examples.

2.4 The group then reached out to VAACs in APAC Region on this topic. Based on the inputs received, the group noted the phrase "VA NOT IDENTIFIABLE FM SATELLITE" can be used by VAACs under the following scenarios:

i. Volcanic ash cloud is not identifiable from satellite imagery due to too small an area and/or obscuration from meteorological clouds, and there is no reliable observation report providing the extent of ash cloud;
ii. Volcanic ash cloud is not identifiable from satellite imagery due to too small an area and/or obscuration from meteorological clouds. However, there are reliable observation reports providing the extent of ash cloud (such as VONA, etc) and VA emission is expected to persist with no indication of VA cloud dissipation; and
iii. Some VAACs used the phrase to denote cessation of VA advisories.

2.5 For Scenario i, the group propose not to issue VA SIGMET since there is a lack of reliable information. However, if the MWO involved has the means to identify the volcanic ash cloud, they should proceed to contact their respective VAACs and advise the VAACs accordingly. For Scenario ii, the group suggest proceeding with the issuance of a VA SIGMET based on available information provided via the advisory. For Scenario iii, the group propose the MWO involved should verify the ERUPTION DETAILS, FCST and RMK sections of the VA advisory to ensure a SIGMET is not erroneously issued or maintained for an ash cloud that has already dissipated.

2.6 The additional notes and SIGMET example for Scenario ii proposed by the ad-hoc group for inclusion into the APAC Regional SIGMET Guide is shown under **Appendix A** of this paper. The meeting is invited to review and discuss these new materials for possible inclusions into the next edition of the APAC Regional SIGMET Guide.

Error in location indicator for Papua New Guinea

2.7 The group was also notified of a mistake in the ICAO location indicator for Papua New Guinea under Appendix D "WMO HEADINGS (WMO AHL) FOR SIGMET BULLETINS". The location indicator should be "AYPM" instead of "AYPY". The error has been rectified, and the corrected identifier is reflected in the next edition of the APAC Regional SIGMET Guide included as an **Attachment** to this paper.

2.8 It is recommended that the MET SG/30 adopts the following Decision:

Decision MET SG/30-xx – Updates to Regional SIGMET Guide

That ICAO be invited to adopt the updated APAC Regional SIGMET Guide, attached to WP/13, as regional guidance material (13th Edition), distribute the guide to States and make the guide available on the ICAO APAC website.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) Propose any further updates to the SIGMET Guide as necessary; and

c) Adopt the Decision in paragraph

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APPENDIX A: Additional guidance for VA SIGMET

Proposed additional guidance on SIGMET for volcanic ash not identifiable from satellite data for addition to the APAC Regional SIGMET Guide Appendix B SIGMET EXAMPLES 7 following the current description:

7) Additional examples using volcanic ash references applicable to volcanic ash SIGMET only

When the Volcanic Ash Advisory (VAA) contains the phrase "VA NOT IDENTIFIABLE FM SATELLITE DATA".

The phrase "VA NOT IDENTIFIABLE FM SATELLITE" can be used by VAACs under the following scenarios:

i. Volcanic ash cloud is not identifiable from satellite imagery due to too small an area and/or obscuration from meteorological clouds, and there is no reliable observation report providing the extent of ash cloud;
ii. Volcanic ash cloud is not identifiable from satellite imagery due to too small an area and/or obscuration from meteorological clouds. However, there are reliable observation reports providing the extent of ash cloud (such as via VONA etc) and VA emission is expected to persist with no indication of VA cloud dissipation; and
iii. Some VAACs used the phrase to denote cessation of VA advisories. MWOs must verify the ERUPTION DETAILS, FCST and RMK sections of the VA advisory to ensure a SIGMET is not erroneously issued or maintained for an ash cloud that has already dissipated.

Example for Scenario ii

```
VA ADVISORY
DTG: 20260605/0220Z
VAAC: DARWIN
VOLCANO: ASHVAL 000000
PSN: N4315 E02115
AREA: INDONESIA
SOURCE ELEV: 1325M AMSL
ADVISORY NR: 2026/632
INFO SOURCE: HIMAWARI-9, CVGHM
ERUPTION DETAILS: VA ERUPTION REP FM GND AT 05/0055Z
EST VA DTG: 05/0200Z
EST VA CLD: SFC/FL070 N4315 E02115 – N4345 E02145 - N4330 E02215 –
N4245 E02230 – N4230 E02145 - N4315 E02115 MOV E 10KT
FCST VA CLD +6 HR: NOT AVBL
FCST VA CLD +12 HR: NOT AVBL
FCST VA CLD +18 HR: NOT AVBL
RMK: VA NOT IDENTIFIABLE ON CURRENT SATELLITE IMAGERY DUE TO
MET CLOUD. INTERMITTENT VA EMISSIONS ARE EXPECTED TO BE
ONGOING.
NXT ADVISORY: NO LATER THAN 20260605/0820Z=
```

VA SIGMET (issued by MWO):
YUDD SIGMET 1 VALID 050230/050830 YUSO–

YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD FCST AT 0200Z WI N4315 E02115 – N4345 E02145 - N4330 E02215 – N4245 E02230 – N4230 E02145 - N4315 E02115 SFC/070 MOV E 10KT NC=

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC REGIONAL SIGMET GUIDE

THIRTEENTH EDITION — XXXX 2026

(130 pages)

a. RECORD OF AMENDMENTS AND CORRIGENDA

Amendments			
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1 INTRODUCTION

1.1 General

1.1.1 The main purpose of this regional SIGMET guide is to provide guidance for standardization and harmonization of the procedures and formats related to the preparation and issuance of aeronautical meteorological information pertaining to specified en-route hazardous weather, and other phenomena in the atmosphere, which may affect safety of aircraft operations, known as SIGMET. The guidance is complementary to Annex 3 to the Convention on International Civil Aviation – *Meteorological Services for International Air Navigation*, the Standards and Recommended Practices (SARPs) contained therein regarding SIGMET, and to the SIGMET-related provisions in ICAO Regional Air Navigation Plans (ANPs).

1.1.2 Within this document, the term SIGMET stands for the message including the contained information.

1.1.3 This document includes guidance for SIGMET concerning significant en-route weather phenomenon. The guidance is provided for the provision of SIGMET in traditional alphanumeric code (TAC) form and in the ICAO Meteorological Information Exchange Model (IWXXM) form.

1.1.4 ICAO provisions concerning the preparation and issuance of SIGMET information are primarily contained in:

- Annex 3 - Meteorological Service for International Air Navigation, Chapters 3 and 7 and Procedure for Air Navigation Services Meteorology (PANS-MET) Chapter 6;
- Annex 11 - Air Traffic Services, Chapter 4, 4.2.1 and Chapter 7, 7.1;
- Regional Air Navigation Plans, Basic ANP, Part VI - Meteorology (MET);
- Regional Air Navigation Plans, Volume II;
- Procedures for Air Navigation Services – Air Traffic Management (PANS- ATM, Doc 4444), Chapter 9, 9.1.3.2;
- Regional Supplementary Procedures (Doc 7030), Chapter 6, 6.13.2;
- ICAO Abbreviations and Codes (Doc 8400);
- Handbook on the International Airways Volcano Watch (IAVW) – Operational Procedures and Contact List (Doc 9766);
- Manual of Aeronautical Meteorological Practice (Doc 8896), Chapters 1 and 4;
- Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services (Doc 9377).

1.1.5 This regional SIGMET guide is primarily intended to assist meteorological watch offices (MWOs) in preparing and disseminating SIGMET information in conformance with the format prescribed in Annex 3 and PANS-MET. The explanations of the format to be used are accompanied by examples. The regional SIGMET guide also provides information regarding the necessary coordination between the MWOs, air traffic services (ATS), volcanic ash advisory centres (VAACs), tropical cyclone advisory centres (TCACs) and pilots, and their respective responsibilities.

1.1.6 To support regional management of SIGMET issuance and dissemination, Appendix C of the regional SIGMET guide contains guidance on the purpose, scope and procedures for conducting regional SIGMET tests.

2 RESPONSIBILITIES AND COORDINATION

2.1 General

2.1.1 SIGMETs provide information on hazardous meteorological and other phenomena which may affect safety of aircraft operations; hence they are considered a high priority among other types of meteorological information provided to the aviation users. The primary purpose of SIGMET is for in-flight service, which requires timely transmission of the SIGMET messages to pilots by the ATS units and/or through VOLMET and D-VOLMET. Further information on the responsibilities of each party involved in the SIGMET process can be found in the *Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services* (Doc 9377).

2.1.2 Airlines are the main users of the SIGMET information. They contribute to the effectiveness of the SIGMET service through issuance of special air-reports reported by pilots to the ATS units. Special air-reports are among the most valuable sources of information for the MWOs in the preparation of SIGMET. The ATS units receiving special air-reports should forward them to their associated MWOs without delay.

2.1.3 In view of the foregoing, it should be well understood that the effectiveness of the SIGMET service depends strongly on the level of collaboration between the MWOs, ATS units, pilots, TCACs, VAACs and State volcano observatories. That is why, close coordination between these parties, as well as mutual understanding of their needs and responsibilities are essential for the successful implementation of the SIGMET service.

2.1.4 For the special cases of SIGMET for volcanic ash and tropical cyclones, the MWOs are provided with advisories from VAACs and TCACs respectively, as designated in the regional ANPs.

2.1.5 SIGMET is also used for flight planning. This requires global dissemination of SIGMET through the regional OPMET data banks (RODBs), the Secure Aviation Data Information Service (SADIS) and the WAFS Internet File Service (WIFS). SIGMET should also be distributed to the World Area Forecast Centres (WAFCs) London and Washington for use in the preparation of the significant weather (SIGWX) forecasts.

2.2 Meteorological watch office (MWO) responsibilities

2.2.1 SIGMET is to be issued by the MWO in order to provide timely information on the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere affecting the safety of the flight operations in the MWO's area of responsibility. SIGMET provides information concerning the location, extent, intensity and expected evolution of the specified phenomena.

2.2.2 Information about the provision of the SIGMET service, including details on the designated MWO(s), is to be included in the State's Aeronautical Information Publication (AIP) as required by Annex 15 – *Aeronautical Information Service*, Appendix 1, GEN 3.5.8.

2.2.3 If a State is temporarily unable to meet its obligations for establishing MWO(s) and for provision of SIGMET, arrangements have to be made for another State to assume this responsibility. Such delegation of responsibilities is to be agreed by the meteorological authority of each State concerned and should be notified by a NOTAM, within the State's AIP and in a letter to the ICAO Regional Office concerned.

2.2.4 The meteorological authority concerned should ensure that the MWO obligations and responsibilities are clearly defined and assigned to the unit designated to serve the MWO. Corresponding operational procedures should be established and the meteorological staff should be trained accordingly.

2.2.5 In preparing SIGMET information MWOs should follow the format prescribed in PANS-MET Appendix 7 Table A7-5. Whilst Table A7-5 is the authoritative source, Appendix A of this regional SIGMET guide, includes an enhanced SIGMET specific guidance based on Table A7-5 and provides more specific instructions on how SIGMET should be compiled. The aim is to ensure that SIGMET is produced reliably and consistently worldwide.

1.1.1 SIGMET must be issued only for those phenomena listed in, PANS-MET Chapter 6 6.4.4 and only when specified criteria for their intensity and spatial extent are met (section 3.2 below refers).

2.2.6 The MWOs should be adequately equipped in order to be able to identify, analyse and forecast those phenomena for which SIGMET is required. The MWO should make use of all available sources of information including:

- special air-reports passed to the MWO from ATS (voice communication);
- special air-reports received from automated downlink;
- Numerical Weather Prediction (NWP) data, especially high resolution models where available;
- meteorological observations, including those from automatic weather stations and human observers;
- upper wind information;
- information from meteorological satellites;
- weather radar (including Doppler radar);
- State volcano observatories;
- International Atomic Energy Agency (IAEA) through the relevant World Meteorological Organization (WMO) Regional Specialized Meteorological Centre (RSMC) for radioactive cloud;
- local knowledge;
- volcanic ash or tropical cyclone advisory messages.

2.2.7 On receipt of a special air-report from the associated ACC or FIC, the MWO shall:

- issue SIGMET information based on the special-air report; or
- send the special air-report for onward transmission to MWOs, WAFCs and other meteorological offices in accordance with regional air navigation agreement in the case that the issuance of SIGMET information is not warranted (e.g., the phenomenon concerned is of transient nature).

2.2.8 Appropriate telecommunication means should be available at the MWO in order to ensure timely dissemination of SIGMET according to a dissemination scheme, which should include transmission to:

- local ATS users;
- aerodrome MET offices within its area of responsibility, where SIGMET is required for briefing and/or flight documentation;
- other MWOs in accordance with regional air navigation plans;
- Centres designated for transmission of VOLMET or D-VOLMET where SIGMET is required for those transmissions;
- responsible ROBEX centres and regional OPMET data bank (RODB). It should be arranged that, through the ROBEX scheme, SIGMETs are sent to the designated RODB in the other ICAO regions, to the WAFCs and to the SADIS and WIFS providers.

2.2.9 In issuing SIGMET for tropical cyclones or volcanic ash, the MWOs should include as appropriate the advisory information received from the responsible TCAC or VAAC. In addition to the information received from the TCAC and VAAC, the MWOs may use the available complementary information from other reliable sources.

2.3 Air traffic service (ATS) unit responsibilities

2.3.1 Close coordination should be established between the MWO and the corresponding ATS unit (ACC or FIC) and arrangements should be in place to ensure:

- receipt without delay and display at the relevant ATS units of SIGMET issued by the associated MWO;
- receipt and display at the ATS unit of SIGMETs issued by MWOs responsible for the adjacent FIRs/ACCs if these SIGMETs are required according to 2.3.4 below; and
- transmission without delay by the ATS unit of special air-reports received through voice communication to the associated MWO.

2.3.2 SIGMET information should be transmitted to aircraft with the least possible delay on the initiative of the responsible ATS unit, by the preferred method of direct transmission followed by acknowledgement or by a general call when the number of aircraft would render the preferred method impracticable.

2.3.3 SIGMET information transmitted to aircraft-in-flight should cover a portion of the route up to two hours flying time ahead of the aircraft. SIGMET should be transmitted only during the time corresponding to their period of validity.

2.3.4 Air traffic controllers should ascertain whether any of the currently valid SIGMETs may affect any of the aircraft they are controlling, either within or outside the FIR/CTA boundary, up to two hours flying time ahead of the current position of the aircraft. If this is the case, the controllers should at their own initiative transmit the SIGMET promptly to the aircraft-in-flight likely to be affected. If necessary, the controller should pass to the aircraft available SIGMETs issued for the adjacent FIR/CTA, which the aircraft will be entering, if relevant to the expected flight route.

2.3.5 The ATS units concerned should also transmit to aircraft-in-flight the special air-reports received, for which SIGMET has not been issued. Once a SIGMET for the weather phenomenon reported in the special air report is made available this obligation of the ATS unit expires.

2.4 Pilot responsibilities

2.4.1 Timely issuance of SIGMET information is largely dependent on the prompt receipt by MWOs of special air-reports. It is essential that pilots prepare and transmit such reports to the ATS units whenever any of the specified en-route hazardous conditions are encountered or observed.

2.4.2 It should be emphasized that, even when automatic dependent surveillance (ADS) is being used for routine air-reports, pilots should continue to make special air-reports.

2.4.3 Pilots should compile special air-reports and disseminate to ATS by air-ground data link as per PANS-MET Chapter 3, 3.1.2 and *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444), 4.12.3.2, or by voice communication as per Annex 3, Appendix 4, 1.3 and PANS-ATM (Doc 4444), 4.12.3.3.

Note. — The MWO will compile special air-reports for uplink as per PANS-MET Chapter 6, and as reported using the instructions given PANS-ATM, Appendix 1.

2.5 Coordination between MWOs and ATS units

2.5.1 To achieve the best service to aviation and as part of the collaborative decision-making process, close coordination between the MWO and the ATS units is required. This is of particular importance for the avoidance of hazardous weather.

2.5.2 A Letter of Agreement between the ATS authority and the meteorological authority is also recommended (as per Annex 3, 4.2) to outline the responsibilities and coordination processes between the MWOs and ATS units.

2.6 Coordination between MWOs, VAACs, TCACs and State volcano observatories

2.6.1 Amongst the phenomena for which SIGMET information is required, volcanic ash and tropical cyclones are of particular importance.

2.6.2 Since the identification, analysis and forecasting of volcanic ash and tropical cyclones requires considerable scientific and technical resources, normally not available at each MWO, VAACs and TCACs have been designated to provide volcanic ash advisories and tropical cyclone advisories respectively to the users and assist the MWOs in the preparation of SIGMETs for those phenomena. Close coordination should be established between the MWO and its responsible VAAC and/or TCAC.

Note: For events near VAAC boundaries, or passing between VAAC AoR, the VAACs will discuss who will issue the VAA. MWOs should be aware that a neighbouring VAAC may issue a VAA for that MWO's FIR, due to the neighbouring VAAC continuing to hold on to the responsibility for the event.

In these cases, the MWO will receive a VAA that will refer them to the VAA issued by the neighbouring VAAC which will provide information on VA in that MWO's FIR. This information should be used to prepare the WV SIGMET.

2.6.3 Information regarding the VAACs and TCACs areas of responsibility and lists of MWOs and ACC/FICs to which advisories are to be sent is provided in Appendix E and F. Volcanic ash advisories and tropical cyclone advisories are required for global exchange through SADIS and WIFS as they are used by the operators during the pre-flight planning. Nevertheless, it should be emphasized that SIGMET information is still required especially for in-flight re-planning. SIGMETs should be transmitted to aircraft-in-flight through voice communication, VOLMET or D-VOLMET, thus providing vital information for making in-flight decisions regarding large-scale route deviations due to volcanic ash clouds or tropical cyclones.

2.6.4 Information from State volcano observatories is an important part of the process for issuance of volcanic ash advisories and SIGMETs. Information from a State volcano observatory should be in the form of a Volcano Observatory Notification for Aviation (VONA) and include information on significant pre-eruption volcanic activity, volcanic eruptions or the presence of volcanic ash clouds. Guidance including responsibilities for the issuance of the VONA is given in the *Handbook on the International Airways Volcano Watch (IAVW) – Operational Procedures and Contact List* (Doc 9766); the format of the VONA is given in Appendix E of the Doc 9766.

2.7 SIGMET Coordination

2.7.1 To ensure harmonization of SIGMET messages on en-route hazardous weather affecting or expected to affect more than one FIR, neighbouring MWOs should coordinate in SIGMET provision in accordance with Recommendation 3.4.4 of Annex 3 *Meteorological Service for International Air Navigation* effective on 5 November 2020. Guidelines on SIGMET coordination including planning and operational implementation are provided in Appendix K *Guidelines on Operational SIGMET Coordination* of this Guide.

3 PROCEDURES FOR PREPARATION OF SIGMET INFORMATION

3.1 General

3.1.1 SIGMET is intended for transmission to aircraft in flight either by ATC or by VOLMET or D-VOLMET, and therefore, SIGMET messages should be kept concise. To this end, SIGMET information is prepared using approved ICAO abbreviations, a limited number of non-abbreviated words and numerical values of a self-explanatory nature. In addition to the issuance of SIGMET in TAC format, MWOs should issue SIGMET information in the IWXXM format. For more information, please refer to APAC ROBEX Handbook, Guidelines for the Implementation of OPMET Data Exchange Using IWXXM and WMO-No. 306 Volume I.3.

3.1.2 The increasing use of automated systems for handling the aeronautical meteorological information by the users makes it essential that all types of OPMET information, including SIGMET messages, are prepared and issued in the prescribed standardized format. Therefore, the format of the SIGMET message, as specified in PANS-MET, Appendix 7 Table A7-5, should be strictly followed by the MWOs.

3.1.3 The MWO should maintain watch over the evolution of the phenomenon for which a SIGMET has been issued. If the phenomenon persists or is expected to persist beyond the period of validity of the SIGMET, another SIGMET message for a further period of validity should be issued with updated information. SIGMETs for volcanic ash and tropical cyclone should be updated at least every 6 hours, while SIGMET for all other phenomena should be updated at least every 4 hours.

3.1.4 SIGMET should be promptly cancelled when the phenomenon is no longer occurring or no longer expected to occur in the MWO's area of responsibility. In addition, correcting a SIGMET is not recommended as it is not specified in Annex 3 or PANS-MET and not supported by IWXXM. If an incorrect SIGMET (e.g. error in FL) is issued, the incorrect SIGMET is recommended to be cancelled and a new SIGMET be issued with the corrected information.

3.1.5 Some SIGMET are generated using information from special air-reports (received by voice communications or data link (downlink)). The reporting of turbulence and icing used in special air-reports includes both moderate and severe categories (as per Doc 4444, Appendix 1).

Note. — Although the categories for the reporting, by pilots, of moderate and severe turbulence in special air-reports is provided in PANS-ATM (Doc 4444), some pilots report turbulence as "moderate to severe". A MWO is then faced with determining which category to use in a special air- report (uplink) or in a SIGMET message for severe turbulence. Some States elect to treat such "moderate to severe" observations as 'severe' in the context of using the report to prompt the issuance of a special air-report (uplink) or a SIGMET message.

3.2 SIGMET phenomena

3.2.1 SIGMET shall only be issued for the phenomena listed in *Table 1* below and only using the abbreviations as indicated.

Phenomena Abbreviation	Description
OBSC TS	Thunderstorms that are obscured by haze or smoke or cannot be readily seen due to darkness.
EMBD TS	Thunderstorms that are embedded within cloud layers and cannot be readily recognized by the pilot in command

FRQ TS	Frequent thunderstorms where, within the area of thunderstorms, there is little no separation between adjacent thunderstorms with a maximum spatial coverage greater than 75%.
SQL TS	A squall line indicating that a line of thunderstorms with little or no space between individual cumulonimbus clouds (CB).
OBSC TSGR	Thunderstorms with hail that are obscured by haze or smoke or cannot be readily seen due to darkness.
EMBD TSGR	Thunderstorms with hail that are embedded within cloud layers and cannot be readily recognized.
FRQ TSGR	Frequent thunderstorms with hail, within the area of thunderstorms, there is little or no separation between adjacent thunderstorms with a maximum spatial coverage greater than 75%.
SQL TSGR	A squall line indicating that a line of thunderstorms with hail with little or no space between cumulonimbus clouds (CB).
TC	A tropical cyclone with a 10-minute mean surface wind speed of 17m/s (34 kt) or more.
SEV TURB	Severe turbulence referring to: ● low-level turbulence associated with strong surface winds; ● rotor streaming; or ● clear air turbulence, whether in cloud or not in cloud. *Note. — Turbulence should not be used in connection with convective clouds. Severe turbulence shall be considered whenever the peak value of EDR equals or exceeds 0.45.*
SEV ICE	Severe icing not associated with convective cloud.
SEV ICE (FZRA)	Severe icing caused by freezing rain and not associated with convective cloud.
SEV MTW	Severe mountain wave the accompanying downdraft is 3 m/s (600 ft/min) or more or when severe turbulence is observed or forecast.
HVY DS	Heavy duststorm where the visibility is below 200 m and the sky is obscured.
HVY SS	Heavy sandstorm where the visibility is below 200 m and the sky is obscured.
VA	Volcanic ash
RDOACT CLD	Radioactive cloud

Table 1: *SIGMET phenomena abbreviations and descriptions*

3.3 Allowable abbreviations

3.3.1 Abbreviations that can be used in the meteorological section of SIGMET are given in *Table 1* above and in *Table 2* below.

Abbreviation	Meaning		Abbreviation	Meaning
ABV	Above		NC	No change
APRX	Approximate or approximately		NE	North-east
AT	At (followed by time)		NNE	North-north-east
BLW	Below		NNW	North-north-west
BTN	Between		NM	Nautical miles
CB	Cumulonimbus cloud		NO	No
CLD	Cloud		NW	North-west
CNL	Cancel or cancelled		OBS	Observe or observed or observation

E	East or eastern longitude		PSN	Position
ENE	East-north-east		S	South or southern latitude
ESE	East-south-east		SE	South-east
EXER	Exercise		SFC	Surface
EXP	Expect or expected or expecting		SSE	South-south-east
FCST	Forecast		SSW	South-south-west
FIR	Flight information region		STNR	Stationary
FL	Flight level		SW	South-west
FT	Feet		TO	To
INTSF	Intensify or intensifying		TOP	Cumulonimbus cloud top (height)
KM	Kilometres		W	West or western longitude
KT	Knots		WID	Width or wide
M	Metres		WKN	Weaken or weakening
MOV	Move or moving or movement		WNW	West-north-west
MT	Mountain		WSW	West-south-west
N	North or northern latitude		Z	Coordinated Universal Time

Table 2: *SIGMET phenomena abbreviations and descriptions.*

3.4 SIGMET structure

3.4.1 A SIGMET message in TAC (Traditional Alphanumeric Code) format consists of:

- WMO Abbreviated Heading Line (WMO AHL) – all SIGMETs are preceded by an appropriate WMO AHL;
- First line, containing location indicators of the respective ATS unit and MWO, sequential number and period of validity;
- SIGMET main body, containing information concerning the observed or forecast phenomenon for which the SIGMET is issued together with its expected evolution within the period of validity, and a TEST or EXERCISE indicator when appropriate.

These elements are also part of a SIGMET message in IWXXM format, according to the IWXXM schema.

3.5 SIGMET format

Note 1 — In the following text, square brackets - [ ] - are used to indicate an optional or conditional element, and angled brackets - < > - for symbolic representation of a variable element, which in a real SIGMET accepts a discrete numerical value.

Note 2 —The rules below apply for SIGMET in TAC format, as well as for SIGMET in IWXXM format. However, for the exact formatting of the messages in IWXXM, the XML schema and schematron rules can be found at the following URL: https://schemas.wmo.int/iwxxm/

3.5.1 WMO header

$T_1T_2A_1A_2$ii CCCC YYGGgg [BBB]

The group **$T_1T_2A_1A_2$ii**is the bulletin identification (WMO AHL) for the SIGMET message. It is constructed in the following way:

T_1T_2	Data type designator	**For SIGMET in TAC format:** **WS**– for SIGMET for phenomena other than volcanic ash cloud or tropical cyclone **WC**– for SIGMET for tropical cyclone **WV**– for SIGMET for volcanic ash **For SIGMET in IWXXM format:** **LS**– for SIGMET for phenomena other than volcanic ash cloud or tropical cyclone **LY**– for SIGMET for tropical cyclone **LV**– for SIGMET for volcanic ash
A_1A_2	Country or territory designators	Assigned according to Table C1, Part II of *Manual on the Global Telecommunication System*, Volume I – *Global Aspects* (WMO Publication No. 386)
ii	Bulletin number	Assigned on national level according to p 2.3.2.2, Part II of *Manual on the Global Telecommunication System*, Volume I – *Global Aspects* (WMO Publication No. 386)

Table 3: *Specification of the WMO Abbreviated Header Line for SIGMET*

Note 1. — Tropical cyclone and volcanic ash cloud SIGMETs will be referred to hereafter as WC SIGMET (due to the T_1T_2 section of the WMO AHL being set to WC) and WV SIGMET (due to the T_1T_2 section of the WMO AHL being set to WV) respectively. All other SIGMET types will be referred to by WS (due to the T_1T_2 section of the WMO AHL being set to WS).

Note 2. — WMO AHLs for SIGMET bulletins used by MWOs in APAC Region are listed in Appendix D to this SIGMET Guide.

CCCCis the ICAO location indicator of the communication centre disseminating the message (this may be the same as the MWO location indicator).

YYGGggis the date/time group; where **YY**is the day of the month and **GGgg**is the time of compilation of the SIGMET in hours and minutes UTC (normally this time is assigned by the disseminating (AFTN) centre, it may also be the time the forecast software compiles the SIGMET message).

[BBB] is not usually used for SIGMET bulletins. Amendment/correction of SIGMET is done by issuance of updated SIGMET and cancellation of original SIGMET. (See section 3.5.5 below for more information.)

Examples:

WSTH31 VTBS 121200

WVJP31 RJTD 010230

WCNG21 AYPY 100600

3.5.2 First line of TAC SIGMET

CCCC SIGMET [n][n]n VALID YYGGgg/YYGGgg CCCC-

The meaning of the groups in the first line of the SIGMET is as follows:

CCCC	ICAO location indicator of the ATS unit serving the FIR, UIR or CTA to which the SIGMET refers
SIGMET	Message identifier
[n][n]n	Daily sequence number (see 3.5.2.2)
VALID	Period of validity indicator
YYGGgg/YYGGgg	Validity period of the SIGMET given by date/time group of the beginning and date/time group of the end of the period (see 3.5.2.3)
CCCC	ICAO location indicator of the issuing MWO
-	Mandatory **hyphen** (without space) to separate the preamble from the text

Table 4: *Elements making up the first line of SIGMET*

The numbering of SIGMETs starts every day at 0001 UTC. The sequence number should consist of up to three alphanumeric characters and may be a combination of letters and numbers, such as:

- **1**, **2**, …
- **01**, **02**, …
- **A01**, **A02**, …

Examples:
RPMM SIGMET 3 VALID 121100/121700 RPLL- WSJC SIGMET A04 VALID 202230/210430 WSSS-

*Note 1. — No other combinations should be used, like "**CHARLIE 05**" or "**NR7**".*

Note 2. — Correct numbering of SIGMET is very important since the number is used for reference in communication between ATC and pilots and in VOLMET and D-VOLMET.

Note 3. — In accordance with Annex 5 – Units of Measurement to be Used in Air and Ground Operations, when the validity period begins or ends at midnight, YY should be set for the following day and GGgg should be '0000'. i.e. SIGMET validity ending at midnight on the 23rd day of the month should be expressed as '240000'.

Note 4. - The sequence number is the sequence number for all SIGMET messages types (WS, WV and WC) for one flight information region

The following regulations apply when determining the validity period:

- The period of validity of a WS SIGMET should not be more than 4 hours;
- The period of validity of a WC or WV SIGMET should not be more than 6 hours;
- In case of a SIGMET for an observed phenomenon, the filing time (date/time group in the WMO header) should be the same or very close to the time in the date/time group indicating the start of the SIGMET validity period;
- When the SIGMET is issued for a forecast phenomenon:
  - the beginning of validity period should be the time of the expected commencement (occurrence) of the phenomenon in the MWO area of responsibility;
  - the time of issuance of a **WS** SIGMET should not be more than 4 hours before the start of validity period (i.e., expected time of occurrence of the phenomenon); and for **WC** (tropical cyclone) and **WV** (volcanic ash) SIGMET the lead time should not be more than 12 hours.

The period of validity is that period during which the SIGMET information is valid for transmission to aircraft in flight.

Examples:

1. First two lines of a TAC SIGMET for an observed phenomenon:
   WSTH31 VTBS 241120
   VTBB SIGMET 3 VALID 241120/241500 VTBS–
2. First two lines of a TAC SIGMET for a forecast phenomenon (expected time of occurrence 1530)
   WSSR20 WSSS 311130
   WSJC SIGMET 1 VALID 311530/311930 WSSS-

3.5.3 Structure of the meteorological part of TAC SIGMET

The meteorological part of a SIGMET for the phenomena consists of elements as shown in the table below.

Start of the second line of the message

1	2	3	4	5	6
Name of the FIR/UIR or CTA (M)	Test or Exercise (C)	Phenomenon (M)	Observed or forecast phenomenon (M)	Location (C)	Level (C)
See 3.5.3.2	See 3.5.3.3	See 3.5.3.4	See 3.5.3.5	See 3.5.3.6	See 3.5.3.7

7	8	9	10	11	12
Movement *or* expected movement (C)	Changes in intensity (C)	Forecast time (C)	TC Forecast position (C)	Forecast position (C)	Repetition of elements (C)
See 3.5.3.8	See 3.5.3.9	See 3.5.3.10	See 3.5.3.11	See 3.5.3.12	See 3.5.3.13

Table 5: *Elements making up the meteorological part of SIGMET.*

Note 1. Item 2, 'Test or Exercise' element should only be used if the SIGMET message is for TEST or EXERCISE purposes – see section 3.5.3.3 below for more information.

Note 2. Item 7, 'Movement or expected movement' should not be used if the 'forecast time' and 'forecast position' elements are used.

Note 3. M = inclusion mandatory, part of every message. C = inclusion conditional, include whenever applicable.

Name of the FIR/UIR or CTA

CCCC <name> FIR[/UIR]

or

CCCC <name> CTA

The ICAO location indicator and the name of the FIR/CTA are given followed by the appropriate abbreviation: FIR, FIR/UIR or CTA.

Examples:

```
VTBB BANGKOK FIR
```

Test or Exercise

This field will only be used if the SIGMET message is intended to be used for Test or Exercise purposes. The omission of this field indicates that the SIGMET is intended for operational decision making.

TEST is generally employed in messages without meteorological information, to test the data

dissemination. When TEST is used, the SIGMET message may end immediately after the word TEST.

EXER is generally used for international exercises where realistic meteorological information will be used to test coordination.

When used, the SIGMET message may either end immediately after the word TEST or abbreviation EXER. Alternatively after the word TEST or abbreviation EXER, depending on the nature of the test and under most exercise circumstances the SIGMET message may contain realistic, although not necessarily valid content (the nature of tests and exercises may require historical data to be used).

Phenomenon

The phenomenon description consists of a qualifier and a phenomenon abbreviation. SIGMET should be issued only for the following phenomena observed and forecast to persist for more than a transitory period.:

- thunderstorms – if they are **OBSC**, **EMBD**, **FRQ** or **SQL** with or without hail (**GR**);
- turbulence – only **SEV**
- icing – only **SEV** with or without **FZRA**
- mountain waves – only **SEV**
- dust storm – only **HVY**
- sand storm – only **HVY**
- radioactive cloud – **RDOACT CLD**

For volcanic ash SIGMET (WV) only, the following conventions should be used:

a. In the case when the eruption is from a previously unknown or un-named volcano.

VA ERUPTION PSN Nnn[nn] or Snn[nn] Ennn[nn] or Wnnn[nn]
VA CLD

b. In the case when the eruption is from a known and named volcano.

VA ERUPTION MT nnnnnnnnnn PSN Nnn[nn] or Snn[nn] Ennn[nn] or Wnnn[nn] VA CLD

c. In the case when a region of volcanic ash cloud is known to exist, but the precise origin of its source is unknown (the ash cloud may be of large horizontal extent, and obscuring the precise vent from which it emanates, and is otherwise in an area sparse of observation to identify the source).

VA CLD

For tropical cyclone SIGMET (WC) only, the following conventions should be used:

a. In the case when the tropical cyclone is known and named.

TC nnnnnnnnnn PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] CB

b. In the case when the tropical cyclone is not yet named.

TC NN PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] CB

The appropriate abbreviations and combinations, and their meaning are given in *Table 1*.

Indication whether the phenomenon is observed or forecast

OBS

or

OBS AT GGggZ

or

FCST

or

FCST AT GGggZ

The indication whether the phenomenon is observed or forecast is given by using the abbreviations **OBS** or **FCST**. **OBS AT** and **FCST AT** may be used, in which case they are followed by a time group in the form **GGggZ**. If the phenomenon is observed, **GGggZ** is the time of the observation in hours and minutes UTC.

In the case of **OBS AT**, the time of the report/observation having triggered or confirmed the phenomenon should be considered. This is generally the case when **OBS AT** is used to have different times for the observation and the start of validity of the SIGMET. The observation can be the trigger for the forecaster to issue a SIGMET and the preparation time of the SIGMET will lead to a SIGMET start validity time later than the observation.

If the exact time of the observation is not known the time is not included. When the phenomenon is based on a forecast without a reported observation, the time given for **GGggZ** represents the time of commencement of the validity period.

Examples:
OBS
OBS AT 0140Z
FCST
FCST AT 0200Z

Note. — In the case of volcanic ash cloud covering more than one area within the FIR or cumulonimbus clouds associated with a tropical cyclone covering more than one area within the FIR, when elements such as location and forecast position are repeated, each location and forecast position must be preceded by an observed or forecast time.

Location of the phenomenon

The location of the phenomenon is given with reference to geographical coordinates (latitude and longitude). Latitude and longitude may be reported in degrees, or in degrees and minutes. When reporting in degrees the format will be **Nnn** or **Snn** for latitude, and **Ennn** or **Wnnn** for longitude. When reporting in degrees and minutes the format will be **Nnnnn** or **Snnnn** for latitude, and **Ennnnn** or **Wnnnnn** for longitude. The MWOs should try to be as specific as possible in reporting the location of the phenomenon and, at the same time, to avoid overwhelming the SIGMET with too many coordinates, which may be difficult to process or follow when transmitted by voice radio.

The following are the possible ways to describe the location of the phenomenon:

1. An area of the FIR defined by a polygon. The end point should be a repeat of the start point.

   For TAC SIGMET, the polygon should have a minimum of 4 coordinates, and not normally more than 7 coordinates. The points of a polygon should be provided in a clockwise order.

   For IWXXM SIGMET, the number of polygon's vertices following "WI" can be greater than 7. Following conventions on spatial schemas (ISO 19107:2019), the coordinate information of the polygon should be provided in a counter-clockwise order.

   The use of WITHIN in describing the location of the phenomenon is preferred operationally by users as it enables translation to machine-readable formats for ingestion into automated systems used by the airlines for flight planning and in- flight decision making.

   Symbolically, this is indicated as:

   ```
   WI <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
   <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
   <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
   <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
   <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
   <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> -
   <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>
   ```

   For example:

   WI N6030 E02550 – N6055 E02500 – N6050 E02630 – N6030 E02550

   WI N60 E025 – N62 E027 - N58 E030 - N59 E026 - N60 E025

Note 1. — The location of phenomenon given at the beginning of the SIGMET is referring to the beginning of the validity period if the e/act time group of Observed or Forecast phenomenon is not included.

The following are additional ways to describe the location of the phenomenon. They can only be used for SIGMETs in TAC format and their use makes translating SIGMET in TAC form into IWXXM more complex.

Use of polygons with complex FIR boundaries.

PANS-MET Chapter 6 specifies that the points of a polygon '... should be kept to a minimum and should not normally exceed seven'. However, some FIR boundaries are complex, and it would be unrealistic to expect that a polygon would be defined that followed such boundaries exactly. As such, some States have determined that the polygon points be chosen in relation to the complex boundary such that the FIR boundary approximates, but is wholly encompassed by, the polygon, and that any additional area beyond the FIR boundary be the minimum that can be reasonably and practically described. Caution should however be exercised in those instances where international aerodromes are located in close proximity to such a complex FIR boundary. Appendix B provides examples and advice with regard to

describing such areas.

2. a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and end points on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at that point).

   Symbolically this is indicated as:

   <N OF> or <NE OF> or <E OF> or <SE OF> or <S OF> or <SW OF> or <W OF> or <NW OF> LINE <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>

   For example:

   NE OF LINE N2500 W08700 – N2000 W08300 W OF LINE N20 E042 – N35 E045

2. b) In a sector of the FIR defined as being between two lines of latitude, or between two lines of longitude.

