International Civil Aviation Organization

FOURTEENTH MEETING OF THE ASIA/PACIFIC METEOROLOGICAL INFORMATION EXCHANGE WORKING GROUP (MET/IE WG/14)

Bangkok, Thailand, 7 – 9 March 2016

Agenda Item Conjoint C2: SIGMET and (volcanic ash and tropical cyclone) advisory information (including SIGMET tests)

SIGMET PAMPHLETS

(Presented by MET/S WG Ad Hoc Group)

SUMMARY

This paper presents the draft volcanic ash (WV) SIGMET pamphlet in line with Amendment 76 to Annex 3 – Meteorological Service for International Air Navigation and the completed tropical cyclone (WC) and other phenomena (WS) SIGMET pamphlets.

1. INTRODUCTION

1.1 At the third meeting of the Meteorological Hazards Task Force (MET/H TF/3), held in Bangkok from 13-15 March 2013, it was agreed that Australia, New Zealand and Hong Kong, China review the SIGMET posters following Amendment 76 to *Annex 3 – Meteorological Service for International Air Navigation*.

1.2 The fourth meeting of the Meteorological Hazards Task Force (MET/H TF/4), held in Beijing, China from 19-21 March 2014, formulated the agreed action 4/12 as follows: *'Ad-hoc group consisting of Australia, Hong Kong-China and New Zealand (Rapporteur) to review and update the SIGMET posters to realign with Amendment 77 to Annex 3 in 2016*'.

1.3 The fifth meeting of the Meteorological Hazards Task Force (MET/H TF/5), held in Seoul, Republic of Korea from 18-20 March 2015, was presented with a draft of the WS and WC SIGMET pamphlets and subsequently formulated the following Decision:

MET/H TF/5 Decision 5/1 – Regional guidance material: SIGMET pamphlets

That, in order to enhance the guidance available to States for the production of SIGMET:

a) The draft pamphlets presented in MET/H TF/5 WP/4, intended as a quick reference guide for the preparation of [WC and WS] SIGMET, be further developed and a new draft pamphlet be developed for [WV] SIGMET and promulgated through the MET SG to APANPIRG, ICAO HQ and WMO for final review and further action;

b) Arrangements be proposed for the appropriate publication/distribution of the (approved) SIGMET pamphlets in electronic form; and

c) Future revisions are to be developed to realign all the SIGMET pamphlets with Amendment 77 to ICAO Annex 3 for final review and approval in time for applicability in November 2016.

1.4 The nineteenth meeting of the Meteorological Sub Group (MET/SG/19), held in Bangkok, Thailand from 3-6 August 2015, was also presented with a draft of the WS and WC SIGMET pamphlets and subsequently formulated the following draft conclusion for APANPIRG and Decision for the METSG:

METSG/19 Draft Conclusion 19/18 — SIGMET Pamphlets

That, the final version of the SIGMET Pamphlets located at ***Attachment 13*** *to this Report be adopted as Regional guidance material and distributed to States to facilitate improved format of SIGMET information.*

METSG/19 Decision 19/19 — SIGMET Pamphlets

That, the ad hoc group, consisting of Australia, New Zealand, Japan and Hong Kong China:

a) Forward the final versions of the WS and WC SIGMET pamphlets to ICAO for publication on the APAC eDocuments website, if approved by APANPIRG;*

b) Further develop the WV SIGMET pamphlet; and

c) Review the pamphlets again in July 2016 when Amendment 77 to Annex 3 is published to ensure that the pamphlets are aligned accordingly with Amendment 77 prior to its effective date in November 2016.

1.5 The twenty-sixth meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/26), held in Bangkok, Thailand from 7-10 September 2015, was also presented with a draft of the WS and WC SIGMET pamphlets and subsequently formulated the following Conclusion:

Conclusion APANPIRG/26/59 — SIGMET Pamphlets

That, ICAO be invited to adopt the SIGMET Pamphlets, provided in APANPIRG/26 WP/10 Appendix F, as Regional guidance material and distribute to States to facilitate improved format of SIGMET information.

2. DISCUSSION

2.1 Initial discussion within the ad hoc group, and at the MET/H TF, regarding the format of the information concluded that it would be an advantage to provide the information in an A4 pamphlet style publication rather than a poster. This would allow for the information to be updated more readily as well as providing a format that could be easily viewed and/or downloaded from the Internet or sent to States via email.

