INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

REPORT OF THE THIRD MEETING OF ASIA/PACIFIC METEOROLOGICAL HAZARDS TASK FORCE (MET/H TF/3)

13 - 15 March 2013
Bangkok, Thailand

The views expressed in this Report should be taken as those of the Meeting and not the Organization.

Approved by the Meeting
and published by the ICAO Asia and Pacific Office, Bangkok

History of the Meeting **Page**

Report on Agenda Items

Attachments

Appendices

List of Appendices to the report on the conjoint session

– – – – – – – – – – – –

1. Introduction

1.1 The Third Meeting of the Asia and Pacific (APAC) Meteorological Hazards (MET/H TF/3) of the Meteorology Sub-group (MET SG) of the APAC Air Navigation Planning and Implementation Regional Group (APANPIRG) was held in Bangkok, Thailand, from 13 to 15 March 2013. The meeting commenced with a conjoint session on 13 March 2013 with the Eleventh Meeting of the APAC Regional Operational Meteorological (OPMET) Bulletins Exchange Working Group (ROBEX WG/11) of the MET SG of APANPIRG.

2. Attendance

2.1 The meeting was attended by 41 experts from Australia, Bhutan, Cambodia, China, Hong Kong-China, Indonesia, Japan, Lao PDR, Malaysia, New Zealand, Philippines, Republic of Korea (ROK), Singapore, Thailand, Viet Nam, the International Air Transport Association (IATA) and the International Civil Aviation Organization (ICAO). The List of Participants is provided in **Attachment 1** to the Report.

3. Opening of the meeting

3.1 Mr. Peter C. Dunda, Regional Officer Aeronautical Meteorology (RO-MET), opened the meeting and extended welcome to all the participants to the ICAO Regional Office and provided the opening remarks.

3.2 The meeting noted that this was the first time for the group to meet as the MET/H TF, which was reformed from the Meteorological Advisories and Warnings Implementation Task Force (METWARN/I TF) following discussion that commenced at the group's previous meeting (Report from METWARN/I TF/2, paragraph C5.1-C5.2, refers) and was followed up at the subsequent 16th Meeting of the Communications, Navigation, Surveillance and Meteorology Sub-group (CNS/MET SG/16) of APANPIRG, held in Bangkok, Thailand, from 23 to 27 July 2012, in CNS/MET SG/16 Decision 16/34.

3.3 The meeting also noted that this year the group will report to the MET SG of APANPIRG, which is in accordance with APANPIRG/22 Decision 22/52 that approved a new structure for the APANPIRG Sub-groups effective from the 2013 meeting year.

4. Chair and Secretariat

4.1 Mr. Michael Berechree presided over the meeting in the role as chairperson of the MET/H TF and indicated that he will not be available to chair the group at the next meeting.

4.2 Mr. Chan Pak Wai was elected as co-chairperson of the MET/H TF commencing at the next meeting and assisted in this meeting as co-chairperson.

4.3 Mr. Peter Dunda, RO-MET, acted as Secretary of the meeting.

4.4 The meeting agreed that a second co-chairperson would be needed to support Mr. Chan Pak Wai in the co-chairperson role at the next meeting.

5. Organization and language of the meeting

5.1 The meeting met as a single body. Working language was English including all papers and this report. The meeting considered 17 Working Papers and 5 Information Papers, plus 8 Working Papers in the conjoint session with MET/H TF/3. A list of papers is provided in **Attachment 2** to this Report.

Agenda Item 1: Adoption on provisional agenda

a) Adoption of provisional agenda and working arrangements for the meeting

b) Review of the TORs and follow-up action on the TF/2 meeting and relevant APANPIRG/23 Conclusions

1.1 Adoption of provisional agenda and working arrangements for the meeting

1.1.1 The agenda was adopted by the meeting as follows:

Conjoint (with MET/H TF/3)

Agenda Item C1: VAAC Backup Tests

Agenda Item C2: SIGMET
a) SIGMET tests (Activity 3 – ROBEX WG)
b) Regional SIGMET monitoring and coordination
c) Review SIGMET Guide
d) Advisory information
e) Other business

Agenda Item 1:
a) Adoption of provisional agenda and working arrangements for the meeting
b) Review of the TORs and follow-up action on the TF/2 meeting and relevant APANPIRG/23 Conclusions

Agenda Item 2: Review educational material
a) Monitor the developments of IAVWOPSG and METWSG with reference to guidance on radioactive cloud and Tsunami
b) Other necessary guidance

Agenda Item 3: Review progress on contingency plans

Agenda Item 4: Aerodrome Warnings

Agenda Item 5: Future Work Programme

Agenda Item 6: Any other business

1.1.2 The proposed order of business of the meeting, including the conjoint session with the MET/H TF/3 meeting on Wednesday 13 March 2013, was adopted by the chairperson as a guide for the conduct of the meeting. The order of business is given in **Attachment 3** to this Report.

1.2 Review of the TORs and follow-up action on the TF/2 meeting and relevant APANPIRG/23 Conclusions

1.2.1 The meeting noted some highlights from the previous meeting, METWARN/I TF/2, held in Bangkok, Thailand from 19 to 20 April 2012, which included: review of the SIGMET advisory trial in Asia, hosted by China from April to July 2011, consideration of discussions stemming from IVATF on ways to reduce information overload during volcanic eruptions due to

multiple sources of VA-information, review of the structure and working arrangements of the MET SG task forces, review of the work plan and action of the group, review of global progress on guidance for radioactive cloud, progress on regional contingency plans for phenomena including volcanic ash, tsunami, radioactive cloud and tropical cyclone, and consideration of the requirements for aerodrome warning for tsunami.

1.2.2. The meeting reviewed the follow-up of actions from METWARN/I TF/2, which are listed in the tables at **Appendix C** to this Report.

1.2.3 The meeting was reminded that IAVWOPSG/6 Conclusion 6/21 formed an ad-hoc group to assess and evaluate the proposal for VAA/VAG to replace SIGMET for volcanic ash. The ad-hoc group (Rapporteur – U.S.) submitted IAVWOPSG/7-WP/29 discussing the pros and cons of the proposal, which cover much of the discussion that took place at METWARN/I TF/2, which led to action agreed 2/2. The meeting reviewed WP/29, to be discussed at IAVWOPSG/7, and suggested that should the opportunity arise during the discussions in IAVWOPSG/7 on WP/29 the MET/H TF Member from United States who is a Member of the IAVWOPSG could provide additional comments to the IAVWOPSG/7 to supplement the pros and cons listed in the paper.

1.2.4 The meeting reviewed the relevant Conclusions from APANPIRG/23, held in Bangkok, Thailand, from 10 to 14 September 2012, which are listed in the table at **Appendix D** to this Report.

1.2.5 In relation to Conclusion 23/41 – *VAAC Backup Procedures in the ASIA/PAC Region* – the meeting was informed that VAAC back-up procedures and VAAC back-up test procedures were incorporated into the SIGMET Guide (Appendices K & L) in September 2012 and the meeting was apprised of progress towards inclusion of VAAC Wellington in the VAAC back-up and VAAC back-up test procedures, which is expected to be formalized in a letter of agreement between New Zealand and Australia and put into practice with VAAC back-up testing (Wellington/Darwin) towards the end of 2013.

1.2.6 The chairperson reviewed the TOR of the group contained in **Appendix A** to this Report.

– – – – – – – – – – – – –

REPORT on Conjoint session of ROBEX WG/11 & MET/H TF/3 – 13 March 2013

Agenda Item C1: VAAC Back-up Tests

C1.1 The meeting was apprised of the outcomes from a back-up test conducted between the VAAC Darwin and VAAC Tokyo on 19 September 2012, in accordance with Annex 3, 3.5.2.

C1.2 The meeting was reminded that back-up procedures to be used in case of interruption to the operation of a VAAC are included in the Handbook of the International Airways Volcano Watch (IAVW) – Appendix D (ICAO Doc 9766). The document also notes that the "backup site may be another meteorological centre in the same Contracting State or it may be another VAAC" and "The backup arrangements should be tested at least annually".

C1.3 The meeting recalled that the procedures for conducting a back-up test were developed jointly by the Darwin and Tokyo VAACs and included in the Regional SIGMET Guide. A State Letter from the ICAO APAC Office was distributed with notification and information on the back-up test a month in advance of the scheduled test date.