   Symbolically this is indicated as:

   <N OF> or <S OF> <Nnn[nn]> or <Snn[nn]> AND <N OF> or <S OF> <Nnn[nn]> or <Snn[nn]>

   <W OF> or <E OF> <Wnnn[nn]> or <Ennn[nn]> AND <W OF> or <E OF> <Wnnn[nn]> or <Ennn[nn]>

   Chosen so that the affected area is BETWEEN lines of latitude or BETWEEN lines of Longitude

   For example:

   N OF N1200 AND S OF N2530
   W OF W060 AND E OF W082

2. c) In a sector of the FIR defined as being between two specified lines, or between two series of up to three connected lines, each with start and endpoints on the FIR boundary (or start and endpoints so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points).

   <N OF> or <NE OF> or <E OF> or <SE OF> or <S OF> or <SW OF> or <W OF> or <NW OF> LINE <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>[- <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>][- <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>] AND <N OF> or <NE OF> or <E OF> or <SE OF> or <S OF> or <SW OF> or <W OF> or <NW OF> LINE <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]> [- <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>][- <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>]

   For example:

NE OF LINE N2500 W08700 – N2000 W08300 AND SW OF LINE N2800 W08500 – N2200 W08200

W OF LINE N20 E042 – N35 E045 AND E OF LINE N20 E039 – N35 E043

2. d) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a quadrant);

   Symbolically this is indicated as:

   <N OF> or <S OF> <Nnn[nn]> or <Snn[nn]> AND
   <E OF> or <W OF> <Wnnn[nn]> or <Ennn[nn]>

   For example:

   N OF N1200 AND E OF W02530
   S OF N60 AND W OF E120

2. e) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment), where a coordinate of latitude (or longitude) defines a line, and the preceding descriptor defines on which side of the line the phenomena is expected

   Symbolically, this is indicated as:

   <N OF> or <S OF> <Nnn[nn]> or <Snn[nn]> or
   <E OF> or <W OF> <Wnnn[nn]> or <Ennn[nn]>

   For example:

   N OF S2230
   W OF E080

3. Defined by a 'corridor' of specified width, centred upon a line, of up to three connected segments, described by;

   APRX nnKM WID LINE BTN <Nnn[nn]> or <Snn[nn]>
   <Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]>
   <Wnnn[nn]> or <Ennn[nn]>[- <Nnn[nn]> or <Snn[nn]>
   <Wnnn[nn]> or <Ennn[nn]>][- <Nnn[nn]> or <Snn[nn]>
   <Wnnn[nn]> or <Ennn[nn]>]

   Or

   APRX nnNM WID LINE BTN <Nnn[nn]> or <Snn[nn]>
   <Wnnn[nn]> or <Ennn[nn]> - <Nnn[nn]> or <Snn[nn]>
   <Wnnn[nn]> or <Ennn[nn]>[- <Nnn[nn]> or <Snn[nn]>
   <Wnnn[nn]> or <Ennn[nn]>][- <Nnn[nn]> or <Snn[nn]>
   <Wnnn[nn]> or <Ennn[nn]>]

   For example:

   APRX 50KM WID LINE BTN S1500 E07348 – S1530 E07642

4. At a specific point within the FIR, indicated by a single coordinate of latitude and longitude.

Symbolically, this is indicated as:

```
<Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or <Ennn[nn]>
```

For example:

N5530 W02230
S23 E107

5. Within a specified radius of the centre of a tropical cyclone.

   Symbolically, this is indicated as:

   ```
   WI nnnKM OF TC CENTRE
   ```

   ```
   WI nnnNM OF TC CENTRE
   ```

6. Within a specified radius of the location of a radioactive release event.

   Symbolically, this is indicated as:

   ```
   WI nnKM OF <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
   <Ennn[nn]>
   WI nnNM OF <Nnn[nn]> or <Snn[nn]> <Wnnn[nn]> or
   <Ennn[nn]>
   ```

   For example:

   ```
   WI 30KM OF N5530 W02230
   ```

   A radius of up to 30 kilometres (or 16 nautical miles) from the source and a vertical extent from surface (SFC) to the upper limit of the flight information region/upper flight information region (FIR/UIR) or control area (CTA) is to be applied.

Note. - For SIGMET messages for radioactive cloud, only within (WI) is to be used for the location of phenomenon and must describe a cylinder centred on the location of the radioactive release event.

7. A reference to the whole FIR, FIR/UIR, or CTA.

   Symbolically, this is indicated as:

   ```
   ENTIRE FIR
   ```

   ```
   ENTIRE UIR
   ```

   ```
   ENTIRE FIR/UIR
   ```

   ```
   ENTIRE CTA
   ```

More detail on reporting the location of the phenomenon is given in the examples provided in Appendix B to this guide.

Flight level

Symbolically, the options permitted are:

`FLnnn`

or

`nnnnM`

or

`[n]nnnnFT`

or

`SFC/FLnnn`

or

`SFC/nnnnM`

or

`SFC/[n]nnnnFT`

or

`FLnnn/nnn`

or

`TOP FLnnn`

or

`ABV FLnnn`

or

`TOP ABV FLnnn or TOP ABV [n]nnnnFT`

or

`TOP BLW FLnnn` (only to be used for tropical cyclone)

or

`nnnn/nnnnM`

or

`[n]nnnn/[n]nnnnFT`

or

`nnnnM/FLnnn`

or

`[n]nnnnFT/FLnnn`

In more detail, the location or extent of the phenomenon in the vertical is given by one or more of the above methods, as follows:

1. reporting at a single flight level

   For example: **`FL320`**

2. reporting at a single geometric level, in metres or feet

   For example: **`4500M or 8250FT or 12000FT`**

3. reporting a layer extending from the surface to a given height in meters, feet or flight level

For example: **SFC/3000M or SFC/9900FT or SFC/11000FT or SFC/FL350**

4. reporting a layer extending from a given FL to a higher flight level

   For example: **FL250/290**

5. reporting a layer where the base is unknown, but the top is given

   For example: **TOP FL350**

6. reporting phenomenon above a specified flight level, but where the upper limit is unknown

   For example: **ABV FL350**

7. reporting phenomenon that has an unknown lower limit, but has an upper limit that is known to extend above a known flight level

   For example: **TOP ABV FL350**

8. reporting phenomenon expected between a lower and upper geometric level expressed in metres or feet

   For example: **3500/9000M or 8000/12000FT or 11000/14000FT**

9. reporting phenomenon expected between a lower geometric level expressed in metres or feet and a higher flight level

   For example: **4000M/FL220 or 6000FT/FL140 or 11000FT/FL190**

10. reporting the CB upper limit for tropical cyclone SIGMET

    For example: **TOP BLW FL450**

Additional examples:

EMBD TS … **TOP ABV FL340**
SEV TURB … **FL180/210**
SEV ICE … **SFC/FL150**
SEV MTW … **FL090**

Movement

Note. — Footnote 26 to Table A7-5 of PANS-MET Appendix 7 states that "The elements 'Forecast Time' and 'Forecast Position' are not to be used in conjunction with the element 'Movement or Expected Movement'".

Rate of movement is indicated in the following way:

```
MOV <direction> <speed>KMH[KT]
```

or

```
STNR
```

Direction of movement is given with reference to one of the sixteen points of compass (**N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, NNW**). Speed is given in **KMH** or **KT**. The abbreviation **STNR** is used if no significant movement is expected.

For example:

MOV NNW 30KMH
MOV E 25KT
STNR

Note 1. – Movement information should not be provided when a forecast position is explicitly given

Note 2. – For SIGMET messages for radioactive cloud, only stationary (STNR) is to be used for the element "Movement or Expected movement".

Note 3. – For SIGMET messages for tropical cyclone, "Movement or Expected Movement" solely refers to the movement of the centre of a tropical cyclone and not the associated cumulonimbus clouds.

Expected changes in intensity

The expected evolution of the phenomenon's intensity is indicated by one of the following abbreviations:

INTSF

or

WKN

or

NC

Note. – For SIGMET messages for tropical cyclone, this element indicates the change of the maximum surface winds around a tropical cyclone and not the intensity of the associated cumulonimbus clouds.

Forecast time

This section is used, with 'Forecast position' to explicitly provide a forecast of the position of the phenomena at the time specified. The format is fixed, and is of the form

FCST AT <GGgg>Z

For example:

FCST AT 1600Z

Where the forecast time is the same as the SIGMET validity end time.

Note. — In accordance with Anne/ 5 – Units of Measurement to be Used in Air and Ground Operations, when the validity period ends at midnight, YY should be set for the following day and GGgg should be '0000'. i.e. SIGMET validity ending at midnight on the 23rd day of the month should be e/pressed as '240000'.

TC Forecast position

Only to be used for tropical cyclones, and used to indicate the location of the centre of the tropical cyclone.

The forecast centre position of a tropical cyclone is given by:

`TC CENTRE PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]`

or

`TC CENTRE PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] CB`

Note. — The term CB is to be used when the forecast position for the cumulonimbus cloud is included.

For example:

TC CENTRE PSN N2740 W07345
TC CENTRE PSN S1015 E15030 CB

Forecast position of the hazardous phenomenon at the end of the validity period of the SIGMET message

The available methods of describing the forecast position of the phenomenon in the 'Forecast position' section is exactly as detailed in section 3.5.3.6 "Location of the phenomenon" with the addition of :

a. For volcanic ash which is not expected to be present within the FIR at the end of the validity of the SIGMET, the following is permitted:

NO VA EXP

Note. — Currently, there is no provision for indicating changes to the levels affected by phenomena between the initial position and the forecast position. As such, and as per footnote 27 to Table A7-5 of PANS-MET Appendix 7, it should be assumed that the levels affected remain the same for both initial and forecast positions. If levels differ significantly then separate SIGMET should be issued.

Repetition of elements (volcanic ash and tropical cyclone SIGMET only)

Elements can be repeated when there are instances of more than one volcanic ash cloud, or more than one area of cumulonimbus cloud associated with a tropical cyclone.

Note 1. — This must not be used for two separate tropical cyclones that are present in a FIR, or UIR.

Note 2. — For SIGMET messages for tropical cyclone, this should be used for areas of cumulonimbus clouds associated with a tropical cyclone, not all cumulonimbus clouds in a FIR.

With regard to the portrayal of complex volcanic ash events (which implies areas of volcanic ash at different levels) guidance in this regard is provided in Appendix B, example 8.

With regard to the portrayal of more than one area of cumulonimbus cloud associated with a tropical cyclone, guidance is provided in Appendix B, example 10.

3.5.4 Cancellation of SIGMET

Annex 3, 7.4.1.2 requires that "SIGMET information shall be cancelled when the phenomena are no longer occurring or are no longer expected to occur in the area".

As such, it is mandatory for an MWO to cancel any SIGMET that is currently valid but for which the specified phenomena no longer exists or is expected to exist.

The cancellation is done by issuing the same type of SIGMET with the following structure in TAC format:

- WMO heading with the same data type designator;
- First line, including the next sequence number followed by a new validity period that represents the remaining time of the original period of validity, and
- Second line, which contains the name of the FIR or CTA, the combination CNL SIGMET, followed by the sequence number of the original SIGMET and its original validity period.

A cancellation SIGMET should have a unique sequence number, and should follow the format below.

As an example, an original TAC SIGMET of:

```
YMMM SIGMET A01 VALID 260300/260700 YMMC-
YMMM MELBOURNE FIR EMBD TS FCST WI S4000 E12000 – S3830 E12200 –
S4200 E12100 – S4000 E12000 TOP FL450 MOV SW 05KT INTSF=
```

If it were to be cancelled early (i.e. prior to 0700 UTC), then the following would be appropriate:

```
YMMM SIGMET A02 VALID 260600/260700 YMMC-
YMMM MELBOURNE FIR CNL SIGMET A01 260300/260700=
```

Where:

- the sequence number will be the next incrementing, unique sequence number.
- the validity time will be the time remaining between issuance and the end time of the original SIGMET.
- the sequence number of the original (and to be cancelled) SIGMET shall follow '`CNL SIGMET `'.
- the original validity time of the original (and to be cancelled) SIGMET shall be included in the message after the reference to the original SIGMET's sequence number.

For SIGMET for volcanic ash only, the following is permitted:

```
WVAU01 YMMC 202155
YBBB SIGMET E03 VALID 202155/210000 YMMC
YBBB BRISBANE FIR CNL SIGMET E01 202000/210000 VA MOV TO WXYZ FIR=
```

Where the FIR (`WXYZ` in the example) into which the volcanic ash has moved is indicated.

3.5.5 Amendment/correction of SIGMET

If it is known that an existing SIGMET no longer accurately describes the existing or expected future evolution of the phenomena a new SIGMET, correctly describing the hazard should be issued, followed immediately by a cancellation of the original, erroneous SIGMET. The new SIGMET should be issued before the cancellation in order to ensure there is always a SIGMET in force and that the cancellation is not mistakenly understood to mean that the hazard has completely dissipated.

Originally issued SIGMET, later determined to no longer be accurate (bold text identifies points that will be changed):

WSZZ21 YUSO 201855
YUDD SIGMET 1 VALID 202000/210000 YUSO-
YUDD SHANLON FIR SEV TURB FCST WI S1530 E13700 - **S1900 E13730 S2000 E13130** - S1600 E13500 - S1530 E13700 SFC/FL120 MOV SE 12KT WKN=

Updated SIGMET (bold text identifies points that have been changed):

WSZZ21 YUSO 202155
YUDD SIGMET 2 VALID 202155/210155 YUSO-
YUDD SHANLON FIR SEV TURB FCST WI S1530 E13700 - **S2000 E13750 – S2045 E13245** - S1600 E13500 - S1530 E13700 SFC/FL120 MOV SE 12KT WKN=

Note .- the updated SIGMET can have not only validity of four hours (or six hours for a VA or TC SIGMET) but also a reduced validity period, either to retain the original end validity time of the SIGMET it replaced, or to reflect the expected duration of the phenomenon.

Cancellation SIGMET (this cancels the original SIGMET):

```
WSZZ21 YUSO 202156
YUDD SIGMET 3 VALID 202155/210000 YUSO-
YUDD SHANLON FIR CNL SIGMET 1 202000/210000=
```

Note .- it is essential that the time of compilation of the updated (correct) SIGMET and of the cancellation are separated by at least one minute to prevent inadvertent suppression by message switches. However, it is also important that the minimum delay between issuance of the updated and the cancellation messages.

3.6 Dissemination of SIGMET

3.6.1 SIGMET is part of operational meteorological (OPMET) information. According to Annex 3, the telecommunication facilities used for the exchange of the operational meteorological information should be the aeronautical fixed service (AFS).

3.6.2 The AFS consists of a terrestrial segment, AFTN or ATN (AMHS), as well as the Internet- based SADIS and WIFS services provided by WAFC London and WAFC Washington respectively. Note that SIGMET priority indicator is **FF** for flight safety messages (Annex 10, Volume II, 4.4.1.1.3 refers).

3.6.3 Currently, AFS should be used by the MWOs to send the SIGMET, as follows:

- to the adjacent MWOs and ACCs[11] using direct AFTN addressing;
- when required for VOLMET or D-VOLMET, SIGMET should be sent to the relevant centre providing the VOLMET service;

[1] For this dissemination it is required that SIGMET is available at the ACCs for transmission to aircraft in flight for the route ahead up to a distance corresponding to two hours flying time.

- SIGMET should be sent to all regional OPMET Data Banks (RODB);
- it should be arranged that SIGMET is relayed to the SADIS and WIFS providers for satellite/public internet dissemination, as well as to the WAFCs London and Washington, either through the ROBEX scheme, or directly by the issuing MWO;
- SIGMET for volcanic ash should be disseminated to the responsible VAAC.

3.6.4 Through SADIS and WIFS, SIGMET is disseminated to all authorised users. In this way, SIGMET is available on a global basis, meeting the aeronautical requirements.

APPENDIX A

ENHANCED SIGMET GUIDANCE TABLE DEVELOPED FROM PANS-MET APPENDIX 7 TABLE A7-5

Note. — The table below seeks to provide more detailed guidance than that given in PANS-MET Appendix 7 Table A7-5. It does this by removing all references to the AIRMET message from A7-5. The table below simplifies the available options and provides more specific expansion of the symbolic structure of SIGMET messages, with guidance sub-titles where appropriate. It should be noted that PANS-MET Appendix 7 Table A7-5 remains the authoritative reference.

Ref No.	Element as specified in Annex 3 Chapter 7 and PANS-MET Chapter 6	Detailed Content	Expanded symbolic - These 'expanded' symbolic representations of the various SIGMET code elements represent the interpretation of Table A7-5 PANS-MET Appendix 7. MWOs are encouraged to align their SIGMETs with the guidelines below.	Examples. These examples of various SIGMET code elements represent the interpretation Table A7-5 of PANS-MET Appendix 7. MWOs are encouraged to align their SIGMETs with the examples below.
1.1	Location indicator of FIR/CTA (M)[1]	ICAO location indicator of the ATS unit serving the FIR or CTA to which the SIGMET refers	nnnn	YUCC[2] YUDD[2]
1.2	Identification (M)	Message identification and sequence number[3]	SIGMET n SIGMET nn SIGMET nnn	SIGMET 1 SIGMET 01 SIGMET A01
1.3	Validity period (M)	Day-time groups indicating the period of validity in UTC	VALID nnnnnn/nnnnnn	VALID 010000/010400 VALID 221215/221600 VALID 101520/101800 VALID 251600/252200 VALID 152000/160000 VALID 192300/200300 VALID 122200/130400 (6 hour validity applicable to TC or VA only)
1.4	Location indicator of MWO (M)	Location indicator of MWO originating the message with a separating hyphen	nnnn–	YUDO–[2] YUSO–[2]
1.5	Name of the FIR/CTA (M)	Location indicator and name of the FIR/CTA[4] for which the SIGMET is issued	nnnn nnnnnnnnnn FIR nnnn nnnnnnnnnn UIR nnnn nnnnnnnnnn FIR/UIR nnnn nnnnnnnnnn CTA	YUCC AMSWELL FIR[2] YUDD SHANLON FIR/UIR[2] YUDD SHANLON FIR[2] YUCC AMSWELL CTA[2]
1.6	Status indicator (C)[5]	Indicator of test or exercise	TEST *or* EXER	TEST EXER
2.1	Phenomenon (M)[6]	Description of	OBSC[7] TS	OBSC TS

		phenomenon causing the issuance of SIGMET	OBSC[7] TSGR[8] EMBD[9] TS EMBD[9] TSGR[8] FRQ[10] TS FRQ[10] TSGR[8] SQL[11] TS SQL[11] TSGR[8] TC nnnnnnnnnn PSN Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] CB TC NN[12] PSN Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] CB SEV TURB[13] SEV ICE[14] SEV ICE (FZRA)[14] SEV MTW[15] HVY DS HVY SS VA ERUPTION PSN Nnn[nn] *or* Snn[nn] Ennn[nn] *or* Wnnn[nn] VA CLD VA ERUPTION MT nnnnnnnnnn PSN Nnn[nn] *or* Snn[nn] Ennn[nn] *or* Wnnn[nn] VA CLD VA CLD RDOACT CLD	OBSC TSGR EMBD TS EMBD TSGR FRQ TS FRQ TSGR SQL TS SQL TSGR TC GLORIA PSN N2215 W07500 CB TC NN PSN S26 E150 CB SEV TURB SEV ICE SEV ICE (FZRA) SEV MTW HVY DS HVY SS VA ERUPTION PSN N27 W017 VA CLD VA ERUPTION PSN S1200 E01730 VA CLD VA ERUPTION MT ASHVAL[2] PSN S15 E073 VA CLD VA ERUPTION MT VALASH[2] PSN N2030 E02015 VA CLD VA CLD RDOACT CLD
2.2	Observed or forecast phenomenon (M)[20,21]	Indication whether the information is observed and expected to continue, *or* forecast	OBS OBS AT nnnnZ FCST FCST AT nnnnZ	OBS OBS AT 1210Z FCST FCST AT 1815Z
2.3	Location (C)[20,21,33]	Location (referring to latitude and longitude (in degrees and minutes))	1) An area of the FIR defined by a polygon. The end point shall be a repeat of the start point. Minimum 4 coordinates (including the last point as a repeat of the first), and not normally more than 7 coordinates. WI [22,23] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]][– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] *or*	1) An area of the FIR defined by a polygon. The end point shall be a repeat of the start point. Minimum 4 coordinates (including the last point as a repeat of the first), and not normally more than 7 coordinates. WI N6030 E02550 – N6055 E02500 – N6050 E02630 – N6030 E02550 WI N30 W067 – N32 W070 – N35 W068 – N30 W067

			2a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and endpoints on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points).
			
			`[N][NE][E][SE][S][SW][W][NW] OF LINE`[22] `Nnn[nn]` ***or*** `Snn[nn] Wnnn[nn]` ***or*** `Ennn[nn] - Nnn[nn]` ***or*** `Snn[nn] Wnnn[nn]` ***or*** `Ennn[nn] [- Nnn[nn]` ***or*** `Snn[nn] Wnnn[nn]` ***or*** `Ennn[nn]] [- Nnn[nn]` ***or*** `Snn[nn] Wnnn[nn]` ***or*** `Ennn[nn]]`
			
			or
			
			2b) In a sector of the FIR defined as being **between** two lines of latitude, or **between** two lines of longitude.
			
			`N OF Nnn[nn]` ***or*** `N OF Snn[nn] AND S OF Nnn[nn]` ***or*** `S OF Snn[nn]`
			
			or
			
			`W OF Wnnn[nn]` ***or*** `W OF Ennn[nn] AND E OF Wnnn[nn]` ***or*** `E OF Ennn[nn]`
			
			or
			
			2c) In a sector of the FIR defined as being **between** two specified lines, or **between** two series of up to three connected lines, each with start and endpoints on the FIR boundary (or start and endpoints so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points).
			
			`[N][NE][E][SE][S][SW][W][NW] OF LINE`[22] `Nnn[nn]` ***or*** `Snn[nn] Wnnn[nn]` ***or*** `Ennn[nn] - Nnn[nn]` ***or*** `Snn[nn] Wnnn[nn]` ***or*** `Ennn[nn] [- Nnn[nn]` ***or*** `Snn[nn] Wnnn[nn]` ***or*** `Ennn[nn]] [- Nnn[nn]` ***or*** `Snn[nn] Wnnn[nn]` ***or*** `Ennn[nn]] AND [N][NE][E][SE][S][SW][W][NW] OF LINE Nnn[nn]` ***or*** `Snn[nn] Wnnn[nn]` ***or*** `Ennn[nn] - Nnn[nn]` ***or*** `Snn[nn] Wnnn[nn]` ***or*** `Ennn[nn] [- Nnn[nn]` ***or*** `Snn[nn] Wnnn[nn]` ***or*** `Ennn[nn]] [- Nnn[nn]` ***or*** `Snn[nn] Wnnn[nn]` ***or*** `Ennn[nn]]`
			
			or
			
			2d) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a quadrant);
				or
				
				2a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and endpoints on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points).
				
				`NE OF LINE N2515 W08700 – N2000 W08330`
				`S OF LINE S14 E150 – S14 E155`
				
				or
				
				2b) In a sector of the FIR defined as being **between** two lines of latitude, or **between** two lines of longitude.
				
				`N OF N45 AND S OF N50`
				
				or
				
				`W OF E04530 AND E OF E04000`
				
				or
				
				2c) In a sector of the FIR defined as being **between** two specified lines, or **between** two series of up to three connected lines, each with start and endpoints on the FIR boundary (or start and endpoints so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points).
				
				`SW OF LINE N50 W020 – N45 E010 AND NE OF LINE N45 W020 – N40 E010`
				
				or
				
				2d) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a quadrant);

			N OF Nnn[nn] AND W OF Wnnn[nn] *or* N OF Nnn[nn] AND E OF Wnnn[nn] *or* S OF Nnn[nn] AND W OF Wnnn[nn] *or* S OF Nnn[nn] AND E OF Wnnn[nn] *or* N OF Nnn[nn] AND W OF Ennn[nn] *or* N OF Nnn[nn] AND E OF Ennn[nn] *or* S OF Nnn[nn] AND W OF Ennn[nn] *or* S OF Nnn[nn] AND E OF Ennn[nn] *or* N OF Snn[nn] AND W OF Wnnn[nn] *or* N OF Snn[nn] AND E OF Wnnn[nn] *or* S OF Snn[nn] AND W OF Wnnn[nn] *or* S OF Snn[nn] AND E OF Wnnn[nn] *or* N OF Snn[nn] AND W OF Ennn[nn] *or* N OF Snn[nn] AND E OF Ennn[nn] *or* S OF Snn[nn] AND W OF Ennn[nn] *or* S OF Snn[nn] AND E OF Ennn[nn] *or*	S OF N3200 AND E OF E02000 S OF S3215 AND W OF E10130 S OF N12 AND W OF E040 N OF N35 AND E OF E078
			or	*or*
			2e) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment); N OF Nnn[nn] *or* S OF Nnn[nn] *or* N OF Snn[nn] *or* S OF Snn[nn] *or* W OF Wnnn[nn] *or* E OF Wnnn[nn] *or* W OF Ennn[nn] *or* E OF Ennn[nn]	2e) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment); N OF S2230 S OF S43 E OF E01700 E OF W005
			or	*or*
			3) Defined by a 'corridor' of specified width, centred upon a line, of up to three connected segments, described by; APRX nnKM WID LINE[22] BTN Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] APRX nnNM WID LINE[22] BTN Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [–	3) Defined by a 'corridor' of specified width, centred upon a line, of up to three connected segments, described by; APRX 50KM WID LINE BTN N64 W017 – N60 W010 – N57 E010 – N60 E015 APRX 50NM WID LINE BTN S1530 W09500 – S1815 W10130 – S2000 W10300

			Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] *or* 4) At a specific point within the FIR; Nnn[nn] Wnnn[nn] *or* Nnn[nn] Ennn[nn] *or* Snn[nn] Wnnn[nn] *or* Snn[nn] Ennn[nn] *or* 5) tropical cyclone; WI nnnKM (or nnnNM) OF TC CENTRE[24] *or* 6) A cylinder of specified radius;[25] WI nnKM (*or* nnNM) OF Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] *or* 7) A reference to the whole FIR, FIR/UIR, or CTA ENTIRE FIR ENTIRE FIR/UIR ENTIRE UIR ENTIRE CTA	*or* 4) At a specific point within the FIR; N5530 W02230 S12 E177 *or* 5) tropical cyclone; WI 400KM OF TC CENTRE WI 250NM OF TC CENTRE *or* 6) A cylinder of specified radius; WI 30 KM OF N6030 E02550 WI 50 NM OF S2000 E04000 *or* 7) A reference to the whole FIR, FIR/UIR, or CTA ENTIRE FIR ENTIRE FIR/UIR ENTIRE UIR ENTIRE CTA
2.4	Level (C)[20,21]	Flight level or altitude	1) Generic height/range descriptors to be used when 'Location' descriptors above are used. FLnnn [n]nnnnFT nnnnM SFC/FLnnn SFC/nnnnM SFC/nnnnFT SFC/nnnnnFT FLnnn/nnn TOP FLnnn	1) Generic height/range descriptors to be used when 'Location' descriptors above are used. FL180 7000FT 10000FT 600M 1200M SFC/FL070 SFC/9000FT SFC/10000FT

			ABV FLnnn TOP ABV FLnnn ABV [n]nnnnFT TOP ABV [n]nnnnFT nnnn/nnnnM [n]nnnn/[n]nnnnFT nnnnM/FLnnn [n]nnnnFT/FLnnn *or*[24] TOP FLnnn TOP BLW FLnnn TOP ABV FLnnn	SFC/2500M FL050/080 FL310/450 TOP FL390 ABV FL280 ABV 7000FT TOP ABV FL100 TOP ABV 9000FT TOP ABV 10000FT 3000M 2000/3000M 8000FT 6000/12000FT 11000/14000FT 2000M/FL150 8000FT/FL190 10000FT/FL250 *or* TOP FL500 TOP BLW FL450 TOP ABV FL360
2.5	Movement *or* expected movement (C)[20, 26,34]	Movement *or* expected movement (direction and speed) with reference to one of the sixteen points of compass, *or* stationary	MOV N [nnKMH (or nnKT)] or MOV NNE [nnKMH (or nnKT)] or MOV NE [nnKMH (or nnKT)] or MOV ENE [nnKMH (or nnKT)] or MOV E [nnKMH (or nnKT)] or MOV ESE [nnKMH (or nnKT)] or MOV SE [nnKMH (or nnKT)] or MOV SSE [nnKMH (or nnKT)] or MOV S [nnKMH (or nnKT)] or MOV SSW [nnKMH (or nnKT)] or MOV SW [nnKMH (or nnKT)] or MOV WSW [nnKMH (or nnKT)] or MOV W [nnKMH (or nnKT)] or MOV WNW [nnKMH (or nnKT)] or MOV NW [nnKMH (or nnKT)] or MOV NNW [nnKMH (or nnKT)] *or* STNR	MOV E 40KMH MOV E 20KT MOV SE 20KT STNR
2.6	Changes in intensity (C)[20]	Expected changes in intensity	INTSF *or* WKN *or* NC	INTSF WKN NC
2.7	Forecast time (C)[20,21,26]	Indication of the forecast time of the phenomena	FCST AT nnnnZ	FCST AT 2200Z FCST AT 0000Z
2.8	TC forecast position (C)[24]	Forecast position of TC centre	TC CENTRE PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] *or*[31]	TC CENTRE PSN N1030 E16015

			TC CENTRE PSN Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] CB	TC CENTRE PSN N1015 E15030 CB
2.9	Forecast position (C)[20, 21, 26,27,33]	Forecast position of phenomenon at the end of the validity period of the SIGMET message [32]	1) An area of the FIR defined by a polygon. The end point shall be a repeat of the start point. Minimum 4 coordinates (including the last point as a repeat of the first), and not normally more than 7 coordinates. WI [22,23] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]][– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] *or* 2a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and endpoints on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points). [N][NE][E][SE][S][SW][W][NW] OF LINE[22] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] *or* 2b) In a sector of the FIR defined as being **between** two lines of latitude, or **between** two lines of longitude. N OF Nnn[nn] or N OF Snn[nn] AND S OF Nnn[nn] or S OF Snn[nn] *or* W OF Wnnn[nn] or W OF Ennn[nn] AND E OF Wnnn[nn] or E OF Ennn[nn] *or* 2c) In a sector of the FIR defined as being **between** two specified lines, or **between** two series of up to three connected lines, each with start and endpoints on the FIR boundary (or start and endpoints so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points).	1) An area of the FIR defined by a polygon. The end point shall be a repeat of the start point. Minimum 4 coordinates (including the last point as a repeat of the first), and not normally more than 7 coordinates. WI N6030 E02550 – N6055 E02500 – N6050 E02630 – N6030 E02550 WI N30 W067 – N32 W070 – N35 W068 – N30 W067 *or* 2a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and endpoints on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points). NE OF LINE N2515 W08700 – N2000 W08330 S OF LINE S14 E150 – S14 E155 *or* 2b) In a sector of the FIR defined as being **between** two lines of latitude, or **between** two lines of longitude. N OF N45 AND S OF N50 W OF E04530 AND E OF E04000 or 2c) In a sector of the FIR defined as being **between** two specified lines, or **between** two series of up to three connected lines, each with start and endpoints on the FIR boundary (or start and endpoints so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points). SW OF LINE N50 W020 – N45 E010 AND NE OF LINE

			[N][NE][E][SE][S][SW][W][NW] OF LINE[22] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] AND [N][NE][E][SE][S][SW][W][NW] OF LINE Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] *or* 2d) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a quadrant); N OF Nnn[nn] AND W OF Wnnn[nn] *or* N OF Nnn[nn] AND E OF Wnnn[nn] *or* S OF Nnn[nn] AND W OF Wnnn[nn] *or* S OF Nnn[nn] AND E OF Wnnn[nn] *or* N OF Nnn[nn] AND W OF Ennn[nn] *or* N OF Nnn[nn] AND E OF Ennn[nn] *or* S OF Nnn[nn] AND W OF Ennn[nn] *or* S OF Nnn[nn] AND E OF Ennn[nn] *or* N OF Snn[nn] AND W OF Wnnn[nn] *or* N OF Snn[nn] AND E OF Wnnn[nn] *or* S OF Snn[nn] AND W OF Wnnn[nn] *or* S OF Snn[nn] AND E OF Wnnn[nn] *or* N OF Snn[nn] AND W OF Ennn[nn] *or* N OF Snn[nn] AND E OF Ennn[nn] *or* S OF Snn[nn] AND W OF Ennn[nn] *or* S OF Snn[nn] AND E OF Ennn[nn] *or* *or* 2e) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment); N OF Nnn[nn] *or* S OF Nnn[nn] *or* N OF Snn[nn] *or* S OF Snn[nn] *or* W OF Wnnn[nn] *or* E OF Wnnn[nn] *or* W OF Ennn[nn] *or* E OF Ennn[nn]	N45 W020 – N40 E010 *or* 2d) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a quadrant); S OF N3200 AND E OF E02000 S OF S3215 AND W OF E10130 S OF N12 AND W OF E040 N OF N35 AND E OF E078 *or* 2e) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment); N OF S2230 S OF S43 E OF E01700 E OF W005 *or*

			or 3) Defined by a 'corridor' of specified width, centred upon a line, of up to three connected segments, described by; APRX nnKM WID LINE[22] BTN Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] APRX nnNM WID LINE[22] BTN Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] *or* 4) At a specific point within the FIR; Nnn[nn] Wnnn[nn] *or* Nnn[nn] Ennn[nn] *or* Snn[nn] Wnnn[nn] *or* Snn[nn] Ennn[nn] *or* 5) tropical cyclone; WI nnnKM (or nnnNM) OF TC CENTRE[24] or 6) A cylinder of specified radius; [25] WI nnKM OF Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] WI nnNM OF Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] *or* 7) A reference to the whole FIR, FIR/UIR, or CTA	3) Defined by a 'corridor' of specified width, centred upon the line described; APRX 50KM WID LINE BTN N64 W017 – N60 W010 – N57 E010 – N60 E015 APRX 50NM WID LINE BTN S1530 W09500 – S1815 W10130 – S2000 W10300 *or* 4) At a specific point within the FIR; N5530 W02230 S12 E177 *or* 5) tropical cyclone; WI 150NM OF TC CENTRE *or* 6) A cylinder of specified radius; WI 30 KM OF N6030 E02550 WI 16 NM OF S2000 E04000 *or* 7) A reference to the whole FIR, FIR/UIR, or CTA ENTIRE FIR ENTIRE FIR/UIR ENTIRE UIR ENTIRE CTA

			ENTIRE FIR ENTIRE FIR/UIR ENTIRE UIR ENTIRE CTA *or* 8) No volcanic ash expected[28] NO VA EXP	*or* 8) No volcanic ash expected NO VA EXP
3.0	Repetition of elements (C)[29]	Repetition of elements included in a SIGMET message for volcanic ash cloud or tropical cyclone	[AND][29]	AND
4.0	Cancellation of SIGMET (C)[30]	Cancellation of SIGMET referring to its identification	CNL SIGMET n nnnnnn/nnnnnn CNL SIGMET nn nnnnnn/nnnnnn CNL SIGMET nnn nnnnnn/nnnnnn *or* CNL SIGMET n nnnnnn/nnnnnn VA MOV TO nnnn FIR[28] CNL SIGMET nn nnnnnn/nnnnnn VA MOV TO nnnn FIR[28] CNL SIGMET nnn nnnnnn/nnnnnn VA MOV TO nnnn FIR[28]	CNL SIGMET 2 102000/110000 CNL SIGMET 12 101200/101600 CNL SIGMET A12 031600/032000 *or* CNL SIGMET 3 251030/251630 VA MOV TO YUDO FIR CNL SIGMET 06 191200/191800 VA MOV TO YUDO FIR CNL SIGMET B10 030600/031200 VA MOV TO YUDO FIR

Table A-1: Expanded SIGMET template

Footnotes to table: (note, in order to ensure consistency between this document and PANS-MET Appendix 7, Table A7-5, any footnote in Table A7-5 that refers to AIRMET only is identified as such below.

1. See Annex 3, 7.4.1.7.
2. Fictitious location.
3. In accordance with PANS-MET 6.4.3
4. AIRMET only – not SIGMET
5. To be used only when a test (TEST) or an exercise (EXER) is taking place. When the word "TEST" or the abbreviation "EXER" is included, the SIGMET may contain information that should not be used operationally or will otherwise end immediately after the word "TEST". Any information included after the abbreviation "TEST" or "EXER" is to be included on a subsequent line.
6. In accordance with 6.4.4
7. In accordance with Appendix 8, 1 a).
8. In accordance with Appendix 8, 4.
9. In accordance with Appendix 8,1 b).
10. In accordance with Appendix 8, 2.
11. In accordance with Appendix 8, 3.
12. Used for unnamed tropical cyclones.
13. In accordance with Appendix 8, 5 and 6.
14. In accordance with Appendix 8, 7.
15. In accordance with Appendix 8, 8.
16. AIRMET only – not SIGMET
17. AIRMET only – not SIGMET
18. AIRMET only – not SIGMET
19. AIRMET only – not SIGMET
20. In the case of volcanic ash cloud covering more than one area within the FIR, these elements can be repeated, as necessary. Each location and forecast position are to be preceded by an observed or forecast time.
21. In the case of cumulonimbus clouds associated with a tropical cyclone covering more than one area within the FIR, these elements can be repeated, as necessary. Each location and forecast position are to be preceded by an observed or forecast time.
22. A straight line is to be used between two points drawn on a map in the Mercator projection or between two points which crosses lines of longitude at a constant angle.
23. The number of coordinates is to be kept to a minimum and should not normally exceed seven.
24. Only for SIGMET information for tropical cyclones.
25. Only for SIGMET information for radioactive cloud. A radius of up to 30 kilometres (16 nautical miles) from the source and a vertical extent from surface (SFC) to the upper limit of the flight information region/upper flight information region (FIR/UIR) or control area (CTA) are to be applied.
26. The elements "forecast time" and "forecast position" are not to be used in conjunction with the element "movement or expected movement".
27. The levels of the phenomena remain fixed throughout the forecast period.
28. Only for SIGMET information for volcanic ash.
29. To be used for more than one cumulonimbus clouds associated with a tropical cyclone simultaneously affecting the FIR concerned.

30. End of the message (as the SIGMET information is being cancelled).
31. The abbreviation CB is to be used when the forecast position for the cumulonimbus cloud is included.
32. The forecast position for cumulonimbus (CB) cloud occurring in connection with tropical cyclones relates to the forecast time of the tropical cyclone centre position, not to the end of the validity period of SIGMET information.
33. For SIGMET information for radioactive cloud, only within (WI) is to be used for the elements “location” and “forecast position”.
34. For SIGMET information for radioactive cloud, only stationary (STNR) is to be used for the element “movement or expected movement”
35. To be used for more than one volcanic ash clouds simultaneously affecting the FIR concerned.