2.2 The WS and WC SIGMET pamphlets approved by APANPIRG/26 are available online at: http://www.icao.int/APAC/Documents/edocs/WS-SIGMET.pdf and http://www.icao.int/APAC/Documents/edocs/WC-SIGMET.pdf respectively.

2.3 Subsequently the ad hoc group has been working on a draft of the WV SIGMET pamphlet. This is provided in **Attachment A** to this paper.

3. RECOMMENDATION

3.1 It is recommended that the METSG/20 adopt the following draft Conclusion:

Draft Conclusion MET/S WG/6/x – SIGMET Pamphlets

a) The MET/S WG review the WV SIGMET pamphlets and provide comment to the ICAO RO MET no later than 20 April 2016.

b) The ad hoc group, consisting of Australia, New Zealand, Japan and Hong Kong China, finalise the WV SIGMET pamphlet for approval at the MET SG in June 2016; and

c) An ad hoc group, consisting of Australia, New Zealand, Japan and Hong Kong China, review the pamphlets again in July 2016 when Amendment 77 to ICAO Annex 3 is published to ensure that they are updated prior to the effective date of November 2016.

4. ACTION BY THE MEETING

4.1 The meeting is invited to:

a) note the information contained in this working paper; and

b) adopt the Conclusion in paragraph 3.1.

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SIGMET QUICK REFERENCE GUIDE

WV SIGMET

DRAFT 5

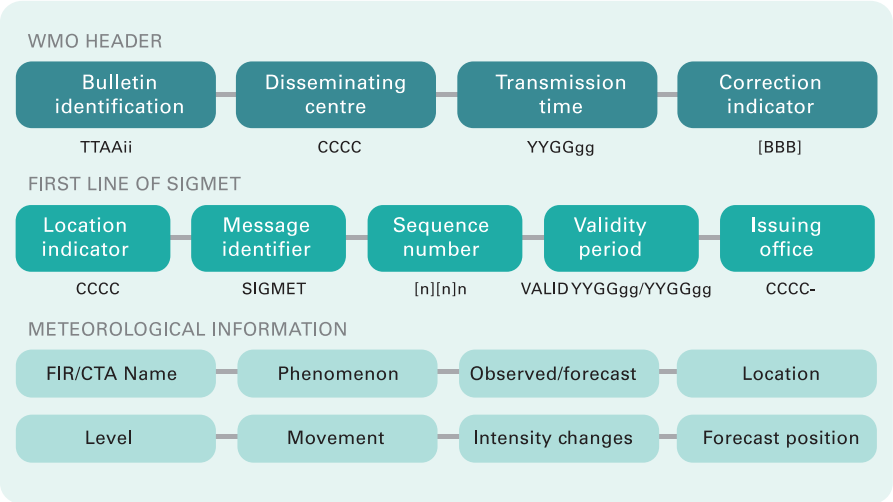
SIGMET Abbreviations

APRX	Approximately
BTN	Between
CLD	Cloud
CNL	Cancel or cancelled
CTA	Control area
EXP	Expected
FCST	Forecast
FIR	Flight Information Region
FL	Flight level
FT	Feet
INTSF	Intensify or intensifying
KM	Kilometres
KT	Knots
KMH	Kilometres per hour
M	Metres
MOV	Moving
MT	Mountain
NC	No Change (in intensity)
NM	Nautical Miles
OBS	Observed
PSN	Position
SFC	Surface
STNR	Stationary
UIR	Upper Information Region
VA	Volcanic Ash
WI	Within (area)
WID	Wide
WKN	Weakening (intensity)
Z	Coordinated Universal Time

WV SIGMET

A SIGMET provides concise information issued by a Meteorological Watch Office (MWO) concerning the occurrence or expected occurrence of specific en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations. The WV SIGMET provides information on volcanic ash and should be based on the Volcanic Ash Advisory.

SIGMET Structure



WMO Header

Bulletin identification

TT	Data type designator	**WV** – for SIGMET for volcanic ash
AA	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 Part II of *Manual on the Global Telecommunication System*, Volume I – *Global Aspects* (WMO Publication No. 386)

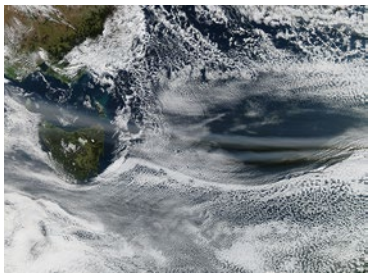
Disseminating centre

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

Transmission time

YYGGgg is the date/time group; where YY is the day of the month and GGgg is the time of transmission of the SIGMET in hours and minutes UTC (normally this time is assigned by the disseminating (AFTN) centre).

