International Civil Aviation Organization

WORKING PAPER

Eleventh Meeting of the Meteorological Services Working Group (MET/S WG/11)

Web-conference, 24 to 26 March 2021

Agenda Item 6: Guidance and education related to the provision of meteorological services

SIGMET GUIDANCE FOR VOLCANIC ASH FORECAST TO CROSS FIR BOUNDARIES

(Presented by MET/S Ad Hoc Working Group)

SUMMARY

This paper presents a draft proposal for inclusion in the Asia/Pacific Regional SIGMET Guide that provides guidance on SIGMET issuance in scenarios whereby volcanic ash is forecast to cross FIR boundaries.

1. INTRODUCTION

1.1 An Asia/Pacific Volcanic Ash Exercise was conducted on 20 September 2018 (APAC VOLCEX 18/02) by Indonesia. The exercise included the scenario whereby volcanic ash was observed in the Jakarta FIR and was forecast to enter both the Kuala Lumpur and Singapore FIRs in less than 12 hours (based on Volcanic Ash Advisory (VAA) T+6 and T+12). This scenario revealed the need to provide guidance within the ICAO Asia/Pacific Regional SIGMET Guide on issuance of Volcanic Ash SIGMETs when the volcanic ash is not currently within an FIR but is forecast to enter that FIR.

1.2 A draft proposal for inclusion in the Asia/Pacific Regional SIGMET Guide is contained in Attachment 1.

2. DISCUSSION

2.1 The Twenty-fourth Meeting of the Meteorology Sub-group of APANPIRG (MET SG/24) held in November 2020 included a follow-up on Decision MET SG/23-3 to improve regional guidance for SIGMET for volcanic ash forecast to cross FIR boundaries. The meeting requested Action/Task 24/02 that the Meteorological Services Working Group (MET/S WG) considers developing examples of how to coordinate the issuance of SIGMET information for volcanic ash which is forecast in adjacent FIRs in response to challenges reported by participants of the exercise APAC VOLCEX 18/02.

2.2 The APAC VOLCEX 18/02 Report was presented in Working Paper 3 at the Sixth Meeting of the Asia and Pacific Volcanic Ash Exercises Steering Group (APAC VOLCEX/SG/6) in June 2019. Paragraph 2.20 of the working paper noted that 'particular guidance on the issuance of SIGMET for forecast VA in adjacent FIR is not explained in SIGMET Guide' and included the following recommendation: "Adding or reviewing existing SIGMET Guide, related to movement of volcanic ash

distribution if predicted to enter the adjacent FIR. This is intended to provide guidance for the local MWO in publishing SIGMET containing forecast information."

2.3 Paragraph 7.1.4 of Annex 3 to the Convention on International Civil Aviation includes the following recommendation: "SIGMET messages concerning volcanic ash cloud and tropical cyclones should be based on advisory information provided by VAACs and TCACs, respectively, designated by regional air navigation agreement."

2.4 Further, Paragraph 7.1.6 of Annex 3 states the following: "In the special case of SIGMET messages for volcanic ash cloud and tropical cyclones, these messages shall be issued as soon as practicable but not more than 12 hours before the commencement of the period of validity."

2.5 Table A6-1A of Annex 3 shows SIGMET can be issued for either observed (OBS) or forecast (FCST) phenomena.

2.6 Therefore, in the scenario where, for example, volcanic ash is within the Jakarta FIR (adjacent to the Kuala Lumpur FIR) and the volcanic ash advisory forecasts ash to cross over the FIR boundary into the Kuala Lumpur FIR within the next 12 hours, the Kuala Lumpur MWO will issue a WV SIGMET for VA FCST for any affected area within the Kuala Lumpur FIR that coincides with a forecast area of volcanic ash in the relevant volcanic ash advisory.