Additional notes (not specifically identified in footnotes to PANS-MET Appendix 7 Table A7-5:

In accordance with Appendix 8, 9,

Sandstorm (SS) /duststorm (DS) 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 200 m, and the sky is not obscured; or
    2. between 200 m and 600 m.

(no footnote in Annex 3 and PANS-MET, but this is applicable reference)

APPENDIX B

SIGMET EXAMPLES

*Note. — The figures used in this appendix are intended simply to clarify the intent of the SIGMET message in abbreviated plain language (TAC), and therefore how each SIGMET should be **constructed** by MWOs and also **interpreted** by users. The figures used are <u>not</u> intended to give guidance on how a SIGMET in graphical format should be produced.*

Examples of '**WS**' SIGMET. See the sections for SIGMET for volcanic ash only (WV) and SIGMET for tropical cyclone only (WC) for examples specific to those phenomena.

Contents

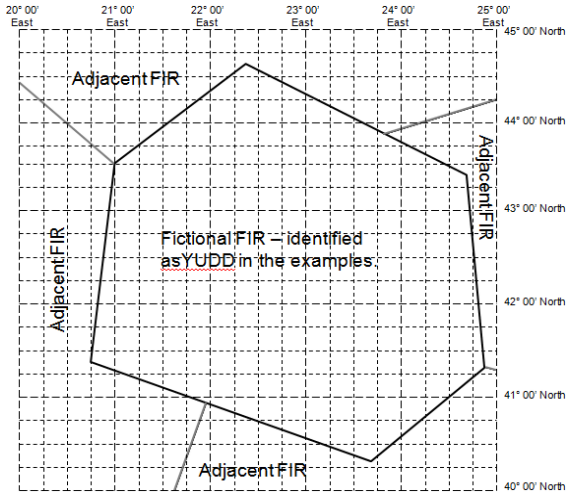
General
1. An area of the FIR defined by a polygon.
   Use of polygons with complex FIR boundaries.
2. a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and end points on the FIR boundary
2. b) In a sector of the FIR defined as being between two lines of latitude, or between two lines of longitude
2. c) In a sector of the FIR defined as being *between* two specified lines, or *between* two series of up to three connected lines, each with start and endpoints on the FIR boundary
2. d) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a segment)
2. e) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment)
3. Defined by a 'corridor' of specified width, centred upon the line described;
4. At a specific point within the FIR
5. A vertical cylinder of specified radius
6. Covering entire FIR.
7. Additional examples using volcanic ash references applicable to volcanic ash SIGMET only
8. Additional examples using volcanic ash references applicable to multiple areas in SIGMET for volcanic ash.
9. Additional examples relating to cases of volcanic ash predicted to enter an adjacent FIR
10. Additional example illustrating use of "WI nnnKM (or nnnNM) OF TC CENTRE " in Tropical Cyclone SIGMET only.
11. Additional example with multiple CB areas in SIGMET for tropical cyclone
12. Additional examples of SIGMETs relating to 'concave' or 'horseshoe' shaped FIRs
13. Examples of Test and Exercise SIGMET indicators

General

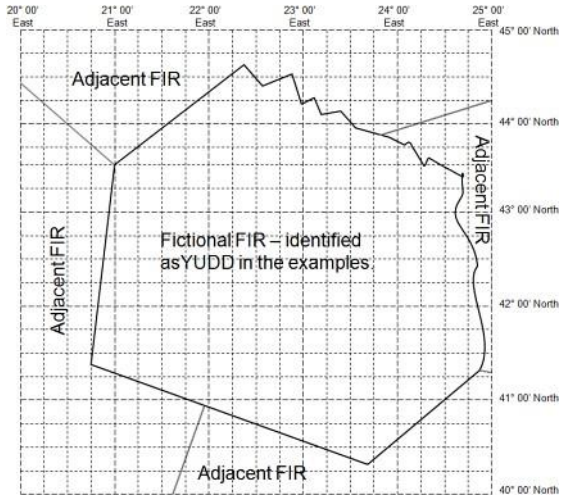
In the following paragraphs, some examples of SIGMET are provided in TAC format.

Explanation of “fictional FIR”.

In each of the examples below, a fictional FIR area is indicated, with portions of adjacent fictional FIRs also indicated. The FIR areas are overlaid on a coordinate grid, in order that the example plain language SIGMETs can be explicitly related to the intended meaning.



For some cases, examples are given where the FIR has boundaries that are complex (country borders for example, especially when defined by rivers)



Fictional FIR ‘Shanlon = YUDD’ is used for the examples.

Repetition of start point as last coordinate.

In accordance with practices and procedures laid down for other aeronautical bulletins (i.e.

NOTAM), it is recommended that the last point of a polygon is a repeat of the first point of the polygon. This will ensure that the polygon has been closed, and that no points have been accidentally omitted.

'Direction' of encoding of the points of a polygon

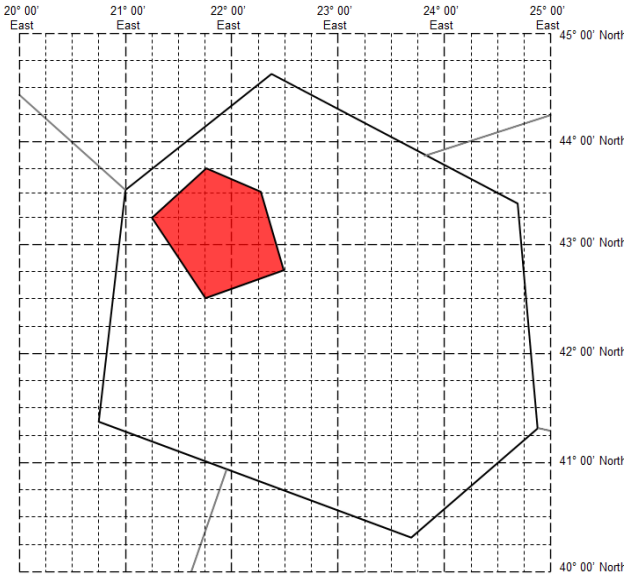
In accordance with practices and procedures laid down for other aeronautical bulletins and international practice (e.g. BUFR encoding of WAFS significant weather (SIGWX) forecasts), it is recommended that the points of a polygon are provided in a 'clockwise' sense. This assists automated systems in determining the 'inside' of polygons.

Use of ‘Expected Movement’ and ‘Forecast Position’/’Forecast Time’.

The ‘Expected Movement’ element of SIGMET should not be used if the ‘Forecast Position’/’Forecast Time’ element is being used, and vice versa. This is to prevent duplication at best and inconsistencies at worst.

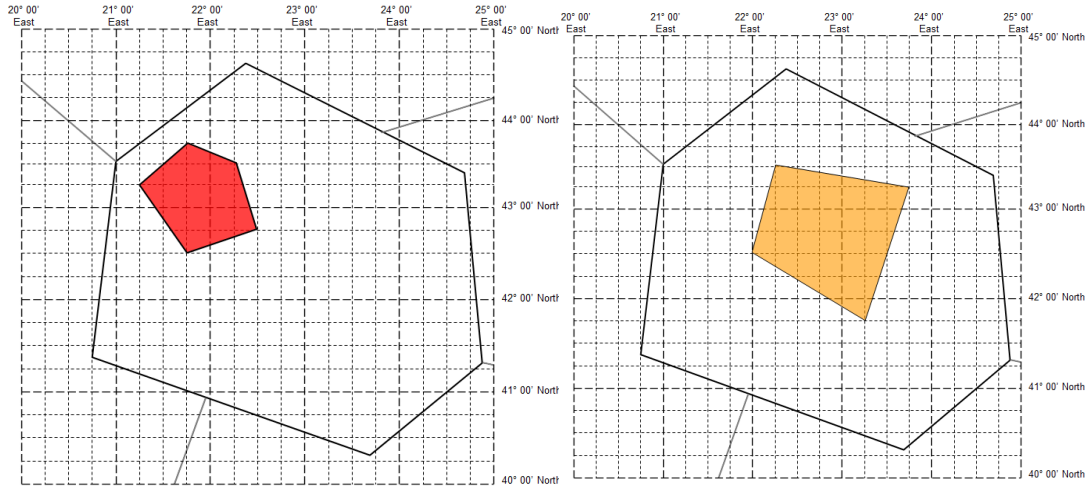
1) An area of the FIR defined by a polygon. The end point should be a repeat of the start point. Points of a polygon are provided in a 'clockwise' manner.

When the SIGMET does not include a 'forecast position' section.



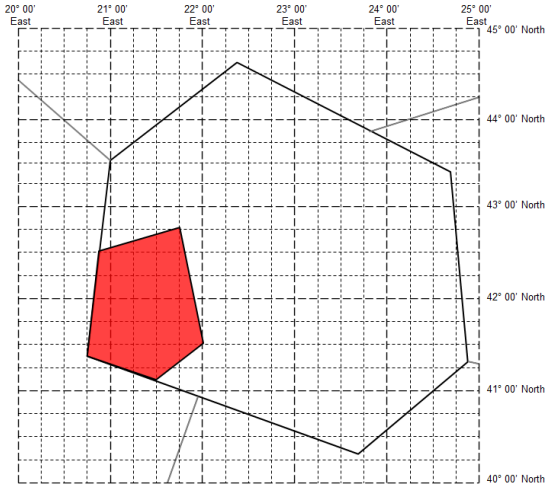
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST WI N4230 E02145 - N4315 E02115 - N4345 E02145 - N4330 E02215 - N4245 E02230 - N4230 E02145 FL250/370 MOV ESE 20KT INTSF=

With an explicit forecast position:



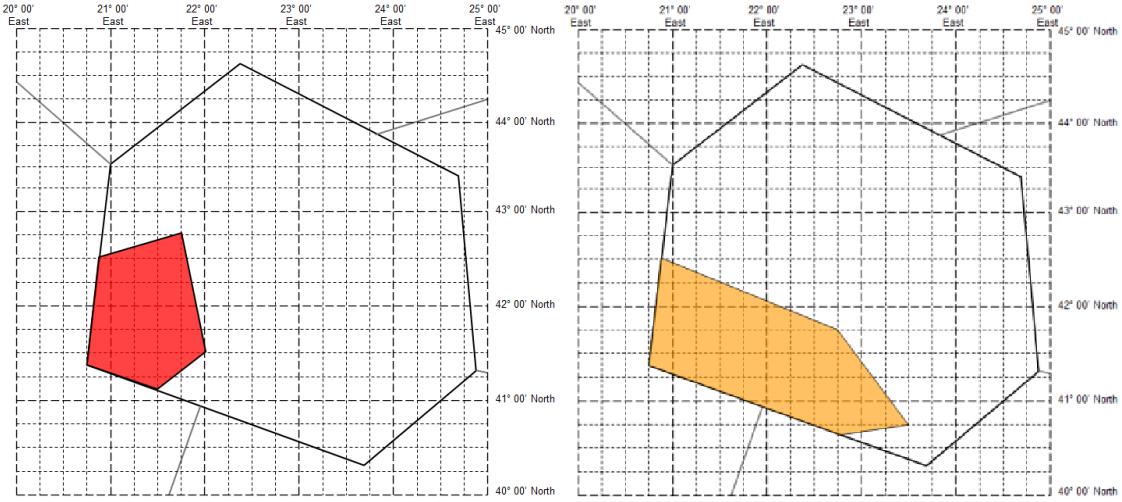
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST WI N4230 E02145 - N4315 E02115 - N4345 E02145 - N4330 E02215 - N4245 E02230 - N4230 E02145 FL250/370 INTSF FCST AT 1600Z WI N4145 E02315 - N4230 E02200 - N4330 E02215 - N4315 E02345 - N4145 E02315=

When the SIGMET does not include a ‘forecast position’ section.



YUDD SIGMET 2 VALID 101200/101600 YUSO–
YUDD SHANLON FIR/UIR SEV TURB FCST WI N4230 E02052 – N4245 E02145 – N4130 E02200 – N4107 E02130 – N4123 E02045 - N4230 E02052 FL250/370 MOV SE 30KT WKN=

With an explicit forecast position:



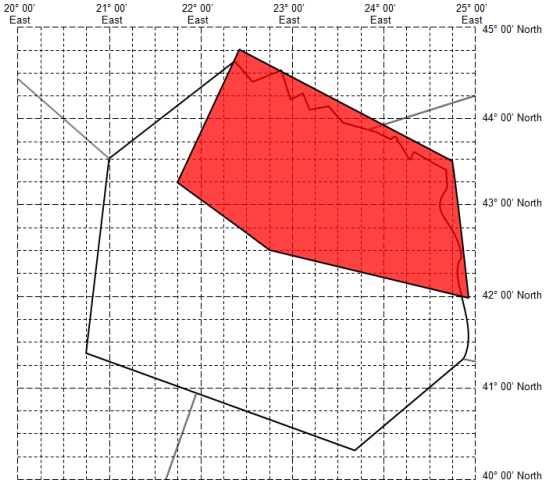
YUDD SIGMET 2 VALID 101200/101600 YUSO–
YUDD SHANLON FIR/UIR SEV TURB FCST WI N4230 E02052 – N4245 E02145 – N4130 E02200 – N4107 E02130 – N4123 E02045- N4230 E02052 FL250/370 WKN FCST AT 1600Z WI N4230 E02052 – N4145 E02245 – N4045 E02330 – N4040 E02248 – N4123 E02045- N4230 E02052=

Use of polygons with complex FIR boundaries.

PANS-MET specifies that the points of a polygon '... are to be kept to a minimum and should not normally exceed seven'. However, some FIR boundaries are complex, and it would be unrealistic to expect that a polygon would be defined that followed such boundaries precisely. As such, some States have determined that the polygon points be chosen in relation to the complex boundary such that the FIR boundary approximates, but is wholly encompassed by, the polygon, and that any additional area beyond the FIR boundary be the minimum that can be reasonably and practically described. Caution should however be exercised in those instances where international aerodromes are located in close proximity to such a complex FIR boundary.

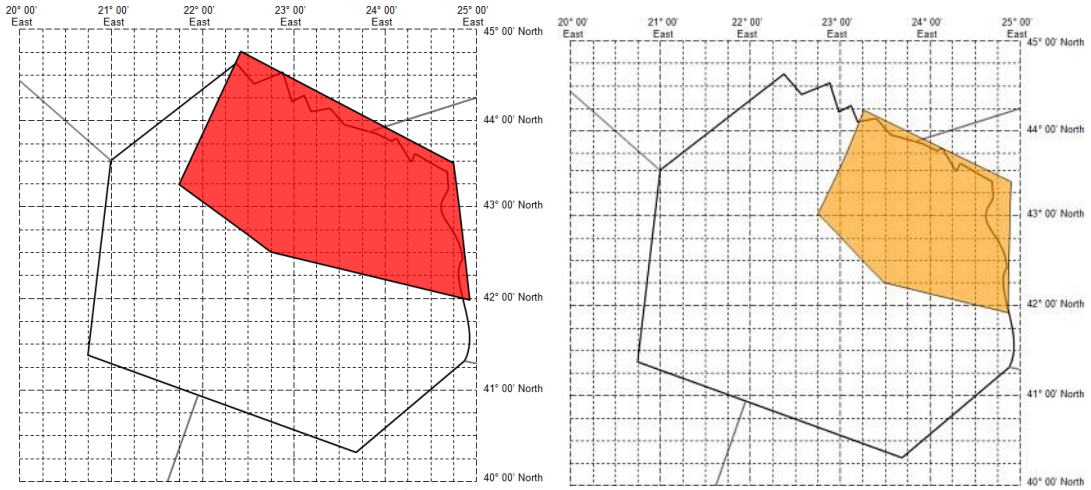
In the examples below, it would not be practical to follow the northeastern boundary of the FIR exactly. The point close to N4330 E02245 is obviously a 'major' turning point along the FIR boundary, but the other, numerous and complex turning points can only be approximated when constrained to seven points.

<u>When the SIGMET does not include a 'forecast position' section.</u>




```
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST WI N4315 E02145 - N4445 E02225 -
N4330 E02445 - N4200 E02455 - N4230 E02245 - N4315 E02145 FL250/370 MOV
SE 20KT WKN=
```

With an explicit forecast position:

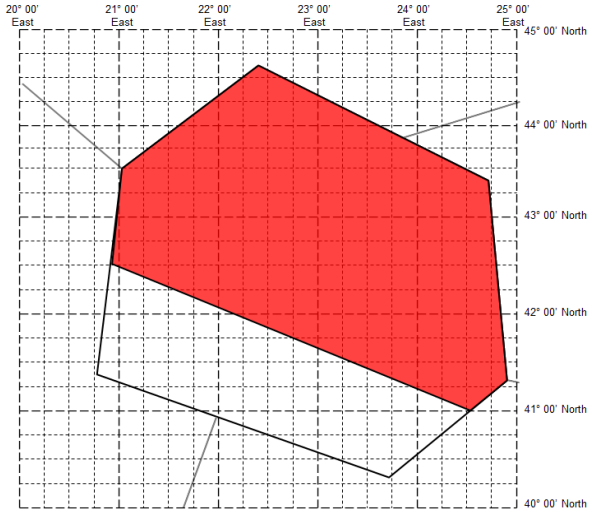


YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST WI N4315 E02145 - N4445 E02245 - N4330 E02445 - N4200 E02455 - N4230 E02245- N4315 E02145 FL250/370 WKN FCST AT 1600Z WI N4300 E02245 - N4415 E02315 - N4322 E02452 - N4155 E02445 - N4215 E02330- N4300 E02245=

2a) In a sector of the FIR defined relative to a specified line, or single series of up to three connected lines, with start and end points on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at that point).

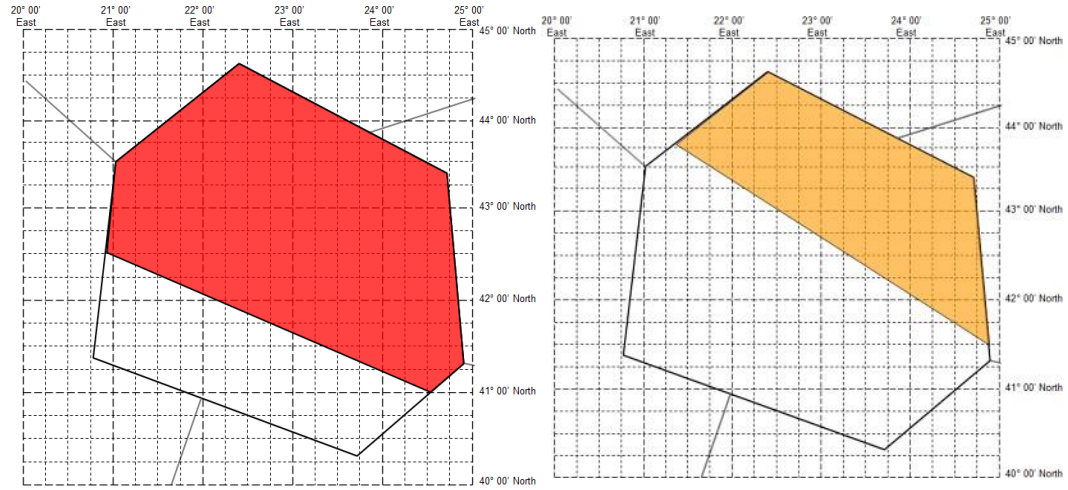
The specified points shall be on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at that point)

When the SIGMET does not include a 'forecast position' section.



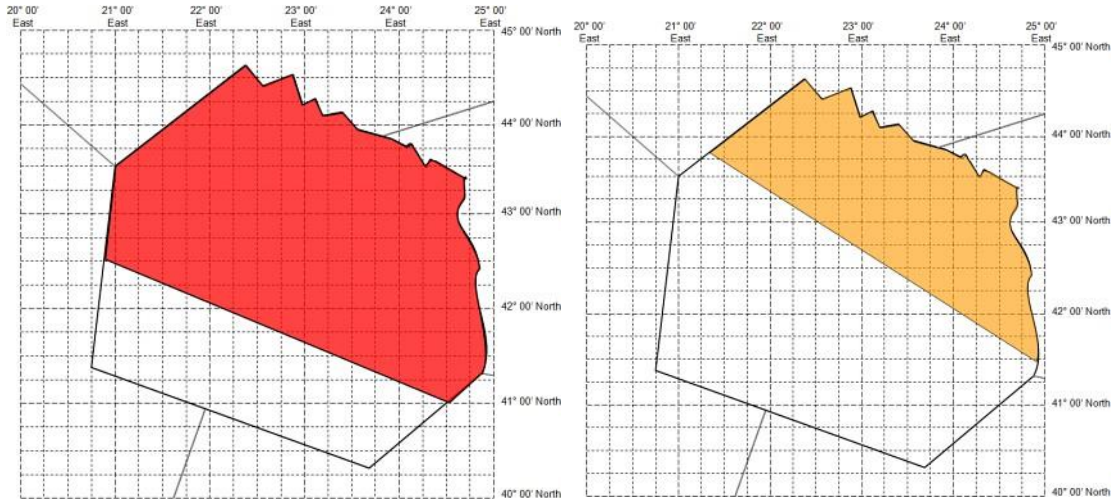
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4230 E02052 - N4100 E02430 FL250/370 MOV NE 15KT WKN=

With an explicit forecast position:



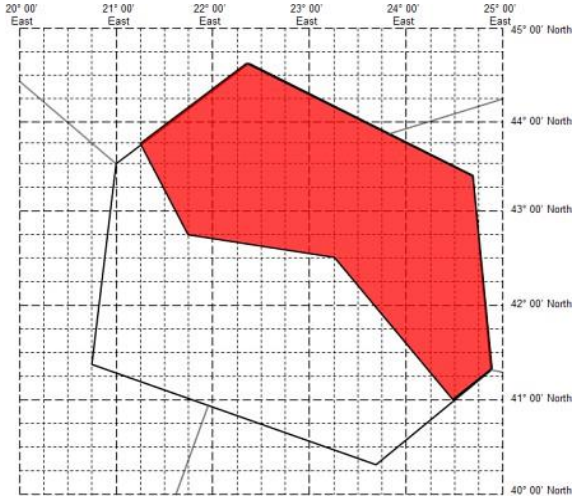
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4230 E02052 - N4100 E02430
FL250/370 WKN FCST AT 1600Z NE OF LINE N4346 E02122 - N4130 E02452=

A separate example is provided below illustrating a case where the northeastern boundary is complex.



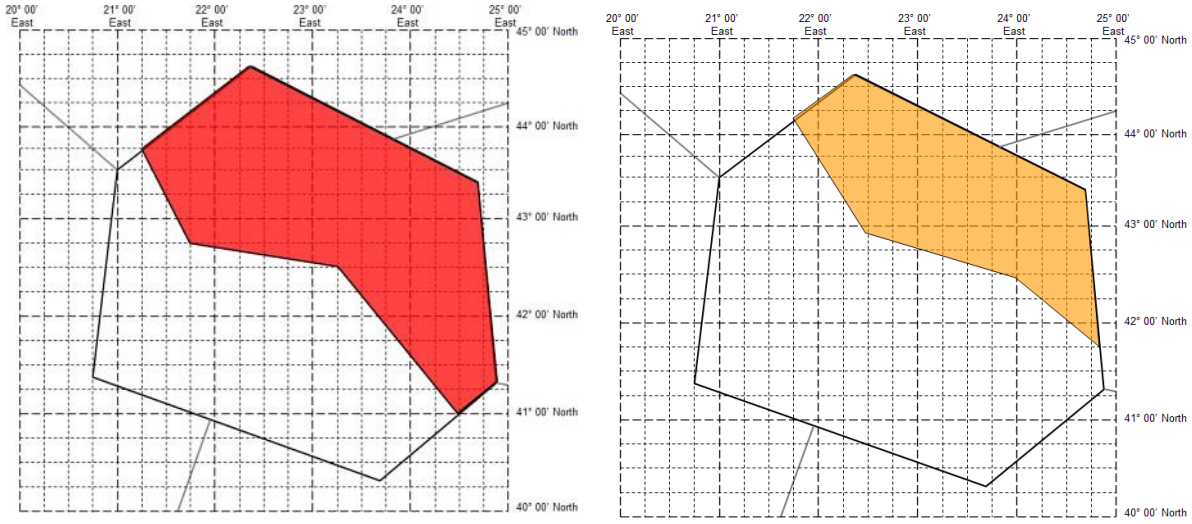
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4230 E02052 - N4100 E02430 FL250/370
WKN FCST AT 1600Z NE OF LINE N4346 E02122 - N4130 E02457=

For a series of connected lines <u>when the SIGMET does not include a 'forecast position' section.</u>



YUDD SIGMET 2 VALID 101200/101600 YUSO–
YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4345 E02115 – N4245 E02145 - N4230 E02315 – N4100 E02430 FL250/370 MOV NE 20KT WKN=

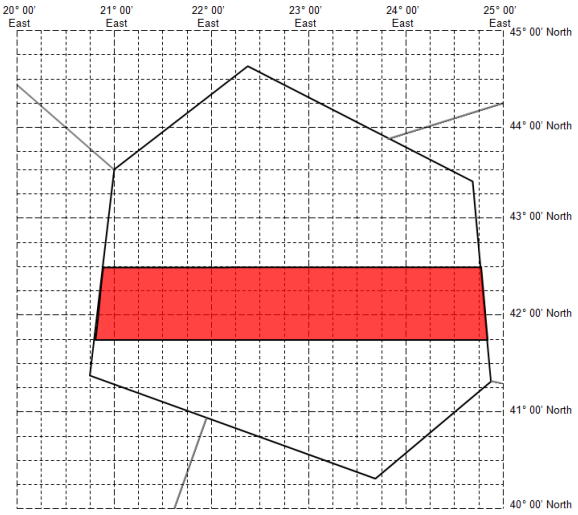
<u>With an explicit forecast position:</u>



YUDD SIGMET 2 VALID 101200/101600 YUSO–
YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4345 E02115 – N4245 E02145 - N4230 E02315 – N4100 E02430 FL250/370 WKN FCST AT 1600Z NE OF LINE N4411 E02145 – N4255 E02228 - N4228 E02400 – N4145 E02450=

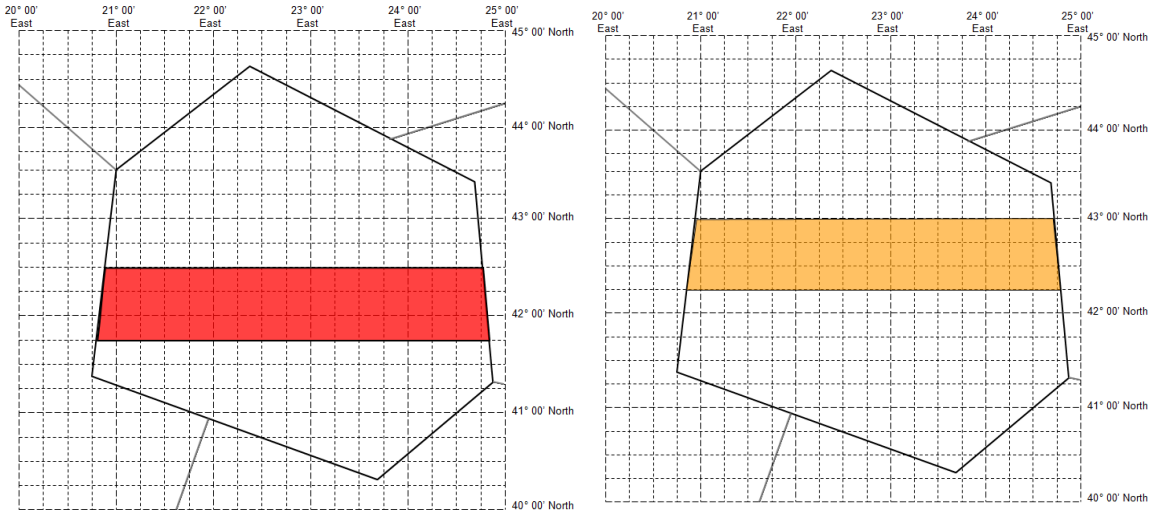
2b) In a sector of the FIR defined as being *between* two lines of latitude, or between two lines of longitude.

When the SIGMET does not include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR SEV TURB FCST N OF N4145 AND S OF N4230 FL250/370 MOV N 30KT WKN=

With an explicit forecast position:



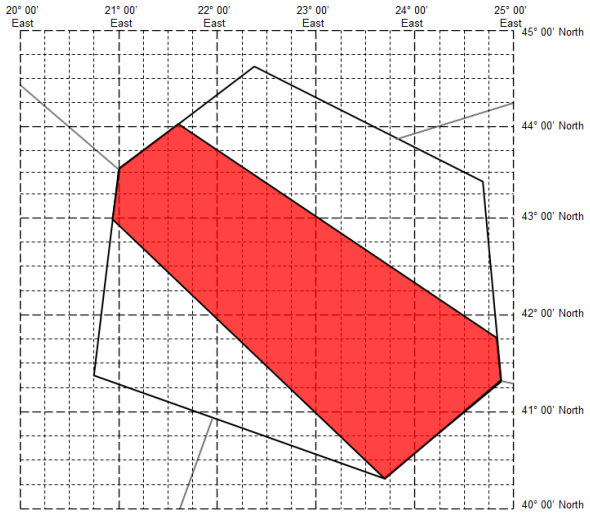
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR SEV TURB FCST N OF N4145 AND S OF N4230 FL250/370 WKN FCST AT 1600Z N OF N4215 AND S OF N4300=

(similar constructions can be used for specifying areas between lines of longitude)

2c) In a sector of the FIR defined as being *between* two specified lines, or *between* two series of up to three connected lines, each with start and endpoints on the FIR boundary (or start and endpoints so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at those points).

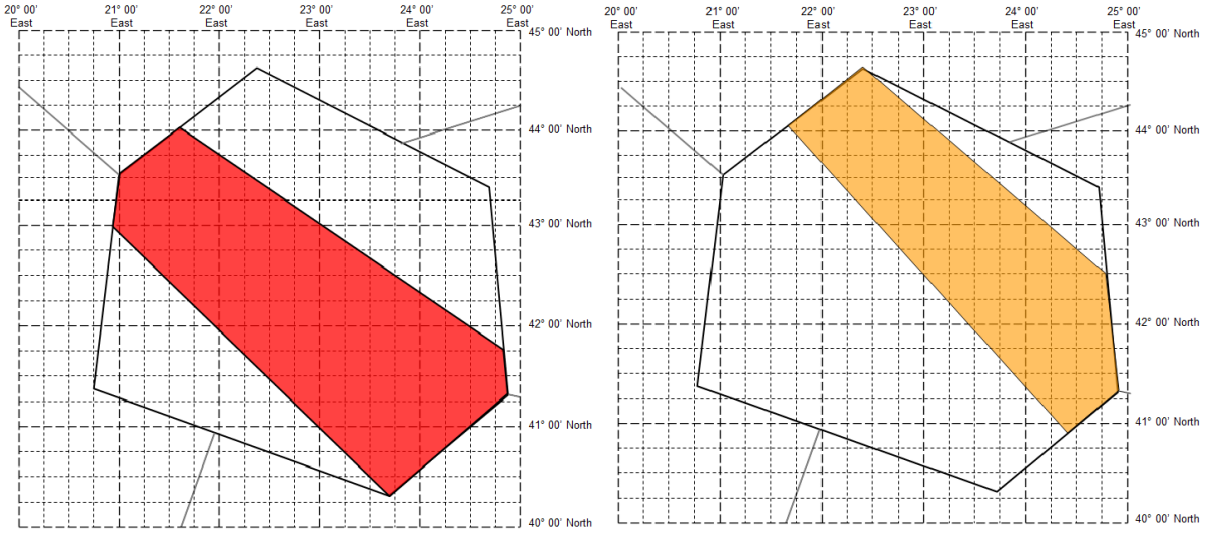
The specified points shall be on the FIR boundary (or so close to the FIR boundary so as to leave no doubt that the intent is for the line to connect to the FIR boundary at that point)

When the SIGMET does not include a 'forecast position' section.



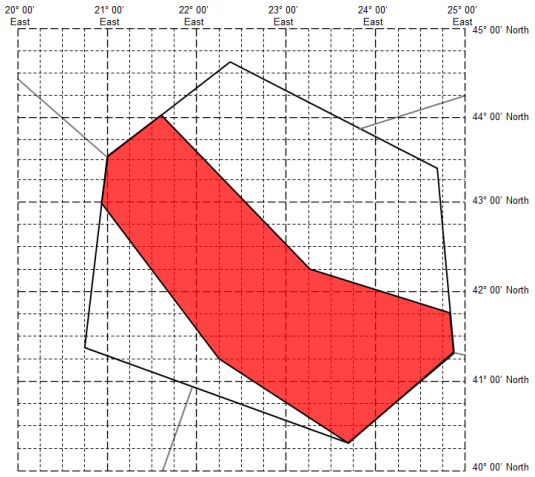
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4300 E02057 - N4020 E02340 AND SW OF LINE N4402 E02142 - N4145 E02450 FL250/370 MOV NE 20KT WKN=

With an explicit forecast position:



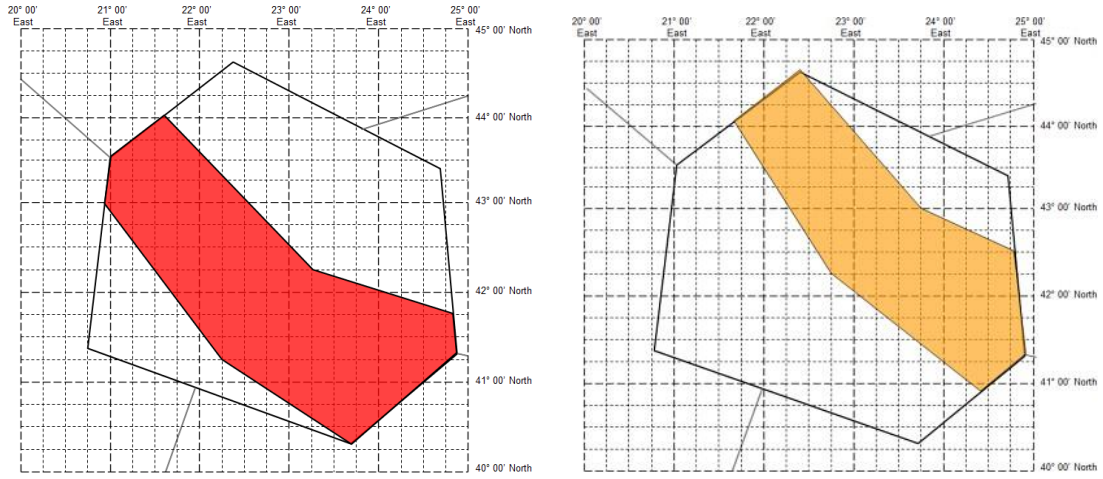
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4300 E02057 - N4020 E02340 AND SW OF LINE N4402 E02142 - N4145 E02450 FL250/370 WKN FCST AT 1600Z NE OF LINE N4403 E02140 - N4055 E02422 AND SW OF LINE N4437 E02222 - N4230 E02447=

For a series of connected lines when the SIGMET does not include a ‘forecast position’ section.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4300 E02057 – N4115 E02215 – N4020 E02340 AND SW OF LINE N4402 E02137 – N4215 E02315 - N4145 E02450 FL250/370 MOV NE 20KT WKN=

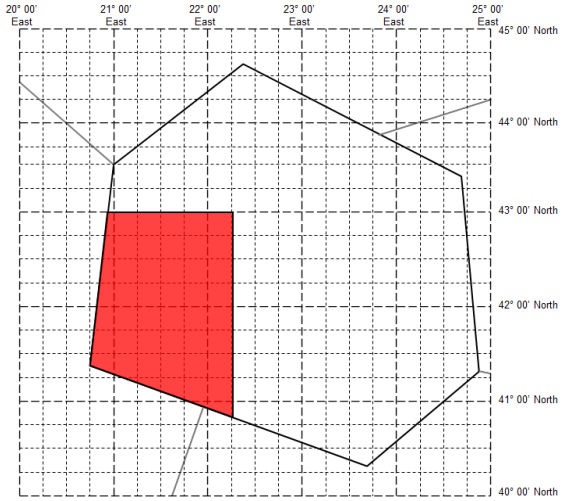
<u>With an explicit forecast position:</u>



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR SEV TURB FCST NE OF LINE N4300 E02057 – N4115 E02215 – N4020 E02340 AND SW OF LINE N4402 E02137 – N4215 E02315 - N4145 E02450 FL250/370 WKN FCST AT 1600Z NE OF LINE N4403 E02140 - N4215 E02245 – N4055 E02422 AND SW OF LINE N4437 E02222 – N4300 E02345 – N4230 E02447=

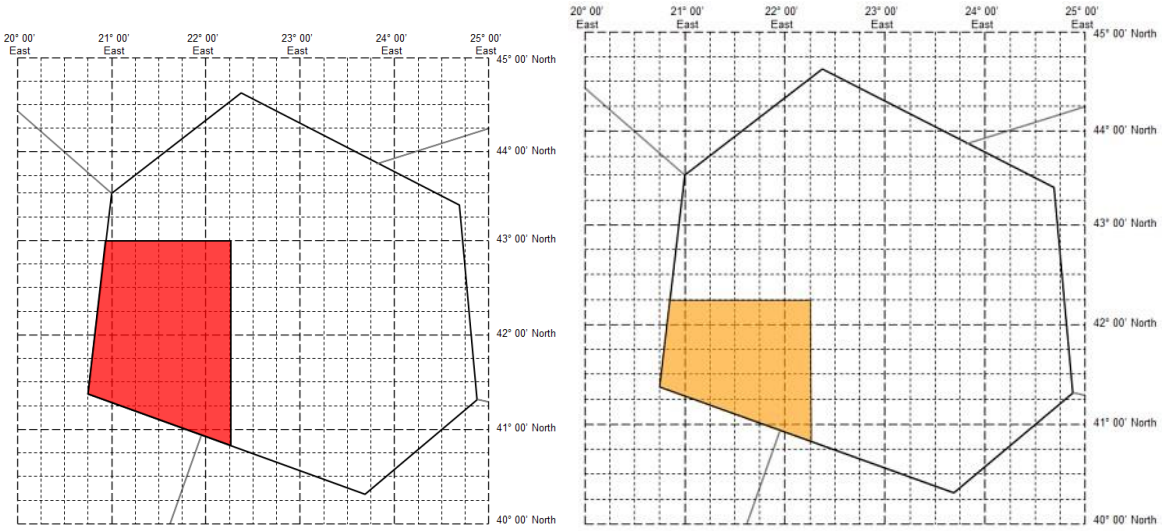
2d) In a sector of the FIR defined relative to a line of latitude and a line of longitude (effectively a quadrant)

When the SIGMET does not include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST S OF N4300 AND W OF E02215 FL250/370 MOV S 12KT WKN=

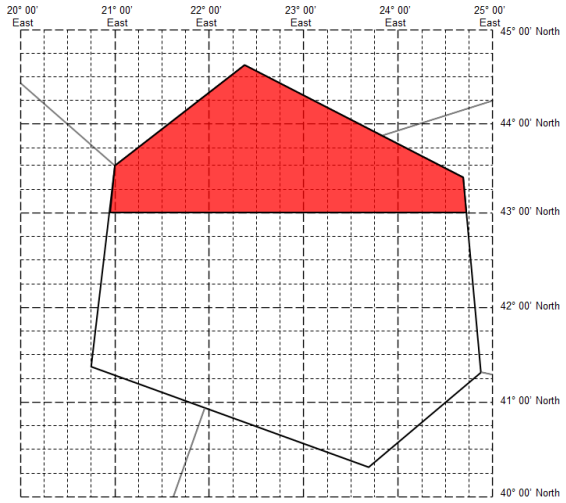
When the SIGMET does include a 'forecast position'.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST S OF N4300 AND W OF E02215 FL250/370 WKN FCST AT 1600Z S OF N4215 AND W OF E02215=

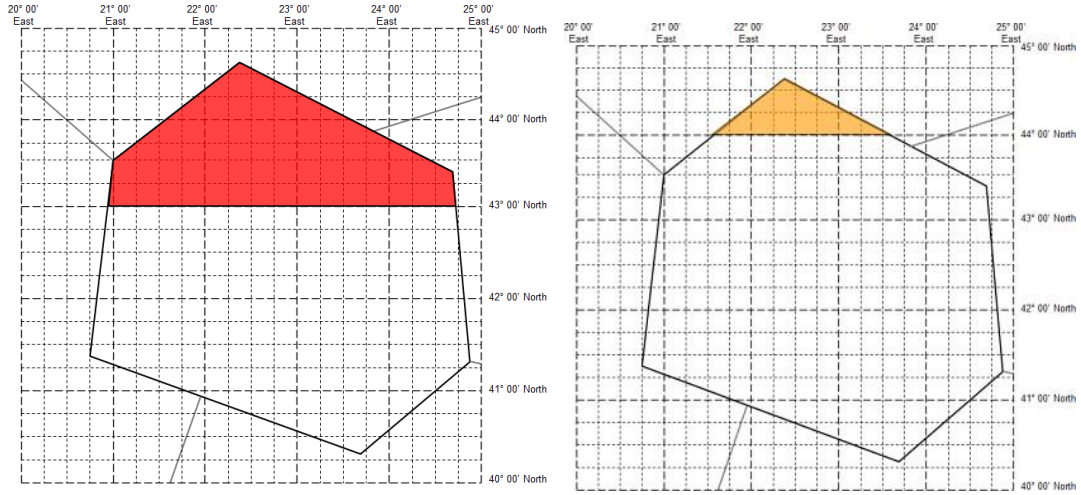
2e) In a sector of the FIR defined relative to a line of latitude or longitude (effectively a segment)

When the SIGMET does not include a 'forecast position' section.