C.1.4 The meeting was pleased to learn that the message dissemination problems reported by Australia in the previous test on 18 January 2012 were resolved (by addressing VAA individually in AFTN rather than using a collective address) and VAA were successfully disseminated via AFTN in a timely manner and acknowledgements of receipt were provided to Darwin VAAC by a significant number of VAA clients and from Singapore and Brisbane RODBs.

C1.5 Contrary to the VAAC back-up test procedures, which state that MWOs should not issue a test SIGMET during the VAAC back-up test, the meeting was advised that VA (test) SIGMET were issued by MWOs Ujung Pandang (WAAA) and Manila (RPLL); Ujung Pandang issued a test SIGMET prior to the test VAA and Manila issued a test SIGMET in response to the test VAA. The meeting was also advised that the VA (test) SIGMET message issued by Ujung Pandang, which validity of 6 hours, had the potential to overwrite an existing VA SIGMET in an automated Flight Planning System.

C1.6 The meeting considered the possibility that MWOs may have confused the VAAC back-up test with the Regional SIGMET test exercises – which do require MWOs to issue test SIGMET – and recommended that follow-up investigation be conducted. Philippines confirmed that this may have occurred at RPLL.

C1.7 The meeting discussed the situation where users of the Darwin VAAC information who use email as their primary source could not receive the test VAA because dissemination via email was not included in the back-up test. The meeting suggested the VAACs may investigate best practice to disseminate VAA in a secure manner to reach all known users, preferably via the AFTN, with possible guidance from the global group concerned.

C1.8 In view of the issues discussed above, the meeting agreed that a review and possible amendments to the VAAC back-up test procedures would be required **(Action agreed 11/7, refers)**. Note that the actions agreed (11/-) are for the ROBEX WG/11 meeting and are reproduced in **Appendix G** to this Report.

C1.9 In addition to the issues discussed above, based on the successful outcomes from the test, the meeting recommended that:

a) Agreement on back-up arrangements between VAACs Tokyo and Darwin be formalized and ‘draft’ status could be removed from the test procedures;

b) VAACs Tokyo and Darwin continue to promote the implementation and understanding of the IAVW, through active engagement with regional MWOs;

c) VAACs develop the capability to disseminate VAA to clients through official channels during backup operations; and

d) VAACs continue to conduct regular back-up testing at least annually.

C1.10 The meeting was also advised that procedures for VAAC back-up and VAAC back-up testing are being developed between Wellington and Darwin and arrangements for VAAC back-up (for the area south of latitude 20 south) are being formalized between the two respective States, New Zealand and Australia. The procedures will be promulgated to ICAO for consideration and inclusion in the SIGMET Guide and VAAC back-up testing may be conducted before the end of 2013.

– – – – – – – – – – – – – –

Agenda Item C2: SIGMET

a) SIGMET tests
b) Regional SIGMET monitoring and coordination
c) Review SIGMET Guide
d) Advisory information
e) Other business

C2.1 SIGMET tests

C2.1.1 The meeting reviewed results of SIGMET tests No.8 conducted in November 2012 for WC SIGMET (7 November 2012), WV SIGMET (14 November 2012) and WS SIGMET (21 November 2012), presented by RODBs Singapore and Tokyo, noting that procedures for conducting SIGMET tests are in the Asia/Pacific Regional SIGMET Guide. The State letter, dated 29 September 2012, notified the schedule and procedures for the SIGMET tests and helped promote awareness of the tests. SIGMET test results presented by RODBs Singapore and Tokyo are reproduced in the **Appendix C-1** to this Report. Formatting errors identified by RODB Tokyo in the WC and WV SIGMET tests are highlighted in the data in Table 8 and Table 9 of **Appendix C-1**. A table of formatting errors identified by RODB Singapore in the WS SIGMET test is reproduced in the **Appendix C-2** to this Report.

C2.1.2 The meeting was pleased to note that all five RODBs in the Region, Bangkok, Brisbane, Tokyo, Singapore and Nadi and WAFC London provided summaries of the reception of the WS SIGMET tests to the focal point for the WS SIGMET Tests in the Asia/Pacific region.

C2.1.3 The Regional OPMET Centre (ROC) Vienna also provided a summary report on the reception of the WS SIGMET test messages in the EUR region. Both ROC London and Vienna had reviewed the SIGMET distribution using this monitoring result and made the SIGMET routing more efficient and streamlined.

C2.1.4 A total of 16 of the possible 29 States listed in the Asia/Pacific SIGMET Guide participated in the WS SIGMET test.

C2.1.5 A total of 7 States (Afghanistan, Bangladesh, Nauru, Nepal, Papua New Guinea, Solomon Islands and Sri Lanka) have not participated in any of the SIGMET tests conducted. One of the non-participating States, Papua New Guinea, has responsibility for SIGMET issuance on behalf of Nauru and the Solomon Islands.

C2.1.6 A total of 13 of the possible 51 MWOs did not issue a test WS SIGMET for at least one of their FIRs, 7 of these did not participate in any of the eight tests conducted.

C2.1.7 The meeting reviewed the analysis of formatting errors reported from the WS SIGMET test, noting some persistent errors that should be followed up with States concerned.

C2.1.8 Australia advised that format errors due to incorrect sequence number, incorrect end of message and incorrect priorities would be rectified by a new SIGMET system by 30 May 2013.

C2.1.9 The meeting noted with some concern that participation by States and MWO in the WS SIGMET test No. 8 was lower than the previous year (States: 55% vs 62%; MWOs: 75% vs 80%) and suggested that the annual SIGMET test follow-up (letter) should be sent to all States summarizing the results (including successes and failures) of the tests and the benefits of participation, which may help promote increased participation by States.

C2.1.9 The meeting also noted that Nadi RODB's WS tests reception had increased by 14 percent compared to the previous year (2011: 76%; 2012: 90%).

C2.1.10 The meeting learned that the WS SIGMET test results from WAFC London, compiled based on reception at Secured SADIS FTP, were not as good as the RODBs (WAFC: 81%; RODB average: 91%).

C2.1.11 The meeting was pleased to note support from Regional OPMET Centres (ROCs) London and Vienna to RODB Singapore for OPMET exchange in both regions and appreciative of the effort by ROC Vienna to provide a very comprehensive and well laid summary report on the WS SIGMET tests. The meeting was pleased to see the relatively high rate of reception at the EUR ROCs (ROC averages: 88%; RODB average: 91%).

C2.1.12 In relation to the WC SIGMET test, the meeting was advised that the total number of WC SIGMET bulletins expected to be reported during the test from ASIA/PAC States was 46 and that received during the WC SIGMET test was 32, although there were some bulletins with incorrect formats or WMO headings. The overall availability of the test WC SIGMET from ASIA/PAC States was about 70%. The availability was slightly higher than that of the SIGMET test in 2011 with additional bulletins from OPLA, RPLL, VGHS and VLVT.

C2.1.13 In relation to the WV SIGMET test, the meeting was advised that the total number of WV SIGMET bulletins expected to be reported during the test from ASIA/PAC States was 49 and that RODB Tokyo relayed the 9 Russian WV SIGMETs (from UELL, UEST, UHHH, UHMA, UHMM, UHPP, UIAA and UIII). Therefore the total number of WV SIGMET bulletins expected to be reported during the WV SIGMET test was 58. The total number of WV SIGMET bulletins received during the test from ASIA/PAC and from Russia was 35 and 8, respectively. The availability in the ASIA/PAC region was 72% which was almost the same as that of the SIGMET test in 2011.

C2.1.14 The meeting was reminded that the issue of formatting errors in the WV and WC SIGMET tests due to incorrect WMO heading, especially for TT (WS, WC or WV), remained largely unchanged from the previous year.

C2.1.15 The meeting was pleased to note that, overall, the availability of both WC and WV test bulletins for 2012 showed improvement on 2011. However, some MWOs issued test bulletins with the same message repetitively, which the meeting noted could cause confusion when analyzing the results of the SIGMET tests.

C2.2 Regional SIGMET monitoring and coordination

C2.2.1 The meeting recalled the action agreed 10/3 by the OPMET/M TF/10 meeting required both RODB Brisbane and RODB Singapore to monitor the issuance of WS SIGMET for the following States: Afghanistan, Bangladesh, Nauru, Papua New Guinea, Solomon Islands, and Sri Lanka.