Sarychev volcano, on Matua Island in the Kuril Islands, erupting on 12 June 2009. Image courtesy NASA.



Ash over Tasmania from Puyehue-Cordón Caulle volcano, Chile, 13 June 2011. Image courtesy NASA, Satellite, Aqua.

Sakurajima volcano, in southern Japan is one of the most active volcanoes in the world. Image courtesy Kimon Berlin.

Correction indicator

BBB should only be included when issuing a correction to a SIGMET which had already been transmitted. The BBB indicator shall take the form **CCx** for corrections to previously relayed bulletins, where x takes the value A for the first correction, B for the second correction, etc., for a specific SIGMET.

First line of SIGMET

Location indicator

CCCC is the ICAO location indicator of the ATS unit serving the FIR or CTA to which the SIGMET refers.

Message identifier

The message identifier is **SIGMET**.

Sequence number

The daily sequence number in the form **[n][n]n**, e.g. 1, 2, 01, 02, A01, A02, restarts every day for SIGMETs issued from 0001 UTC.

Validity period

The validity period is given in the format **VALID YYGGgg/YYGGgg** where YY is the day of the month and GGgg is the time in hours and minutes UTC. For observed volcanic ash, the start of validity for the SIGMET should be the same as the issue time. For forecast volcanic ash, the start of validity should be the time the volcanic ash is expected to enter/develop in a MWO's FIR and can be issued no more than 12 hours prior to the start of validity. The validity period for a WV SIGMET shall be no more than 6 hours.

Issuing Office

CCCC- is the ICAO location indicator of the MWO originating the message followed by a hyphen.

Meteorological Information

FIR/CTA Name

The ICAO location indicator and full name of the FIR/CTA for which the SIGMET is issued in the form **CCCC <name> FIR[/UIR]** or **CCCC <name> CTA**.

Phenomenon

The description of the volcanic ash consists of: **VA ERUPTION [MT volcano name] PSN <location> VA CLD**

Observed or forecast

Whether the volcanic ash is observed or forecast in the form **OBS [AT GGggZ]** or **FCST [AT GGggZ]** where GG is hours and gg minutes UTC.

Location

The location of the volcanic ash is provided with reference to geographical coordinates in latitude and longitude in degrees and minutes.

If the volcanic ash covers the entire FIR or CTA the following can be used as an alternative: **ENTIRE FIR [/CTA]**

Level

The level or vertical extent of the volcanic ash:
FLnnn or **nnnnM** or **nnnnFT** or **SFC/FLnnn** or **SFC/nnnnM** or **SFC/nnnnFT** or **FLnnn/nnn** or **nnnn/nnnnFT** or **TOP FLnnn** or **ABV FLnnn** or **TOP ABV FLnnn**. **FLnnn/nnn [APRX nnnKM BY nnnKM] [nnKM WID LINE BTN (nnNM WID LINE BTN)] [Nnn[nn]** or **Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn]** or **Snn[nn] Wnnn[nn]** or **Ennn[nn] [– Nnn[nn]** or **Snn[nn] nnn[nn]** or **Ennn[nn]] [– Nnn[nn]** or **Snn[nn] Wnnn[nn]** or **Ennn[nn]]]** or **FLnnn/nnn [APRX nnnNM BY nnnNM] [Nnn[nn]** or **Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn]** or **Snn[nn] Wnnn[nn]** or **Ennn[nn] [– Nnn[nn]** or **Snn[nn] Wnnn[nn]** or **Ennn[nn]] [– Nnn[nn]** or **Snn[nn] Wnnn[nn]** or **Ennn[nn]]])**

E	East or eastern longitude
ENE	East-north-east
ESE	East-south-east
N	North or northern latitude
NE	North-east
NNE	North-north-east
NNW	North-north-west
NW	North-west
S	South or southern latitude
SE	South-east
SSE	South-south-east
SSW	South-south-west
SW	South-west
W	West or western longitude
WNW	West-north-west
WSW	West-south-west

Tavurvur Volcano, Rabaul, 8 December 2009. More than a foot of ash fell on parts of the city, and combined with rain, it collapsed many of the small city's buildings and houses. Image courtesy NASA, Earth Observatory.

Movement

Direction and rate of movement of the volcanic ash where the direction is given with reference to one of the sixteen points of the compass (using the appropriate abbreviation) and the rate is given in KT (or KMH) in the form **MOV <direction> <speed>KT** or **KMH**. The abbreviation **STNR** (Stationary) is used if no significant movement is expected.