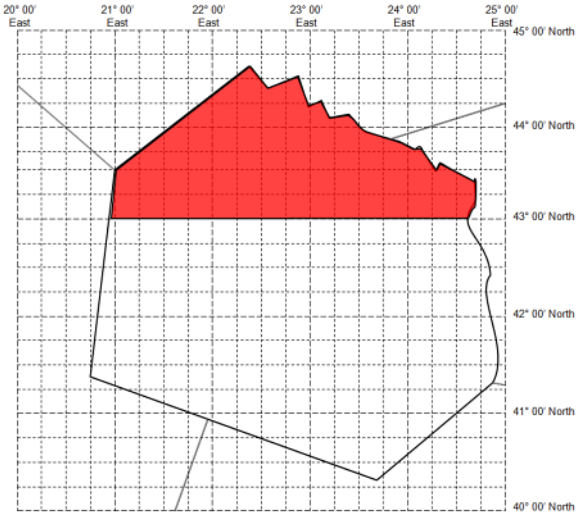
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST N OF N43 FL250/370 MOV N 15KT WKN=

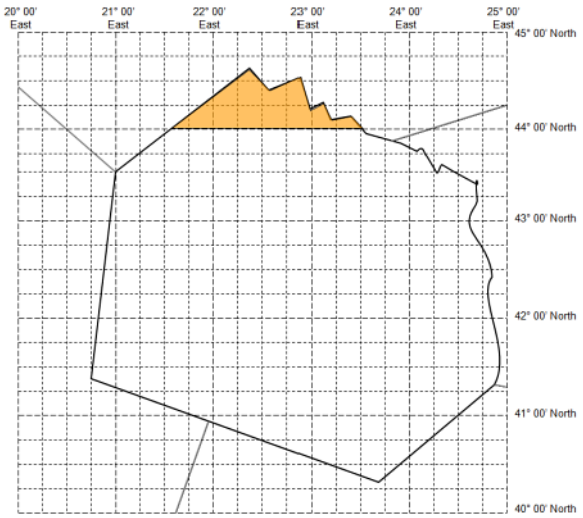
When the SIGMET does include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST N OF N43[2] FL250/370 WKN FCST AT 1600Z N OF N44=

[2] It would be equally valid to use 'N4300'.

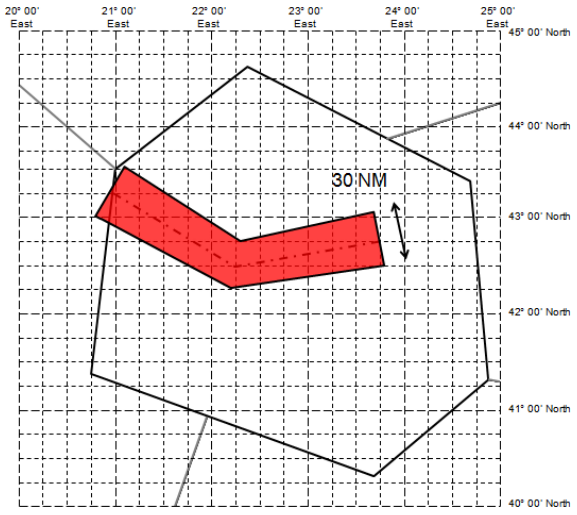


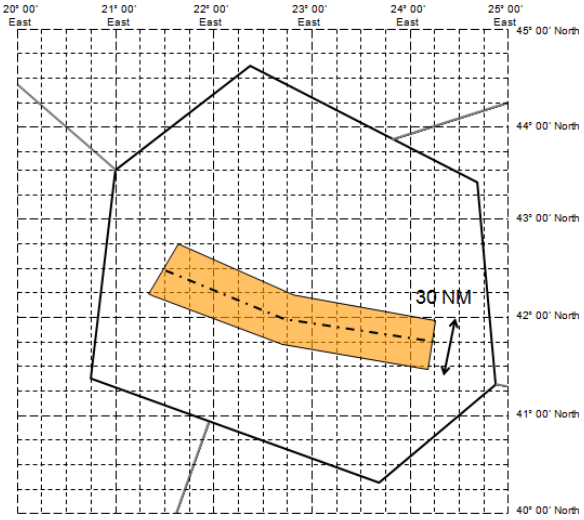


YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST N OF N43[3] FL250/370 WKN FCST AT 1600Z
N OF N44=

3) Defined by a 'corridor' of specified width, centered upon the line described;

YUDD SIGMET 2 VALID 101200/101600 YUSO-





YUDD SHANLON FIR/UIR SEV TURB FCST APRX 30NM WID LINE BTN N4315 E02100 - N4230 E02215 - N4245 E02345 FL250/370 WKN FCST AT 1600Z APRX 30NM WID LINE BTN N4230 E02130 - N4200 E02245 - N4145 E02415=

Note: The nature of this option means that, as at N4315 E02100, it is inferred that there is some encroachment into the neighbouring FIR.

[3] It would be equally valid to use 'N4300'.

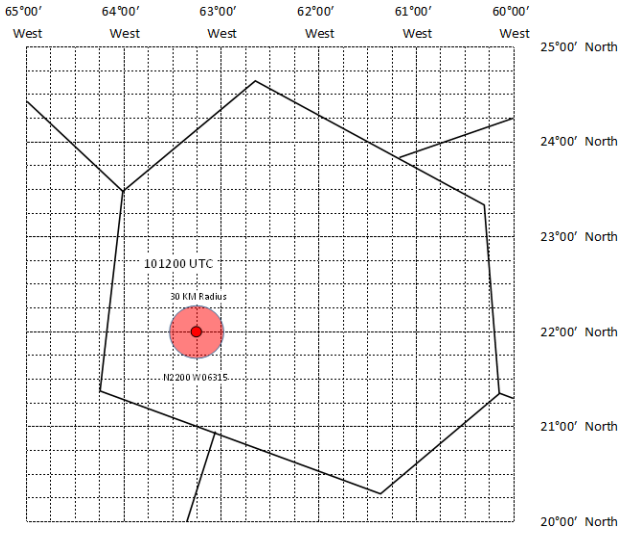
4) At a specific point within the FIR;

When the SIGMET does not include a 'forecast position' section.

```
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB OBS N4245 E02230 FL250/370 STNR WKN=
```

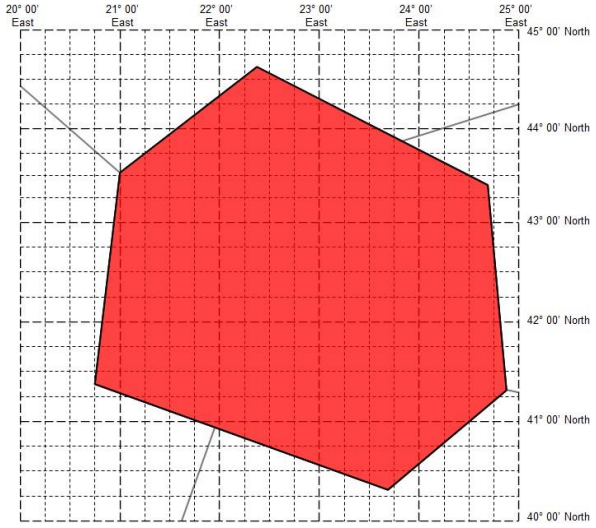
5) A vertical cylinder of specified radius.

For SIGMET messages for radioactive cloud, a cylinder of specified radius is used.




```
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR RDOACT CLD OBS AT 1200Z WI 30KM OF N2200 W06315 SFC/3000FT
NC FCST AT 1600Z WI 30KM OF N2200 W06315=
```

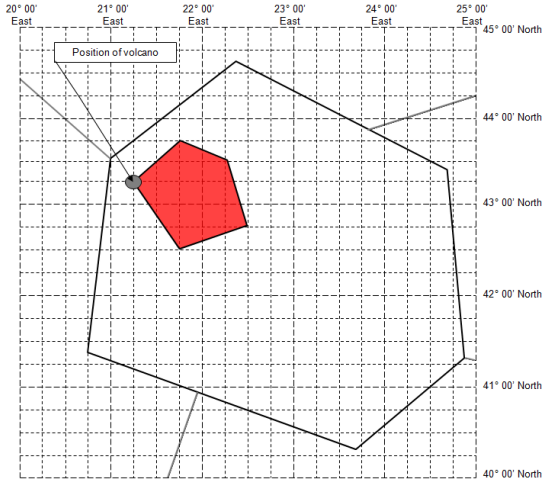
6) Covering entire FIR.




```
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR VA CLD FCST AT 1200Z ENTIRE FIR FL250/370 STNR WKN=
```

7) Additional examples using volcanic ash references applicable to volcanic ash SIGMET only

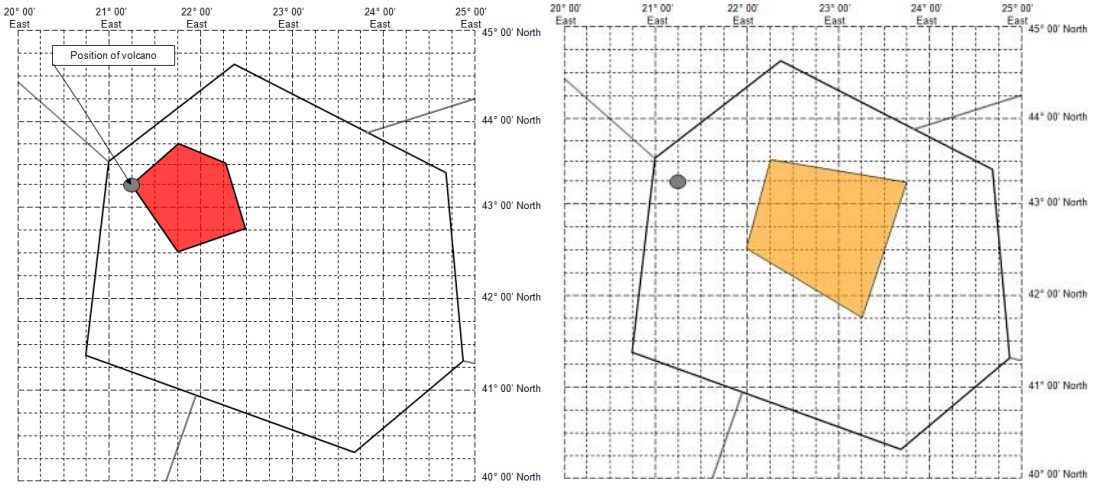
When the VA SIGMET does not include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD OBS AT 1200Z WI N4315 E02115 - N4345 E02145 - N4330 E02215 - N4245 E02230 - N4230 E02145 - N4315 E02115 FL250/370 MOV ESE 20KT NC=

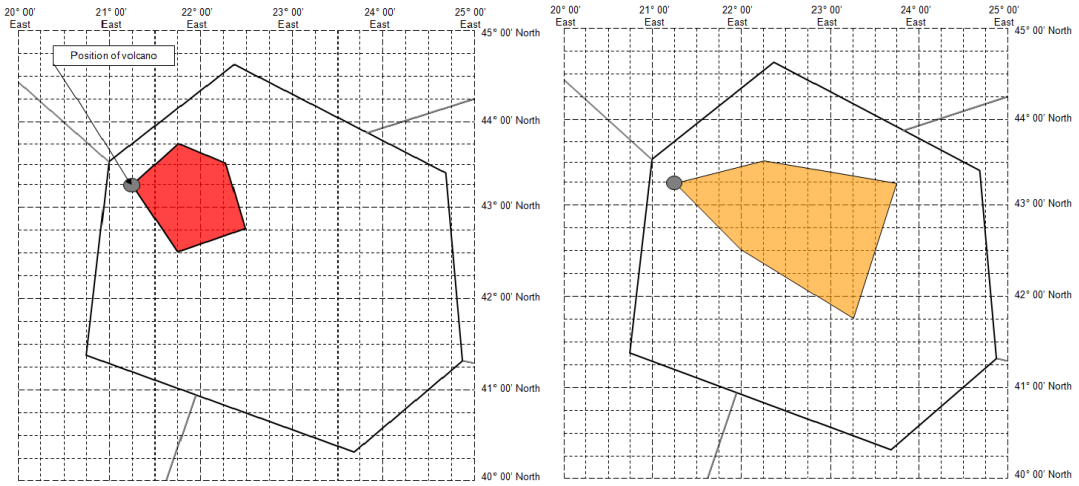
When the SIGMET does include a 'forecast position' section (no rate of movement).

For VA (eruption ceased, ash cloud persists downwind):



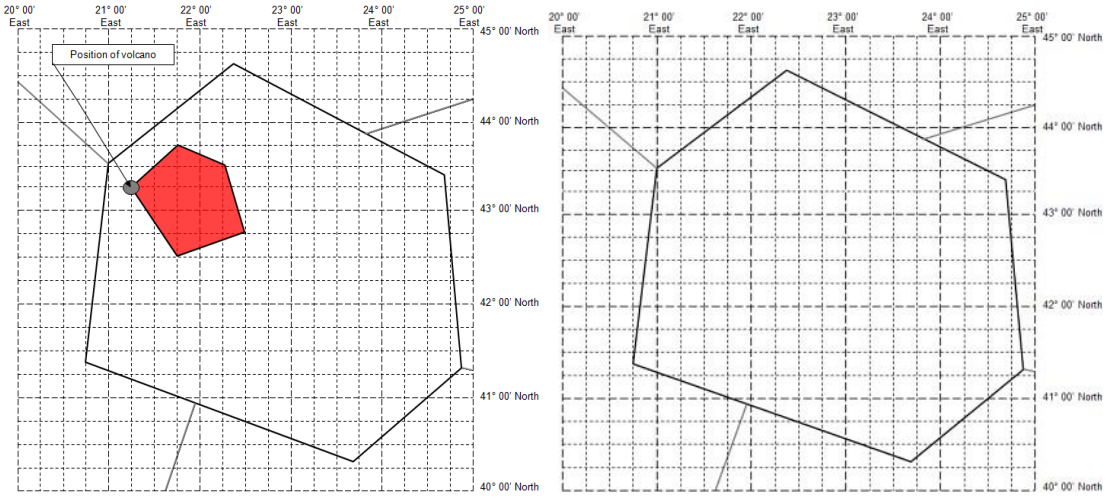
YUDD SIGMET 2 VALID 101200/101800 YUSO-
YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD OBS AT 1200Z WI N4315 E02115 - N4345 E02145 - N4330 E02215 - N4245 E02230 - N4230 E02145 - N4315 E02115 FL250/370 NC FCST AT 1800Z WI N4330 E02215 - N4315 E02345 - N4145 E02315 - N4230 E02200 - N4330 E02215=

For VA (eruption on-going):



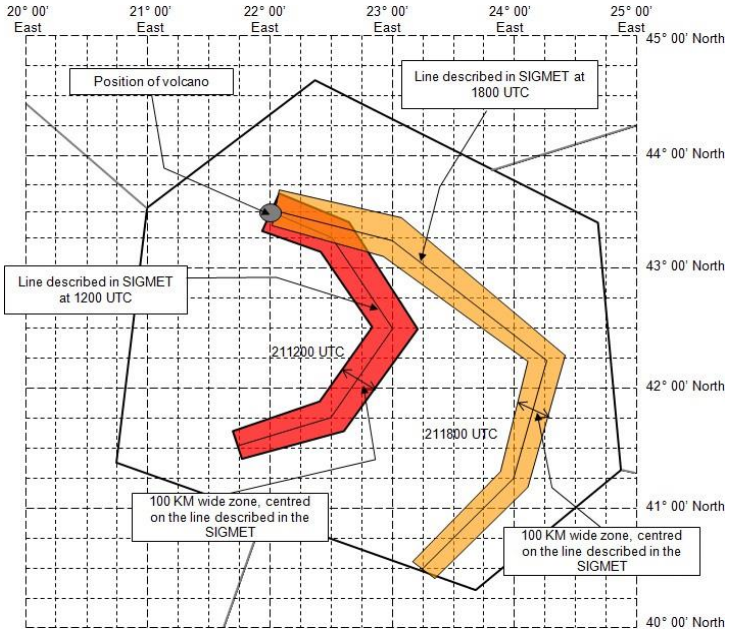
YUDD SIGMET 2 VALID 101200/101800 YUSO-
YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD OBS AT 1200Z WI N4315 E02115 - N4345 E02145 - N4330 E02215 - N4245 E02230 - N4230 E02145 - N4315 E02115 FL250/370 NC FCST AT 1800Z WI N4315 E02115 - N4330 E02215 - N4315 E02345 - N4145 E02315 - N4230 E02200 - N4315 E02115=

For VA (eruption ceasing, ash dispersing):



YUDD SIGMET 2 VALID 101200/101800 YUSO-
YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD OBS AT 1200Z WI N4315 E02115 - N4345 E02145 - N4330 E02215 - N4245 E02230 - N4230 E02145 - N4315 E02115 FL250/370 WKN FCST AT 1800Z NO VA EXP=

For VA (eruption on-going), defining the area affected as a corridor of specified width;



YUDD SIGMET 2 VALID 211200/211800 YUSO-
YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL PSN N4330 E02200 VA CLD FCST AT 1200Z APRX 100KM WID LINE BTN N4330 E02200 - N4315 E02230 - N4230 E02300 - N4145 E02230 - N4130 E02145 FL310/450 NC FCST AT 1800Z APRX 100KM WID LINE BTN N4330 E02200 - N4315 E02300 - N4215 E02415 - N4115 E02400 - N4030 E02315=

When the Volcanic Ash Advisory (VAA) contains the phrase "VA NOT IDENTIFIABLE FM SATELLITE DATA".

The phrase "VA NOT IDENTIFIABLE FM SATELLITE" can be used by VAACs under the following scenarios:

i. Volcanic ash cloud is not identifiable from satellite imagery due to too small an area and/or obscuration from meteorological clouds, and there is no reliable observation report providing the extent of ash cloud;
ii. Volcanic ash cloud is not identifiable from satellite imagery due to too small an area and/or obscuration from meteorological clouds. However, there are reliable observation reports providing the extent of ash cloud (such as via VONA etc) and VA emission is expected to persist with no indication of VA cloud dissipation; and
iii. Some VAACs used the phrase to denote cessation of VA advisories. MWOs must verify the ERUPTION DETAILS, FCST and RMK sections of the VA advisory to ensure a SIGMET is not erroneously issued or maintained for an ash cloud that has already dissipated.

Example for Scenario ii

VA ADVISORY
DTG: 20260605/0220Z
VAAC: DARWIN
VOLCANO: ASHVAL 000000
PSN: N4315 E02115
AREA: INDONESIA
SOURCE ELEV: 1325M AMSL
ADVISORY NR: 2026/632
INFO SOURCE: HIMAWARI-9, CVGHM
ERUPTION DETAILS: VA ERUPTION REP FM GND AT 05/0055Z

```
EST VA DTG: 05/0200Z
EST VA CLD: SFC/FL070 N4315 E02115 – N4345 E02145 - N4330 E02215 – N4245
E02230 – N4230 E02145 - N4315 E02115 MOV E 10KT
FCST VA CLD +6 HR: NOT AVBL
FCST VA CLD +12 HR: NOT AVBL
FCST VA CLD +18 HR: NOT AVBL
RMK: VA NOT IDENTIFIABLE ON CURRENT SATELLITE IMAGERY DUE TO
MET CLOUD. INTERMITTENT VA EMISSIONS ARE EXPECTED TO BE
ONGOING.
NXT ADVISORY: NO LATER THAN 20260605/0820Z=
```

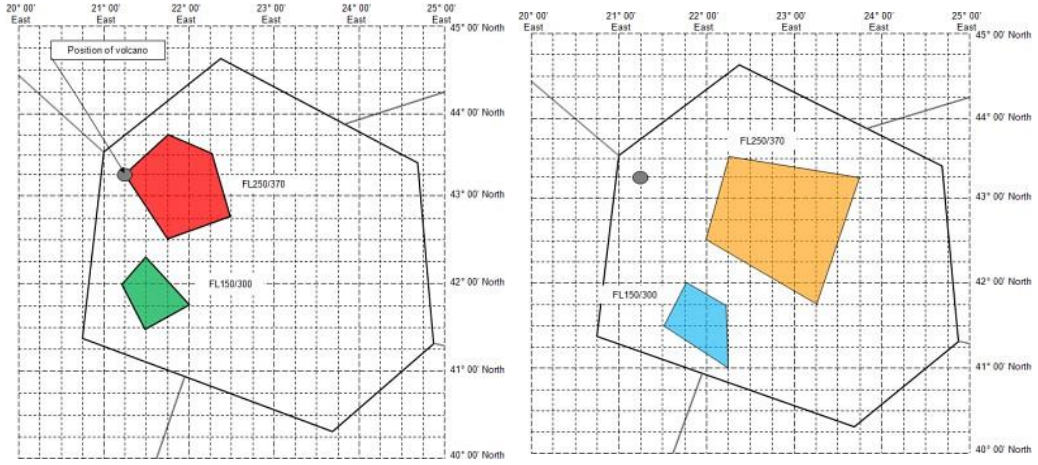
VA SIGMET (issued by MWO):

YUDD SIGMET 1 VALID 050230/050830 YUSO–
YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD FCST AT 0200Z WI N4315 E02115 – N4345 E02145 - N4330 E02215 – N4245 E02230 – N4230 E02145 - N4315 E02115 SFC/070 MOV E 10KT NC=

8) Additional examples using volcanic ash references applicable to multiple areas in SIGMET for volcanic ash.

The only way to include a second instance of a volcanic ash cloud in a SIGMET message is to use the 'AND' option after the 'Forecast position' section.

In the example below, two areas of volcanic ash cloud (at different levels) are forecast to move as described. The normal courier font refers to the northernmost areas of ash, and the italicised font refers to the southernmost areas of ash during the period. 'AND' is highlighted in **bold** to identify the separation of the two features.



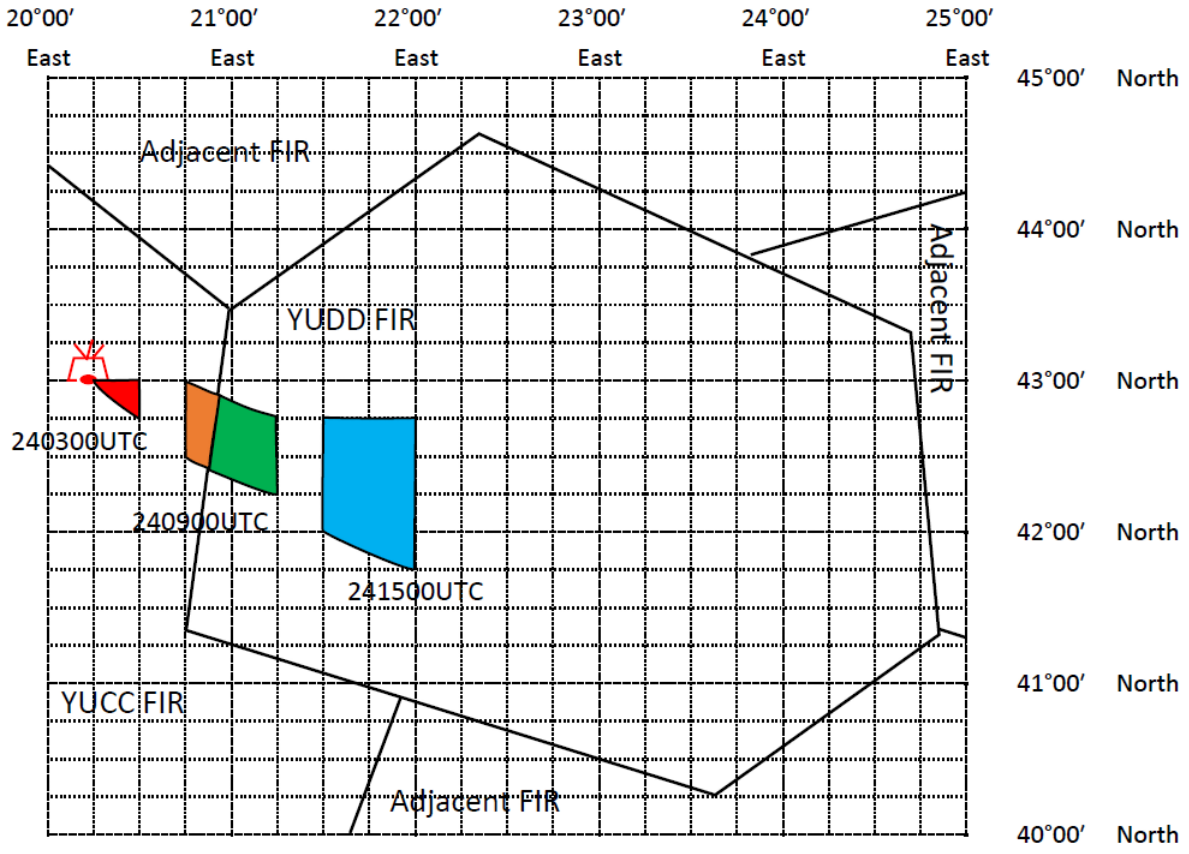
YUDD SIGMET 2 VALID 101200/101800 YUSO–
YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD OBS AT 1200Z WI N4315 E02115 – N4345 E02145 - N4330 E02215 – N4245 E02230 – N4230 E02145 - N4315 E02115 FL250/370 NC FCST AT 1800Z WI N4330 E02215 – N4315 E02345 – N4145 E02315 – N4230 E02200 - N4330 E02215 **AND** *OBS AT 1200Z WI N4200 E02115 – N4217 E02130 – N4145 E02200 – N4130 E02130 – N4200 E02115 FL150/300 NC FCST AT 1800Z WI N4200 E02145 – N4145 E02215 – N4100 E02215 - N4130 E02130 – N4200 E02145*=

The above only works if there are two instances of ash at the start and end of the period. If the number of ash areas is different at the start and end, it is recommended that separate SIGMETs be issued as necessary.

9) Additional examples relating to cases of volcanic ash predicted to enter an adjacent FIR.

Volcanic Ash SIGMET should be based on advisory information provided by VAACs and shall be issued as soon as practicable but not more than 12 hours before commencement of the period of validity. To ensure harmonization of SIGMET messages on en-route hazardous weather affecting or expected to affect more than one FIR (Ref 2.7.1), MWOs is recommended to communicate and coordinate with neighbouring FIRs for the validity periods of the VA SIGMETs issued. For the scenario in which a volcano straddles right on the border of two adjacent FIRs, the volcanic ash from an eruption may result in the ash cloud spreading across the two FIRs when eruption first took place. The MWOs for these adjacent FIRs may refer to the following examples for the issuance of VA SIGMETs or make special arrangements to coordinate VA SIGMET issuance upon seeking user advice. This is to ensure harmonised SIGMET information for volcanic ash.

Consider an advisory is issued for volcanic ash that is observed to be contained within the fictional FIR YUCC at start of validity and is predicted to move to an area that is contained within the adjacent fictional FIR YUDD by time T+12h as depicted below.



Both MWOs responsible for YUCC and YUDD FIRs will each issue a VA SIGMET based on the information contained within the advisory but only for the affected areas within the FIR they are responsible for.

The corresponding text products are as follows: VA advisory (issued by VAAC):

VA ADVISORY
DTG: 20210324/0300Z
VAAC: DARWIN

VOLCANO:	ASHVAL 123456
PSN:	N4300 E02015
AREA:	INDONESIA
SOURCE ELEV:	2329M
ADVISORY NR:	2021/1
INFO SOURCE:	HIMAWARI-8, VONA
ERUPTION DETAILS:	VA OBS TO FL400 MOV ESE AT 24/0300Z
OBS VA DTG:	24/0300Z
OBS VA CLD:	SFC/FL400 N4300 E02015 – N4300 E02030 – N4245 E02030 MOV ESE 10KT
FCST VA CLD +6HR:	SFC/FL400 N4300 E02045 – N4245 E02115 – N4215 E02115 – N4230 E02045
FCST VA CLD +12HR:	SFC/FL250 N4245 E02130 – N4245 E02200 - N4145 E02200 – N4200 E02130
FCST VA CLD +18HR:	NO VA EXP
RMK:	VA OBS MOV ESE ON LATEST VIS SAT IMAGERY; HEIGHT AND FCST BASED ON HIMAWARI-8, VONA AND MODEL GUIDANCE. VA EXPECTED TO DISSIPATE BY 24/2100Z.
NXT ADVISORY:	NO LATER THAN 20210324/0900Z

SIGMETs (issued by MWOs):

```
YUCC SIGMET 1 VALID 240310/240900 YUDO-
YUCC AMSWELL FIR VA ERUPTION MT ASHVAL PSN N4300 E02015 VA CLD OBS AT 0300Z WI
N4300 E02015 - N4300 E2030 - N4245 E02030 - N4300 E02015 SFC/FL400 NC FCST AT
0900Z WI N4300 E02045 - N4255 E02055 - N4225 E02050 - N4230 E02045 - N4300 E02045=
```

Note: The MWO responsible for the YUCC FIR issues a SIGMET as soon as practicable based on the advisory received. Assuming the advisory is received at around 0300UTC, the SIGMET might be issued at around 0310UTC.

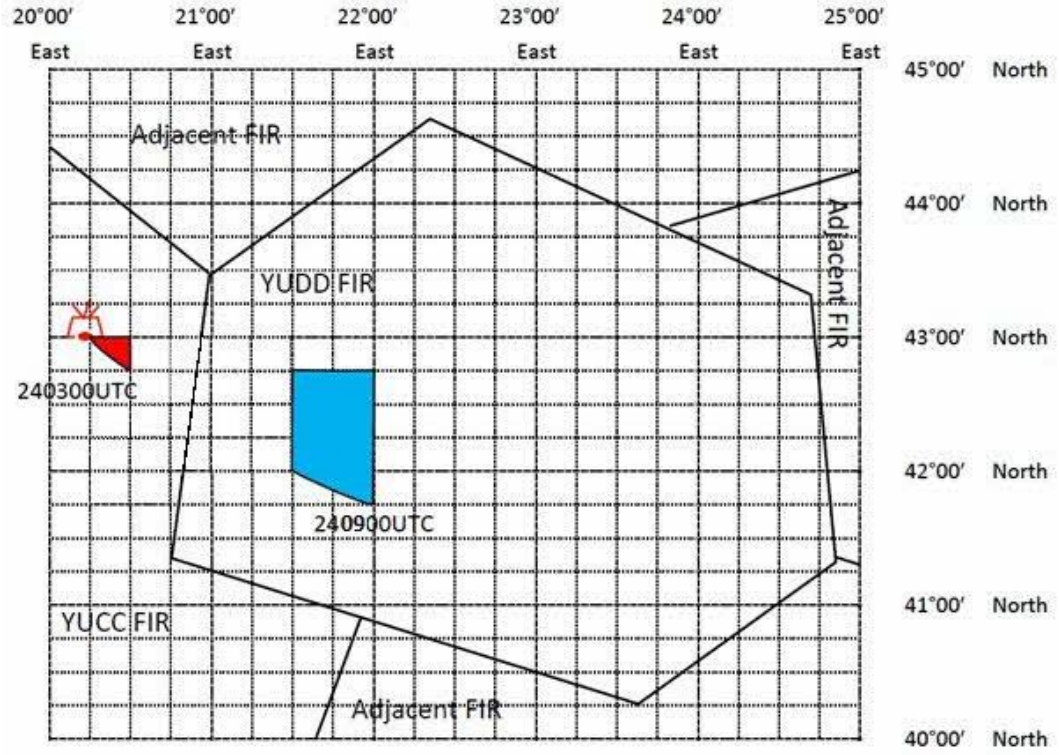
```
YUDD SIGMET 1 VALID 240310/240910 YUSO-
YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4300 E02015 VA CLD FCST AT 0900Z WI
N4255 E02055 - N4245 E02115 - N4215 E02115 - N4225 E02050 - N4255 E02055 SFC/FL400
NC=
```

Note: The MWO responsible for the YUDD FIR should also issue a SIGMET as soon as practicable following receipt of the advisory, e.g. 0310UTC. In this case, the MWO responsible for YUDD FIR will issue a SIGMET that includes the area of FCST VA cloud and not the area of OBS VA cloud as the OBS VA cloud is entirely within the YUCC FIR. The ne/t SIGMET (SIGMET 2) is issued as soon as practicable upon receipt of the ne/t advisory.

Note: If the MWO responsible for the YUDD FIR is capable of estimating the time forecast VA cloud first enter the YUDD FIR, the estimated time can be set as the SIGMET validity start time. It is desirable to estimate it not only by the interpolation of the OBS and FCST VA CLD provided in the advisory, but also supplementing it by other reliable sources. Communication with neighbouring MWOs would also be beneficial. In this case, the validity period is 0600/1200 as the forecast VA cloud is estimated to first enter the YUDD FIR at 0600UTC as follows.

```
YUDD SIGMET 1 VALID 240600/241200 YUSO-
YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4300 E02015 VA CLD FCST AT 0900Z WI
N4255 E02055 - N4245 E02115 - N4215 E02115 - N4225 E02050 - N4255 E02055 SFC/FL400
NC=
```

Consider an advisory is issued for volcanic ash that is entirely within the YUCC FIR at the OBS time (e.g. 03Z) and is predicted to move to an area that is entirely within the YUDD FIR by time T+6h (09Z), as depicted below.



The corresponding text products are as follows:

VA advisory (issued by VAAC):

VA ADVISORY	
DTG:	20210324/0300Z
VAAC:	DARWIN
VOLCANO:	ASHVAL 123456
PSN:	N4300 E02015
AREA:	INDONESIA
SOURCE ELEV:	2329M
ADVISORY NR:	2021/1
INFO SOURCE:	HIMAWARI-8, VONA
ERUPTION DETAILS:	VA OBS TO FL400 MOV ESE AT 24/0300Z
OBS VA DTG:	24/0300Z
OBS VA CLD:	SFC/FL400 N4300 E02015 – N4300 E02030 – N4245 E02030 MOV ESE 20KT
FCST VA CLD +6HR:	SFC/FL250 N4245 E02130 – N4245 E02200 - N4145 E02200 – N4200 E02130
FCST VA CLD +12HR:	NO VA EXP

FCST VA CLD +18HR:	NO VA EXP
RMK:	VA OBS MOV ESE ON LATEST VIS SAT IMAGERY; HEIGHT AND FCST BASED ON HIMAWARI-8, VONA AND MODEL GUIDANCE. VA EXPECTED TO DISSIPATE BY 24/1500Z.
NXT ADVISORY:	NO LATER THAN 20210324/0900Z

SIGMETs (issued by MWOs):

YUCC SIGMET 1 VALID 240310/240910 YUDO-
YUCC AMSWELL FIR VA ERUPTION MT ASHVAL PSN N4300 E02015 VA CLD OBS AT 0300Z WI N4300 E02015 – N4300 E2030 – N4245 E02030 – N4300 E02015 SFC/FL400 MOV ESE 20KT NC=

Note: The elements "forecast time" and "forecast position" are not to be used in conjunction with the element "movement or expected movement". In this example, it is only the OBS polygon that is included, so the movement element is permitted. The forecast T+6h VA polygon is not included as this area is forecast to be entirely within the YUDD FIR at that timestep.

YUDD SIGMET 1 VALID 24310/240910 YUSO-
YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4300 E02015 VA CLD FCST AT 0900Z WI N4245 E02130 – N4245 E02200 – N4145 E02200 – N4200 E02130 – N4245 E02130 SFC/FL250=

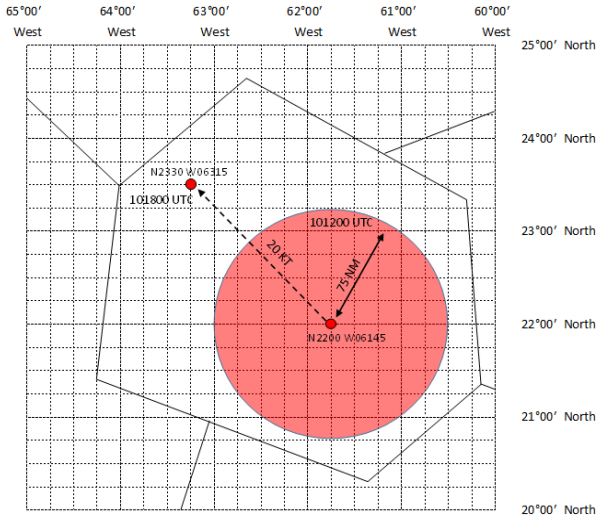
Note: The MWO responsible for the YUDD FIR should also issue a SIGMET as soon as practicable following receipt of the advisory, e.g., 0310UTC. In this case, the MWO responsible for YUDD FIR will issue a SIGMET that includes the area of FCST VA cloud and not the area of OBS VA cloud as the OBS VA cloud is entirely within the YUCC FIR. The ne/t SIGMET (SIGMET 2) is issued as soon as practicable upon receipt of the ne/t advisory.