C2.2.2 RODBs Brisbane and Singapore developed a mutual plan and monitored WS SIGMET over a period of 2 months, commencing 0000 UTC on 1 August 2012 and ending 2359 UTC on 30 September 2012.

C2.2.3 The meeting appreciated the work done by RODBs Singapore and Brisbane to monitor, to record and present the results, which were reviewed by the meeting and are reproduced in the **Appendix C-3** to this Report.

C2.2.4 The meeting was concerned that no SIGMET was received from four States, namely Afghanistan, Nauru, Papua New Guinea and Solomon Islands, in the 2-month period monitored, noting that SIGMET (for thunderstorms) were issued by surrounding MWOs on some days. The meeting also recalled that one of those States, Papua New Guinea, has an agreement to provide SIGMET for 3 FIRs – Port Moresby, Honiara, and Nauru – on behalf of the host States.

C2.2.5 The meeting was apprised, however, that MWO Colombo issued 7 SIGMET in August and 4 SIGMET in September and MWO Dhaka issued WS SIGMET on every day; on average 6 SIGMET per day.

C2.2.6 Given the results of the SIGMET monitoring discussed above, and the history of non-participation of States in SIGMET tests (Papua New Guinea in particular – noting its obligation also for SIGMET issuance on behalf of the Solomon Islands and Nauru) the meeting urged the ICAO Regional Office to step-up its effort in establishing dialogue with the States concerned, particularly PNG, and obtaining feedback from those States in order to urgently facilitate the establishment and implementation of effective corrective action plans to address the deficiencies related to SIGMET not provided in accordance with requirements (**Action agreed 11/8 refers**).

C2.3 Review SIGMET Guide

C2.3.1 The meeting recalled that the main purpose of the SIGMET Guide is to provide guidance for standardization and harmonization of the procedures and formats related to SIGMET information. The guidance is complementary to the Annex 3 Standards and Recommended Practices (SARPs) regarding SIGMET and to the SIGMET related provisions of the Regional Air Navigation Plan.

C2.3.2 The SIGMET Guide is reviewed and updated regularly in order to be kept in line with the relevant ICAO SARPs and regional procedures including SIGMET test instructions and changes associated with MWO as provided by States.

C2.3.3 The SIGMET Guide was last amended following discussions at the previous conjoint session of OPMET/M TF/10 and METWARN/I TF/2. The meeting reviewed the last amendments to the SIGMET Guide published in September/October 2012, which are listed in the **Appendix C-4** to this Report.

C2.3.4 The meeting was reminded of the review of regional SIGMET Guides conducted by the 4th meeting of the Meteorological Warnings Study Group (METWSG/4), held in Montréal from 15 to 18 May 2012, which noted several inconsistencies between two ICAO regional SIGMET guides, namely those for the European region and Asia/Pacific regions. The METWSG agreed that a comprehensive review of all regional SIGMET guides should be carried out noting that these guides generally contained generic information (which would not vary regionally) and specific information pertaining to the communications and other needs of each region (METWSG/4 Action Agreed 4/3 refers).

C2.3.5 The meeting also noted that the work of the METWSG ad-hoc group tasked with developing generic guidance on the issuance of SIGMET for each ICAO Region has made some progress in terms of the structure of a template for a (generic) SIGMET guide. A progress report should be made available to METWSG Members by 15 March 2013 for consideration at the METWSG/5 in June 2013.

C2.3.6 The meeting was also reminded of APANPIRG/22 – Conclusion 22/44, adopted in September 2011 (CNS/MET SG/15 draft Conclusion 15/32 also refers), to provide guidance in relation to volcanic eruptions that resulted in the ash plumes dissipating within a few hours following the eruptions. Amendment 76 to Annex 3, which was developed to include a provision (in Table A6-1) that would allow for the reporting of 'NO VA EXP' (decode: no volcanic ash expected) in the forecast part of a SIGMET message, has subsequently been adopted by Council and will become applicable in November 2013. Therefore the meeting noted the requirement for an example in the Asia/Pacific SIGMET Guide to report a situation when no ash is expected in the forecast section of a SIGMET – that should be implemented in time for Am.76.

C2.3.7 The meeting also noted the Am.76 Annex 3, Appendix 6, Table A6-1 provisions that require the location of phenomena (in SIGMET) to only be identified by the use of coordinates – therefore SIGMET will no longer contain geographical locations – which will have implications for APAC States providing SIGMET.

C2.3.8 Minor updates for the SIGMET Guide were provided by the meeting for further consideration and are contained in the **Appendix C-5** to this Report. The meeting suggested that a minor amendment to the SIGMET Guide could be processed in the short term with more significant changes (as discussed in the paragraphs above) requiring more time to be included in a September 2013 update (**Action agreed 11/9 refers**).

C2.4 Advisory information

C2.4.1 The meeting was apprised of JMA developments of an automatic significant weather detection technique that is considered important by Japan in order to provide advisory information with timeliness and accuracy for a large region. The technique for automated detection of thunderstorm areas uses satellite observations and forecasts by a global numerical weather prediction model to produce SIGMET advisory information to improve the content of SIGMET.

C2.4.2 Noting the potential for such developments to be of interest to the global group investigating the feasibility of SIGMET advisory centres, the meeting encouraged Japan to report further development of the system and associated practical experience to the METWSG.

C2.5 Other Business

C2.5.1 The meeting was reminded that, in view of the planned cessation of WAFS products in WMO GRIB 1[1] code form, users of SADIS or WIFS should migrate to receiving, decoding and using the WAFS gridded global forecasts in WMO GRIB 2[2] code form as soon as possible if not already done so.

C2.5.2 The meeting noted that State Letters (Ref.: AN 10/3.1-13/2, 23 January 2013; and Ref.: T 4/8.1:AP029/13, 22 February 2013) were issued to urge States to migrate to GRIB 2, and to seek assistance if required, and that States were requested to reply (to Ref.: T 4/8.1:AP029/13) no later than 19 April 2013 indicating the status of preparations for the migration to WAFS gridded global forecasts in WMO GRIB 2 code form.

– – – – – – – – – – – – –

[1] Gridded Binary Edition 1
[2] Gridded Binary Edition 2

Agenda Item 2: Review educational material

a) Monitor the developments of IAVWOPSG and METWSG with reference to guidance on radioactive cloud and Tsunami

b) Other necessary guidance

2.1 Developments of IAVWOPSG with reference to guidance on radioactive cloud

2.1.1 The meeting recalled that CNS/MET SG/15 formulated Decision 15/33 – to task the METWARN/1 TF to continue its efforts to develop guidance material in appropriate Regional Guidance Document (i.e. SIGMET Guide or Contingency Plan) in consultation with the IAVWOPSG and WMO for the issuance of RDOACT CLD (decode: radioactive cloud) SIGMET.

2.1.2 Progress on the development of guidance material for radioactive cloud was subsequently reviewed by CNS/MET SG/16, which noted the formulation of IAVWOPSG/6 Conclusion 6/29 — *Provision of information on radioactive material released into the atmosphere*, and Conclusion 6/30 — *Alternative provisions for radiological cloud information for international air navigation*, and determined that further development of regional guidance material for the issuance of radioactive cloud SIGMET will depend on outcomes of the IAVWOPSG ad-hoc group's work to be discussed at IAVWOPSG/7, in Bangkok, from 18 to 22 March 2013.

2.1.3 The ad-hoc groups reporting to IAVWOPSG/7 will include progress made on: the draft concept of operations (ConOps) for the provision of information about the release of radioactive material into the atmosphere in support of international air navigation, consideration of existing ICAO provisions and guidance with regards the draft ConOps and a proposal provided for SIGMET for radioactive clouds.

2.1.4 The meeting anticipated that IAVWOPSG/7 outcomes may include conclusion on further progress required with regards to guidance material for radioactive material and whether and how to further develop the ConOps document for the provision of information about the release of radioactive material into the atmosphere in support of international air navigation.

2.1.5 In light of the discussion above, the meeting expects that further development of the regional guidance material for the issuance of radioactive cloud SIGMET will depend on outcomes from IAVWOPSG/7, which may be considered by the MET SG/17 meeting in Bangkok, 13 to 16 May 2013.