Intensity changes

The expected evolution of the volcanic ash's intensity as indicated by:
INTSF or **WKN** or **NC**

Forecast position

The forecast position of the volcanic ash in the form: **FCST <GGgg> Z VA CLD APRX [nnn NM (or KM) WID LINE BTN] <location> [AND second location if required]**
or **FCST <GGgg>Z ENTIRE FIR[/CTA]**
or **FCST <GGgg>Z NO VA EXP**

Note: Forecast position should not be used in conjunction with the movement or expected movement of the volcanic ash cloud.

Renewing a SIGMET

A SIGMET is renewed with a new sequence number when the validity period is due to expire but the volcanic ash is expected to persist.

Cancelling a SIGMET

If, during the validity period of a SIGMET, the volcanic ash is no longer evident or if it has moved out of the FIR, the SIGMET shall be cancelled by issuing a SIGMET with the abbreviation CNL in lieu of meteorological information.
CNL SIGMET [n][n]n YYGGgg/YYGGgg

Source of Information

Source of Information	Types of Information	Issue a VA SIGMET
VAAC	Advice that ash is observed or is expected to enter the MWO's FIR at a specific time in the future.	Issue immediately
Volcano Observatory	Details of an eruption with either no information about any ash or the extent of any ash cloud. These may be received in the form of a Volcano Observatory Notice for Aviation (VONA).	Issue immediately
Pilot Report, Met Office, ATS Unit	Report of an eruption with or without associated ash, or an ash encounter without any reference to a specific volcano. Note: All reports should be forwarded on to the responsible VAAC without delay.	Issue immediately, even if no information received from a VAAC

SIGMET Dissemination

SIGMET is part of operational meteorological (OPMET) information and should be exchanged via aeronautical fixed service (AFS). The SIGMET priority indicator used shall be **FF**.

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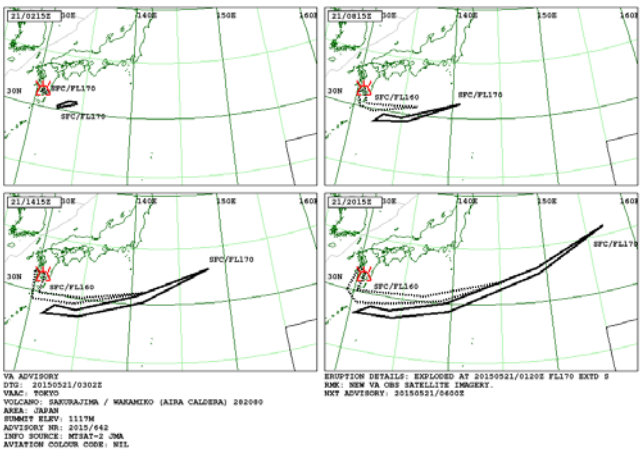
VAA, VAG and WV SIGMET Example 1