2.7 In alignment with guidance contained within Annex 3, the MET/SG WG Ad Hoc Group seeks to provide clarity on SIGMET issuance in scenarios whereby volcanic ash is forecast to cross into an adjacent FIR. In doing so, it also seeks to satisfy MET SG/24 Action/Task 24/02. It proposes to achieve this by inserting into the Asia/Pacific Regional SIGMET Guide the material and examples contained in Attachment 1.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) Note the information contained in this paper.
b) Consider proposed guidance material in Attachment 1 for inclusion in Regional SIGMET Guide.
c) Formulate decision and action for endorsement by MET SG.

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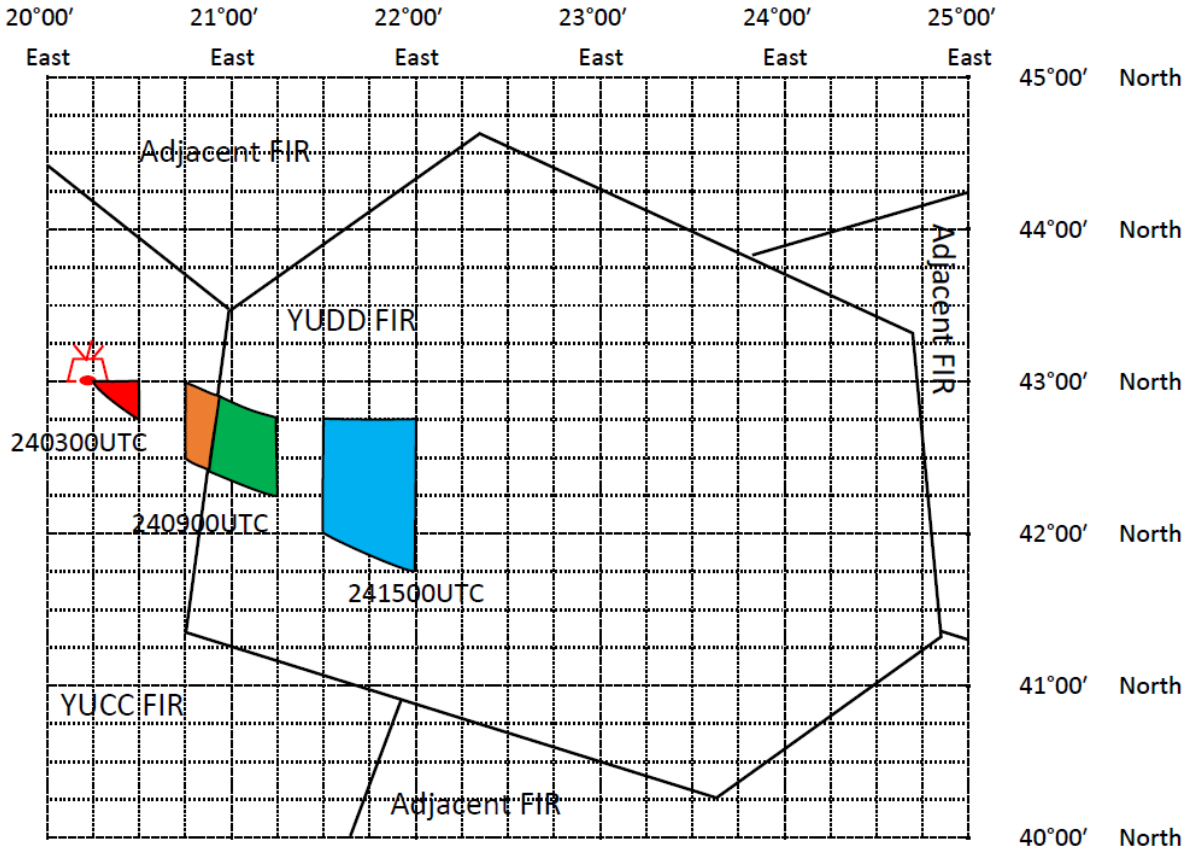
Attachment 1 – *For insertion in Asia/Pacific Regional SIGMET Guide Appendix B (SIGMET EXAMPLES) between examples 8 and 9:*

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

Volcanic Ash (WV) 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.