2.1.6 The meeting recalled that a Regional survey was conducted in 2011 on the status of present capabilities of Asia/Pacific States to prepare and issue R-SIGMET and recommended the results be reviewed and presented in a paper at the next meeting along with results from a new survey to update the status in 2013 (**Action Agreed 3/1 refers**). Note that the actions agreed by the MET/H TF/3 meeting are contained in the **Appendix B** to this Report.

2.2 Termination of radioactive cloud SIGMET

2.2.1 The meeting was apprised of the circumstances under which the Japan Meteorological Agency (JMA) made its decisions to first issue, then change, then cancel SIGMET messages referring to radioactive cloud in response to the accident at the Fukushima Daiichi nuclear power plant in March 2011.

2.2.2 The JMA reported that the criteria for the issuance of SIGMET messages referring to radioactive cloud are not clear because SIGMET issuance criteria refer to en-route phenomena which may affect the safety of aircraft operations, but the effects of radioactive material on aircraft operation are not readily known.

2.2.3 The meeting learned that, in the absence of other credible sources of information on the level of safety, the JMA utilized information from government declarations of the indoor evacuation area for inhabitants, and the no-fly zone issued by JCAB, to base the initial SIGMET messages referring to radioactive cloud issued at 0610 UTC, 17 March 2011. Subsequent revisions to the area covered in the SIGMET messages referring to radioactive cloud were based on changes to the JCAB no-fly zone and consultation with the Nuclear Safety Institute.

2.2.4 The meeting noted that the JMA considered it important to maintain consistency between SIGMET messages referring to radioactive cloud and the information from national nuclear emergency authorities to avoid any significant disruption due to conflicting information. In practice, however, the JMA found it difficult to express consistently the size and shape of the domain in the SIGMET messages referring to radioactive cloud when the corresponding domain declared by the emergency authorities was too small or too complex.

2.2.5 The meeting also noted that with no useful technique to forecast the atmospheric transport of the radioactive cloud due to the lack of source term information, the JMA had infrequent justification on which to change the area for the SIGMET information and in such case an extended period of validity of SIGMET messages referring to radioactive cloud may be more appropriate.

2.2.6 The meeting noted that JMA previously presented the details and problems associated with the issuance of SIGMET messages referring to radioactive cloud to CNS/MET SG/16, in IP/50.

2.3 Developments of METWSG with reference to guidance on tsunami

2.3.1 The meeting recalled that previous discussions at METWARN/I TF/1 and METWARN/I TF/2 concerning APAC regional issues on the capabilities of States to provide tsunami information, including the issuance of aerodrome warnings for tsunami, were forwarded to the METWSG.

2.3.2 The METWSG tasked an ad-hoc group with developing guidance for the provision of aerodrome warnings for tsunami, taking into consideration the practices adopted in those States (and regions) potentially affected (METWSG action agreed 3/16 refers). The ad-hoc group recommended that aerodrome warning for tsunami be replaced by either an element of a national (tsunami warning) system or by information stemming from an international (tsunami) warning centre whose area of responsibility covers the State concerned.

2.3.4 METWSG/4, Montréal, Canada, 15 to 18 May 2012, agreed that it would be difficult to place requirements in ICAO provisions for national public safety systems or indeed for the international tsunami warning centres, however, in cases where a national public safety plan was in place concerning the incidence of tsunami, and the aerodrome in consideration was a full and active part of that plan, then METWSG/4 agreed that the issuance of a separate aviation-related tsunami warning would be redundant and could even cause confusion. As a result, METWSG/4 formulated the following action:

METWSG/4 Action Agreed 4/7 — Tsunami warnings where national public safety plans incorporating the aerodrome exist

That the Secretary develop a draft amendment proposal to Annex 3, Appendix 6, 5.1.3, to add a note stating that tsunami warnings are not required in cases where a national public safety plan for tsunami was fully integrated with the "at risk" aerodrome concerned.

2.3.5 In light of the discussion above (including METWSG/4 action agreed 4/7), the meeting expects that further development of the regional guidance material for the issuance of aerodrome warnings for tsunami will depend on the outcome(s) of METWSG/5, to be held in Montréal from 20 to 21 June 2013, concerning the amendment proposal to Annex 3, Appendix 6, 5.1.3.

– – – – – – – – – – – –

Agenda Item 3: Review progress on contingency plans

3.1 The meeting was reminded that METWARN/I TF/2 reviewed the progress and composition of the ad-hoc group formed (at METWARN/I TF/1) to work on the framework for APAC regional (MET) contingency plans for phenomena that include volcanic ash, tropical cyclone, radioactive cloud and tsunami. The meeting reviewed the draft framework for regional (MET) contingency plans developed by the ad-hoc group and reproduced in the **Appendix E** to this Report.

3.2 The meeting recalled that APANPIRG/22 Conclusion 22/9 led to the formation of the Regional ATM Contingency Plan Task Force (RACP/TF), for planning, coordination and implementation of a regional ATM contingency plan, with a link to the (former) METWARN/I TF, which first met in Bangkok, from 17 to 19 April 2012, and was concurrently holding its second meeting in Bangkok, from 12 to 15 March 2013.

3.3 The meeting was also reminded that the International Volcanic Ash Task Force (IVATF), which concluded its activities at its fourth meeting (IVATF/4), held at ICAO Headquarters from 13 to 15 June 2012, had developed an Air Traffic Management Volcanic Ash Contingency Plan (ATM VACP) template that includes interfaces with supporting services, such as aeronautical information service (AIS) and meteorological (MET) services. The meeting reviewed the ATM VACP template, which was made available to States at APANPIRG/23 (in IP/28) for consideration and use in the development of volcanic ash contingency plans, and is reproduced in **Appendix F** to this Report.

3.4 The meeting recalled that the IAVWOPSG, which provides advice and guidance concerning the operation and development of the international airways volcano watch (IAVW), will take into consideration the regional utilization of the ATM VACP template when it reviews the IAVW-related guidance material at IAVWOPSG/7 to be held in Bangkok from 18 to 22 March 2013.

3.5 The meeting considered the work plan of the MET/H TF ad-hoc group on contingency plans and noted that the group should determine how the ATM VACP template can assist with further development of a framework for APAC regional (MET) contingency plans for phenomena that include volcanic ash, tropical cyclone, radioactive cloud and tsunami. The meeting also considered the kind of assistance the ad-hoc group would provide in meeting the RACP/TF requirements for MET input in regional ATM contingency plans, including potential regional adaptation of ATM VACPs based on the ATM VACP template.

3.6 The composition and work plan of the ad-hoc group was reviewed and updated and is included in **Appendix E** to this Report. The work of the ad-hoc group was also incorporated into the overall work plan document of the MET/H TF, which is in the **Appendix A** to this Report.

3.7 The meeting was informed about the details and outcomes of the ICAO EUR/NAT Region Volcanic Ash Exercise conducted in Kamchatka (VOLKAM13) from 15-16 January 2013 to test the EUR/NAT Air Traffic Management Volcanic Ash Contingency Plan (EUR Doc 019/NAT Doc 006, Part II) and mitigate impacts of volcanic ash on air traffic. The objectives of VOLKAM13 included consideration of adapting the ATM VACPs for use in the EUR/NAT Region, based on the exercise conclusions and the ATM VACP template.

3.8 The meeting was given an overview of the exercise and reviewed the VOLKAM13 outcomes, noting that the VOLKAM13 report is accessible on the ICAO EUR/NAT website, and discussed lessons learned and recommendations from the exercise that would be worthy of further consideration in respect of potential, similar exercise(s) being conducted in the APAC Region.

3.9 The meeting learned that one of the most significant challenges faced in VOLKAM13 was coordinating the teleconferences necessary to facilitate the Collaborative Decision Making process among the various participating organizations. The teleconferences were conducted in the English language, which the meeting was advised could present significant challenges in an exercise conducted in the APAC Region, and would require careful planning to mitigate the risk of mis-communication. Other recommendations from the exercise included improvements to VAAC products that will be forwarded to IAVWOPSG for further consideration through the appropriate regional representative(s) of the global group.

3.10 The meeting noted that the VOLKAM13 targeted an area that included three ICAO Regions, namely EUR, APAC and NAM, and that inter-regional issues identified by VOLKAM13 would be forwarded to the Cross Polar Working Group (CPWG) for consideration. The CPWG will consider adaptation of ATM VACPs, based on the ATM VACP template, for use in the target area, which would need approval by the respective planning and implementation regional groups (PIRGs).