Volcanic Ash Advisory (VAA) Example

FVFE01 RJTD 210302
VA ADVISORY

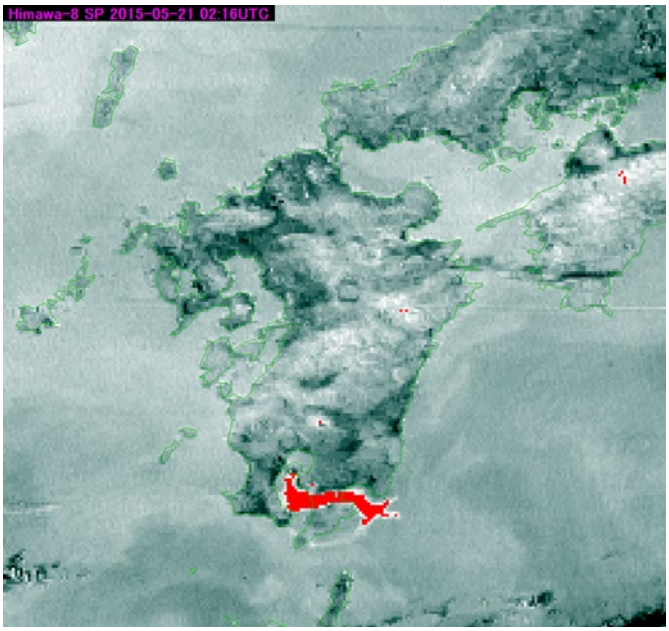
DTG:	20150521/0302Z
VAAC:	TOKYO
VOLCANO:	SAKURAJIMA / WAKAMIKO (AIRA CALDERA) 282080
PSN:	N3136 E13039
AREA:	JAPAN
SUMMIT ELEV:	1117M
ADVISORY NR:	2015/642
INFO SOURCE:	MTSAT-2 JMA
AVIATION COLOUR CODE:	NIL
ERUPTION DETAILS:	EXPLODED AT 20150521/0120Z FL170 EXTD S
OBS VA DTG:	21/0215Z
OBS VA CLD:	SFC/FL170 N3020 E13225 - N3051 E13328 - N3056 E13414 - N3042 E13422 - N3009 E13229 MOV E 35KT SFC/FL170 N3134 E13042 - N3121 E13117 - N3110 E13108 - N3119 E13031 MOV SE 45KT
FCST VA CLD +6 HR:	21/0815Z SFC/FL170 N2939 E13308 - N2936 E13456 - N3116 E14050 - N2923 E13534 - N2856 E13219 SFC/FL160 N3113 E13012 - N3129 E13045 - N3020 E13114 - N3045 E13627 - N2946 E13155 - N3003 E13034
FCST VA CLD +12 HR:	21/1415Z SFC/FL170 N2858 E13433 - N3043 E14030 - N3303 E14809 - N3009 E14109 - N2828 E13451 - N2814 E13124 - N2907 E13225 SFC/FL160 N3144 E12945 - N3143 E13049 - N2957 E13035 - N3006 E13458 - N3104 E14120 - N2929 E13413 - N2918 E13001
FCST VA CLD +18 HR:	21/2015Z SFC/FL170 N2959 E13924 - N3301 E14857 - N3551 E15658 - N3231 E14905 - N2916 E13941 - N2814 E13412 - N2809 E13035 - N2855 E13156 - N2849 E13352 SFC/FL160 N3209 E13000 - N3142 E13046 - N3003 E13019 - N3027 E13706 - N3203 E14530 - N3010 E13850 - N2924 E13334 - N2901 E13028 - N3000 E12917
RMK:	NEW VA OBS SATELLITE IMAGERY.
NXT ADVISORY:	20150521/0600Z=

Volcanic Ash Graphic (VAG) Example



Volcanic Ash (WV) SIGMET Example

WVJP31 RJTD 210320
RJJJ SIGMET E05 VALID 210320/210920 RJTD-
RJJJ FUKUOKA FIR VA ERUPTION MT SAKURAJIMA-
WAKAMIKO(AIRA-CALDERA) PSN N3136 E13039 VA CLD OBS AT 0215Z SFC/FL170 N3020 E13225 - N3051 E13328 - N3056 E13414 -N3042 E13422 - N3009 E13229 - N3020 E13225 MOV E 35KT FCST 0815Z VA CLD APRX SFC/FL170 N2939 E13308 - N2936 E13456 - N3116 E14050 - N2923 E13534 - N2856 E13219 - N2939 E13308=



Infrared difference satellite imagery by Himawari-8 during its pre-operational phase. The red-coloured region indicates volcanic ash. Image courtesy Japan Meteorological Agency.