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 WV 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

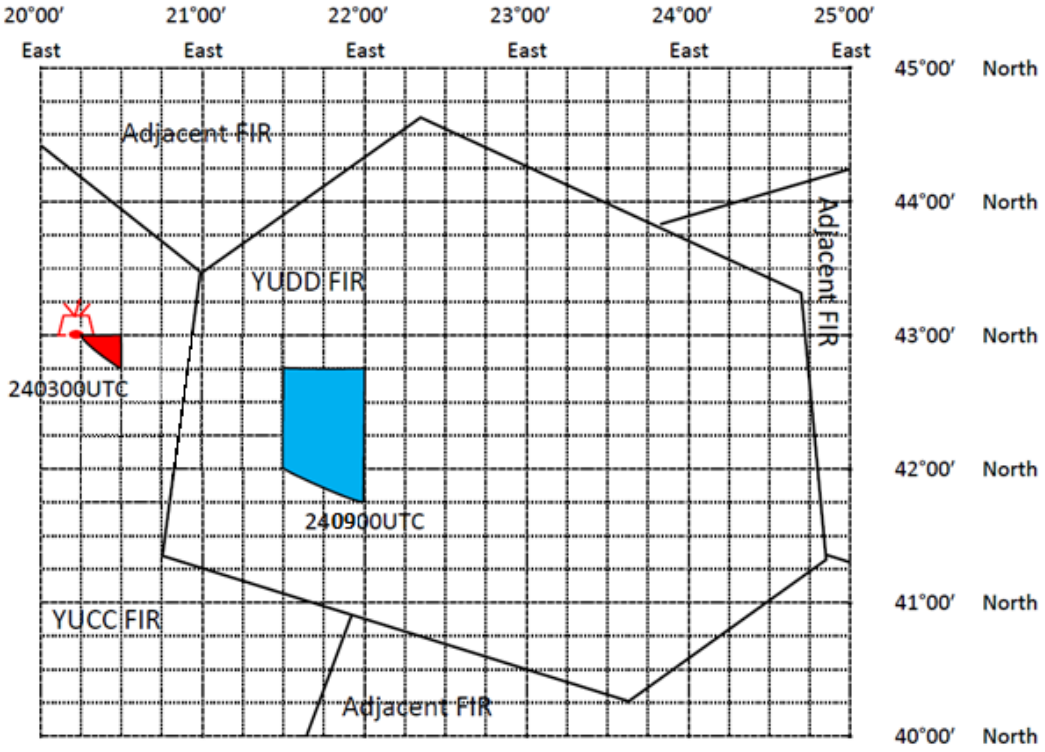
DTG:	20210324/0300Z
VAAC:	DARWIN
VOLCANO:	ASHVAL
PSN:	N4300 E02015
AREA:	INDONESIA
SUMMIT ELEV:	2329M
ADVISORY NR:	2021/1
INFO SOURCE:	HIMAWARI-8, VONA
AVIATION COLOUR CODE:	RED
ERUPTION DETAILS:	VA OBS TO FL400 MOV ESE AT 24/0300Z
OBS VA DTG:	24/0300Z
OBS VA CLD:	SFC/FL400 N4300 E02015 – N4300 E02030 – 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 240300/240900 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=

YUDD SIGMET 1 VALID 240900/241500 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 FCST AT 1500Z WI N4245 E02130 – N4245 E02200 – N4145 E02200 – N4200 E02130 – N4245 E02130 SFC/FL250=

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.



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INFO SOURCE:	HIMAWARI-8, VONA
AVIATION COLOUR CODE:	RED
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 240300/240900 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 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 240900/241500 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=

Note: The MWO responsible for the YUDD FIR should also issue a SIGMET around 0300Z with validity 0900/1500 as the forecast VA cloud is expected to be at YUDD FIR at 09Z. In this case, the MWO responsible for YUDD FIR will issue a SIGMET based on the FCST VA cloud and not the OBS VA cloud as the OBS VA cloud is entirely within the YUCC FIR.