– – – – – – – – – – – –

Agenda Item 4: Aerodrome Warnings

4.1 Discussion on developments of the METWSG with reference to guidance on tsunami and the issuance of aerodrome warnings for tsunami is contained in section 2.3 of this report.

4.2 The meeting recalled that a Regional survey was conducted in 2011 on the present capabilities of Asia/Pacific States to prepare and issue aerodrome warning for tsunami and recommended the results be reviewed and presented in a paper at the next meeting along with results from a new survey to update the status in 2013 (**Action Agreed 3/2 refers**).

Agenda Item 5: Future Work Programme and review of TOR

5.1 The updated work plan document was reviewed as included in the **Appendix A** to this Report.

Agenda Item 6: Any other business

6.1 Next Meeting

6.1.1 Dates for the next meeting were tentatively agreed as Wednesday 19 to Friday 21 March 2014, including a conjoint session with ROBEX WG/12 on 19 March 2014.

– – – – – – – – – – – – – – –

WORK PLAN
ICAO APANPIRG MET SG
METEOROLOGICAL HAZARDS TASK FORCE (MET/H TF)

1.TASK TEAM		
Secretariat	**Address**	**Contact**
Peter C. Dunda	Regional Officer MET International Civil Aviation Organization 252/1 Vibhavadi Rangsit Road Chatuchak Thailand	Ph: +66 (2) 537-8189 Ext. 153 Fax: +66 (2) 537-8199 Email: pdunda@icao.int
Co-Chairs (2)	**Address**	**Contact**
~~Mr. Michael I. Berechree~~ ~~AUSTRALIA~~ Mr. Pak-wai Chan HONG KONG CHINA 2nd Co-chair TBA	~~National Manager Aviation Weather Services~~ ~~Weather and Ocean Services Branch~~ ~~Bureau of Meteorology~~ ~~GPO Box 1289, Melbourne VIC 3001~~ ~~Australia~~ Senior Scientific Officer Hong Kong Observatory 134A Nathan Road Tsim Sha Tsui Hong Kong	~~Ph: +61 3 9669 4586~~ ~~Fax: +61 3 9669 4695~~ ~~Mob: +61 434516872~~ ~~Email: m.berechree@bom.gov.au~~ ~~srav@bom.gov.au~~ Ph: +852 2926 8435 Fax: +852 2375 2645 Em: pwchan@hko.gov.hk
Members	**Address**	**Contact**
Australia Ms. Sue O'Rourke	Section Head, Meteorological Authority Strategy, Parliamentary, International & Communications Branch GPO Box 1289 Melbourne VIC 3001 AUSTRALIA	Tel: +61 (3) 9669 4662 Fax: +61 (3) 9669 4473 E-mail: s.o'rourke@bom.gov.au
Mr. Wang Fengyun CHINA	Engineer MET Office, Air Traffic Management Bureau of East China Shanghai 200335 China	Ph: +86 (21) 2232 7521 Fax: +86 (21) 6268 3667 Em: wangfy@atmb.cn
Ms. Zou Juan CHINA	Engineer MET Division Air Traffic Management Bureau, CAAC No. 12, East San-huan Road Middle Chaoyang District, Beijing 100022 China	Ph: +86 (10) 8778 6828 Fax: +86 (10) 8778 6820 Em: zoujuan@atmb.net.cnjuan_zou@yahoo.com
~~Mr. Pak-wai Chan~~ ~~HONG KONG~~	~~Senior Science Officer~~ ~~Hong Kong Observatory~~ ~~134A~~ ~~Nathan~~ ~~Road~~	~~Ph: +852 2926 8435~~ ~~Fax: +852 2375 2645~~ ~~Em: pwchan@hko.gov.hk~~

~~CHINA~~	~~Tsim Sha Tsui Hong Kong~~	
Mr. Manoj Kumar Bhatnagar INDIA	Deputy Director General of Meteorology Mausam Bhavan Office of the Director General of Meteorology India Meteorological Department Lodi Road New Delhi 110 003 India	Ph: 00 91 (11) 246 15371 Fax: 00 91 (11) 246 99216 / 246 00 91 (11) 246 15371 Em: bhatnagarmk1@gmail.commk.bhatnagar@imd.gov.in
Dr. R. Suresh INDIA	Scientist 'E' Aerodrome Meteorological Office, ATS Complex Meenambakkam India Meteorological Department Chennai 600027 India	Ph: 00 91 44 225 61636 00 91 44 225 60618 Fax: 00 91 44 225 61636 00 91 44 225 60790 Em: suresh.imd@gmail.com dr_r_suresh@yahoo.co.in
Member Name INDONESIA	~~(transferred from OPMET/M TF membership – no contact information declared – to confirm)~~ Mr. Mustari Heru Jatmika Head of Aeronautical Meteorology Division Indonesian Meteorological Climatological and Geophysical Agency Jalan Angkasa I No.2 Kemayoran, Jakarta, Indonesia - 10720 Mr. Zulkarnain Senior Forecaster of Aeronautical Meteorology Aeronautical Meteorology Division Indonesian Meteorological Climatological and Geophysical Agency Jalan Angkasa I No.2 Kemayoran, Jakarta, Indonesia - 10720	Tel : +62 (21) 4246321 Fax : +62 (21) 6546315 Email : emhadjatmiko@yahoo.co.id ; heru1959@gmail.com Tel : +62 (21) 6546318 Fax : +62 (21) 6546315 Email : zulkarnain@bmkg.go.id ; cillo_85@yahoo.com
JAPAN Jun Ryuzaki	Scientific Officer Aeronautical Meteorology Division Administrative Department Japan Meteorological Agency (JMA) Ministry of Land, Infrastructure, Transport and Tourism	Tel: +81 3 3212 8341 (ext.2285) Fax: +81 3 3212 8968 E-mail:: jryuzaki@met.kishou.go.jp

	1-3-4 Otemachi, Chiyoda-ku Tokyo Japan	
Ab Llah Che Cob MALAYSIA	Director KLIA Meteorological Office 1st Floor, Airport Management Centre (AMC) 64000 KLIA Sepang, Selangor	Ph: +603 8787 2388 Fax: +603 8787 1019 Em: ablah@met.gov.my
Ali Shareef MALDIVES	Deputy Director General Maldives Meteorological Service Hulhule, 22000 MALDIVES	Ph: +960 332 6200 Fax: +960 334 1797, 332 0021 Em: shareef@meteorology.gov.mv
Mr. Keith Mackersy NEW ZEALAND	Technical Consultant, Meteorology Civil Aviation Authority of New Zealand P.O. Box 3555 Wellington 6140 NEW ZEALAND	Ph: +64 (4) 560 9400 Fax: +64 (4) 569 2024 Em: keith.mackersy@caa.govt.nz
Ms. Chua Guat Mui SINGAPORE	Chief Technical Officer Meteorological Service of Singapore National Environment Agency P.O. Box 8, Singapore Changi Airport Singapore 918141 SINGAPORE	Tel: +65 6542 2861 Fax: +65 6542 2816 E-mail: chua_guat_mui@nea.gov.sg
Mr. Perapol Begkhuntod THAILAND	Acting Director Weather Monitoring Division Bureau of Aeronautical Meteorology Thai Meteorological Department 6th Floor, ATC Complex Suvarnabhumi International Airport Bang Pli, Samut Prakarn, 10540 THAILAND	Ph: +66 (2) 1340006 +66 (2) 1340007 Fax: +66 (2) 1340009 +66 (2) 1340010 Em: pira@tmd.go.th
~~Ms. Plaidao KhumchaiYaphum THAILAND~~	~~Meteorologist Aeronautical Meteorology Forecast Division Bureau of Aeronautical Meteorology Thai Meteorological Department 6th Floor, ATC Complex Suvarnabhumi International Airport Bang Pli, Samut Prakarn, 10540 THAILAND~~	~~Ph: +66 (2) 1340006 +66 (2) 1340007 Fax: +66 (2) 1340010 Em: pound_ph@hotmail.com~~
Mr. Steven Albersheim UNITED STATES	Federal Aviation Administration Senior Meteorologist, Programme Lead International FAA Headquarters, 800 Independence Ave, S.W. Washington, D.C. 20591	Ph: +1 (202) 385 7185 Fax: +1 (202) 385 7240 Em: Steven.albersheim@faa.gov