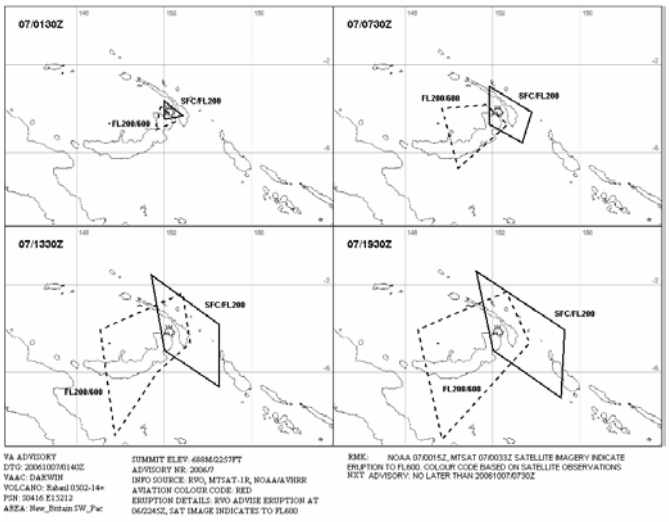
DRAFT 5

VAA, VAG and WV SIGMET Example 2

Volcanic Ash Advisory (VAA) Example

VA ADVISORY	
DTG:	20151007/0140Z
VAAC:	DARWIN
VOLCANO:	RABAUL 0502-14
PSN:	S0416 E15212
AREA:	NEW_BRITAIN SW_PAC
SUMMIT ELEV:	688M/2257FT
ADVISORY NR:	2015/7
INFO SOURCE:	RVO, MTSAT-1R, NOAA/AVHRR
SUMMIT ELEV:	688M/2257FT
AVIATION COLOUR CODE:	RED
ERUPTION DETAILS:	RVO ADVISE ERUPTION AT 06/2245Z, SAT IMAGE INDICATES TO FL600
OBS VA DTG:	07/0130Z
OBS VA CLD:	SFC/FL200 S0430 E15200 - S0340 E15200 - S0420 E15250 - S0430 E15200 MOV NE 15KT FL200/600 S0355 E15150 - S0435 E15235 - S0500 E15135 - S0355 E15150 MOV SW 30KT
FCST VA CLD +6HR:	07/0730Z SFC/FL200 S0445 E15150 -S0300 E15150 -S0410 E15345 - S0535 E15320 - S0445 E15150 FL200/600 S0350 E15140 - S0445 E15240 - S0645 E15025 - S0400 E14940 - S0350 E15140
FCST VA CLD +12HR:	07/1330Z SFC/FL200 S0500 E15200 - S0135 E15125 -S0350 E15430 - S0640 E15430 - S0500 E15200 FL200/600 S0440 E15310 - S0225 E14945 - S0600 E14905 - S0855 E15250 - S0405 E15140 - S0440 E15310
FCST VA CLD +18 HR:	07/1930Z SFC/FL200 S0500 E15200 - S0125 E15115 - S0405 E15515 – S0710 E15505 - S0500 E15200 FL200/600 S0220 E15235 - S0440 E15340 -S0905 E14940 – S0405 E14835 - S0220 E15235
RMK:	NOAA 07/0015Z, MTSAT 07/0033Z SATELLITE IMAGERY INDICATES ERUPTION TO FL600. COLOUR CODE BASED ON SATELLITE OBSERVATIONS GRAPHIC AT http://www.bom.gov.au/info/vaac/advisories.shtml
NXT ADVISORY:	NO LATER THAN 20151007/0730Z

Volcanic Ash Graphic (VAG) Example



Volcanic Ash (WV) SIGMET Format

WVAAii CCCC YYGGgg [BBB]
CCCC SIGMET [n][n]n VALID YYGGgg/YYGGgg CCCC-
CCCC <FIR/CTA Name> FIR/CTA VA ERUPTION MT <name>
PSN <location> VA CLD OBS/FCST [AT GGggZ] <Location>
<Level> <Movement> <Intensity> <Forecast position>=

Volcanic Ash (WV) SIGMET Example

WVNG20 AYPY 070200
AYPY SIGMET A1 VALID 070200/070800 AYPY-
AYPY PORT MORESBY FIR VA ERUPTION MT RABAUL PSN S0416 E15212 VA CLD OBS AT 0130Z WI S0430 E15200 – S0340 E15200 – S0420 E15250 – S0430 E15200 SFC/200 MOV NE 15KT NC FCST 0730Z VA CLD APRX S0445 E15150 – S0300 E15150 – S0410 E15345 – S0535 E15320 – S0445 E15150 AND WI S0355 E15150 – S0435 E15235 – S0500 E15135 – S0355 E15150 FL200/600 MOV SW 30KT NC FCST 0730Z VA CLD APRX S0350 E15140 – S0445 E15240 – S0645 E15025 – S0400 E14940 – S0350 E15140=

Cancellation

WVNG20 AYPY 072250
AYPY SIGMET A5 VALID 072300/080200 AYPY-
AYPY PORT MORESBY FIR CNL SIGMET A4 072000/080200=

Australian Government
Bureau of Meteorology

香港天文台
Hong Kong Observatory

CAA
Civil Aviation Authority of New Zealand

気象庁
Japan Meteorological Agency

Refer to the following for more information

ICAO *Annex 3 – Meteorological Service for International Air Navigation* (Amd 76)
ICAO *Regional SIGMET Guide*
ICAO Doc.8896 – *Manual of Aeronautical Meteorological Practice*
WMO No.49 *Technical Regulations Volume II – Meteorological Service for International Air Navigation* (2013 ed)
WMO No.732 *Guide to Practices for Meteorological Offices Serving Aviation*
ICAO Doc. 9691 – *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds*
ICAO Doc. 9766 – *Handbook on the International Airways Volcano Watch*