Note: If the MWO responsible for the YUDD FIR is capable of estimating the time forecast VA cloud first enter the YUDD FIR, the estimated time can be set as the SIGMET validity start time. It is desirable to estimate it not only by the interpolation of the OBS and FCST VA CLD provided in the advisory, but also supplementing it by other reliable sources. Communication with neighbouring MWOs would also be beneficial. In this case, the validity period is 0430/1030 as the forecast VA cloud is estimated to first enter the YUDD FIR at 0430UTC as follows.

YUDD SIGMET 1 VALID 240430/241030 YUSO-
YUDD SHANLON FIR VA ERUPTION MT ASHVAL PSN N4300 E02015 VA CLD FCST AT 0900Z WI N4245 E02130 – N4245 E02200 – N4145 E02200 – N4200 E02130 – N4245 E02130 SFC/FL250 NC=

10) Additional example illustrating use of "WI nnnKM (or nnnNM) OF TC CENTRE " in Tropical Cyclone SIGMET only

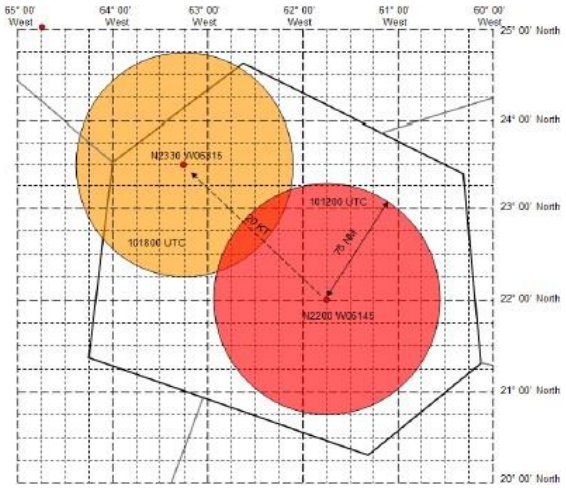
When the SIGMET does not include a 'forecast position' section.



YUDD SIGMET 2 VALID 101200/101800 YUSO-
YUDD SHANLON FIR TC GLORIA PSN N2200 W06145 CB OBS AT 1200Z WI 075NM OF TC CENTRE TOP BLW FL500 MOV NW 20KT WKN=

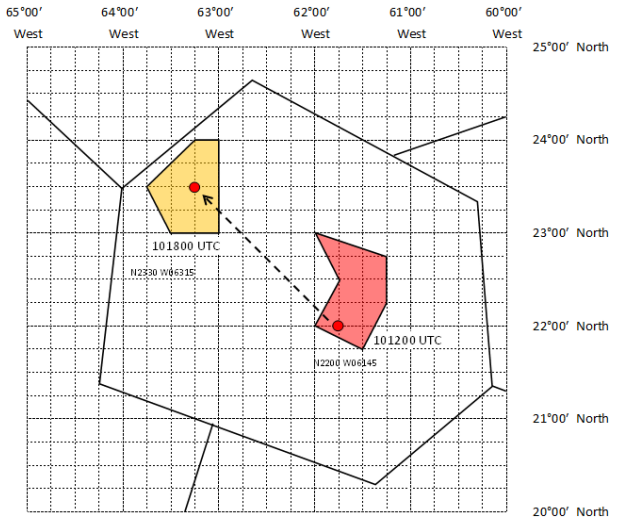
YUDD SIGMET 2 VALID 101200/101800 YUSO-
YUDD SHANLON FIR TC GLORIA PSN N2200 W06145 CB OBS AT 1200Z WI 075NM OF TC CENTRE TOP BLW FL500 WKN FCST AT 1800Z TC CENTRE PSN N2330 W06315=

When the SIGMET does include 'TC forecast position' and 'Forecast position' sections.



YUDD SIGMET 2 VALID 101200/101800 YUSO-
YUDD SHANLON FIR TC GLORIA PSN N2200 W06145 CB OBS AT 1200Z WI 075NM OF TC CENTRE TOP BLW FL500 WKN FCST AT 1800Z TC CENTRE PSN N2330 W06315 CB WI 075NM OF TC CENTRE=

It is acceptable to use the other 'Location' options to describe the area affected by the CB of a Tropical Cyclone:



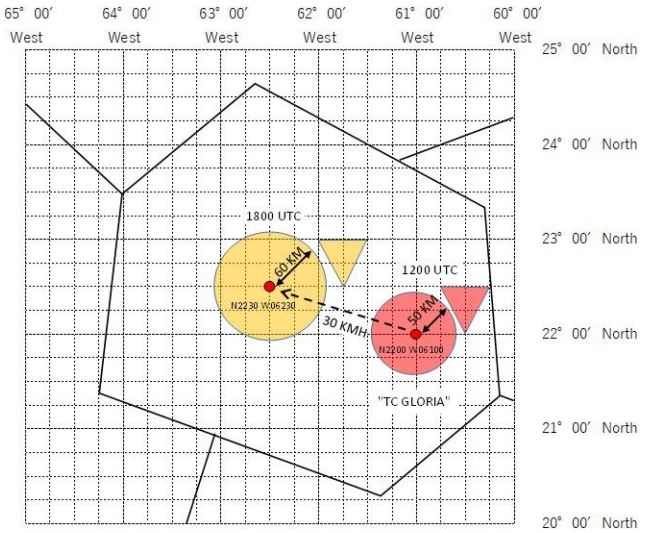
YUDD SIGMET 2 VALID 101200/101800 YUSO–

YUDD SHANLON FIR TC GLORIA PSN N2200 W06145 CB OBS AT 1200Z WI N2200 W06200 – N2230 W06145 – N2300 W06200 - N2245 W06115 – N2215 W06115 – N2145 W06130 – N2200 W06200 TOP BLW FL500 WKN FCST AT 1800Z TC CENTRE PSN N2330 W06315 CB WI N2300 W06300 – N2400 W06300 – N2400 W06315 - N2330 W06345 – N2300 W06330 – N2300 W06300=

11) Additional example with multiple CB areas in SIGMET for tropical cyclone.

The only way to include a second instance of a tropical cyclone in a SIGMET is to use the 'AND' option after the 'Forecast position' section.

In the example below, two areas of CB cloud associated with a TC can be described. The normal courier font refers to the CB within a specified radius of a TC, and the italicised font refers to the northeast CB areas of a TC. 'AND' is highlighted in **bold** to identify the separation of the two features.



Note 1: If the number of cumulonimbus areas is different at the start and end, separate SIGMETs can be issued as necessary. For example, one SIGMET for the tropical cyclone and a separate SIGMET for the frequent or embedded cumulonimbus cloud.

When the WC SIGMET does include a 'TC forecast position' section and 'forecast position' sections of both of two CB areas.

YUDD SIGMET 3 VALID 251230/251830 YUSO-
YUDD SHANLON FIR TC GLORIA PSN N22 W061 CB OBS AT 1200Z WI 050KM OF TC CENTRE TOP FL500 INTSF FCST AT 1800Z TC CENTRE PSN N2230 W06230 CB WI 060KM OF TC CENTRE **AND** *OBS AT 1220Z WI N2230 W06045 - N2230 W06015 - N2200 W06030 - N2230 W06045 TOP ABV FL500 FCST AT 1800Z WI N2300 W06200 - N2300 W06130 - N2230 W06145 - N2300 W06200=*

For the above case, referring to Note 1 of this section, an alternative is to use WS SIGMET to describe the CB. An example of pairing use of WS with WC SIGMET below:

YUDD SIGMET 3 VALID 251230/251830 YUSO-
YUDD SHANLON FIR TC GLORIA PSN N22 W061 CB OBS AT 1200Z WI 050KM OF TC CENTRE TOP FL500 INTSF FCST AT 1800Z TC CENTRE PSN N2230 W06300 CB WI 060KM OF TC CENTRE=

YUDD SIGMET 4 VALID 251230/25**1600** YUSO-
YUDD SHANLON FIR EMBD TS *OBS AT 1220Z WI N2230 W06045 - N2230 W06015 - N2200 W06030 - N2230 W06045 TOP ABV FL500* ***FCST AT 1600Z*** *WI N2245 W06130 - N2245 W06120 - N2230 W06125 - N2245 W06130=*

When the WC SIGMET does not include a 'TC forecast position' section and 'forecast position' sections of both of two CB areas.

Although a second instance of a CB cloud is to use the 'AND' option after the 'Forecast position' section, 'Forecast position' is omitted.

YUDD SIGMET 3 VALID 251230/251830 YUSO-
YUDD SHANLON FIR TC GLORIA PSN N22 W061 CB OBS AT 1200Z WI 050KM OF TC CENTRE TOP FL500 MOV WNW 30KMH INTSF **AND** *OBS AT 1220Z WI N2230 W06045 - N2230 W06015 - N2200 W06030 - N2230 W06045 TOP ABV FL500=*

When the WC SIGMET does not include a 'TC forecast position' section and 'forecast position' section of the first instance of CB area but include a 'forecast position' section of the second instance of CB area.

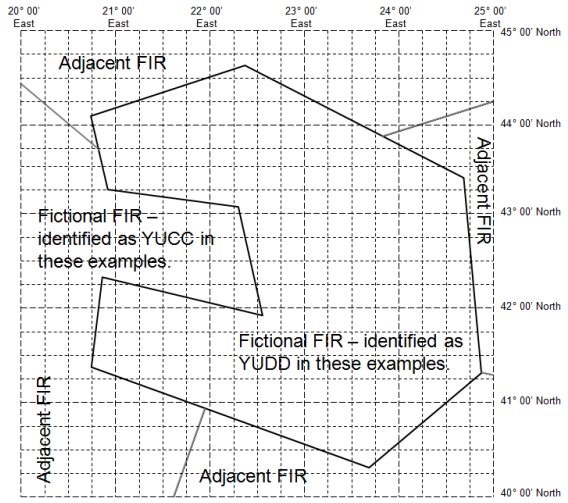
YUDD SHANLON SIGMET 3 VALID 251230/251830 YUSO-
YUDD SHANLON FIR TC GLORIA PSN N22 W061 CB OBS AT 1200Z WI 050KM OF TC CENTRE TOP FL500 MOV WNW 30KMH INTSF **AND** *OBS AT 1220Z WI N2230 W06045 - N2230 W06015 - N2200 W06030 - N2230 W06045 TOP ABV FL500 FCST AT 1800Z WI N2300 W06200 - N2300 W06130 - N2230 W06145 - N2300 W06200=*

Note 2: In the case that 'forecast position' is available, including 'forecast position' is recommended instead of 'movement'.

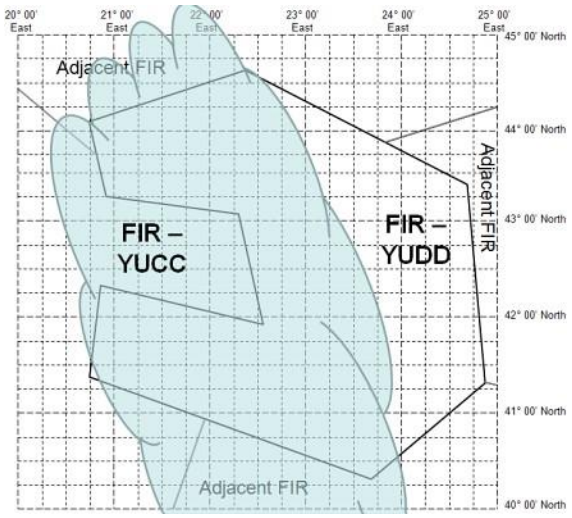
12) Additional examples of SIGMETs relating to 'concave' or 'horseshoe' shaped FIR's

There are examples of FIRs that partially surround adjacent FIRs and are what might be described as concave or 'horseshoe' shaped. An example is given below.

Considering a concave, horseshoe' shaped FIR partially surrounding another FIR with 'legs' of similar different size



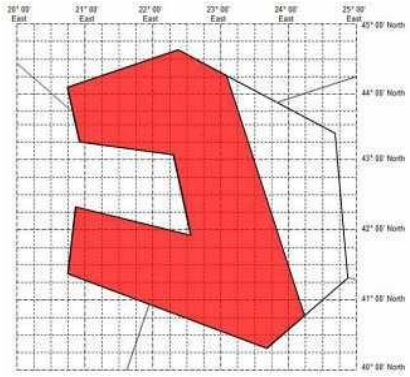
The question arises as to how to encode a SIGMET under circumstances where the hazard affects the outer FIR (YUDD in this case) and the FIR that is partially enclosed (YUCC in this case).



With due regard to removing any possible ambiguity, and also with regard to consistency with protocols for IWXXM versions of SIGMET, the following best practice is provided.

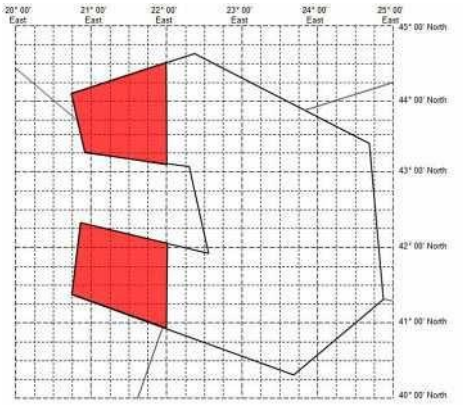
In the examples below, the area indicated in red is taken as representing the meteorological hazard.

Example 1) In this example, it is considered that the situation below could be encoded as a single, simple SIGMET. Users would be expected to interpret the SIGMET as indicating the area identified in red was affected by the hazard within the YUDD FIR.



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST SW OF LINE N4415 E02305 - N4045 E02415 FL250/370 MOV SW 15KT WKN=

Example 2) In this example, in order to prevent any possible ambiguity and to prevent complications and inconsistencies with equivalent IWXXM versions of SIGMET then two separate SIGMETs should be issued.



In this case, the following is recommended:

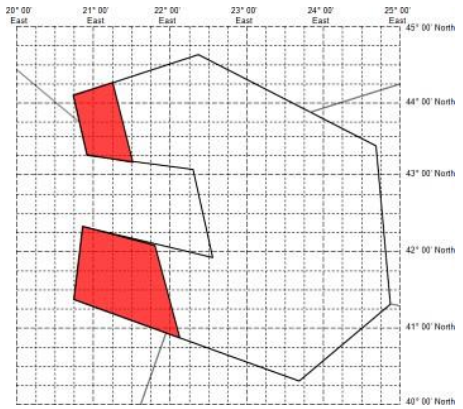
One SIGMET (northern extension of the 'horseshoe' shape)

```
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST W OF LINE N4430 E02200 - N4307 E02200
FL250/370 MOV W 15KT WKN=
```

AND a second SIGMET (southern extension of the 'horseshoe' shape)

```
YUDD SIGMET 3 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST W OF LINE N4203 E02200 - N4058 E02200
FL250/370 MOV W 15KT WKN=
```

Where the line delineating the hazard is not a line of latitude or longitude, a similar process should be followed



One SIGMET (northern extension of the 'horseshoe' shape)

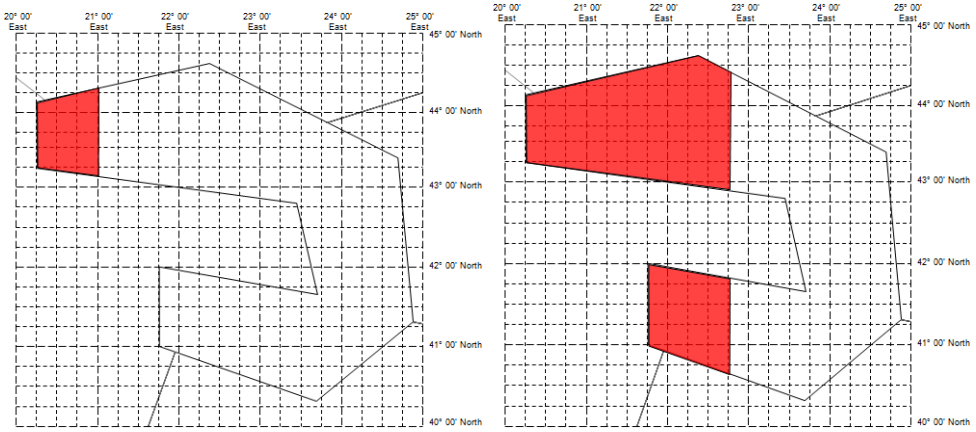
```
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST SW OF LINE N4415 E02115 - N4312 E02130
FL250/370 MOV W 15KT WKN=
```

AND a second SIGMET (southern extension of the 'horseshoe' shape)

```
YUDD SIGMET 3 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST SW OF LINE N4205 E02147 - N4052 E02206
FL250/370 MOV W 15KT WKN=
```

b) Considering a concave, 'horseshoe' shaped FIR partially surrounding another FIR with 'legs' of very different size.

If the southern 'leg' is expected to be affected during the forecasted validity period, as the example below then 2 SIGMETs should be issued.



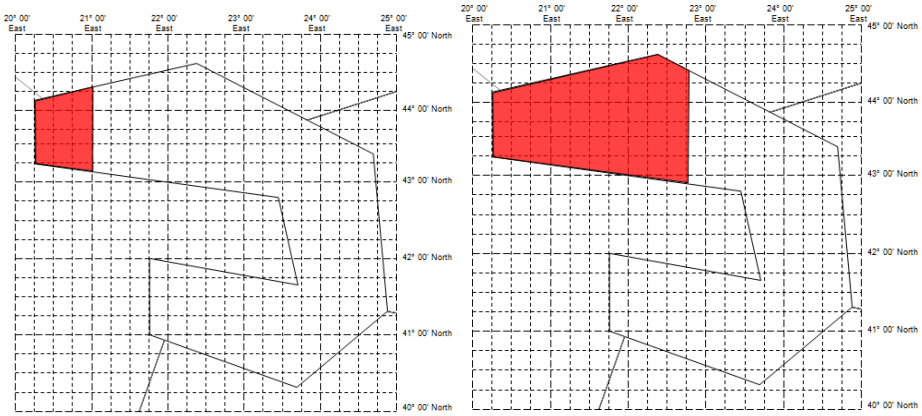

```
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST AT 1200Z W OF LINE N4416 E02100 -
N4307 E02100 FL250/370 WKN FCST AT 1600Z W OF LINE N4427 E02245 - N4252
E02245=
```

AND a second SIGMET

```
YUDD SIGMET 3 VALID 101330/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST AT 1330Z W OF LINE N4200 E02145 -
N4100 E02145 FL250/370 WKN FCST AT 1600Z W OF LINE N4147 E02245 - N4038
E02245=
```

Note, the validity time (highlighted) of the second SIGMET commences sometime after that of the first since the southern extension of the horseshoe shape is not as far west.

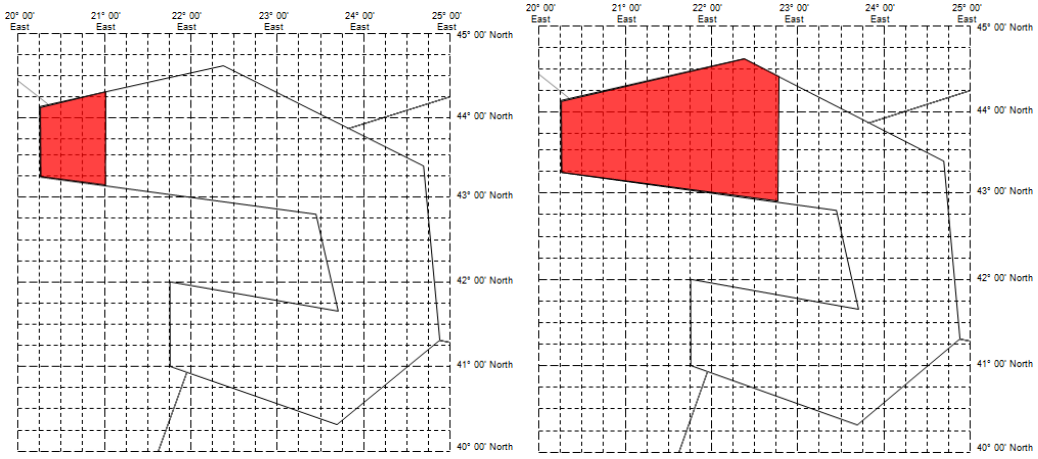
If the southern leg of the FIR is not expected to be affected, as in the example below,



Then a single SIGMET could be issued.

```
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST AT 1200Z W OF LINE N4415 E02100 - N4307
E02100 FL250/370 MOV E 25KT WKN=
```

However, to remove any possible doubt it is better to include an explicit forecast position,




```
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR SEV TURB FCST AT 1200Z W OF LINE N4415 E02100 - N4307
E02100 FL250/370 WKN FCST AT 1600Z W OF LINE N4427 E02245 - N4252 E02245=
```

It should also be noted that in all of these examples relating to concave, horseshoe shaped FIRs, polygons could also be used to explicitly define the areas affected. The above examples are intended to show that the principle under such circumstances is that two SIGMETs should be issued. This, as noted, will prevent ambiguity and will permit straightforward translation of alphanumeric SIGMET into IWXXM versions of SIGMET.

13) Examples of Test and Exercise SIGMET indicators.

The principles of using the Test or Exercise indicators are straightforward.

The fundamental and overriding principle is that SIGMET bulletins with the Test or Exercise indicators MUST NOT be used for operational decision making.

When using Test indicator, depending on the circumstances, the SIGMET may be truncated immediately after the word TEST, and this approach may be useful when simply testing routing of messages.

Alternatively, and again depending on the circumstances, realistic (although not necessarily valid) data may be included.

When using the Exercise indicator, it is expected that the SIGMET will contain realistic although not necessarily valid data. This will permit exercises at national or regional level to be undertaken.

In all instances, by including the TEST or EXER at a specified point in the SIGMET message, users and systems can immediately identify if the message should be used for operational decision making.

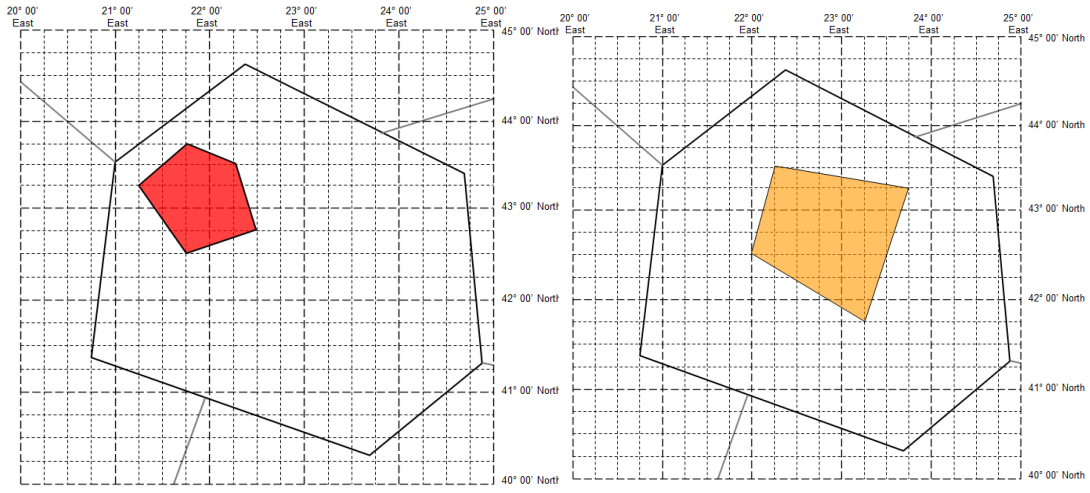
THIS DOES NOT REMOVE THE REQUIREMENT FOR ALL STAKEHOLDERS TO APPLY APPROPRIATE RIGOUR AND QUALITITY CONTROL WITH REGARD TO CORRECT IDENTIFICATION AT ORIGINATION AND CORRECT USE ON RECEIPT/PROCESSING

Test SIGMET message, with minimum content:

The example below may be used for ad hoc testing of routing, or for regional SIGMET routing tests.

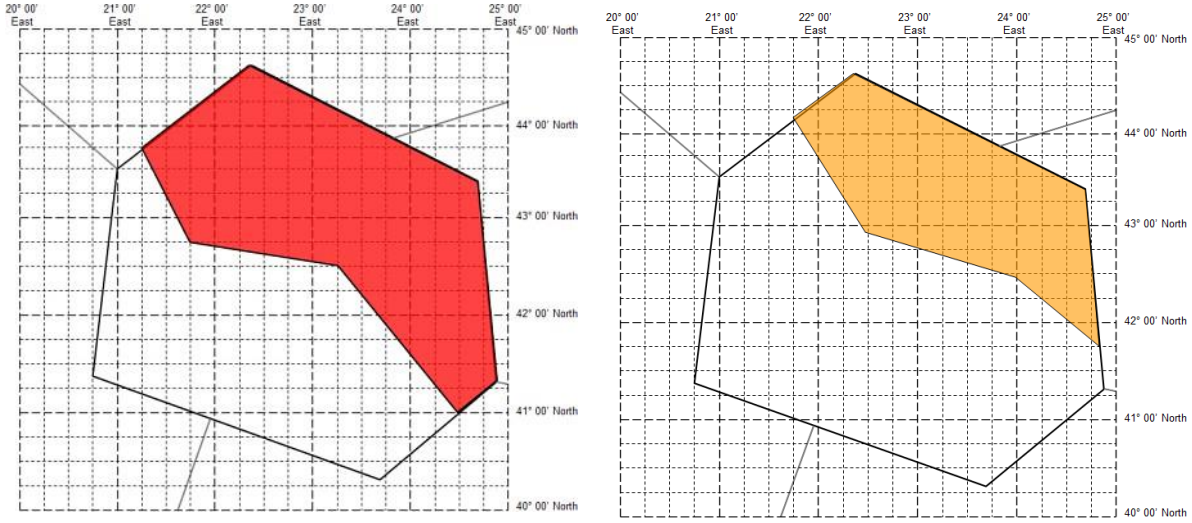
```
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR TEST=
```

Test SIGMET message, with realistic (though not necessarily valid) content:



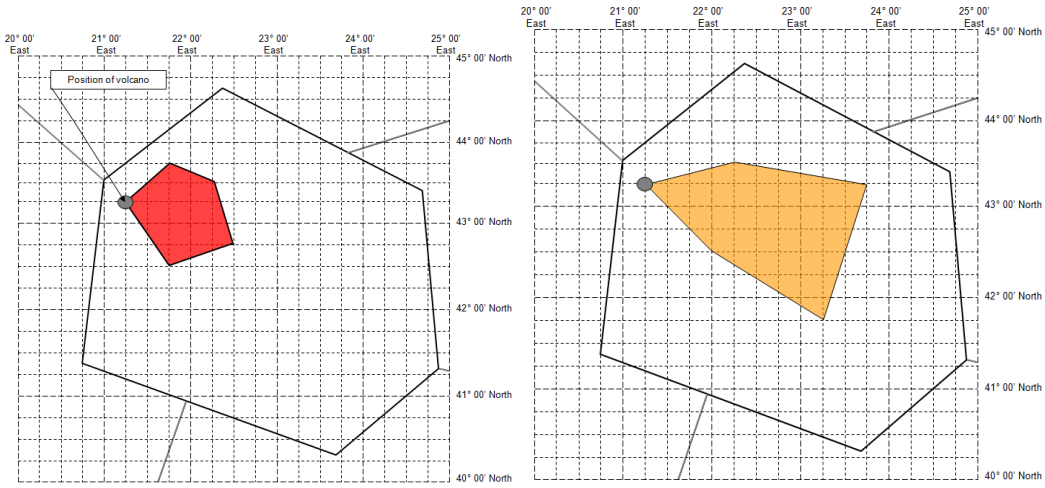

```
YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR/UIR TEST SEV TURB FCST WI N4230 E02145 – N4315 E02115 – N4345
E02145 – N4330 E02215 – N4245 E02230 - N4230 E02145 FL250/370 INTSF FCST AT
1600Z WI N4145 E02315 – N4230 E02200 – N4330 E02215 – N4315 E02345 - N4145
E02315=
```

Exercise SIGMET message, with realistic (though not necessarily valid) content:



YUDD SIGMET 2 VALID 101200/101600 YUSO-
YUDD SHANLON FIR EXER SEV TURB FCST NE OF LINE N4345 E02115 - N4245 E02145 - N4230 E02315 - N4100 E02430 FL250/370 WKN FCST AT 1600Z NE OF LINE N4411 E02145 - N4255 E02228 - N4228 E02400 - N4130 E02450=

The most common, organised Exercise – especially at regional level – is likely to be related to volcanic ash. On such occasions, 'historical' data is used in order to practice procedures over specific areas.



YUDD SIGMET 2 VALID 101200/101800 YUSO -
YUDD SHANLON FIR EXER VA ERUPTION MT ASHVAL PSN N4315 E02115 VA CLD OBS AT 1200Z WI N4315 E02115 - N4345 E02145 - N4330 E02215 - N4245 E02230 - N4230 E02145 - N4315 E02115 FL250/370 NC FCST AT 1800Z WI N4315 E02115 - N4330 E02215 - N4315 E02345 - N4145 E02315 - N4230 E02200 - N4315 E02115=

———————

APPENDIX C

SIGMET TEST PROCEDURES

Note 1: While care is taken to ensure these instructions are correct, the instructions are for illustration only and may not be up to date. When participating in the annual SIGMET test, please follow the instructions supplied by ICAO specifically for that year's test.

Note 2: The inclusion of test volcano observatory notice to aviation (VONA) messages is expected from 2026.

1. INTRODUCTION

1.1. The Meteorology Divisional Meeting (2002) formulated Recommendation 1/12 b), Implementation of SIGMET requirements, which called, inter alia, for the relevant planning and implementation regional groups (PIRGs) to conduct periodic tests of the issuance and reception of SIGMET messages, especially those for volcanic ash.

1.2. This document describes the procedures for conducting regional SIGMET tests. Following the provisions of *Procedures for Air Navigation Services — Meteorology (*PANS-MET, Doc 10157), the test messages (for SIGMET, volcanic ash and tropical cyclone advisories (VAA and TCA respectively), and volcano observatory notice to aviation (VONA) information) should be disseminated in the ICAO meteorological information exchange model (IWXXM) form in addition to the dissemination of the test messages in abbreviated plain language and alphanumeric form following the templates provided in PANS-MET.

1.3. The Manual on the ICAO Meteorological Information Exchange Model (IWXXM) (Doc 10003) and the ICAO Guidelines for the Implementation of OPMET Data Exchange using IWXXM provide guidance on implementing IWXXM.

1.4. The test procedures encompass all the three types of SIGMET messages, TCA, VAA and VONA, as follows:

Message type	Message header data type designator	
	Alphanumeric	IWXXM
Tropical cyclone SIGMET	WC	LY
Volcanic ash SIGMET	WV	LV
Weather and other phenomena SIGMET (apart from tropical cyclone and volcanic ash)	WS	LS
Tropical cyclone advisory	FK	LK
Volcanic ash advisory	FV	LV
VONA	WM	LM

1.5. The requirements for disseminating SIGMET, TCA, VAA and VONA messages are specified in PANS-MET and in the ICAO Asia/Pacific Regional SIGMET Guide, para. 3.6 (currently excludes VONA).

1.6. SIGMET messages for tropical cyclones, volcanic ash, and weather and other phenomena (apart from tropical cyclone and volcanic ash) will be referred to hereafter as WC/LY SIGMET, WV/LV SIGMET and WS/LS SIGMET, respectively, due to the data type designator T_1T_2 of the WMO AHL being set to WC or LY, WV or LV, and WS or LS, respectively, according to the SIGMET type

2. PURPOSE AND SCOPE OF REGIONAL SIGMET TESTS

2.1. The purpose of the regional SIGMET tests is to check the awareness of participating MWOs of the ICAO requirements for the issuance of SIGMET messages and the compliance of the States' procedures for the preparation and dissemination of SIGMET messages with the relevant ICAO Standards and Recommended Practices (SARPs) and regional procedures. A secondary outcome of the SIGMET tests is to further verify the compliance of participating volcanic ash and tropical cyclone advisory centres (TCACs and VAACs), along with SVOs, for the issuance of VAA, TCA and VONA, respectively.

2.2. An MWO (or TCAC, VAAC or SVO) can issue test messages for local reasons (e.g., testing of local systems or routing, etc.). Furthermore, it is recommended that agencies consider issuing test messages following upgrades to operational forecast or product tools, or dissemination systems. However, whilst such tests may not involve other MWOs or agencies directly, it is recommended that the general principles of the ICAO Asia/Pacific Regional SIGMET Guide be followed concerning local and ad hoc testing.

2.3. For this document's purposes, references to "SIGMET tests" or "tests" should be understood to refer to regional SIGMET tests, encompassing all test SIGMETs, advisories and VONA.

2.4. The scope of the tests is to check also the interaction between TCACs, VAACs and the MWOs located within the TCACs and VAACs' respective areas of responsibility, along with the interaction of SVOs with their associated VAAC(s). Therefore, where the issuance of WC/LY and WV/LV SIGMET messages is being tested, the SIGMET test messages initiated by the MWOs should normally be triggered by an advisory test message issued by the responsible TCAC or VAAC. Further, a VAAC will record the test VONA received from its associated SVO(s)

2.5. When an MWO is responsible for SIGMET services for an FIR that falls within the area of responsibility of more than one VAAC or TCAC, it should issue a corresponding SIGMET test message based on the receipt (or non-receipt) of each advisory test message from each of its associated VAACs or TCACs. For example, the FIR Kolkata lies within the areas of responsibility of VAACs Tokyo, Darwin and Toulouse. Therefore, the responsible MWO should issue a corresponding WV/LV SIGMET test message based on the receipt (or non-receipt) of each advisory test message from the VAACs Tokyo, Darwin and Toulouse.

2.6. When an SVO is responsible for monitoring volcanoes located within the areas of responsibility of multiple VAACs, it should issue a test VONA message and send it to each relevant VAAC. For example, one of the United States SVOs, the Hawai'i Volcano Observatory, has responsibility for monitoring volcanoes in American Samoa (VAAC Wellington area of responsibility) and also Hawai'i (VAAC Washington area of responsibility).

2.7. The regional OPMET data banks (RODBs) will monitor the message dissemination by filing all advisory, SIGMET, and VONA test messages and the corresponding reception times. The participating RODBs will provide the monitoring results from the WC/LY, WV/LV and WS/LS SIGMET tests, including FV/LU and FK/LK test advisories and WM/LM test VONA, in the form of summaries to the two SIGMET test focal points (ref: para. 6.2.2.), with a copy to the ICAO APAC Office.

2.8. The SIGMET test focal points will prepare a consolidated summary report and submit it to the ICAO APAC Office. The report will include recommendations for improving the SIGMET, advisory and VONA message exchange and availability. The test results should be reported to the Meteorological Information Exchange Working Group (MET/IE WG).

2.9. The ICAO APAC Office will advise participating States of any discrepancies with respect to SIGMET issuance procedures or other findings identified by the tests and request the States concerned to take necessary corrective action.

3. PROCEDURES FOR *WC/WV* SIGMET TEST

3.1. Participating units

3.1.1. Participating units include the following:

- Meteorological Watch Offices (MWOs)* as listed in para. 9.3. Table 1, with a required SIGMET test task indicated as 'WC/LY' or 'WV/LV';
- Regional OPMET Data Banks (RODBs) as listed in para. 9.3. Table 2;
- Tropical Cyclone Advisory Centres (TCACs) as listed in para. 9.3. Table 3;
- Volcanic Ash Advisory Centres (VAACs) as listed in para. 9.3. Table 4; and
- World Area Forecast Centres (WAFCs) as listed in para. 9.3. Table 5.
- Volcanic Ash Advisory Centres (VAACs) as listed in para. 9.3. Table 4;
- World Area Forecast Centres (WAFCs) as listed in para. 9.3. Table 5; and
- State volcano observatories (SVOs) as listed in para. 9.3. Table 6.

**Note. - The participation of MWOs in States outside the APAC region should be coordinated through the responsible ICAO Regional Office.*

3.2. Issuance of the advisory test message

3.2.1. On the specified date for the test, each participating TCAC and VAAC should issue an advisory test message (to trigger the associated MWOs to issue the WC/LY or WV/LV SIGMET test messages) at 0200 UTC, apart from TCAC New Delhi and TCAC La Réunion (see below) *.

**Notes. –*

i. To accommodate the ICAO Middle East (MID) Region in the WC/LY SIGMET test, TCAC New Delhi should issue the advisory test message at 0200 UTC (to MWOs in the APAC Region only) followed by another advisory test message at 0800 UTC (to MWOs in the MID Region, only), as indicated in para 9.3. Tables 3 and 6; and

ii. To accommodate TCAC La Réunion in the WC/LY SIGMET test, TCAC La Réunion should issue one advisory test message at 0500 UTC (to MWOs in the APAC Region only), as indicated in para. 9.3. Tables 3 and 6.

3.3. Dissemination of advisory test message

3.3.1. TCACs and VAACs should send (TC and VA) advisory test messages to the recipient units** specified in the Regional Air Navigation Plan. Region-specific documentation should identify the relevant AFTN addresses. (Note: TC and VA advisory test messages in the IWXXM form should be sent to RODBs only).

***Note.* - The RODBs, MWOs and WAFCs to which the participating TCACs and VAACs should send the advisory test messages are indicated in para. 9.3. Tables 2, 3, 4 and 5.

3.4. Content of advisory test message

3.4.1. The content of the tropical cyclone (TC) and volcanic ash (VA) advisory test message should follow the templates given in PANS-MET, Appendix 7, Table A7-2 and A7-3 (ref: examples of advisory

test messages in abbreviated plain language in paras. 7.1. and 7.2.). Using the status indicator "TEST" at the appropriate position of the advisory test message provides recipients with an indication that it is a test message.

3.4.2. For the advisory test messages in IWXXM form, the Guidelines for the Implementation of OPMET Data Exchange using IWXXM provides further guidance on the format for IWXXM messages issued for non-operational purposes. Crucially, the IWXXM element name 'permissibleUsage' shall be set to NON-OPERATIONAL. In addition, the 'permissibleUsageReason' field shall be set to TEST.

3.5. Issuance of WC/LY and WV/LV SIGMET test message

3.5.1. Upon receipt of the TC or VA advisory test message (from its associated TCAC or VAAC), the participating MWO should issue the WC/LY or WV/LV SIGMET test messages, accordingly, including sending the messages to all participating RODBs (ref: examples of WC and WV SIGMET test messages in paras. 7.3 and 7.4.).