	United States	
Mr. Dao Son Hai VIETNAM	Deputy Director, Air Navigation Department, CAAV 119 Nguyen Son str, Long Bien Dis. Ha Noi, Viet Nam	Ph: (84 4) 38720199 Fax: (84 4) 38732762 Em: dsh@caa.gov.vn

2.DESCRIPTION	
Objective	Improve the quality of meteorological advisories and warnings and implement the International Airways Volcano Watch (IAVW) and International Tropical Cyclone Watch (ITCW).
Benefits	• Improve in-flight safety by providing information on volcanic ash, tropical cyclone and other hazardous weather. • Improve pre-flight planning by optimizing flight routes with respect to volcanic ash, tropical cyclone and other hazardous weather phenomena.
Terms of Reference	Under guidance from ICAO Secretariat: • Maintain awareness of current and future requirements with respect to the issuance of meteorological advisories and warnings; • Maintain awareness of the implementation of meteorological advisories and warnings within the ASIA/PAC Region and any deficiencies; • Continually seek ways to improve the operational effectiveness of the meteorological advisory and warning system; and • Provide advice to the ~~CNS/~~MET Sub-group on the above issues.
Work Program	The work to be addressed by the ASIA/PAC ~~METWARN/I~~ MET/H TF includes: • Review procedures for the issuance of meteorological advisories and warnings in the region and propose actions for their improvement to related performance objectives; • In conjunction with ~~OPMET Management Task Force~~ROBEX WG, investigate the deficiencies in the format and dissemination of meteorological advisories and warnings and propose remediation plans; • Respond to the needs of the States for guidance and/or training related to the implementation of meteorological advisories and warnings and inform ~~OPMET/M TF~~ROBEX WG of changes required to the SIGMET guide; • In conjunction with ~~MET/ATM~~MET/R TF, provide meteorological input for contingency planning for specific phenomenon including Volcanic Ash, Radioactive Cloud, Tropical Cyclone and Tsunami; • Follow the developments in the States related to the improvement of meteorological advisories and warnings and provide regional input on these matters to relevant ICAO and WMO groups and to gather user requirements from ANSPs, IATA, IFATCA and IFALPA; • Report on its work to the ~~CNS/~~MET Sub-group of APANPIRG; and • Maintain a link to the Regional ATM Contingency Plan Task Force (RACP/TF).

3. COMMUNICATION STRATEGIES				
Description	**Target Audience**	**Delivery Method**	**Frequency/ Date**	**Responsibility**
Work Plan	Task Force Members	Document via email and posted on ICAO Bangkok website	As required but reviewed at least quarterly	Co-Chair
General correspondence	Task Force Members	Email	As required	Task Force Members
Task Force Meeting	Task Team Members	Meeting in conjunction with ~~OPMET M/TF~~ROBEX WG	Yearly in March	Chair

Status& Milestone Reports	ICAO Secretariat and Task Team Members	Report via email	Quarterly	Chair
Task Force Report	~~METWARN I/TF~~MET/H TF and ROBEX WG ~~OPMET M/TF~~	Working Paper	Yearly	Chair
Task Force Report	~~APANPIRG~~ MET SG	Working Paper	Yearly	Secretariat

4. PERFORMANCE FRAMEWORK FORM (PFF)				
Tasks	**Time Frame**	**Responsibility**	**Status**	**Milestone**
Task 1: Monitor and provide assistance to the regional implementation of meteorological warnings and advisories that include volcanic ash (VA) and tropical cyclone (TC) advisories and meteorological warnings and advisories based on current and future requirements	2013-2016	~~METWARN/I~~MET/H TF	In progress	1
Task 2: Track and investigate deficiencies in the format and dissemination of meteorological advisories and warnings and propose remediation plans and provide information to ICAO and WMO groups for possible assistance	2013-2016	~~METWARN I/TF~~MET/H TF and ROBEX WG ~~OPMET M/TF~~	In progress	1,2
Task 3: Review WC, WV & WS SIGMET test results and implement improvements.	2013-2016	~~METWARN/I TF~~ MET/H TF	In progress	1
Task 4: Provide guidance and/or training related to the implementation of meteorological advisories and warnings, including input to the Regional SIGMET Guide as they relate to the Annex 3 amendment cycle.	2013	~~METWARN/I TF OPMET/M TF~~ R/O, MET/H TF and ROBEX WG	In progress	1,3
Task 5: Develop framework for contingency plans for specific phenomenon, including VA, radioactive cloud, TC and Tsunami, with consideration to global ICAO groups and WMO developments.	2013	~~METWARN/I TF MET/ATM~~ MET/H TF and MET/R TF	In progress	3

5. MILESTONES			
Milestone	**Accountability**	**Dates**	**Status**
Milestone 1: Report back to MET SG on regional performance and action plan	*Chair*	*Annually*	
Milestone 2: Review and further develop suitable educational Material	*Chair*	*Annually*	
Milestone 3: Develop framework for ASIA/PAC Regional (MET) Contingency Plans	*~~Keith~~ad-hoc group*	*~~Mar 2013~~Aug 2013*	
Milestone 4: Review requirements from ASIA/PAC Regional (MET) for dissemination of Tsunami warnings	*Chair & R/O*	*~~Mar~~Apr 2013*	

6. WORK PLAN				
Task / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
Activity 1: SIGMET TESTS				
Task 1.1: Review ~~OPMET report on~~ SIGMET tests (conjoint session with ROBEX WG)	Chair	-	Annually	
Task 1.2: Develop action plan to fix identified deficiencies	Task Force	~~OPMET report~~ conjoint session with ROBEX WG	During meeting	
Milestone 1: Report back to MET SG on regional performance and action plan	Chair	-	*Annually*	
Activity 2: EDUCATIONAL MATERIAL				
Task 2.1: Review current SIGMET posters and education material (Future Annex 3 amendments)	~~Task Force~~ Australia, Hong Kong, China and New Zealand in conjunction with METWSG or ICAO HQ	-	Following Annex 3 amendments Next meeting	
Task 2.2: Review the requirements for educational material in light of ~~OPMET~~ monitoring results	Task Force	-	~~February 2013~~ Next meeting	
Task 2.3: Consider the requirement for seminars/workshops	Task Force	-	February 2013 Next meeting	
Milestone 2: Review and further develop suitable educational material	Chair		*July (annually)MET SG*	
Activity 3: REGIONAL CONTINGENCY PLANS				
Task 3.1: Report on the progress of ~~IVATF~~IAVWOPSG to ~~METWARN I/TF~~MET/H TF	Chair	-	Mar 2014	
Task 3.2: Considering existing VA procedures and plans in the ASIA/PAC, and in light of the issuance of the EUR/NAT, NAM/SAM contingency plans, consider the appropriateness of an ASIA/PAC contingency plan, and develop possible framework.	Task Force & ad-hoc group	-	~~Mar~~ Aug 2013	
Task 3.3 Consider existing contingency plan in APAC region (e.g., TC, radioactive cloud and Tsunami)	Task Force& ad-hoc group	-	~~Mar~~ Aug 2013	
Milestone 3: Develop framework for ASIA/PAC Regional (MET) Contingency Plans	~~*Keith*~~ *Rapporteur ad-hoc group*		~~*Mar*~~ *Aug 2013*	
Activity 4: TSUNAMI				
Task 4.1: Report on the progress of topic from METWSG/5 for regional applications	Chair	-	March 2014	
Task 4.2: Review outcomes from METWSG/5	Task Force		Mar 2014	

6. WORK PLAN				
Task / Milestone	**Accountability**	**Predecessors**	**Date**	**Status**
in relation to the provision of Tsunami Warnings to aerodromes		-		
Milestone 4: Review requirements from ASIA/PAC Regional (MET) for dissemination of Tsunami warnings	*Chair*		*Mar 2014*	

– – – – – – – – – – – – –

MET/H TF/3 Agreed Actions

Status on **15 March 2013**
(✓ = completed)

No.	Title/Action	Follow-up action (target/completion dates in brackets)
3/1	**Regional capabilities to prepare and issue radioactive SIGMET.** That, results of the 2011 Regional survey on the status of present capabilities of Asia/Pacific States to prepare and issue R-SIGMET are reviewed at the next meeting and a new survey is conducted to update the status in 2013.	Secretariat/States Survey (July 2013) WP for MET/H TF/4 (Feb 2014)
3/2	**Regional capabilities to prepare and issue aerodrome warning for tsunami.** That, results of the 2011 Regional survey on the status of present capabilities of Asia/Pacific States to prepare and issue aerodrome warning for tsunami are reviewed at the next meeting and a new survey is conducted to update the status in 2013.	Secretariat/States Survey (July 2013) WP for MET/H TF/4 (Feb 2014)