3.5.2. If the MWO does not receive the advisory test message from its associated TCAC or VAAC within 30 minutes of the commencement time of the SIGMET test, the MWO should still issue a SIGMET test message, indicating that it did not receive the advisory test message (ref: examples in paras. 7.3. and 7.4.).

3.6. Issuance, dissemination and content of VONA test message

3.6.1. On the specified date for the test, each participating SVO should issue a test VONA message. The test VONA message should be sent to the SVO's associated VAAC(s) and to the RODBs, as indicated in para. 9.3. Table 2.

3.6.2. The content of the test VONA message should follow the template given in PANS-MET, Appendix 7, Table A7-1 (ref: example of test VONA message in abbreviated plain language in paras. 7.6.1). Using the status indicator "TEST" at the appropriate position of the test VONA message provides recipients with an indication that it is a test message.

3.6.3. For the test VONA messages in IWXXM form, the *Guidelines for the Implementation of OPMET Data E/change using IWXXM* provides further guidance on the format for IWXXM messages issued for non-operational purposes. Crucially, the IWXXM element name 'permissibleUsage' shall be set to NON-OPERATIONAL. In addition, the 'permissibleUsageReason' field shall be set to TEST.

3.7. Special case for the non-issuance of WC/LY and WV/LV SIGMET test message

3.7.1. To avoid any possible risk of confusion during actual tropical cyclone and volcanic ash events, in the case where, at the time of the test, there is a valid WC/LY or WV/LV SIGMET message for the MWO's area of responsibility, the MWO should not send a SIGMET test message of the same type. However, in this case, the MWO should notify the WC/LY and WV/LV SIGMET test focal point (ref: para. 6.2.2.) to be excluded from the analysis of the SIGMET test messages.

4. PROCEDURES FOR *WS/LS* SIGMET TEST

Note. — The MWO initiates the WS/LS SIGMET test message at the designated time in para. 4.2. It is not initiated by an advisory test message as in the WC/LY and WV/LV SIGMET tests.

4.1. Participating units

4.1.1. Participating units include the following:

- Meteorological Watch Offices (MWOs) as listed in para. 9.3. Table 1, with required SIGMET test task indicated as 'WS/LS' (i.e., all MWOs in the APAC Region);
- Regional OPMET Data Banks (RODBs) as listed in para. 9.3. Table 2; and
- World Area Forecast Centres (WAFCs) as listed in para. 9.3. Table 5.

4.2. **Issuance of WS/LS SIGMET test message**

4.2.1. The participating MWO should issue a WS/LS SIGMET test message during the 10 minutes between 0200 and 0210 UTC (ref: example of the WS SIGMET test message in para. 7.5.).

5. COMMON PROCEDURES FOR WC/LY, WV/LV AND WS/LS SIGMET TEST

5.1. **Date and time of SIGMET test**

5.1.1. The ICAO APAC Office will set a date and time for each SIGMET test after consultation with the participating VAACs, TCACs and RODBs. The information about the agreed date and time will be sent to all States concerned by a State letter and copied to the States' SIGMET test focal points.

5.1.2. Tests for different types (i.e., WC/LY, WV/LV and WS/LS) of SIGMET messages should preferably be conducted on separate dates.

5.1.3. WC/LY, WV/LV, and WS/LS SIGMET tests should be conducted at least yearly.

5.2. **Duration of SIGMET test**

5.2.1. A SIGMET test should be terminated within 2 hours of the test start time. Exceptionally, where the test requires SIGMET messages to be valid for longer than 2 hours, the test may be extended to a maximum of 4 hours (for WS/LS SIGMET) or 6 hours (for WC/LY and WV/LV SIGMET).

5.3. **Validity period of SIGMET test message**

5.3.1. The SIGMET test message should normally have a short validity period (i.e., 10 minutes). However, where necessary, it may be issued with a validity period up to the maximum allowed (i.e., 4 hours for WS/LS SIGMET, 6 hours for WC/LY and WV/LV SIGMET).

5.4. **Content of SIGMET test message**

5.4.1. Following ICAO PANS-MET Appendix 7 Table A7-5, all the elements in the first line of the WC, WV and WS SIGMET test messages and the first element of the second line should be valid entries. The remainder of the body of the message should comprise the status indicator "TEST". It may also contain additional information that should not be used operationally, informing recipients in plain language that the message is a test. For example, the WC and WV SIGMET test messages should contain information on the receipt or non-receipt of the relevant TC or VA advisory test message (ref: examples of WC, WV and WS SIGMET test messages in paras. 7.3, 7.4 and 7.5).

5.4.2. For the LY, LV and LS SIGMET test messages in IWXXM form, the *Guidelines for the Implementation of OPMET Data E/change using IWXXM* provides further guidance on the format for IWXXM messages that are issued for non-operational purposes. Crucially, the IWXXM element name 'permissibleUsage' shall be set to NON-OPERATIONAL. In addition,

the 'permissibleUsageReason' field shall be set to TEST.

5.4.3. **Attachment C1** provides an example of the LS SIGMET test message in the IWXXM form.

5.5. Special procedure to avoid overwriting of a valid SIGMET message

5.5.1. The proper use in the SIGMET test message of the status indicator, TEST, and the next sequence number* for the flight information region (FIR) will ensure that the SIGMET test message is correctly processed (i.e., not used for operational decision making) and avoid over-writing of a previously issued and valid SIGMET message.

> ***For example**, a WS/LS SIGMET test is scheduled for 0200 UTC on the 29th. The MWO has issued three valid SIGMET messages for the FIR since 0001 UTC. Therefore, in this case, the sequence number of the WS/LS SIGMET test message, which will correspond with the number of SIGMET messages issued for the FIR since 0001 UTC on the day of the test, will be 4, as indicated in the following WS SIGMET test message e/ample:*
>
> ```
> WSAU01 YBRF 290200
> YBBB SIGMET 4 VALID 290200/290210 YBRF- YBBB
> BRISBANE FIR TEST=
> ```

**Note. - If required by local procedures, States may choose to continue replacing the next sequence number for the FIR with the special sequence number for SIGMET test messages: Z99.*

5.6. Heading of the meteorological bulletin for advisory, VONA and SIGMET test message

5.6.1. Following ICAO PANS-MET 10.1.1.3, the meteorological bulletin from a participating unit containing an advisory, VONA or SIGMET test message should contain a valid heading, also known as the World Meteorological Organization (WMO) abbreviated heading line (AHL).

5.6.2. The APAC Regional SIGMET Guide, Appendices D and E list the WMO AHLs for the meteorological bulletins containing SIGMET messages and TC advisory messages used by the MWOs and TCACs in the APAC Region. WMO AHLs for the VA advisory message bulletins are available in Table 4-3 of the ICAO *Handbook on the International Airways Volcano Watch* (Doc 9766), available at https://www.icao.int/airnavigation/METP/Pages/default.aspx.

5.7. Dissemination of SIGMET test message

5.7.1. The participating MWO should send the SIGMET test message to the recipient units** specified in the Regional Air Navigation Plan. Region-specific documentation should identify the relevant AFTN addresses.

***Note. - The RODBs and WAFCs to which the MWO should send the SIGMET test message are listed in para. 9.3. Tables 2 and 5.*

5.7.2. Following ICAO Annex 10, Vol. II, para. 4.4.1.1.3, the priority indicator is **FF** for flight safety messages disseminated by the aeronautical fixed service (AFS), including TC and VA advisory messages and SIGMET messages.

5.7.3. An RODB that is also nominated as an Inter-Regional OPMET Gateway (IROG)[4] will relay the bulletins

[4] The IROGs designated in the APAC Region are indicated in the ICAO (APAC) ROBEX Handbook

containing SIGMET test messages to its corresponding IROG.

5.8. **Coordination with air traffic services (ATS) units**

5.8.1. Following Annex 3, para 3.3, each participating MWO should inform its associated ATS unit/s by a suitable advanced notice of the forthcoming SIGMET test/s.

6. PROCESSING THE SIGMET TEST RESULTS

6.1. **Role of the RODBs**

6.1.1. Each participating RODB should file all incoming meteorological bulletins containing advisory test messages, SIGMET test messages, and VONA test messages, and perform an analysis of the availability and timeliness of arrival of the test messages and the correctness of the bulletin headings (WMO AHLs).

6.1.2. Each participating RODB should prepare and send a SIGMET test summary table (ref: para.8.1) to the relevant SIGMET test focal point (ref: para. 6.2.2) with a copy to the ICAO APAC Office (apac@icao.int). The summary should separately present the information on the meteorological bulletins received in the IWXXM form and the abbreviated plain language or alphanumeric form.

6.2. **SIGMET test focal points**

6.2.1. The designated SIGMET test focal points should prepare the final report of the SIGMET test/s and send it to the ICAO APAC Office for submission to the next meeting of the Meteorological Information Exchange Working Group (MET/IE WG).

6.2.2. The designated SIGMET test focal points for the APAC Region are as follows:

Focal point for WC/LY and WV/LV SIGMET tests:
Mr. Kentaro Tsuboi
Japan Meteorological Agency
Information and Communications Technology Division / Information Infrastructure Department
3-6-9 Toranomon, Minato City
Tokyo 105-8431JAPAN
Tel: +81 (3) 3434 9098
Fax: +81 (3) 3434 9097
E-mail: k-tsuboi@met.kishou.go.jp

Focal point for WS SIGMET test:
Mr. GOH Wee Poh
Head, Central Forecast Office
Weather Services Division
Meteorological Service Singapore
P.O. Box 8, Singapore Changi Airport Post Office
SINGAPORE 918141
Tel: +65 6244 6133
E-mail: goh_wee_poh@nea.gov.sg

7. EXAMPLES OF TEST MESSAGES

7.1. **TC advisory test message**

7.1.1. Example of the advisory test message for a tropical cyclone in abbreviated plain language:

```
TC ADVISORY
STATUS: TEST
DTG: YYYYMMDD/hhmmZ
TCAC: <location indicator or name of TCAC>
TC: TEST ADVISORY
ADVISORY NR: YYYY/nn (actual number)
OBS PSN: NIL
CB: NIL
MOV: NIL
INTST CHANGE: NC
C: NIL
MAX WIND: NIL
FCST PSN +6HR: NIL
FCST MAX WIND +6HR: NIL
FCST PSN +12HR: NIL
FCST MAX WIND +12HR: NIL
FCST PSN +18HR: NIL
FCST MAX WIND +18HR: NIL
FCST PSN +24HR: NIL
FCST MAX WIND +24HR: NIL
RMK: THIS IS A TC ADVISORY TEST MSG. MWO SHOULD
NOW ISSUE A SIGMET TEST MSG FOR TC. PLEASE REF LETTER
FROM ICAO ASIA AND PACIFIC OFFICE DATED YYYYMMDD.
NXT MSG: NO MSG EXP=
```

7.2. **VA advisory test message**

7.2.1. Example of the advisory test message for volcanic ash in abbreviated plain language:

```
VA ADVISORY
STATUS: TEST
DTG: YYYYMMDD/hhmmZ
VAAC: <name of VAAC>
VOLCANO: TEST 999999
PSN: UNKNOWN
AREA: <name of VAAC> VAAC AREA
SOURCE ELEV: UNKNOWN
ADVISORY NR: YYYY/nn
INFO SOURCE: NIL
ERUPTION DETAILS: NIL
OBS VA DTG: DD/GGggZ
OBS VA CLD: VA NOT IDENTIFIABLE FM SATELLITE DATA
FCST VA CLD +6 HR: NO VA EXP
FCST VA CLD +12 HR: NO VA EXP
FCST VA CLD +18 HR: NO VA EXP
RMK: THIS IS A VA ADVISORY TEST MSG. MWO SHOULD NOW ISSUE A
SIGMET TEST MSG FOR VA. PLEASE REF LETTER FROM ICAO ASIA AND
PACIFIC OFFICE DATED YYYYMMDD.
NXT ADVISORY: NO FURTHER ADVISORIES=
```

7.3. **WC/LY SIGMET test message**

7.3.1. Example of the WC SIGMET test message for a tropical cyclone in the alphanumeric form:

```
WCA1A2ii CCCC YYGGgg
CCCC SIGMET [n][n]n VALID YYGGgg/YYGGgg CCCC-
CCCC <name> FIR
TEST=

Example:
WCJP31 RJTD 130205
RJJJ SIGMET 1 VALID 130205/130215 RJTD-
RJJJ FUKUOKA FIR
TEST=
```

Or, to indicate receipt of the associated TC advisory test message:

```
WCA1A2ii CCCC YYGGgg
CCCC SIGMET [n][n]n VALID YYGGgg/YYGGgg CCCC-
CCCC <name> FIR
TEST
TC ADVISORY TEST MSG NUMBER YYYY/nn RECEIVED FM TCAC <name>
AT YYGGggZ=
Example:
WCJP31 RJTD 130205
RJJJ SIGMET 1 VALID 130205/130215 RJTD-
RJJJ FUKUOKA FIR
TEST
TC ADVISORY TEST MSG NUMBER 2019/01 RECEIVED FM TCAC TOKYO AT
130200Z=
```

Or, to indicate non-receipt of the associated TC advisory test message:

```
WCA1A2ii CCCC YYGGgg
CCCC SIGMET [n][n]n VALID YYGGgg/YYGGgg CCCC-
CCCC <name> FIR
TEST
TC ADVISORY TEST MSG NOT RECEIVED FM TCAC <name>=
Example:
WCJP31 RJTD 130230
RJJJ SIGMET 1 VALID 130230/130240 RJTD-
RJJJ FUKUOKA FIR
TEST
TC ADVISORY TEST MSG NOT RECEIVED FM TCAC TOKYO=
```

7.4. **WV/LV SIGMET test message**

7.4.1. Example of the WV SIGMET test message for volcanic ash in alphanumeric form:

```
WVA1A2ii CCCC YYGGgg
CCCC SIGMET [n][n]n VALID YYGGgg/YYGGgg CCCC-
CCCC <name> FIR TEST=

Example:
WVJP31 RJTD 200205
RJJJ SIGMET 1 VALID 200205/200215 RJTD- RJJJ
FUKUOKA FIR
TEST=
```

Or , to indicate receipt of the associated VA advisory test message:

```
WVA1A2ii CCCC YYGGgg
CCCC SIGMET [n][n]n VALID YYGGgg/YYGGgg CCCC-
CCCC <name> FIR TEST
VA ADVISORY TEST MSG NUMBER YYYY/nn RECEIVED FM VAAC <name> AT
YYGGggZ=

Example:
WVJP31 RJTD 200205
RJJJ SIGMET 1 VALID 200205/200215 RJTD- RJJJ
FUKUOKA FIR
```

Or, to indicate non-receipt of the associated VA advisory test message:

```
WVA1A2ii CCCC YYGGgg
CCCC SIGMET [n][n]n VALID YYGGgg/YYGGgg CCCC-
CCCC <name> FIR TEST
VA ADVISORY TEST MSG NOT RECEIVED FM VAAC <name>=

Example:
WVJP31 RJTD 200230
RJJJ SIGMET 1 VALID 200230/200240 RJTD-
RJJJ FUKUOKA FIR
TEST
VA ADVISORY TEST MSG NOT RECEIVED FM VAAC TOKYO=
```

7.5. WS/LS SIGMET test message

```
WSA1A2ii CCCC YYGGgg
CCCC SIGMET [n][n]n VALID YYGGgg/YYGGgg CCCC-
CCCC <name> FIR TEST=

Example:
WSJP31 RJTD 270205
RJJJ SIGMET A2 VALID 270205/270215 RJTD- RJJJ
FUKUOKA FIR
TEST=
```

7.5.1. Example of the WS SIGMET test message for weather and other phenomena (apart from tropical cyclones and volcanic ash) in alphanumeric form:

7.5.2. **Attachment C1** provides an example of the LS SIGMET test message in the IWXXM form.

7.6. VONA test message

7.6.1. Example of the VONA test message for volcanic activity in abbreviated plain language:

```
VONA
STATUS: TEST
DTG: YYYMMDD/hhmmZ
VOLCANO: TEST 999999
PSN: UNKNOWN
AREA: UNKNOWN
SOURCE ELEV: UNKNOWN
NOTICE NR: YYYY/nn
CURRENT COLOUR CODE: NIL
PREVIOUS COLOUR CODE: NIL
SVO: <name of SVO>
ACT STS: NIL
ONSET: NIL
DUR: NIL
VA CLD HGT: NO VA CLD PRODUCED
HGT SOURCE: NO VA CLD PRODUCED
MOV: NO VA CLD PRODUCED
CTC: NIL
RMK: THIS IS A TEST VONA MSG. VAAC SHOULD RECORD DETAILS. PLEASE
REF LETTER FROM ICAO APAC OFFICE DATED YYYYMMDD.
```

8. TEST SUMMARIES

8.1. Test summary tables

8.1.1. The RODBs should present the summaries of meteorological bulletins received in the abbreviated plain language/alphanumeric form and the IWXXM form in separate tables.

8.1.2. VAACs should record test VONA they receive and provide the name of the SVO, VONA bulletin heading information (TTAAii, CCCC and DTG) of the VONA, as well as the time received (in UTC) and any comments the VAAC may have. This information should then be shared with RODB Tokyo at the conclusion of the test, using a summary table (see example for VONA in paragraph 8.1.3).

8.1.3. Example of SIGMET test summary table used by RODBs (for meteorological bulletins received in abbreviated plain language/alphanumeric form):

Name of RODB: Tokyo
Date of Test: 2024/11/20
Target (VA or TC): VA

VONA test messages (WM)				
TTAAii	CCCC	YYGGgg	Received Time(UTC)	Comments/Remarks
WMNZ02	NZKL	170201	02:01:53	SVO: Earth Sciences NZ
WMFE01	RJTD	170200	02:00:09	SVO: JMA
WMID05	WAAA	170200	02:00:45	SVO: CVGHM

VA advisory test messages (FV)				
TTAAii	CCCC	YYGGgg	Received Time (UTC)	Comments/Remarks
FVXX04	LFPW	200200	2:00:29	
FVAU07	ADRM	200209	2:10:53	
FVXX26	KNES	200200	1:59:09	
FVPS02	NZKL	200200	2:00:27	
FVFE01	RJTD	200200	2:00:41	

TTAAii	CCCC	YYGGgg	Received Time (UTC)	MWO	FIR	Comments/ Remarks
WVAU01		200246	2:46:00	YMMC	YMMM	
WVBW20	VGHS	200205	2:04:00	VGHS	VGFR	
WVKP31	VDPP	200200	2:07:00	VDPP	VDPF	
WVCI33	ZBAA	200205	2:02:00	ZBAA	ZBPE	
WVCI36	ZUUU	200205	2:09:00	ZUUU	ZPKM	
WVCI35	ZGGG	200200	2:05:00	ZGGG	ZGZU	
WVCI35	ZJHK	200203	2:05:00	ZJHK	ZJSA	
WVSS20	VHHH	200202	2:03:00	VHHH	VHHK	
WVCI34	ZSSS	200205	2:06:00	ZSSS	ZSHA	
WVCI38	ZYTX	200205	2:05:00	ZYTX	ZYSH	
WVCI39	ZWWW	200205	2:06:00	ZWWW	ZWUQ	
WVCI45	ZHHH	200215	2:16:00	ZHHH	ZHWH	
WVCI37	ZLXY	200203	2:05:00	ZLXY	ZLHW	
WVPF20	NTAA	200212	2:12:00	NTAA	NTTT	
WVIN31	VOMM	200211	2:13:00	VOMM	VOMF	
WVIN31	VECC	200235	2:36:00	VECC	VECF	
WVIN31	VABB	200200	2:15:00	VABB	VABF	
WVIN31	VIDP	200200	2:03:00	VIDP	VIDF	
WVID20	WIII	200211	2:11:00	WIII	WIIF	
WVJP31	RJTD	200205	2:05:00	RJTD	RJJJ	
WVLA31	VLVT	200205	2:00:00	VLVT	VLVT	
WVMS31	WMKK	200212	2:12:00	WMKK	WMFC	
WVMS31	WMKK	200212	2:12:00	WBKK	WBFC	
WSMV31	VRMM	200200	2:20:00	VRMM	VRMF	
WVBM31	VYYY	200226	2:27:00	VYYY	VYYF	
WSNP31	VNKT	200214	2:14:00	VNKT	VNSM	

WVNZ21	NZKL	200203	2:04:00	NZKL	NZZC	
WVPS21	NZKL	200200	2:02:00	NZKL	NZZO	
WVPK31	OPKC	200230	2:30:00	OPKC	OPKR	
WVPK31	OPLA	200230	2:32:00	OPLA	OPLR	
WVPH31	RPLL	200202	2:02:00	RPLL	RPHI	
WVKO31	RKSI	200200	2:12:00	RKSI	RKRR	
WVSR20	WSSS	200210	2:15:00	WSSS	WSJC	
WVSO20	AGGH	200205	2:05:00	AGGH	AGGG	
WVSB31	VCBI	200225	2:36:00	VCBI	VCCF	
WVTH31	VTBS	200212	2:13:00	VTBS	VTBB	
WVVS31	VVGL	200202	2:03:00	VVGL	VVHM	
WVVS31	VVGL	200200	2:02:00	VVGL	VVHN	
WVPA01	PHFO	200200	2:00:00	PHFO	KZAK	
WVPN06	KKCI	200200	2:01:00	KKCI	KZAK	
WVRA31	RUPK	200201	2:01:00	UHPP	UHMM	

9. TEST SUPPLEMENTARY INFORMATION

9.1. Bilateral or multilateral arrangements between States

9.1.1. Where bilateral or multilateral arrangements exist between States for the provision of MWO services, the State responsible for providing air traffic services within the FIR concerned should ensure that arrangements are also in place for the issuance of SIGMET test messages following the procedures set out in this document.

9.2. Coordination with other Regions

9.2.1. To facilitate additional monitoring of the SIGMET tests beyond the ICAO APAC Region, at each stage of the SIGMET tests, the IROG Singapore will relay the meteorological bulletins containing the VONA/advisory /SGMET test messages to the corresponding IROG in the ICAO European (EUR) Region.

9.3. Detailed list of participating States, operational units and tasks

9.3.1. The following tables indicate the participating States, operational units and tasks required for the APAC regional SIGMET tests:

Table 1: Participating MWOs

MWOs (listed by ICAO Region and State) with indication of the required SIGMET test task/s including, where applicable, the associated TCAC/VAAC

MWO DETAILS				REQUIRED SIGMET TEST TASK ID (Refer Table 7 for further details)												
				Associated TCAC WC/LY SIGMET test							Associated VAAC WV/LV SIGMET test					
	STATE	MWO NAME	ICAO Location Indicator	Darwin	Nadi	La Réunion	New Delhi	Tokyo	Honolulu	Miami	Darwin	Toulouse	Tokyo	Wellington	Washington	WS/LS SIGMET test
A	AFGHANISTAN	KABUL	OAKB	-	-	-	-	-	-	-	-	WV/LV 1.1	-	-	-	WS/LS 1.0
A	AUSTRALIA	BRISBANE	YBRF	WC/LY 1.1	-	-	-	-	-	-	WV/LV 1.1	-	-	-	-	WS/LS 1.0
		MELBOURNE	YMRF	-	-	-	-	-	-	-	-	-	-	-	-	WS/LS 1.0
		MELBOURNE (WMC)	YMMC	WC/LY 1.1	WC/LY 1.1	WC/LY 2.1	-	-	-	-	WV/LV 1.1	-	-	-	-	WS/LS 1.0
A	BANGLADESH	DHAKA	VGHS	-	-	-	WC/LY 1.1	-	-	-	-	WV/LV 1.1	WV/LV 1.1	-	-	WS/LS 1.0
A	CAMBODIA	PHNOM PENH	VDPP	-	-	-	-	WC/LY 1.1	-	-	-	-	WV/LV 1.1	-	-	WS/LS 1.0
A	CHINA	BEIJING	ZBAA	-	-	-	-	WC/LY 1.1	-	-	-	-	WV/LV 1.1	-	-	WS/LS 1.0
		CHENGDU	ZUUU	-	-	-	-	WC/LY 1.1	-	-	-	WV/LV 1.1	WV/LV 1.1	-	-	WS/LS 1.0
		GUANGZHOU	ZGGG	-	-	-	-	WC/LY 1.1	-	-	-	-	WV/LV 1.1	-	-	WS/LS 1.0
		HAIKOU	ZJH	-	-	-	-	WC/	-	-	-	-	WV/	-	-	WS/LS

			K					LY 1.1					LV 1.1			1.0
		HONG KONG	VHHH	-	-	-	-	WC/LY 1.1	-	-	-	-	WV/LV 1.1	-	-	WS/LS 1.0
		SHANGHAI	ZSSS	-	-	-	-	WC/LY 1.1	-	-	-	-	WV/LV 1.1	-	-	WS/LS 1.0
		SHENYANG	ZYTX	-	-	-	-	-	-	-	-	-	WV/LV 1.1	-	-	WS/LS 1.0
		TAIBEI	RCTP	-	-	-	-	WC/LY 1.1	-	-	-	-	WV/LV 1.1	-	-	WS/LS 1.0
		URUMQI	ZWWW	-	-	-	-	-	-	-	-	WV/LV 1.1	WV/LV 1.1	-	-	WS/LS 1.0
		WUHAN	ZHHH	-	-	-	-	-	-	-	-	-	WV/LV 1.1	-	-	WS/LS 1.0
		XI'AN	ZLXY	-	-	-	-	-	-	-	-	WV/LV 1.1	WV/LV 1.1	-	-	WS/LS 1.0
A	DPR KOREA	SUNAN	ZKPY	-	-	-	-	WC/LY 1.1	-	-	-	-	WV/LV 1.1	-	-	WS/LS 1.0
A	FIJI	NADI	NFFN	-	WC/LY 1.1	-	-	WC/LY 1.1	-	-	-	-	-	WV/LV 1.1	WV/LV 1.1	WS/LS 1.0
A	FRANCE French Polynesia	TAHITI	NTAA	-	WC/LY 1.1	-	-	-	WC/LY 1.1	WC/LY 1.1	-	-	-	WV/LV 1.1	WV/LV 1.1	WS/LS 1.0
A	INDIA	CHENNAI	VOMM	-	-	-	WC/LY 1.1	-	-	-	WV/LV 1.1	WV/LV 1.1	-	-	-	WS/LS 1.0
		KOLKATA	VECC	-	-	-	-	-	-	-	WV/LV 1.1	WV/LV 1.1	WV/LV 1.1	-	-	WS/LS 1.0
		MUMBAI	VABB	-	-	WC/LY 2.1	WC/LY 1.1	-	-	-	-	WV/LV 1.1	-	-	-	WS/LS 1.0
		NEW DELHI	VIDP	-	-	-	-	-	-	-	-	WV/LV 1.1	-	-	-	WS/LS 1.0
A	INDONESIA	JAKARTA	WIII	WC/LY 1.1	-	-	WC/LY 1.1	WC/LY 1.1	-	-	WV/LV 1.1	-	-	-	-	WS/LS 1.0
		MAKASSAR	WAAA	WC/LY 1.1	-	-	-	WC/LY 1.1	-	-	WV/LV 1.1	-	-	-	-	WS/LS 1.0
A	JAPAN	TOKYO	RJTD	-	-	-	-	WC/LY 1.1	-	-	-	-	WV/LV 1.1	-	-	WS/LS 1.0
A	LAO PDR	VIENTIANE	VLVT	-	-	-	-	WC/LY 1.1	-	-	-	-	WV/LV 1.1	-	-	WS/LS 1.0
A	MALAYSIA	KUALA LUMPUR	WMKK	-	-	-	WC/LY 1.1	WC/LY 1.1	-	-	WV/LV 1.1	-	-	-	-	WS/LS 1.0

A	MALDIVES	MALE	VRMM	-	-	WC/LY2.1	WC/LY1.1	-	-	-	-	WV/LV1.1	-	-	-	WS?LS1.0
A	MONGOLIA	ULAANBAATAR	ZMUB	-	-	-	-	-	-	-	-	WV/LV1.1	WV/LV1.1	-	-	WS/LS1.0
A	MYANMAR	YANGON	VYYY	-	-	-	WC/LY1.1	-	-	-	WV/LV1.1	-	WV/LV1.1	-	-	WS/LS1.0
A	NAURU	NAURU	ANYN	-	WC/LY1.1	-	-	-	-	-	-	-	-	WV/LV1.1	WV/LV1.1	WS/LS1.0
A	NEPAL	KATHMANDU	VNKT	-	-	-	-	-	-	-	-	WV/LV1.1	-	-	-	WS/LS1.0
A	NEW ZEALAND	WELLINGTON	NZKL	-	WC/LY1.1	-	-	-	-	-	-	-	-	WV/LV1.1	-	WS/LS1.0
A	PAKISTAN	KARACHI	OPKC	-	-	-	WC/LY1.1	-	-	-	-	WV/LV1.1	-	-	-	WS/LS1.0
		LAHORE	OPLA	-	-	-	-	-	-	-	-	WV/LV1.1	-	-	-	WS/LS1.0
A	PAPUA NEW GUINEA	PORT MORESBY	AYPY	WC/LY1.1	-	-	-	-	-	-	WV/LV1.1	-	-	-	-	WS/LS1.0
A	PHILIPPINES	MANILA	RPLL	-	-	-	-	WC/LY1.1	-	-	WV/LV1.1	-	WV/LV1.1	-	-	WS/LS1.0
A	REPUBLIC OF KOREA	INCHEON	RKSI	-	-	-	-	WC/LY1.1	-	-	-	-	WV/LV1.1	-	-	WS/LS1.0
A	SINGAPORE	SINGAPORE	WSSS	-	-	-	-	WC/LY1.1	-	-	WV/LV1.1	-	-	-	-	WS/LS1.0
A	SOLOMON ISLANDS	HONIARA	AGGH	WC/LY1.1	WC/LY1.1	-	-	-	-	-	WV/LV1.1	-	-	WV/LV1.1	-	WS/LS1.0
A	SRI LANKA	COLOMBO	VCBI	WC/LY1.1	-	-	WC/LY1.1	-	-	-	WV/LV1.1	-	-	-	-	WS/LS1.0
A	THAILAND	BANGKOK	VTBS	-	-	-	-	WC/LY1.1	-	-	WV/LV1.1	-	WV/LV1.1	-	-	WS/LS1.0
A	UNITED STATES	HONOLULU		-	WC/LY1.1	-	-	WC/LY1.1	WC/LY1.1	WC/LY1.1	WC/LY1.1	-	-	WV/LV1.1	-	WS/LS1.0
A	VIET NAM	GIA LAM	VVGL	-	-	-	-	WC/LY1.1	-	-	WV/LV1.1	-	WV/LV1.1	-	-	WS/LS1.0
		IRKUTSK	UIII	-	-	-	-	-	-	-	-	-	WV/LV1.1	-	-	-
		KHABAROVSK	UHHH	-	-	-	-	WC/LY1.1	-	-	-	-	WV/LV1.1	-	-	-
		KRASNOYARSK	UNKL	-	-	-	-	-	-	-	-	-	WV/LV1.1	-	-	-

E	RUSSIAN FEDERATION	MAGADAN	UHMM	-	-	-	-	-	-	-	-	-	WV / LV 1.1	-	-	-
		YAKUTSK	UEEE	-	-	-	-	-	-	-	-	-	WV / LV 1.1	-	-	-
		YELIZOVO/ PETROPAVLOVSK-KAMCHATSKY	UHPP	-	-	-	-	WC / LY 1.1	-	-	-	-	WV / LV 1.1	-	-	-
M	BAHRAIN	BAHRAIN	OBBI	-	-	-	WC / LY 3.1	-	-	-	-	-	-	-	-	-
M	IRAN	TEHRAN	OIII	-	-	-	WC / LY 3.1	-	-	-	-	-	-	-	-	-
M	KUWAIT	KUWAIT	OKBK	-	-	-	WC / LY 3.1	-	-	-	-	-	-	-	-	-
M	OMAN	MUSCAT	OOMS	-	-	-	WC / LY 3.1	-	-	-	-	-	-	-	-	-
M	SAUDI ARABIA	JEDDAH	OEJN	-	-	-	WC / LY 3.1	-	-	-	-	-	-	-	-	-
M	UNITED ARAB EMIRATES	ABU DHABI	OMAA	-	-	-	WC / LY 3.1	-	-	-	-	-	-	-	-	-
M	YEMEN	SANAA	OYSN	-	-	-	WC / LY 3.1	-	-	-	-	-	-	-	-	-
N	UNITED STATES	ANCHORAGE	PAWU	-	-	-	-	-	WC / LY 1.1	-	-	-	-	-	-	-
		KANSAS CITY	KMKC	-	-	-	-	WC / LY 1.1	WC / LY 1.1	WC / LY 1.1	-	-	-	-	-	-

* A = APAC, E = EUR, M = MID, N = NAM

Table 2: Participating RODBs

RODBs listed by State and ICAO Region, with indication of the required SIGMET test tasks

STATE	ICAO REGION	**RODB NAME**	ICAO Location Indicator	AFTN ADDRESS	**REQUIRED SIGMET TEST TASK (ID)***
AUSTRALIA	APAC	BRISBANE	YBBB	YBBBYPYX	WC/LY 4.0, WV/LV 2.0, WS/LS 2.0
FIJI	APAC	NADI	NFFN	NFFNYPYX	WC/LY 4.0, WV/LV 2.0, WS/LS 2.0
JAPAN	APAC	TOKYO	RJTD	RJTDYPYX	WC/LY 4.0, WV/LV 2.0, WS/LS 2.0
SINGAPORE	APAC	SINGAPORE	WSSS	WSSSYZYX	WC/LY 4.0, WV/LV 2.0, WS/LS 2.0
THAILAND	APAC	BANGKOK	VTBB	VTBBYPYX	WC/LY 4.0, WV/LV 2.0, WS/LS 2.0

*****Refer Table 7 for details

Table 3: Participating TCACs

TCACs listed by State and ICAO Region, with indication of the required SIGMET test tasks and the associated MWOs

STATE	ICAO REGION	**TCAC NAME**	ICAO Location Indicator	**TASK (ID)***	**Associated MWOs** to which the advisory information on tropical cyclones should be sent
AUSTRALIA	APAC	DARWIN	YMMC	WC/LY 1.0	BRISBANE, COLOMBO, HONIARA, JAKARTA,MAKASSAR, MELBOURNE, PORT MORESBY
FIJI	APAC	NADI	NFFN	WC/LY 1.0	HONIARA, HONOLULU, MELBOURNE, NADI, NAURU, TAHITI, WELLINGTON

FRANCE	AFI	LA RÉUNION	FMEE	WC/LY 2.0	MALE, MELBOURNE, MUMBAI
INDIA	APAC	NEW DELHI	VIDP	WC/LY 1.0 WC/LY 3.0	**APAC:** CHENNAI, COLOMBO, DHAKA, JAKARTA, KARACHI, KUALA LUMPUR, MALE, MUMBAI, YANGON **MID:** ABU DHABI, BAHRAIN, JEDDAH,KUWAIT, MUSCAT, QATAR, SANAA, TEHRAN
JAPAN	APAC	TOKYO	RJTD	WC/LY 1.0	**APAC:** BANGKOK, BEIJING, CHENGDU, GIA LAM, GUANGZHOU, HAIKOU, HONG KONG, HONOLULU, INCHEON, JAKARTA, KANSAS CITY, KUALA LUMPUR, MAKASSAR, MANILA, NADI, PHNOM PENH, SHANGHAI, SINGAPORE, SUNAN, TAIBEI, TOKYO, VIENTIANE **EUR:**KHABAROVSK,YELIZOVO/PETROPAVLOVSK-KAMCHATSKY
UNITED STATES	APAC	HONOLULU		WC/LY 1.0	ANCHORAGE, HONOLULU, KANSAS CITY, TAHITI
	NAM	MIAMI		WC/LY 1.0	HONOLULU, KANSAS CITY, TAHITI

*Refer Table 7 for further details

Table 4: Participating VAACs

Participating VAACs listed by State and ICAO Region, with indication of the required SIGMET test tasks and the associated MWOs

STATE	ICAO REGION	**VAAC NAME**	ICAO Location Indicator	**TASK (ID)***	**Associated MWOs** to which the advisory information on volcanic ash should be sent
AUSTRALIA	APAC	DARWIN	YMMC	WV/LV 1.0	BANGKOK, BRISBANE, CHENNAI, COLOMBO, GIA LAM, HONIARA, HONOLULU, JAKARTA, KOLKATA, KUALA LUMPUR, MAKASSAR, MANILA, MELBOURNE, PORT MORESBY, SINGAPORE, YANGON
FRANCE	EUR	TOULOUSE	LFPW	WV/LV 1.0	CHENGDU, CHENNAI, DHAKA, KABUL, KARACHI, KATHMANDU, KOLKATA, LAHORE, MALE, MUMBAI, DELHI, ULAANBAATAR, URUMQI, XI'AN
JAPAN	APAC	TOKYO	RJTD	WV/LV 1.0	**APAC:** BANGKOK, BEIJING, CHENGDU, DHAKA, GIA LAM, GUANGZHOU, HAIKOU, HONG KONG, INCHEON, KOLKATA, MANILA, PHNOM PENH, SHANGHAI, SHENYANG, SUNAN, TAIBEI, TOKYO, ULAANBAATAR, URUMQI, VIENTIANE, WUHAN, XI'AN, YANGON **EUR:** IRKUTSK, KHABAROVSK, KRASNOYARSK, MAGADAN, YELIZOVO/PETROPAVLOVSKKAMCHATSKY, YAKUTSK
NEW ZEALAND	APAC	WELLINGTON	NZKL	WV/LV 1.0	HONIARA, HONOLULU, NADI, NAURU, TAHITI, WELLINGTON
UNITED STATES	NAM	WASHINGTON	KNES	WV/LV 1.0	NADI, NAURU, TAHITI

*Refer Table 7 for further details

Table 5: Participating WAFCs

WAFCs listed by State and ICAO Region, with indication of the required SIGMET test tasks

STATE	ICAO REGION	**WAFC NAME**	ICAO Location Indicator	AFTN ADDRESS	**TASK (ID)***
UNITED KINGDOM	EUR	LONDON	EGZZ	EGZZMASI	WC/LY 4.0, WV/LV 2.0, WS/LS 2.0
UNITED STATES	NAM	WASHINGTON	KWBC	KWBCYMYX	WC/LY 4.0, WV/LV 2.0, WS/LS 2.0

*Refer Table 7 for further details

Table 6: Participating SVOs

SVOs listed by State, with indication of required SIGMET test tasks.
Note:- Refer to APAC Air Navigation Plan Vol I, Table MET I-1, for current list of designated SVOs (see here).

STATE	ICAO REGION	SVO NAME	TASK (ID)*	Associated VAACs to which the VONA test message should be sent.
China	APAC	Heilongjiang Wudalianchi Volcano Observatory	WV/LV 1.2	Tokyo
		Jilin Changbai Mountain Tianchi Volcano Observatory	WV/LV 1.2	Tokyo
Japan		Fukuoka Volcanic Observation and Information Center, Japan Meteorological Agency	WV/LV 1.2	Tokyo
		Kagoshima Local Meteorological Office, Japan Meteorological Agency	WV/LV 1.2	Tokyo
		Sapporo Volcanic Observation and Information Center, Japan Meteorological Agency	WV/LV 1.2	Tokyo
		Sendai Volcanic Observation and Information Center, Japan Meteorological Agency	WV/LV 1.2	Tokyo
		Tokyo Volcanic Observation and Information Center, Japan Meteorological Agency	WV/LV 1.2	Tokyo
India		TBD	WV/LV 1.2	Darwin
Indonesia		Directorate of Volcanology and Geological Hazard Mitigation (DVGHM)	WV/LV 1.2	Darwin
New Zealand		Wairakei Research Centre Institute of Geological and Nuclear Sciences	WV/LV 1.2	Wellington
Papua New Guinea		Rabaul	WV/LV 1.2	Darwin

*Refer to Table 7 for further details

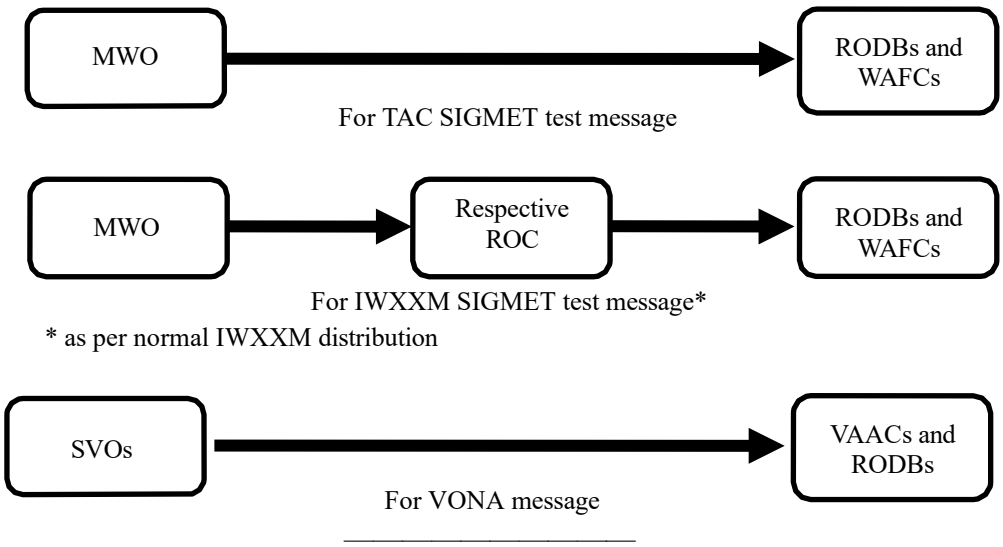
Table 7: Test tasks
Chronology and detailed description of tasks, listed by task ID

TASK ID.	**WHO?** Responsible unit/s	**WHAT?** Detailed description of the task	**WHEN?** Date/Time indicated in the following format: YYYYMMDD/HHMM UTC
Test for tropical cyclone (WC/LY SIGMET, FK/LK TCA test) 202611dd/0200, 202611dd/0500 and 202611dd/0800			
WC/LY 1.0	**TCACs** listed in Table 3 except TCAC La Réunion	Send the TC advisory test message (see para. 7.1) to: i. MWOs as indicated in Table 3 (Note: at this time, TCAC New Delhi should only send the TC advisory test message to MWOs in the APAC Region); ii. RODBs listed in Table 2 (Note: this only applies to TCACs Darwin, Nadi, New Delhi and Tokyo); and iii. WAFCs listed in Table 5	**20241113/0200**

WC/LY 1.1	**MWOs associated with one or more TCACs**	**Send the WC/LY SIGMET test message** based on the TC advisory test message from each associated TCAC (see para. 7.3) to:	**Between 20241113/0200 and 20241113/0230**, on receipt of the TC advisory test message from each associated TCAC, **or**
	listed in Table 3 except TCAC La Réunion.	i. RODBs listed in Table 2 (Note: this only applies to MWOs in the APAC Region); and ii. WAFCs listed in Table 5 *Note.- For LY SIGMET test message to be successfully disseminated to RODBs/WAFCs, MWOs need to send the LY SIGMET test message to their respective Regional OPMET Centre (ROC), and the ROC is responsible for automatically forwarding the message to RODBs/WAFCs.	**at 20241113/0230**, or as soon as practicable after, when the MWO does not receive the TC advisory test message from its associated TCAC. Note: MWOs should send a test WC/LY SIGMET upon receipt (or non-receipt) of a test TC advisory test message **for each TCAC that they are associated with.**
WC/LY 2.0	**TCAC La Réunion**	**Send the TC advisory test message** (see para. 7.1) to: i. MWOs as indicated in Table 3; ii. RODBs listed in Table 2; and iii. WAFCs listed in Table 5	**20241113**/0500
WC/LY 2.1	**MWOs associated with TCAC La Réunion**, as indicated in Table 1 and Table 3	**Send the WC/LY SIGMET test message** based on the TC advisory test message from TCAC La Réunion (see para. 7.3) to: i. RODBs listed in Table 2; and ii. WAFCs listed in Table 5 *Note.- For LY SIGMET test message to be successfully disseminated to RODBs/WAFCs, MWOs need to send the LY SIGMET test message to their respective ROC, and the ROC is responsible for automatically forwarding the message to RODBs/WAFCs.	Between **20241113/0500 and 20241113/0530**, on receipt of the TC advisory test message from TCAC La Réunion, **or at 20241113/0530**, or as soon as practicable after, when the MWO does not receive the TC advisory test message from TCAC La Réunion.
WC/LY 3.0	**TCAC New Delhi**	Send the TC advisory test message (see para. 7.1) to: i. MWOs as indicated in Table 3 (Note: at this time, TCAC New Delhi should only send the TC advisory test message to MWOs in the MID Region); ii. RODBs listed in Table 2; and iii. WAFCs listed in Table 5	**20241113/0800**
WC/LY 3.1	**MWOs in the MID Region TCAC New Delhi**, as indicated in Table 1 and Table 3	**Send the WC/LY SIGMET test message** based on the TC advisory test message from TCAC New Delhi (see para. 7.3) to: i. WAFCs listed in Table 5 *Note.- For LY SIGMET test message to be successfully disseminated to RODBs/WAFCs, MWOs need to send the LY SIGMET test message to their respective ROC, and the ROC is responsible for automatically forwarding the IWXXM form message to RODBs/WAFCs.	**Between 20241113/0800 and 20241113/0830**, on receipt of the TC advisory test message from TCAC New Delhi, **or at 20241113/0830**, or as soon as practicable after, when the MWO does not receive the TC advisory test message from TCAC New Delhi.
WC/LY 4.0	**RODBs** listed in Table 2 and **WAFCs** listed in Table 5	1) **File all received** (TC advisory and WC/LY SIGMET) **test messages**; and 2) **Prepare and send the SIGMET test summary table** (see para. 8.1) to: i. APAC SIGMET test focal points (see para. 6.2.2); and ii. Copy to the ICAO APAC Office	1) **Between 20241113/0200 and 20241113/0830**; and 2) **After 20241113/0830**
Test for volcanic ash (WV/LV SIGMET , FV/LU VAA, WM/LM VONA**) – 202611dd/0200**			
WV/LV 1.0	**VAACs** listed in Table 4	**Send the VA advisory test message** (see para. 7.2) to: i. MWOs as indicated in Table 4; ii. RODBs listed in Table 2 (Note: this only applies to VAACs Darwin, Tokyo and Wellington); and iii. WAFCs listed in Table 5	**202611dd/0200**

WV/LV 1.1	**MWOs associated with one or more VAACs,** as indicated in Table 1 and Table 4	**Send the WV/LV SIGMET test message** based on the VA advisory test message from each associated VAAC (see para. 7.4) to: i. RODBs listed in Table 2 (Note: this only applies to MWOs in the APAC Region); and ii. WAFCs listed in Table 5 *Note.- For LV SIGMET test message to	**Between 20241120/0200 and 20241120/0230,** on receipt of the VA advisory test message from an associated VAAC, **or at 20241120/0230,** or as soon as practicable after, when the MWO does not receive the VA advisory test message from its associated VAAC.
		be successfully disseminated to RODBs/WAFCs, MWOs need to send the LV SIGMET test messageto their respective ROC, and the ROC is responsible for automatically forwarding the message to RODBs/WAFCs.	Note: MWOs should send a test WV/LV SIGMET upon receipt (or non-receipt) of a test VA advisory test message for each **VAAC that they are associated with.**
WV/LV 1.2	SVOs listed in Table 6	Send test VONA message (see para. 7.6) to: i. VAACs as indicated in Table 6 (Note: this does not apply to the SVOs that are under the same organization as the VAAC); and ii. RODBs listed in Table 2.	202611dd/0200
WV/LV 2.0	**RODBs** listed in Table 2 and **WAFCs** listed in Table 5	1) File all received (VA advisory and WV/LV SIGMET) test messages; and 2) Prepare and send the SIGMET test summary table (see para. 8.1) to: i. APAC SIGMET test focal points (see para. 6.2.2); and ii. Copy to the ICAO APAC Office	1) **Between 20241120/0200 and 20241120/0230**; and 2) After **20241120**/0230
SIGMET test for weather and other phenomena apart from tropical cyclone and volcanic ash (WS/LS SIGMET test) – 20241127/0200			
WS/LS 1.0	**MWOs in the APAC Region** listed in Table 1	Send the WS/LS SIGMET test message (see para. 7.5) to: i. RODBs listed in Table 2; and ii. WAFCs listed in Table 5 *Note.- For LS SIGMET test message to be successfully disseminated to RODBs/WAFCs, MWOs need to send the LS SIGMET test messageto their respective ROC, and the ROC is responsible for automatically forwarding the message to RODBs/WAFCs.	**20241127/0200**
WS/LS 2.0	**RODBs** listed in Table 2 and **WAFCs** listed in Table 5	1) **File all received** (WS/LS SIGMET) **test messages**; and 2) **Prepare and send the SIGMET test summary table** (see para. 8.1) to: i. APAC SIGMET test focal points (see para. 6.2.2); and ii. Copy to the ICAO APAC Office	**1) Between 20241127/0200 and 20241127/0230; and** **2) After 20241127/0230**
Final	**APAC SIGMET test focal points** listed in para. 6.2.2	**Prepare the final report of the SIGMET tests**	**Sequential to Tasks ID. WC/LY 4.0, WV/LV 2.0, and WS/LS 2.0**

Figure 1: Schematic diagram of test message dissemination



Attachment C1 - Example LS SIGMET test message (in IWXXM form)

```
<?xml version="1.0" encoding="UTF-8"?>
<collect:MeteorologicalBulletin
        xmlns:iwxxm="http://icao.int/iwxxm/2021-2"
        xmlns:metce="http://def.wmo.int/metce/2013"
        xmlns:collect="http://def.wmo.int/collect/2014"
        xmlns:xlink="http://www.w3.org/1999/xlink"
        xmlns:aixm="http://www.aixm.aero/schema/5.1.1"
        xmlns:gml="http://www.opengis.net/gml/3.2"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                        xsi:schemaLocation="http://icao.int/iwxxm/2021-2
http://schemas.wmo.int/iwxxm/2021-2/iwxxm.xsd http://def.wmo.int/collect/2014
http://schemas.wmo.int/collect/1.2/collect.xsd"
                        gml:id="uuid.ff33267f-6afd-4fd2-9846-5162b0c98951">
        <collect:meteorologicalInformation>
                <iwxxm:SIGMET reportStatus="NORMAL"
                                permissibleUsage="NON-OPERATIONAL"
                                permissibleUsageReason="TEST"
                                gml:id="uuid.0b1308a3-7c73-4c16-8cd3-4c31d47bac12">
                        <iwxxm:issueTime>
                                <gml:TimeInstant gml:id="uuid.b2212776-ec35-4de7-b404-
62206703ae00">
                                        <gml:timePosition>2023-08-
13T01:00:00Z</gml:timePosition>
                                </gml:TimeInstant>
                        </iwxxm:issueTime>
                        <iwxxm:issuingAirTrafficServicesUnit>
                                <aixm:Unit gml:id="uuid.6acc1cca-0f7e-484c-b554-c03c8d6932ad">
                                        <aixm:timeSlice>
                                                <aixm:UnitTimeSlice gml:id="uuid.c8ff450b-d89f-
4f9d-b7a1-305316822208">
                                                        <gml:validTime/>

        <aixm:interpretation>SNAPSHOT</aixm:interpretation>
                                                        <aixm:name>VHHK FIC</aixm:name>
                                                        <aixm:type>FIC</aixm:type>
                                                        <aixm:designator>VHHK</aixm:designator>
                                                </aixm:UnitTimeSlice>
                                        </aixm:timeSlice>
                                </aixm:Unit>
                        </iwxxm:issuingAirTrafficServicesUnit>
                        <iwxxm:originatingMeteorologicalWatchOffice>
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                                        <aixm:timeSlice>
                                                <aixm:UnitTimeSlice gml:id="uuid.f500d47a-3043-
4578-a219-8f4e27248bab">
                                                        <gml:validTime/>

        <aixm:interpretation>SNAPSHOT</aixm:interpretation>
                                                        <aixm:name>VHHH MWO</aixm:name>
                                                        <aixm:type>MWO</aixm:type>
                                                        <aixm:designator>VHHH</aixm:designator>
                                                </aixm:UnitTimeSlice>
                                        </aixm:timeSlice>
                                </aixm:Unit>
                        </iwxxm:originatingMeteorologicalWatchOffice>
                        <iwxxm:issuingAirTrafficServicesRegion>
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c4701d0e3a88">
                                        <aixm:timeSlice>
                                                <aixm:AirspaceTimeSlice gml:id="uuid.06758753-
4df4-408b-95a1-064e8195d4b0">
                                                        <gml:validTime/>

        <aixm:interpretation>SNAPSHOT</aixm:interpretation>
                                                        <aixm:type>FIR</aixm:type>
                                                        <aixm:designator>VHHK</aixm:designator>
                                                        <aixm:name>HONG KONG FIR</aixm:name>
                                                </aixm:AirspaceTimeSlice>
                                        </aixm:timeSlice>
                                </aixm:Airspace>
                        </iwxxm:issuingAirTrafficServicesRegion>
                        <iwxxm:sequenceNumber>01</iwxxm:sequenceNumber>
```

```
                        <iwxxm:validPeriod>
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87a55679ca2a">
                                        <gml:beginPosition>2023-08-
13T01:15:00Z</gml:beginPosition>
                                        <gml:endPosition>2023-08-13T01:30:00Z</gml:endPosition>
                                </gml:TimePeriod>
                        </iwxxm:validPeriod>
                        <iwxxm:analysisCollection>
                                <iwxxm:analysisAndForecastPositionAnalysis
gml:id="uuid.3454275d-9ba9-4be7-b17c-8a29f26c48c6">
                                        <iwxxm:analysis>
                                                <iwxxm:SIGMETEvolvingConditionCollection
timeIndicator="OBSERVATION"
                                                        gml:id="uuid.4658c0ae-a175-40f3-b09b-
2e4573bdf852">
                                                        <iwxxm:phenomenonTime
nilReason="http://codes.wmo.int/common/nil/missing"/>
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                                                                        <iwxxm:geometry/>
                                                                </iwxxm:SIGMETEvolvingCondition>
                                                        </iwxxm:member>
                                                </iwxxm:SIGMETEvolvingConditionCollection>
                                        </iwxxm:analysis>
                                </iwxxm:analysisAndForecastPositionAnalysis>
                        </iwxxm:analysisCollection>
                </iwxxm:SIGMET>
        </collect:meteorologicalInformation>
        <collect:bulletinIdentifier>A_LSSS20VHHH130100_C_VHHH_20230813010000.xml</collect:bull
etinIdentifier>
</collect:MeteorologicalBulletin>
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APPENDIX D

WMO HEADINGS (WMO AHL) FOR SIGMET BULLETINS

Used by Asia/Pacific Meteorological Watch Offices

MWO location	ICAO location indicator	WMO SIGMET Headings						FIR/ACC served	Remarks
		WS/LS		WC/LY		WV/LV		ICAO location indicator	
1	2	3		4		5		6	7
AFGHANISTAN									AFTN not available
KABUL AD	OAKB	WSAH31	LSAH31			WVAH31	LVAH31	OAKX	Headings not confirmed
AUSTRALIA									
BRISBANE/Brisbane	YBRF	WSAU21	LSAU21					YBBB YMMM	
MELBOURNE/Melbourne	YMRF	WSAU21	LSAU21					YBBB YMMM	
MELBOURNE (WORLD MET CENTRE, BUREAU OF METEOROLOGY)	YMMC	WSAU21	LSAU21	WCAU01	LYAU01	WVAU01	LVAU01	YBBB YMMM	
BANGLADESH									
DHAKA/Hazrat Shahjalal International Airport	VGHS	WSBW20	LSBW20	WCBW20	LYBW20	WVBW20	LVBW20	VGFR	
CAMBODIA									
PHNOM-PENH/Phnom Penh Intl	VDPP	WSKP31	LSKP31	WCKP31	LYKP31	WVKP31	LVKP31	VDPF	
CHINA									
BEIJING/Capital	ZBAA	WSCI33	LSCI33	WCCI33	LYCI33	WVCI33	LVCI33	ZBPE	
GUANGZHOU/Baiyun	ZGGG	WSCI35	LSCI35	WCCI35	LYCI35	WVCI35	LVCI35	ZGZU	
HAIKOU/Meilan	ZJHK	WSCI35	LSCI35	WCCI35	LYCI35	WVCI35	LVCI35	ZJSA	
CHENGDU/Shuangliu	ZUUU	WSCI36	LSCI36			WVCI36	LVCI36	ZPKM	
XI'AN/Xianyang	ZLXY	WSCI37	LSCI37			WVCI37	LVCI37	ZLHW	
SHANGHAI/Hongqiao	ZSSS	WSCI34	LSCI34	WCCI34	LYCI34	WVCI34	LVCI34	ZSHA	
SHENYANG/Taoxian	ZYTX	WSCI38	LSCI38			WVCI38	LVCI38	ZYSH	
TAIBEI/Taibei Intl	RCTP	WSCI31	LSCI31	WCCI31	LYCI31	WVCI31	LVCI31	RCAA	
URUMQI/Diwopu	ZWWW	WSCI39	LSCI39			WVCI39	LVCI39	ZWUQ	
WUHAN/Tianhe	ZHHH	WSCI45	LSCI45			WVCI45	LVCI45	ZHWH	
HONG KONG/Hong Kong Intl	VHHH	WSSS20	LSSS20	WCSS20	LYSS20	WVSS20	LVSS20	VHHK	
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA									
SUNAN	ZKPY	WSKR31	LSKR31	WCKR31	LYKR31	WVKR31	LVKR31	ZKKP	
FIJI									
NADI/Nadi Intl	NFFN	WSFJ01,0	LSFJ01,0	WCFJ01,	LYFJ01,0	WVFJ01,0	LVFJ01,0	NFFF	

MWO location	ICAO location indicator	WMO SIGMET Headings						FIR/ACC served	Remarks
		WS/LS		WC/LY		WV/LV		ICAO location indicator	
1	2	3		4		5		6	7
FRENCH POLYNESIA TAHITI/Faaa	NTAA	WSPF21, 22,23,24	LSPF21,22,23,24	WCPF20, 21,22,23, 24	LYPF20, 21,22,23, 24	WVPF20, 21	LVPF20,21	NTTT	
INDIA KOLKATA CHENNAI/Chennai DELHI/Indira Ghandi Intl MUMBAI/Chhatrapati Shivaji Intl.	 VECC VOMM VIDP VABB	 WSIN31 WSIN31 WSIN31 WSIN31	 LSIN31 LSIN31 LSIN31 LSIN31	 WCIN31 WCIN31 WCIN31 WCIN31	 LYIN31 LYIN31 LYIN31 LYIN31	 WVIN31 WVIN31 WVIN31 WVIN31	 LVIN31 LVIN31 LVIN31 LVIN31	 VECF VOMF VIDF VABF	
INDONESIA JAKARTA/Soekarno-Hatta (Comm Center) UJUNG PANDANG/Hasanuddin (Comm Center)	 WIII WAAA	 WSID20 WSID21	 LSID20 LSID21	 WCID20 WCID21	 LYID20 LYID21	 WVID20 WVID21	 LVID20 LVID21	 WIIF WAAF	
JAPAN TOKYO (CITY)	RJTD	WSJP31	LSJP31	WCJP31	LYJP31	WVJP31	LVJP31	RJJJ	
LAO PEOPLE'S DEMOCRATIC REPUBLIC VIENTIANE/Wattay	VLVT	WSLA31	LSLA31	WCLA31	LYLA31	WVLA31	LVLA31	VLVT	
MALAYSIA SEPANG/KL International Airport	WMKK	WSMS31	LSMS31	WCMS31	LYMS31	WVMS31	LVMS31	WBFC WMFC	
MALDIVES MALE/Intl	VRMM	WSMV31	LSMV31	WCMV31	LYMV31	WVMV31	LVMV31	VRMF	
MONGOLIA ULAAN BAATAR	ZMUB	WSMO31	LSMO31			WVMO31	LVMO31	ZMUB	
MYANMAR YANGON/Yangon International	VYYY	WSBM31	LSBM31	WCBM31	LYBM31	WVBM31	LVBM31	VYYY	
NAURU NAURU	ANYN	WSNW20	LSNW20	WCNW20	LYNW20	WVNW20	LVNW20	ANAU	MWO not established however
NEPAL KATHMANDU	VNKT	WSNP31	LSNP31			WVNP31	LVNP31	VNSM	SIGMET currently not issued

MWO location	ICAO location indicator	WMO SIGMET Headings						FIR/ACC served	Remarks
		WS/LS		WC/LY		WV/LV		ICAO location indicator	
1	2	3		4		5		6	7
NEW ZEALAND									
WELLINGTON (Meteorological Office)	NZKL	WSNZ21 WSPS21	LSNZ21 LSPS21	WCNZ21 WCPS21	LYNZ21 LYPS21	WVNZ21 WVPS21	LVNZ21 LVPS21	NZZC NZZO	
PAKISTAN									
KARACHI/Jinnah Intl	OPKC	WSPK31	LSPK31	WCPK31	LYPK31	WVPK31	LVPK31	OPKR	
LAHORE/Allama Iqbal Intl	OPLA	WSPK31	LSPK31			WVPK31	LVPK31	OPLR	
PAPUA NEW GUINEA									
PORT MORESBY/Intl	AYPY	WSNG20	LSNG20	WCNG20	LYNG20	WVNG20	LVNG20	~~AYPY~~ AYPM	
PHILIPPINES									
MANILA/Ninoy Aquino Intl, Pasay City, Metro Manila	RPLL	WSPH31	LSPH31	WCPH31	LYPH31	WVPH31	LVPH31	RPHI	
REPUBLIC OF KOREA									
INCHEON	RKSI	WSKO31	LSKO31	WCKO31	LYKO31	WVKO31	LVKO31	RKRR	
SINGAPORE									
SINGAPORE/Changi	WSSS	WSSR20	LSSR20	WCSR20	LYSR20	WVSR20	LVSR20	WSJC	
SOLOMON ISLANDS									
HONIARA/Henderson	AGGH	WSSO20	LSSO20	WCSO20	LYSO20	WVSO20	LVSO20	AGGG	
SRI LANKA									
COLOMBO/Bandaranaike International Airport Colombo	VCBI	WSSB31	LSSB31	WCSB31	LYSB31	WVSB31	LVSB31	VCBI	
THAILAND									
BANGKOK/Suvarnabhumi Intl Airport	VTBS	WSTH31	LSTH31	WCTH31	LYTH31	WVTH31	LVTH31	VTBB	
UNITED STATES									
ANCHORAGE/Anchorage Intl	PAWU	WSAK01-09 PAWU	LSAK01-09 PAWU	WCAK01-09 PAWU	LYAK01-09 PAWU	WVAK01-09 PAWU	LVAK01-09 PAWU	PAZA	
HONOLULU/Honolulu Intl	PHFO	WSPA01-13 PHFO	LSPA01-13 PHFO	WCPA01-13 PHFO	LYPA01-13 PHFO	WVPA 01-13 PHFO	LVPA 01-13 PHFO	KZAK	
KANSAS CITY	*KKCI*	*WSNT01-13 KKCI*	*LSNT01-13 KKCI*	*WCNT01-13 KKCI*	*LYNT01-13 KKCI*	*WVNT01-13 KKCI*	*LVNT01-13 KKCI*	*KZNY* *KZMA* *KZHU* *TJZU*	
KANSAS CITY	KKCI	WSPN01-13 KKCI	LSPN01-13 KKCI	WCPN01-13 KKCI	LYPN01-13 KKCI	WVPN01-13 KKCI	LVPN01-13 KKCI	KZAK	
VIET NAM									
Gia Lam	VVGL	WSVS31	LSVS31	WCVS31	LYVS31	WVVS31	LVVS31	VVHN VVHM	

APPENDIX E

TROPICAL CYCLONE ADVISORY CENTRES

Explanation of Table

Col. 1: Name of the tropical cyclone advisory centre (TCAC).

Col 2: ICAO location indicator used by the TCAC.

Col 3: WMO heading (TTAAii CCCC) of the FK bulletin.

Col 4: Area of responsibility for the preparation of advisory information on tropical cyclones by the TCAC in column 1.

Col 5: Period of operation of the TCAC.

Col 6: MWOs to which the advisory information on tropical cyclones should be sent.

Col 7: ICAO location indicator of the MWOs in Column 6.

Col 8: Remarks (e.g., Any other bulletin-specific information).

Note. -MWOs in italics are situated outside the Asia/Pacific Region.

TCAC (State)	ICAO location	WMO Heading TTAAii CCCC	Area of Responsibility	Period of operation[1)]	MWO to which advisory information is to be sent	Remarks

	indicator				Name	ICAO location indicator	
1	2	3	4	5	6	7	8
TC Advisories (FK)							
Miami (United States)	KNHC	FKNT21-25 KNHC FKPZ21-25 KNHC	Atlantic Northeast Pacific N: 60°N S: 0°N W: 140°W E: Coastline	May – November	Honolulu *Kansas City* Tahiti	PHFO *KKCI* NTAA	ii = 21 – 25; up to 5 different bulletins possible at a time according to the number of TCs in the TCAC's area of responsibility.
Honolulu (United States)	PHFO	FKPA21-25 PHFO	Central Pacific N: 60°N S: 0°N W: 180°W E: 140°W	May – November	*Anchorage* Honolulu *Kansas City* Tahiti	*PAWU* PHFO *KKCI* NTAA	ii = 21 – 25; up to 5 different bulletins possible at a time according to the number of TCs in the TCAC's area of responsibility.
New Delhi (India)	VIDP	FKIN20 VIDP FKIN21 VIDP	1) Bay of Bengal 2) Arabian Sea N: Coastline S:5°N W: Coastline E: 100°E	April –June October – December	*Bahrain* Chennai Colombo Dhaka *Emirates* Jakarta *Jeddah* Karachi Kuala Lumpur *Kuwait* Male Mumbai *Muscat* *Tehran* *Sana'a* Yangon	*OBBI* VOMM VCBI VGHS *OMAE* WIII *OEJN* OPKC WMKK *OKBK* *VRMM* *VABB* *OOMS* *OIII* *OYSN* *VYYY*	

Darwin (Australia)	ADRM	FKAU01 – 08 ADRM	Area bounded by 0°S 90°E, 40°S 90°E, 40°S 160°E, 0°S 160°E, 0°S 90°E.	November – April	Brisbane[2)] Colombo Honiara Jakarta Melbourne[2)] Port Moresby Ujung Pandang Melbourne(World Met Centre, BoM)[2)]	YBRF VOMM AGGH WIII YMRF AYPY WAAA YMMC	
Nadi (Fiji)	NFFN	FKPS01 NFFN	Southern Pacific N: 0°S S: 40°S W: 160°E E: 120°W	November – April	Brisbane[2)] Honiara Honolulu Melbourne[2)] Melbourne (World Met Centre, BoM)[2)] Nadi Nauru[3)] Tahiti Wellington (Aviation Weather Centre)	YBRF AGGH PHFO YMRF YMMC NFFN ANYN NTAA NZKL	
Tokyo (Japan)	RJTD	FKPQ30-35 RJTD	Western Pacific (incl. South China Sea) N: 60°N S: 0°N W: 100°E E: 180°E	Throughout the year	Bangkok Beijing Chengdu Gia Lam Guangzhou	VTBS ZBAA ZUUU VVGL ZGGG	

					Haikou Hong Kong Honolulu Incheon Jakarta *Kansas City* Kota Kinabaru Kuala Lumpur Manila Nadi Phnom-Penh Shanghai Singapore Sunan Taibei Tokyo Ujung Pandang Vientiane	ZJHK VHHH PHFO RKSI WIII *KMKC* WBKK WMKK RPLL NFFN VDPP ZSSS WSSS ZKPY RCTP RJTD WAAA VLVT	
Réunion (France)	FMEE	FKIO20 FMEE	Southwest Indian Ocean N: 0°S S: 40°S W: African Coastline E: 90°E	Throughout the year	*Antananarivo* *Bloemfontein* Brisbane[2)] *Dar-es-Salaam* *Durban* *Gaborone* *Harare* *Johannesburg*	*FMMI* *FABL* YBRF *HTDA* *FADN* *FBSK* *FVHA* *FAJS*	

					Lilongwe *Mahé* Male *Maputo* *Mauritius* Melbourne[2)] Melbourne (World Met Centre, BoM)[2)] Mumbai *Nairob*	*FWLI* *FSIA* VRMM *FQMA* *FIMP* YMRF YMMC VABB *HKJK*	

NOTES:

1) Indicates approximately the main seasons for tropical cyclones.

2) Tropical cyclone SIGMET for the Australian FIRs is issued by MWOs: Brisbane, Melbourne and Melbourne (World Met Centre, BoM).

3) MWO not implemented.

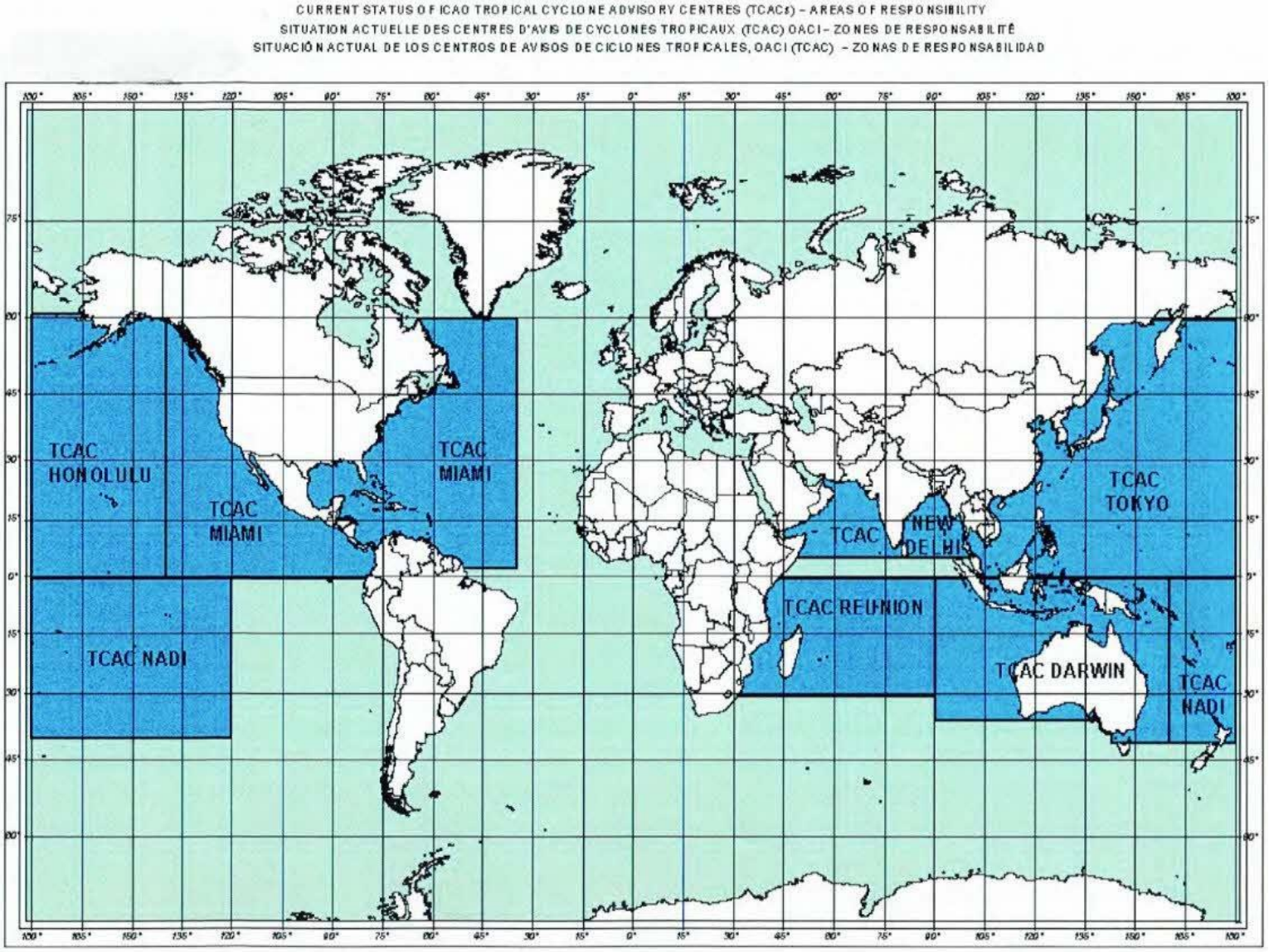

Figure: Areas of responsibility of the TCACs

APPENDIX F

VOLCANIC ASH ADVISORY CENTRES

The operational and back-up header arrangements can be found in *ICAO Handbook on International Airways Volcano Watch (IAVW) Operational Procedures and Contact Lists (Doc 9766)* under table 4-3 (https://www.icao.int/airnavigation/METP/MOG%20IAVW%20Reference%20Documents/Forms/AllItems.aspx).

To supplement the information within the IAVW Handbook, the back-up arrangements between the APAC VAACs are as follows:

VAAC Darwin provides back-up to the full area of responsibility for VAAC Tokyo and VAAC Tokyo provides back-up to the VAAC Darwin area of responsibility north of 20 degrees south.

VAAC Darwin provides back-up to the full area of responsibility for VAAC Wellington and VAAC Wellington provides back-up to the VAAC Darwin area of responsibility south of 20 degrees south.

VAAC Darwin and VAAC Montreal provide back-up to the VAAC Washington area of responsibility. The back-up area covered by VAAC Darwin is westward of W170, southward from N10 from W170 to W100 and the entire Central America, Panama, Barranquilla, Maiquetia, Georgetown, Paramaribo and Cayenne Flight Information Regions (FIRs) and everything southward in VAAC Washington AOR. This will be known as the part of VAAC Washington's AOR designated to VAAC Darwin for back-up services.

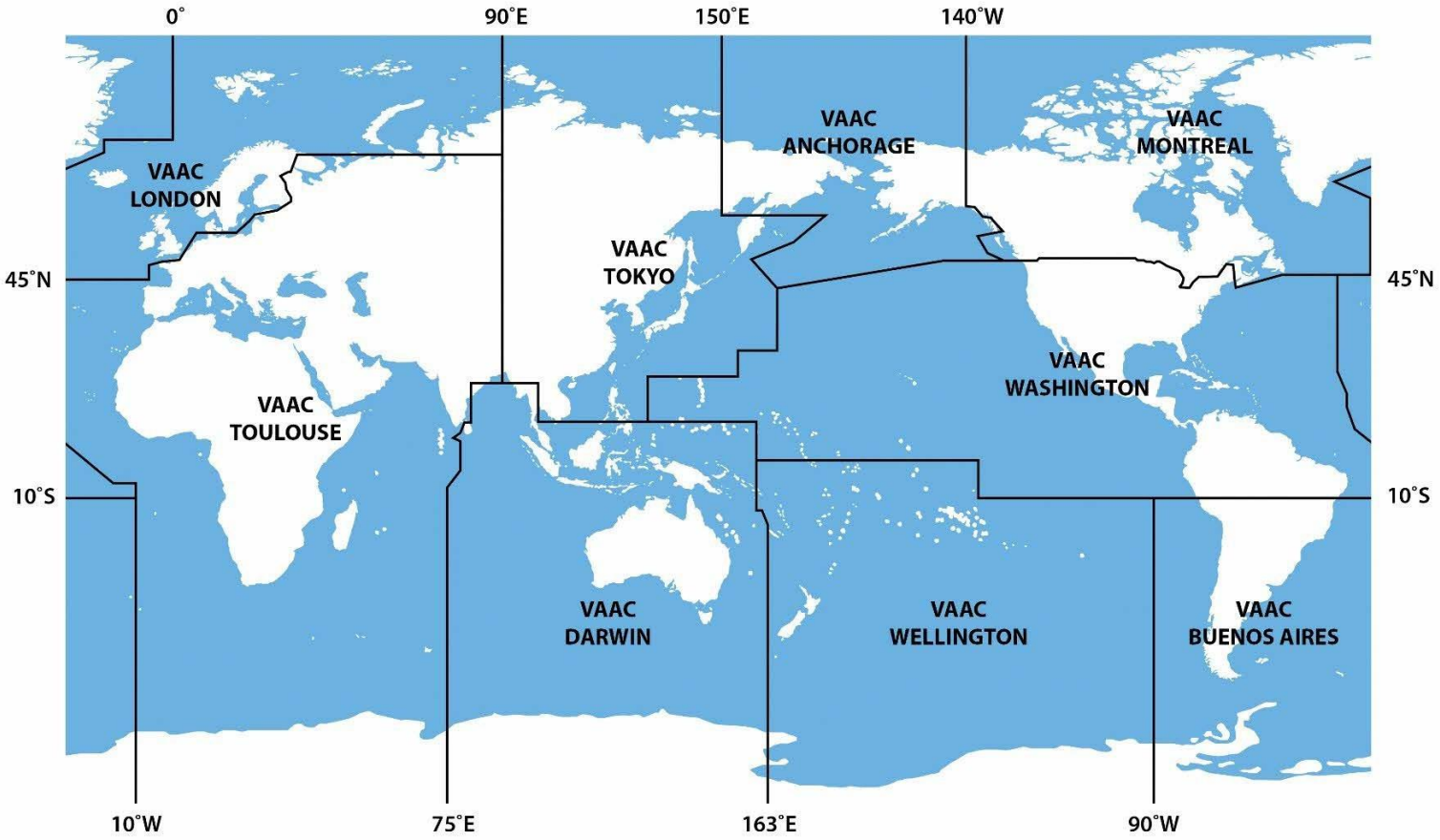

Figure: Areas of responsibility of the VAACs

APPENDIX G

ASIA/PACIFIC VAAC BACK-UP PROCEDURES

1. Situations in which Back-up Procedures should be considered

1.1 Situations that may require VAAC responsibilities to be handed over to the back-up partner include:

- Insufficient VAAC staff resources are available to adequately perform VAAC duties;
- VAAC forecasters are unable to access the information required to adequately monitor any volcanic activity;
- The VAAC is unable to generate VAAs;
- The VAAC is unable to disseminate VAAs;
- The VAAC is under threat from an event that may limit its ability to properly perform its functions in the near future; and
- During any other situation where the VAAC Shift Supervisor considers the VAAC is unable to properly perform its functions.

2. Actions to be taken by Routine VAAC to initiate handover to Back-up VAAC

2.1 The VAAC Shift Supervisor will request back-up from Back-up VAAC using the VAAC contact details contained within IAVW Handbook (ICAO Doc. 9766) Table 4-2. Requests are to be made using the following communication methods as per each VAAC back-up arrangement:

a. E-mail (FAX as back-up method)
b. Communication Platform; and
c. Telephone.

2.2 Using the appropriate communications forms, provide detailed information regarding the following:

a. Expected duration and nature of outage;
b. Current Volcanic Ash Advisories including:
   - Headers used
   - Volcano names
   - Next routine issue times
   - Sequence number
   - What has been observed on satellite imagery
   - What other reports have been received e.g. Volcanological Agency Reports, AIREPs, ASHTAMs, SIGMETs, phone calls or emails
   - Forecast strategy and expected developments; and
c. Other volcanoes of interest including:
   - Any volcanoes for which an imminent eruption has been forecast
   - Any volcanoes exhibiting elevated levels of activity
   - Any recent volcanic activity reports received.

2.3 If possible, provide, any information other than listed above that is not currently available to the Back-up VAAC.

2.4 Maintain a written logbook of actions taken for the duration of the back-up service.

3. Actions to be taken by the Back-up VAAC upon receipt of a back-up request

3.1 Commence satellite monitoring for the Routine VAAC.

3.2 Send a confirmation message using the appropriate communications forms indicating whether operational back-up for the Routine VAAC is able to be commenced.

3.3 Send VAA to external users advising of the outage and advising Back-up VAAC contact details as per appropriate VAA proforma.

3.4 Continue routine satellite monitoring and issue VAA as required to the relevant AFTN and e-mail addresses. If VAA are issued for active eruptions then the VAAC is required to include the message "ISSUED BY VAAC A ON BEHALF OF VAAC B". Advise volcanological agencies that new information should be sent directly to the Back-up VAAC.

3.5 Maintain a written logbook of actions taken for the duration of the back-up service.

4. Actions to be taken by Routine VAAC to resume normal operations

4.1 Commence satellite monitoring for the Routine VAAC.

4.2 Send a notification of intent to resume normal operations to the Back-up VAAC, using the appropriate communications forms.

4.3 Upon receipt of confirmation from the Back-up VAAC, issue VAA to external users advising of the resumption of normal operations by the Routine VAAC as per appropriate VAA pro forma.

4.4 Continue routine satellite monitoring and issue VAA as required to the appropriate AFTN and e-mail addresses. Advise volcanological agencies that information should now be sent directly to the Routine VAAC.

4.5 Prepare an event report summarizing the significant actions and any other relevant information contained within the logbooks of the Back-up VAAC and Routine VAAC.

5. Actions to be taken by Back-up VAAC upon receipt of intent to resume normal operations notification from the Routine VAAC

5.1 Send a confirmation receipt for the intent to resume normal operations notification, using the appropriate communications forms.

5.2 Using the appropriate communications forms, provide detailed information regarding:

A. Details of current Volcanic Ash Advisories including:
- Header used
- Volcano names
- Next routine issue times
- Sequence number
- What has been observed on satellite imagery
- What other reports have been received e.g. Volcanological Agency Reports, AIREPs, ASHTAMs, SIGMETs, phone calls or emails
- Current forecast strategy and expected developments; and

B. Other volcanoes of interest including:
- Any volcanoes for which an imminent eruption has been forecast
- Any volcanoes exhibiting elevated levels of activity
- Any recent volcanic activity reports received.

5.3 Provide the Routine VAAC with copies of logbooks created by the Back-up VAAC during the back-up event.

5.4 Cease routine satellite monitoring for the Routine VAAC.

_____

APPENDIX H

VAAC BACK-UP TEST PROCEDURES

1. Introduction

1.1 The *Handbook on the International Airways Volcano Watch (IAVW) — Operational Procedures and Contact List* (Doc 9766) recommends that Volcanic Ash Advisory Centres (VAACs) should conduct back-up tests at least annually.

1.2 The VAACs A and B have developed a mutual back-up arrangement that includes procedures for undertaking a back-up test as described in Doc 9766.

2. Purpose and Scope of VAAC Back-up tests

2.1 The purpose of the VAAC back-up test is to ensure that internal procedures for the handover of responsibility and the issue of products for the other VAAC's area of responsibility are robust and functional.

2.2 The scope of the test also includes checking the dissemination pathways of the volcanic ash advisory (VAA) messages. However, it is not designed to check the issuance of volcanic ash SIGMET and so there is **no requirement** to issue test SIGMETs.

3. Back-up test of VAAC A by VAAC B

3.1 On the specified date for the test, at mutually agree time (T) VAAC A will request back-up services from VAAC B according to internal procedures and using the operational VAAC contact details contained within the IAVW Handbook (Doc 9766) Table 4-2. VAAC B will issue a VAA for commencement of back-up test to participating operational units as per the VAA example Attachment A (i).

3.2 VAAC B will issue a VAA for VAAC back-up test to participating operational units as per the VAA example in Attachment A (ii). All recipients (ACCs/FICs, MWOs, WAFCs and RODBs) of this VAA are requested to **respond to VAAC A** using the email address E-MAIL ADDRESS HERE and the subject 'VAA TEST' with an affirmative or negative response regarding the receipt of the test VAA.

3.3 At T+30 minutes VAAC A will notify of intent to resume normal operations to VAAC B, and VAAC A will issue a VAA for cessation of back-up test to participating operational units as per the VAA example in Attachment A (iii).

3.4 MWOs should NOT issue a test SIGMET at any stage of the test.

4. Back-up test of VAAC B by VAAC A[5]

4.1 At T+60 minutes, the VAAC B will request back-up services from VAAC A according to internal procedures and using the operational VAAC contact details contained within the IAVW Handbook (Doc 9766) Table 4-2. VAAC A will issue a VAA for commencement of back-up test to participating operational units as per the VAA example in Attachment B (i).

4.2 VAAC A will issue a VAA for VAAC back-up test to participating operational units as per the

[5] In the case of a VAAC Washington back-up test, the second part of this procedure will not occur as VAAC Washington does not provide back-up to VAAC Darwin. Typically, VAAC Washington and VAAC Darwin conduct live back-ups where operational advisories are issued for active volcanoes.

VAA example in Attachment B (ii). All recipients (ACCs/FICs, MWOs, WAFCs and RODBs) of this VAA are requested to **respond to VAAC B** using the email address E-MAIL ADDRESS HERE and the subject 'VAA TEST' with an affirmative or negative response regarding the receipt of the test VAA.

4.3 At T+90 minutes VAAC B will notify of intent to resume normal operations to VAAC A, and VAAC B will issue a VAA for cessation of back-up test to participating operational units as per the VAA example in Attachment B (iii).

4.4 MWOs should NOT issue a test SIGMET at any stage of the test.

5. Back-up test termination and reporting

5.1 At T+120 minutes the test will be terminated.

5.2 In case of significant eruption, the test should be ceased.

5.3 During the test each VAAC will maintain a logbook of events and will provide the other VAAC with a copy.

5.4 Email responses to the VAA for VAAC back-up test will be analysed by the VAACs. Both VAACs will analyse the responses to the test VAAs and will present the results to the conjoint meeting of the Asia/Pacific Meteorological Information Exchange Working Group or an appropriate expert group (or groups) that may be required to progress International Airways Volcano Watch (IAVW) related work.

(i) ATTACHMENT A – SAMPLE VAA MESSAGES

(i) VAA for commencement of back-up test; AFTN message from VAAC B to operational units in VAAC A area of responsibility:

```
FF ********
DDHHMM XXXXXXXX
TTAAii CCCC DDHHMM
VA ADVISORY
STATUS: TEST
DTG: YYYYMMDD/HHMMZ
VAAC: A
VOLCANO: NOTICE 999999 or TEST 999999
PSN: Snnnn or Nnnnn Wnnnnn or Ennnnn
AREA: UNKNOWN
SOURCE ELEV: 9999M or UNKNOWN
ADVISORY NR: YYYY/N
INFO SOURCE: NIL
ERUPTION DETAILS: NIL
OBS VA DTG: nn/nnnnZ
OBS VA CLD: VA NOT IDENTIFIABLE FM SATELLITE DTA WINDS SFC/FL010 VRB00KT
FCST VA CLD +6HR: NO VA EXP
FCST VA CLD +12HR: NO VA EXP
FCST VA CLD +18HR: NO VA EXP
RMK: VAAC A AND VAAC B ARE CONDUCTING A BACK UP TEST NOW.
THIS IS A TEST NOTICE ISSUED BY VAAC B FOR THE VAAC A AREA
OF RESPONSIBILITY ANNOUNCING THE START OF BACK UP TEST FOR VAAC
A BY VAAC B.
NXT ADVISORY: NO FURTHER ADVISORIES.
```

(ii) VAA for VAAC back-up test; AFTN message from VAAC B to operational units in VAAC A area of responsibility:

```
FF ********
DDHHMM XXXXXXXX
TTAAii CCCC DDHHMM
VA ADVISORY
STATUS: TEST
DTG: YYYYMMDD/HHMMZ
VAAC: A
VOLCANO: TEST 999999
PSN: Snnnn or Nnnnn Wnnnnn or Ennnnn
AREA: UNKNOWN
SOURCE ELEV: 9999M or UNKNOWN
ADVISORY NR: YYYY/N
INFO SOURCE: NIL
ERUPTION DETAILS: NIL
OBS VA DTG: nn/nnnnZ
OBS VA CLD: VA NOT IDENTIFIABLE FM SATELLITE DTA WINDS SFC/FL010 VRB00KT
FCST VA CLD +6HR: NO VA EXP
FCST VA CLD +12HR: NO VA EXP
FCST VA CLD +18HR: NO VA EXP
RMK: THIS IS A TEST ADVISORY ISSUED BY VAAC B
FOR THE VAAC A AREA OF RESPONSIBILITY. PLEASE
ACKNOWLEDGE RECEIPT OF THIS ADVISORY BY SENDING AN EMAIL TO
[e-mail address].
NXT ADVISORY: NO FURTHER ADVISORIES.
```

(iii) VAA for cessation of back-up test; AFTN message from VAAC A to operational units in VAAC A area of responsibility:

```
FF ********
DDHHMM XXXXXXXX
TTAAii CCCC DDHHMM
VA ADVISORY
STATUS: TEST
DTG: YYYYMMDD/HHMMZ
VAAC: A
VOLCANO: NOTICE 999999 or TEST 999999
PSN: Snnnn or Nnnnn Wnnnnn or Ennnnn
AREA: UNKNOWN
SOURCE ELEV: 9999M or UNKNOWN
ADVISORY NR: YYYY/N
INFO SOURCE: NIL
ERUPTION DETAILS: NIL
OBS VA DTG: nn/nnnnZ
OBS VA CLD: VA NOT IDENTIFIABLE FM SATELLITE DTA WINDS SFC/FL010 VRB00KT
FCST VA CLD +6HR: NO VA EXP
FCST VA CLD +12HR: NO VA EXP
FCST VA CLD +18HR: NO VA EXP
RMK: VAAC A AND VAAC B ARE CONDUCTING A BACK UP TEST NOW.
THIS IS A TEST NOTICE ISSUED BY VAAC A FOR THE VAAC A AREA
OF RESPONSIBILITY ANNOUNCING THE END OF BACK UP TEST FOR VAAC A
BY VAAC B.
NXT ADVISORY: NO FURTHER ADVISORIES.
```

(ii) ATTACHMENT B – SAMPLE VAA MESSAGES

VAA for commencement of back-up test; AFTN message from VAAC A to operational units in VAAC B area of responsibility:

```
FF ********
DDHHMM XXXXXXXX
TTAAii CCCC DDHHMM
VA ADVISORY
STATUS: TEST
DTG: YYYYMMDD/HHMMZ
VAAC: B
VOLCANO: NOTICE 999999 or TEST 999999
PSN: Snnnn or Nnnnn Wnnnnn or Ennnnn
AREA: UNKNOWN
SOURCE ELEV: 9999M or UNKNOWN
ADVISORY NR: YYYY/N
INFO SOURCE: NIL
ERUPTION DETAILS: NIL
OBS VA DTG: nn/nnnnZ
OBS VA CLD: VA NOT IDENTIFIABLE FM SATELLITE DTA WINDS SFC/FL010 VRB00KT
FCST VA CLD +6HR: NO VA EXP
FCST VA CLD +12HR: NO VA EXP
FCST VA CLD +18HR: NO VA EXP
RMK: VAAC A AND VAAC B ARE CONDUCTING A BACK UP TEST NOW.
THIS IS A TEST NOTICE ISSUED BY VAAC A FOR THE VAAC B AREA
OF RESPONSIBILITY ANNOUNCING THE START OF BACK UP TEST FOR VAAC
B BY VAAC A.
NXT ADVISORY: NO FURTHER ADVISORIES.
```

(ii) VAA for VAAC back-up test; AFTN message from VAAC A to operational units in VAAC B area of responsibility:

```
FF ********
DDHHMM XXXXXXXX
TTAAii CCCC DDHHMM
VA ADVISORY
STATUS: TEST
DTG: YYYYMMDD/HHMMZ
VAAC: B
VOLCANO: TEST 999999
PSN: Snnnn or Nnnnn Wnnnnn or Ennnnn
AREA: UNKNOWN
SOURCE ELEV: 9999M or UNKNOWN
ADVISORY NR: YYYY/N
INFO SOURCE: NIL
ERUPTION DETAILS: NIL
OBS VA DTG: nn/nnnnZ
OBS VA CLD: VA NOT IDENTIFIABLE FM SATELLITE DTA WINDS SFC/FL010 VRB00KT
FCST VA CLD +6HR: NO VA EXP
FCST VA CLD +12HR: NO VA EXP
FCST VA CLD +18HR: NO VA EXP
RMK: THIS IS A TEST ADVISORY ISSUED BY VAAC A
FOR THE VAAC B AREA OF RESPONSIBILITY. PLEASE
ACKNOWLEDGE RECEIPT OF THIS ADVISORY BY SENDING AN EMAIL TO
[e-mail address].
NXT ADVISORY: NO FURTHER ADVISORIES.
```

(iii) VAA for cessation of back-up test; AFTN message from VAAC B to operational units in VAAC B area of responsibility:

```
FF ********
DDHHMM XXXXXXXX
TTAAii CCCC DDHHMM
VA ADVISORY
STATUS: TEST
DTG: YYYYMMDD/HHMMZ
VAAC: B
VOLCANO: NOTICE 999999 or TEST 999999
PSN: Snnnn or Nnnnn Wnnnnn or Ennnnn
AREA: UNKNOWN
SOURCE ELEV: 9999M or UNKNOWN
ADVISORY NR: YYYY/N
INFO SOURCE: NIL
ERUPTION DETAILS: NIL
OBS VA DTG: nn/nnnnZ
OBS VA CLD: VA NOT IDENTIFIABLE FM SATELLITE DTA WINDS SFC/FL010 VRB00KT
FCST VA CLD +6HR: NO VA EXP
FCST VA CLD +12HR: NO VA EXP
FCST VA CLD +18HR: NO VA EXP
RMK: VAAC A AND VAAC B ARE CONDUCTING A BACK UP TEST NOW.
THIS IS A TEST NOTICE ISSUED BY VAAC B FOR THE VAAC B AREA
OF RESPONSIBILITY ANNOUNCING THE END OF BACK UP TEST FOR VAAC A
BY VAAC B.
NXT ADVISORY: NO FURTHER ADVISORIES.
```

(iii) **ATTACHMENT C**

A. AFTN addresses for exchange of VAAC back-up test VAA messages in the VAAC Darwin area of responsibility.

YMMCYMYX (VAAC Darwin)					
AGGGZQZX	NZKLYMYX	VOMMZQZQ	WADDYMYX	WSSSYZYX	YPDNZAZX
AGGHYMYX	PHZHZRZX	VTBBYPYX	WADDYOYX	YBBBVOZM	YPDNZGZA
AGGHYSYX	RJAAJALO	VTBBZQZX	WBFCZQZX	YBBBYPYX	YPDNZTZX
AYPMZQZX	RJAANCAO	VTBDYMYX	WBKKYMYX	YBBBZRZA	YPRFYMYX
AYPYANGM	RJTDYMYX	VTBSYMYX	WBKKZQZQ	YBBBZRZB	YPRMYMYX
AYPYANGO	RJTDYPYX	VVHMZQZX	WIIFZQZX	YBBBZRZG	YPTNZAZX
AYPYYMYX	RKSIYPYX	VVHNZQZX	WIIIYMYX	YBBBZRZX	YPTNZGZA
EDDFDLHD	RPHIZQZX	VVHNZRZX	WMFCZQZX	YBRFYMYX	YPTNZTZX
EGZZMASI	RPLLYMYX	VVVVYMYX	WMKKMASD	YMHFYMYX	YSRFYMYX
EGZZMPAC	VCBIYMYX	VVVVZQZX	WMKKYMYX	YMMLJSTX	YSSYQFAM
EGZZVANW	VCBIZQZX	VYYFZQZX	WMKKZQZX	YMMMZRZA	YSSYWZAX
KLGBPACO	VECCYMYX	VYYYYMYX	WRRRYNYX	YMMMZRZB	
KWBCYMYX	VHHHCPAO	VYYYZQZX	WSJCZQZX	YMMMZRZG	
LSZHSWRW	VHZZYPYX	WAAAYMYX	WSSSSIAO	YMMMZRZX	
NFFNYPYX	VOMFZQZX	WAAFZQZX	WSSSYMYX	YMMCYMYX	
NZAAANZO	VOMMYMYX	WADDYMYF	WSSSYZYK	YMRFYMYX	

B. AFTN addresses for exchange of VAAC back-up test VAA messages in the VAAC Tokyo area of responsibility.

RJTDYMYX (VAAC Tokyo)					
CWAOYMYU	RCTPZQZX	UHHHYMYX	UIIIZRZX	VLVTYMYX	YMMLJSTX
CYYCWJAO	RKRRZQZX	UHHHZRZX	UIKKYMYX	VTBBYPYX	YPDMYMYX
EGKKVIRW	RKSIYMYX	UHMMYMYX	ULMMYMYX	VTBDYMYX	ZBAAYMYX
EGRRYMYX	RPHIZRZX	UHMMZRZX	ULMMZRZX	VTBSYMYX	ZBBBYPYX
EGZZMASI	RPLLYMYV	UHNNYMYX	UNKLYMYX	VVHMZQZX	ZGGGYMYX
EGZZVANW	RPLLYMYX	UHOOYMYX	UNKLZRZX	VVHNZQZX	ZHHHYMYX
EHAMKLMD	SAZZMAMX	UHPPYMYX	UUUUYNYX	VVHNZRZX	ZJHKYMYX
EHAMKLMK	UEEEYMYX	UHPPZRZX	UUUWZDZX	VVVVYMYX	ZKPYYMYX
EHAMKLMW	UEEEZRZX	UHSHYMYX	VDPPYFYX	VYYYYMYX	ZLXYYMYX
KWBCYMYX	UELLYMYX	UHSSYMYX	VDPPYMYX	VYYYZQZX	ZMUBYMYX
NFFNYPYX	UELLZRZX	UHWWYMYX	VDPPZRZX	WSJCZRZX	ZSSSYMYX
NZAAANZO	UERRYMYX	UIAAYMYX	VDPPZTZX	WSSSYMYX	ZUUUYMYX
NZKLYMYX	UERRZRZX	UIAAZRZX	VECCYMYX	WSSSYZYX	ZWWWYMYX
PANCYMYX	UHBBYMYX	UIBBYMYX	VGHSYDYX	YBBBYPYX	ZYTXYMYX
RCTPYMYX	UHBIYMYX	UIIIYMYX	VHHHYMYX	YBZZSQJX	

C. AFTN addresses for exchange of VAAC back-up test VAA messages in the VAAC Wellington area of responsibility.

NZKLYMYX (VAAC Wellington)
AGGHYMYX AGGHYSYX KWBCYMYX NFFNYPYX NFFNYMYX NTAAYMYX NWBBYMYX NZZZBVXX RJTDYPYX VTBBYPYX WSSSYZYX YBBBVOZM YBBBYPYX YBZZMANX YPDMYMYX

D. AFTN addresses for exchange of VAAC back-up test VAA messages in the VAAC Washington area of responsibility.

KWBCYMYX (VAAC Washington)					
CWAOYMYU	MHTGYNYX	MPZLZQZX	SBMUYFTH	SMZZMAMX	SYCJYNYX
KDCAYNYX	MHTGZQZX	MROCYOYX	SBREYMYX	SOCAYMYX	SYCJZQZX
KDZZNAXX	MKJPYMYX	MUHAYMYX	SBRFZRZX	SOOOZQZX	TJSJYFYX
KZAKZRZX	MMMDXTYA	PAZAZRZX	SBRJYNYX	SPIMYMYX	TJSJYMYX
KZINZQZX	MMMXYMYT	PHZHZRZX	SEGUYMYX	SPIMYNYX	TNCCYMYX
KZNYZQZX	MMMXYMYX	SBAOZRZX	SEGUYNYX	SPIMYOYX	TTPPYMYX
NZKLYMYX	MMMXYNYX	SBAZZQZX	SEGUZQZX	SPIMZQZX	TTPPYNYX
MDCSZQZX	MMMYXTYA	SBAZZRZX	SKBOYMYX	SPZZMAMX	TTZPZQZX
MDSDYMYX	MMMZNMXO	SBBRZRZX	SKBOYNYX	SVMIYMYX	
MDSDYNYX	MPPCICPX	SBBSYMYX	SKBOZQZX	SVMIYNYX	
MHCCZQZX	MPTOYMYX	SBCWYMYX	SMJPYFYX	SVZMZQZX	
MHTGYMYX	MPTOYNYX	SBCWZRZX	SMPMZRZX	SYCJYMYX	

APPENDIX I

ADDITIONAL CRITERIA FOR ISSUANCE OF SIGMET FOR THUNDERSTORM

1. Introduction

1.1 As defined in ICAO PANS-MET 6.4, SIGMET are required to be issued for thunderstorms when they are:

(i) obscured with or without hail (OBSC TS /TSGR);
(ii) embedded with or without hail (EMBD TS/TSGR);
(iii) frequent with or without hail (FRQ TS/TSGR); and
(iv) squall line with or without hail (SQL TS/TSGR).

1.2 ICAO PANS-MET Appendix 8 further defines that an area of thunderstorms and cumulonimbus clouds should be considered:

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

(v) **Embedded (EMBD)** if it is embedded within cloud layers and cannot be readily recognized;

(vi) **Frequent (FRQ)** if within that area there is little or no separation between adjacent thunderstorms with a maximum spatial coverage greater than 75 per cent of the area affected, or forecast to be affected, by the phenomenon (at a fixed time or during the period of validity); and

(vii) **Squall line (SQL)** should indicate a thunderstorm along a line with little or no space between individual clouds.

1.3 Some States have developed additional criteria, such as minimum area of coverage of thunderstorms and minimum length of squall line, for the issuance of SIGMET for thunderstorms. Examples of additional criteria developed by the Bureau of Meteorology, Australia (The Bureau) and the Japan Meteorological Agency (JMA) are provided in Section 2 and Section 3 below. Individual States may consider developing additional criteria in consultation with users.

2. Additional Criteria for Issuance of SIGMET for Thunderstorms Developed by the Bureau of Meteorology, Australia.

2.1 Minimum area affected:

2.1.1 A minimum area was introduced for the area affected by embedded (EMBD TS) and frequent (FRQ TS) thunderstorm SIGMETs as follows:

(i) For areas where graphical area forecasts are valid, EMBD and FRQ TS should be affecting an area of 3000 NM^2 (approximately 1 degree squared) or more. This covers areas of high-level air traffic movements and low-level flights; and

(ii) For areas outside of where graphical area forecasts are valid, EMBD and FRQ TS should be affecting an area of 7200 NM^2 (approximately 2 degree by 1 degree) or more. This covers areas where there are lower air traffic movements and generally high-level flights with airborne radar to tactically fly around thunderstorms.

2.2 Definition of "little or no separation":

2.2.1 When determining if thunderstorms have "little or no separation", as required for FRQ and SQL TS SIGMET, the following criterion is used:

(i) The distance between adjacent thunderstorm cells to be applied for frequent (FRQ TS) and squall line (SQL TS) SIGMETs shall be approximately 40 NM between identifiable thunderstorm cells.

2.2.2 This criterion is based on the Australian Civil Aviation Safety Authority and the Federal Aviation Administration recommendations for thunderstorm avoidance which recommends pilots avoid any thunderstorm identified as severe, or giving an intense radar echo, by at least 20NM.

2.3 Length of squall line:

2.3.1 When determining if a line of thunderstorms requires a squall line SIGMET, the following criteria is applied:

(i) A squall line (SQL TS) SIGMET is issued for thunderstorms along a line (straight or an arc) of approximately 100 NM or more in length, with little or no separation between the clouds.

3. Additional Criteria for Issuance of SIGMET for Thunderstorms Developed by the Japan Meteorological Agency.

3.1 FRQ TS

3.1.1 FRQ TS SIGMETs are issued for CB clouds associated with lightning covering greater than or equal to 50% of the area concerned (CB coverage is greater than or equal to OCNL). If there are developing CB clouds with their coverage of OCNL, it is considered they will become FRQ CB. The criteria for minimum size required for SIGMET issuance are as below;

(1) Approach control areas around congested airports : 10,000 sq. km (100km x 100km)
(2) Around main air routes in Japan : 22,500 sq.km (150km x 150km)
(3) Other area (oceanic region) : 40,000 sq.km (200km x 200km)

3.2 EMBD TS

3.2.1 The criteria of CB coverage and minimum size for EMBD TS SIGMET are same as those of FRQ TS. If CB areas are embedded within cloud layers and cannot be readily recognized, EMBD TS SIGMETs are issued.

3.3 SQL TS

3.3.1 SQL TS SIGMETs are issued for line-shaped CB clouds with length of more than 500km and width of more than 100km.

APPENDIX J

SPACE WEATHER ADVISORIES (SWXA)

1. Introduction

1.1 ICAO Annex 3 Amendment 78 (effective November 2018) introduced the provision of Space Weather Advisories (SWXA) issued by designated Space Weather Centres.

1.2 **SIGMETs are not issued for Space Weather**. The purpose of this appendix is to provide a brief description on the SWXA products.

APPENDIX K

GUIDELINES FOR OPERATIONAL SIGMET COORDINATION

1. Inconsistencies in SIGMET information issued by different Meteorological Watch Offices (MWOs) across Flight Information Region (FIR) boundaries pose safety concerns to airspace users. Improved cross-FIR-boundary coordination and sharing of meteorological (MET) information between MWOs concerned is necessary to ensure seamlessness in SIGMET information across FIR boundaries.

2. A concerted effort within the MET community to improve operational coordination across FIR boundaries to provide harmonized MET information for hazardous weather phenomena is of great benefit to airspace users. To this end, the Asia/Pacific Air Navigation Planning and Implementation Group (APANPIRG) adopted the following conclusions in 2015 and 2017:

- **Conclusion APANPIRG/26/62** – Cross-border MET Collaboration and Coordination

  Recognising the presence of SIGMET weather phenomena that straddles across boundaries, States/Administrations are encouraged to promote cross-border collaboration and coordination to harmonise the MET products of such phenomena between Meteorological Authorities to enhance MET support for ATM in the Asia/Pacific Region.

- **Conclusion APANPIRG/28/30 – SIGMET coordination in the APAC Region**

  That, States and Administrations are encouraged to:
  a) Participate in cross-FIR-boundary SIGMET coordination on a bilateral or multilateral basis for seamless hazardous weather information for the benefit of aviation users, as well as advancing the capabilities of participating MWOs in the issuance of SIGMETs for cross-border hazardous weather phenomena; and
  b) Continue to share outcomes from SIGMET coordination activities and consider a step-by-step integration of SIGMET coordination activities in the region when operationally ready.

3. In Amendment 78 to ICAO Annex 3 "*Meteorological Services for International Air Navigation"*, a reference to ICAO Doc. 8896 "*Manual of Aeronautical Meteorological Practices*" was incorporated, which provides guidance on coordination between MWOs on a bilateral or multilateral basis to encourage MWOs to adopt a coordinated approach in SIGMET issuance.

4. This document was developed to provide MWOs with guidelines on SIGMET coordination, including planning and implementing operationally.

b. Objectives and Guiding Principles

5. Prior to implementing SIGMET coordination with neighboring MWOs it is important for the

participating MWOs to agree to the following objectives and guiding principles:

- To share information and enhance coordination between MWOs to ensure seamless MET information across borders improved quality of SIGMET information;
- To undertake effective and efficient coordination between MWOs to avoid any delays. Coordination should not be conducted at the expense of the quality and timeliness of the issuance of SIGMET;
- To put in place a consultative coordination process to facilitate consensus between participating MWOs. However, each MWO remains responsible for the SIGMET(s) issued within their respective area of responsibility (AoR) and in the event that consensus cannot be reached, each MWO retains the right to adjust parameters and assess SIGMETs in their AoR;
- To ensure subsequent issuance of SIGMETs are in line with the guidance provided in the "*ICAO Asia/Pacific Regional SIGMET Guide"* and ICAO Doc 8896 "*Manual of Aeronautical Meteorological Practice*", and complies with relevant provisions on SIGMET content and issuance in accordance with ICAO Annex 3 on "*Meteorological Service for International Air Navigation*".

c. Preliminary Requirements

6. Prior to operationalising SIGMET coordination, the following requirements should be considered.

6.1. Bilateral or multilateral coordination

6.1.1. MWOs should determine whether coordination is required on a bilateral or multilateral basis.

6.1.2. Bilateral coordination is considered straightforward since consensus is only required between two MWOs. Interaction with only one MWO may assist with timely issuance of SIGMETs.

6.1.3. Multilateral coordination is necessary for the issuance of harmonized SIGMETs for multiple FIRs. However, there may be added complexities arising from diversity of views in multilateral discussions that may cause issues in reaching consensus.

6.2. Formalizing coordination arrangements

6.2.1. MWOs should formalize operational arrangements for SIGMET coordination to establish a common understanding on what SIGMET coordination entails. The different modalities include a Letter of Agreement, the Exchange of Letters or a Memorandum of Understanding. Such arrangements can be made on a bilateral or multilateral basis, depending on how coordination is conducted.

6.3. Coordination procedures

6.3.1. MWOs should jointly develop and endorse a set of clear procedures for SIGMET coordination, which then should be adopted when facilitating SIGMET coordination process.

6.3.2. While there are special circumstances for each region (or sub-region) and different challenges (e.g. availability of communications link, language differences, in-house processes), procedures that are developed based on commonalities shared amongst the participating MWOs (e.g. weather pattern and climatology) are the most helpful tools in overcoming differences and challenges.

6.3.3. Procedures may include methodology of coordination (including common situational awareness tools), a communications protocol, criterion for issuances, and methodology for review and evaluation. Each of these is discussed in greater detail in subsequent sections.

d. Operational Coordination

7. The aim of SIGMET coordination is to consult with the participating MWOs, exchange content and reach an agreement.

8. Content to be discussed includes:

- vertical extent;
- boundaries;
- direction and speed of movement of the SIGMET phenomenon observed, and/or expected to affect, two or more areas of responsibility.

9. Initiation of SIGMET coordination

9.1. Coordination can be initiated by any of the participating MWOs. However, the following protocols are recommended:

- When hazardous weather phenomenon warranting a SIGMET is observed or forecast in an AoR and is expected to move in a direction such that an adjacent FIR(s) may be affected, the MWO that issued the initial SIGMET should initiate consultation with the neighboring MWO(s).
- When hazardous weather phenomenon warranting a SIGMET is observed or forecast across FIR boundaries, the MWO with the largest proportion of the hazardous weather phenomenon in its FIR should initiate consultation with the neighboring MWO(s).

10. Common interface

10.1. It is helpful to have access to a common interface (such as a web application) where observational and/or Numerical Weather Prediction (NWP) data can be shared to enable common situational awareness amongst the operational meteorologists. The interface allows operational meteorologists on duty at each MWO to have a shared view of the weather situation and prognosis, before coming to a consensus on the area and parameters to be included in the SIGMET. Hence, graphical presentation of observations, NWP data, and SIGMETs issued on the common interface would be particularly helpful.

10.2. If a web application is available, the application should be interactive to enable technical discussions between MWOs. Therefore, any such tools developed should incorporate functionalities that would support technical discussions, in graphical, textual and/or verbal form. Due to this requirement, it is recommended that such tools be the primary mode of communication between the participating MWOs.

11. Communications protocol

11.1. To ensure effective communication that helps to facilitate discussion whilst arriving at a consensus in a timely manner it may be necessary to develop a communications protocol that includes preset syntax, particularly for the most commonly encountered weather phenomena. Preset syntax can overcome difficulties in communications due to language differences.

12. Alternative communication modes

12.1. Alternative means of communication for operational coordination can serve as redundancy in the event of non-availability of the primary mode of communication. Participating MWOs can use various communication modes, such as telephone and mobile applications (e.g. WhatsApp), as their common contingency or complementary measure.

12.2. Other channels of communication such as video-conferencing and emails can facilitate more in-depth discussion on issues outside of operational coordination or for long-lived and prolonged weather phenomena (e.g. tropical cyclones, sand storms).

13. Establishing what constitutes consensus

13.1. It may be necessary to identify indicators of consensus. These should form part of the preliminary requirements as agreed by the participating MWOs. This establishes a common understanding of what constitutes consensus and can help focus consultation efforts to ensure consensus can be arrived at more often than not.

14. Timeliness in issuance of coordinated SIGMETs

14.1. Certain weather phenomena, such as thunderstorms, can undergo rapid development and therefore, efficient coordination is critical to ensure coordinated SIGMETs are issued in a timely manner. Participating MWOs may set time limits for consultation so that technical discussions do not become so protracted that SIGMET issuance is delayed. In most cases, discussions should not take longer than 15 minutes to complete.

15. Record of consultation cases

15.1. It is a good practice to log all cases of consultation. Items to log include the date and time of consultations, whether consensus was reached and the SIGMETs that were issued. For cases where consensus was not reached reasons should be logged. In case there is not enough time to log all elements in real time, participating MWOs can log remaining elements post event or log only specific cases, such as instances when consensus was not reached.

15.2. Records should be compiled and reviewed regularly to identify difficult cases, common issues that affect coordination and achieve consensus, etc. This will contribute to continuous improvement of the coordination procedures and cooperation between MWOs. The records may also help to highlight important technical issues which may have contributed to difficulties in SIGMET coordination. This will be discussed in a later section.

e. Common Technical Difficulties Encountered in SIGMET Coordination

16. Criteria for issuance

16.1. Subjectivity is inherent in weather forecasting and each MWO will have its own analysis tools and suite of NWP data to be used for analysis, assessment and forecasting. Each operational meteorologist's assessment will be informed by his or her own experience and skills. For a given set of weather conditions and NWP data, the permutation of forecasts that can be issued may have considerable spread.

16.2. The element of subjectivity is known to affect harmonization of SIGMET information. Therefore, setting objective criteria for SIGMET issuance can enable consistency in SIGMET information. The *ICAO Asia/Pacific Regional SIGMET Guide* provides general guidance, however, it should be noted that there is no one-size-fits-all guidance. Issuance criteria generally vary from region to region given that each region has its own unique weather, climate characteristics and challenges.

16.3. Thunderstorm is the most common weather phenomenon that happens across MWOs in the Region. Gathering local practices from different MWOs, generally, common characteristics were observed as following. MWOs who have not developed issuance criteria may take note of the criteria below when seeking users' requirements for developing their issuance criteria.

Issuance criteria for WS SIGMETs for thunderstorms	
Minimum dimension for SIGMET issuance for areas with higher air traffic movements (e.g. near airport)	60 NM x 60 NM (1^o x 1^o)
Minimum dimension for SIGMET issuance for areas with lower air traffic movements (e.g. oceanic areas)	120 NM x 120 NM (2^o x 2^o)
Minimum separation between two SIGMET areas	45 NM
Length of thunderstorms requiring the issuance of squall line SIGMET	270 NM (Length) x 54 NM (Width)

16.4. When a significant convective system straddle across multiple FIRs, even if the affected area within a FIR is smaller than the responsible MWO's SIGMET issuance criterion, all affected MWOs are encouraged to consider issuing SIGMET information for the area concerned within their FIRs for that significant convective system. Movement and development of significant convective cloud system should also be considered.

16.5. SIGMET coordination initiatives have brought MWOs together to discuss such technical issues but the problems are often linked to fundamental meteorological science, which require more focused efforts by the scientific community to resolve. Where appropriate, these issues could be discussed at relevant ICAO and WMO meetings so that a global perspective can be developed which in turn can provide useful guidance and standardised procedures for issuance of coordinated SIGMET. In addition, conducting a stock take of the practices and assessment methodology amongst the MWOs would help to form the basis for the development of a common set of criteria for issuance.

17. Harmonization of SIGMET across regions with different weather characteristics

17.1. As the network of MWOs participating in SIGMET coordination expands, the likelihood of coordination with an MWO with different meteorological characteristics increases. MWOs will have to factor in the different climatology of the different AoRs when drawing up coordination procedures. This information should be included in the preliminary requirements.

f. Post Event Assessment

18. Regular reviews

18.1. Post event, offline reviews should be conducted regularly to ensure continuous improvement is incorporated in the process. For example, regular post event review meetings at the senior meteorologists / chief meteorologists' level with input from operational meteorologists can work on resolving persistent coordination issues and refining procedures, so that the process becomes more efficient. It also promotes harmonization of SIGMET information when coordination amongst MWOs becomes more effective. Technical issues hampering consensus can also be raised for discussions at such fora.

18.2. The MWOs may consider developing case studies based on the findings from the post review events and use these for further improvements.

19. Evaluation of performance

19.1. Similar to other aviation MET products issued, there is a need to verify the forecast and evaluate the quality of the product. Participating MWOs are encouraged to conduct objective verification and evaluation of coordinated SIGMETs issued to measure the performance of the coordination effort.

20. User / stakeholder feedback

20.1. User feedback is critical in improving the SIGMET product. MWOs participating in SIGMET coordination should regularly engage users and stakeholders to solicit feedback on the utility of their SIGMETs, so as to identify areas for improvement. Verification and evaluation of SIGMET and collection of user feedback should be conducted within the States' quality management system.

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