– – – – – – – – – – – – – –

METWARN/I TF/2 Agreed Actions

Status on **15 March 2013**
(✓ = completed)

No.	Title/Action	Follow-up action (target/completion dates in brackets)
2/1	**SIGMET advisory trial.** That, an evaluation of the SIGMET advisory trial in Asia (hosted by China) – including feedback from IATA – is presented for further discussion.	China/Secretariat ✓ IP/7 (& SN/8) presented at METWSG/4; IP/17 & WP/50 presented at CNS/MET SG/16 (May-Jul 2012)
2/2	**Volcanic Ash Advisory and Warning information.** That, the details of discussions in this meeting concerning the pros and cons of removing the requirement for SIGMET for VA be reported to the IAVWOPSG for further consideration.	States/Secretariat ✓ WP/29 prepared by U.S. for IAVWOPSG/7 (March 2013)
2/3	**Volcanic Ash Advisory and Warning information.** That, the outcomes from the IVATF/4 meeting concerning the proposed removal of the requirement for SIGMET for VA be reported to the CNS/MET SG for further consideration.	IVATF /Secretariat ✓ IP/15 presented at CNS/MET SG/16 (Jul 2012)
2/4	**Sub-Regional exchange of volcanic ash information.** That, an investigation of the optimal exchange of MET information in relation specifically to VA in the APAC regions be conducted to facilitate the group's further consideration of the proposal to remove the requirement for SIGMET for VA.	States/Secretariat **In progress** WP for MET/H TF/4 based on outcomes from discussions at IAVWOPSG/7 (revised to February 2014)
2/5	**User requirements for volcanic ash information.** That, the MET/ATM TF be asked to establish detailed user requirements in the APAC regions in relation to VA information.	Secretariat ✓ WP/21 presented to CNS/MET SG/16 (Jul 2012)
2/6	**Structure and working arrangements of MET groups.** That, proposals for streamlining the structure and operation of MET groups (under APANPIRG) be further developed and presented to CNS/MET for consideration.	TF chairs/Secretariat ✓ WP/46 presented to CNS/MET SG/16 (Jul 2012)

2/7	**Aerodrome warning on Tsunami.** That, the METWSG be asked take into consideration the requirements of the Asia/Pacific regions in its development of global requirements for Tsunami warning information.	Secretariat ✓ METWARN/I TF/2 members (Australia, Japan and Hong Kong, China) participated in METWSG/4, which agreed (4/7) to develop draft amendment proposal to Annex 3 (Appendix 6, 5.1.3) that tsunami warnings are not required in cases where a national public safety plan for tsunami was fully integrated with the "at risk" aerodrome concerned. (May 2012)
2/8	**Ad-hoc group on regional contingency plans.** That, the ad-hoc group tasked with the framework for APAC Regional (MET) Contingency Plans be refreshed to include Japan and IFALPA (plus updated contact for Australia) and re-commence action against the established tasks of the group.	Secretariat ✓ WP for METWARN/I TF/3 (February 2013)

– – – – – – – – – – – – –

APANPIRG/23 Conclusions/Decisions – Action Plan

Conclusion/ Decision No	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Target date	Status as of 12 Mar 2013
C 23/39	**User readiness for transition from GRIB1 to GRIB2 code form WAFS Forecasts**	That, ICAO urges States/users of WAFS forecasts in the ASIA/PAC Region to accelerate preparations for transition from WMO GRIB1 to GRIB2 WAFS forecasts if not already done so.	ICAO APAC office	State Letter	Sep 2012 – then revised to Mar 2013 to realign target date with WAFSOPSG/7 C 7/11	COMPLETED State Letters: AP029/13 and AN10/3.1-13/2
C 23/40	**Update to the ASIA/PAC FASID Table MET 6**	That, the ASIA/PAC FASID Table MET 6 be amended to reflect the requirements provided by States for primary Internet-Based service for WAFS Forecasts as provided in **Appendix P** to the Report on agenda item 3.4.	ICAO APAC office	Amendment to ASIA/PAC FASID Table MET 6	Nov 2012 – then revised to Jan/Feb 2013 to combine with PfA required by WAFSOPSG/7 Conclusion 7/2	COMPLETED PfA APAC 13/3
C 23/41	**VAAC Backup Procedures in the ASIA/PAC Region**	That, Australia, Japan and New Zealand considers the further development of: a) VAAC Backup Procedures in the Asia-Pacific Region, as given at **Appendix Q** to the Report on agenda item 3.4, in order to include Tokyo, Wellington and Darwin VAACs; and b) Procedures for VAAC Backup Tests between Tokyo, Wellington and Darwin VAACs for inclusion in the Asia/Pacific Regional SIGMET Guide.	a) Japan, New Zealand and Australia; b) ICAO APAC Office	a) VAAC Backup Procedures for Tokyo/Wellington/Darwin; and b) Appendix (VAAC Backup Test Procedures) in ASIA/PAC Regional SIGMET Guide	Nov 2012 a) revised to Mar 2013 for consideration at conjoint session of ROBEX WG/11 & MET/H TF/3	In Progress a) Australia and New Zealand developing procedures and agreement for VAAC back-up south of 20 S; expected completion before end 2013. b) COMPLETED for Tokyo/Darwin.

Conclusion/ Decision No	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Target date	Status as of 12 Mar 2013
C 23/42	**Improvement of OPMET Data Availability**	That, the ICAO Secretariat, with the assistance of the OPMET/M TF, be invited to: a) continue the efforts to improve the availability (IATA requires at least 95% for AOP and 90% for non-AOP aerodromes listed in the FASID), timeliness and regularity of OPMET data at the RODBs, SADIS and WIFS, through regular monitoring and testing; and b) remind States concerned to ensure not more than one TAF is valid at an aerodrome at any given time (in accordance with Annex 3 – Meteorological Service for International Air Navigation, 6.2.7), and transmitted internationally as per ICAO provisions for services in support of flight planning.	ICAO APAC office	State Letter	September 2012	COMPLETED State Letter AP139/12 (Oct 2012)

Conclusion/ Decision No	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Target date	Status as of 12 Mar 2013
C 23/43	**Improvement of Timeliness, Regularity and Availability of OPMET**	That, ICAO urges the States in the ASIA/PAC Region to: a) note the proposed Amendment 76 Annex 3 provision (intended applicability in November 2013) that will require an aerodrome forecast in the TAF code form to be issued not earlier than one hour prior to the beginning of its validity period; b) note that IATA expressed its requirement for international exchange of aerodrome forecasts to be completed no later than 30 minutes before the commencement of the period of validity *; c) continue efforts for standardized procedures for the issuance of OPMET data; d) consider the details provided in the IATA monitoring for the ASIA/PAC Region; and e) improve the issuance of OPMET data with respect to timeliness, regularity and availability. * ICAO to consider the requirements expressed by IATA and amends the global provisions as necessary.	ICAO APAC office	State Letter	September 2012	COMPLETED State Letter AP139/12 (Oct 2012)

Conclusion/ Decision No	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Target date	Status as of 12 Mar 2013
C 23/44	**Improvement of OPMET Data Format**	That, ICAO remind the States in the Asia Pacific Region of the: a) Standards and Recommended Practices in Annex 3 – Meteorological Service for International Air Navigation concerning provision of operational meteorological information; and b) Annex 3 provisions concerning the quality management of meteorological information to be supplied to users that includes verification and validation procedures to be applied for the exchange of meteorological information for operational purposes, such as OPMET information.	ICAO APAC office	State Letter	September 2012	COMPLETED State Letter AP139/12 (Oct 2012)
C 23/45	**Implementation of Quality Management Systems for Meteorological Service Provision**	That ICAO, in coordination with the World Meteorological Organization (WMO), considers urgent strategies to foster the implementation of quality management systems for meteorological service amongst States in the Asia/Pacific Region in light of the ICAO Annex 3 – Meteorological Service for International Air Navigation requirement applicable 15 November 2012.	ICAO APAC office	Strategy/plan	Oct 2012 – then revised to Mar 2013 to consider outcomes of related ICAO SIP proposal	In Progress States surveyed on QMS implementation (Nov 2012). Further action to be decided.

Conclusion/ Decision No	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Target date	Status as of 12 Mar 2013
D 23/46	**Subjects and Task Lists for CNS and MET Sub-groups**	That, the list of Subjects/Tasks for CNS Sub-group provided in the **Appendix S** and list of Subjects/Tasks for MET Sub-group provided in the **Appendix T** to the Report on agenda item 3.4 be adopted.	ICAO APAC office	CNS and MET SGs notified of the approved Task List	May 2013	In Progress Review relevant parts by ROBEX WG/11, MET/H TF/3 and MET/R TF/3; present WP to MET SG/17
D 23/48	**Aspect of Space Weather**	That, CNS and MET SGs review the impact of space weather in the CNS and MET area and report to APANPIRG.	ICAO APAC office	Working Papers (reviewed by CNS SG/17 & MET SG/17 and delivered to APANPIRG/24)	16 April 2013, for CNS SG/17 & MET/SG 17 and 7 June 2013, for APANPIRG/24	In Progress

Conclusion/ Decision No	Title of Conclusion/Decision	Text of Conclusion/Decision	Responsibility	Deliverable	Target date	Status as of 12 Mar 2013
C 23/52	**Transition from five regional deficiency databases to single global database**	That States and International organization, a) note the approach to transfer five regional air navigation deficiency databases into a single centralized database on iSTARS platform by December 2012; b) test the centralized database on iSTARS platform using the guidance; c) Update the data as necessary in coordination with ICAO APAC Regional Office; and d) provide feedback to ICAO APAC Regional Office on the use of centralized database available in iSTARS, by 30 November 2012.	ICAO APAC office	State letter	Oct 2012	In Progress State Letter AP159/12 (AGA) Nov 2012

– – – – – – – – – – – – –

(Reproduced from ATM/AIS/SAR/SG/21 – WP/5)

Framework for APAC Regional Contingency Plans

Representatives

Singapore (Edmund; Krishnan)- (Rapporteur), Australia (Shona), New Zealand (Keith), USA (Steve); Indonesia (Indra, Masrian); Philippines (Dario, Bartolome); Malaysia (Jamil); Thailand (Perapol Begkhuntod)

Critical topics:

What is the purpose of contingency plan for Volcanic Ash and Radioactive Cloud?

- To ensure the continued safety of air transport in the event of volcanic ash (VA)/radioactive cloud/tsunami/tropical cyclone.

The Asia Pacific Contingency plan:

- Needs to give direction/guidance to someone who isn't an expert/has no knowledge of the situation
- Should show the end-to-end progress and shows how information can flow between agencies and States
- Should avoid duplicating information but make reference/point to it (There is already SARPS in Annex 3, IVA operations manual; PANS-ATM; regional SIGMET guide). A consolidated document is needed – but needs Secretariat support to ensure it remains up to date.
- Should be applicable for more than one phenomenon: initially only for phenomena VA, radioactive cloud; tsunami and tropical cyclone. As they have advisory centres, Area Control Centre/RSMC or equivalent
- **Should this really be about contingency plan or rather how collaborative decision making will work within a region?**
- Needs a common definition so that people understand its purpose and role and what information will be covered
- Needs to define what the operational need is for a contingency plan for each State
- Needs to identify what is the critical information that different organisations/States need

Identify procedures and requirements that are unique to the Asia Pacific region. e.g.: those not defined by Annex 3,

- **Collaborative decision making**

The Contingency Plan needs to define how collaborative decision making works for VA for Asia Pacific.

The Contingency plan needs to capture work already underway to promote CDM and suggest improvements.

- **Dissemination of information**

The Contingency plan needs to define information flows.

The Contingency plan needs to identify operational focal points.

The Contingency plan needs to establish a forum for discussion – virtual, teleconference, etc.

The Contingency plan needs to outline the management of timeliness of decisions, especially in adjoining airspace.

- **Action plans –** Not for intra-state activities, but action plans for regional and interactions between States.

The Contingency plan needs to address what is not working currently

- **VONA** (Volcano Observatory Notice for Aviation) – No reference in Annex 3, only in the handbook which is guidance not binding.
- **Provide guidance on what to do if SIGMETs don't agree cross FIRs.**
- **Define handover processes for MWO for SIGMETs as phenomena cross FIR**
- **Consider potential role of Regional Watch offices**

Who else needs to be involved?

- ATM (Air Traffic Management)
- AOC (Airline Operations Centre)
- Advisory Centres
- Weather Observatories
- RSMC (Regional Specialized Meteorological Centre)
- RODB (Regional OPMET Data Bank)
- MWO (Meteorological Watch Office)
- ANSP (Air Navigation Service Provider)

Additional Specialist advice required:

- IVATF (International Volcanic Ash Task Force)
- Medical (radioactive)
- Tsunami Warning Centres
- IATA

Ad-hoc group on regional contingency plans

Purpose:

An ad-hoc group was tasked to develop the framework of regional contingency plans on volcanic ash, tropical cyclone, tsunami and radioactive cloud (Milestone 3 of MET/H TF Work Plan)

Members:

Australia (Sue) co-Rapporteur, Indonesia (to be confirmed), Japan (Jun) co-Rapporteur (to be confirmed), Malaysia (Mr. V. P. R. Nathan), New Zealand (Keith), Philippines (to be confirmed), Singapore (Mr. Michael Shee), Thailand (Perapol), United States (to be confirmed), IATA (to be invited to participate) and IFALPA (to be invited to participate)

Sub-tasks:

1. Review multi-lateral State (contingency) practices (e.g. Singapore-Indonesia);
2. Review the framework of regional contingency plans (developed by the ad-hoc group) and discussed at the ATM/AIS/SAR/SG/21 in June/July 2011 (WP/05) available at: http://www.bangkok.icao.int/cns/meeting.do?method=MeetingDetail&meeting_id=76;
3. Take into consideration similar work in other Regions, e.g. review relevant outcomes from:
    a. NAT SPG/47 report (Conclusion 47/7) available at: http://www.paris.icao.int/documents_open/files.php?page=2&subcategory_id=156&order=&get_order=desc&user_number_result=;
    b. VOLKAM13 (http://www.paris.icao.int/Met/Volc_Ash/docs/Report_VOLKAM13_Deb_VOLCEXSG2.pdf
4. Review the RACP/TF/1 and RACP/TF/2 reports available at: http://www.bangkok.icao.int/cns/meeting.do?method=MeetingDetail&meeting_id=124, and http://www.bangkok.icao.int/cns/meeting.do?method=MeetingDetail&meeting_id=252
5. Further develop the framework of regional contingency plans, in coordination with the RACP/TF; adapt MET contingency plan to input to ATM VACP template for consideration by RACP/TF/3;
6. Prepare a WP to discuss the framework of regional contingency plans at RACP/TF/3 (by Sep/Oct 2013); and
7. Prepare a WP to report progress of the ad-hoc group at MET SG/17 (May 2013) and MET/H TF/4 (March 2014).

– – – – – – – – – – – – –

(Reproduced from APANPIRG/23 – IP/28)

AIR TRAFFIC MANAGEMENT VOLCANIC ASH CONTINGENCY PLAN TEMPLATE

First Edition (August 2012)

FOREWORD

This document is an Air Traffic Management (ATM) Volcanic Ash Contingency Plan template which sets out standardised guidelines and procedures for the provision of information to airlines and en-route aircraft before and during a volcanic eruption. Volcanic contamination, of which volcanic ash is the most serious, is a hazard for safe flight operations. Mitigating the hazards posed by volcanic ash in the atmosphere and/or at the aerodrome cannot be resolved in isolation but through collaborative decision making (CDM) involving all stakeholders concerned. During an eruption, volcanic contamination can reach and exceed the cruising altitudes of turbine-powered aircraft within minutes and spread over vast geographical areas within a few days. Encounters with volcanic ash may result in a variety of hazards including one or more of the following:

a) the malfunction, or failure, of one or more engines leading not only to reduction, or complete loss of thrust but also to failures of electrical, pneumatic and hydraulic systems;

b) the blockage of pitot and static sensors resulting in unreliable airspeed indications and erroneous warnings;

c) windscreens rendered partially or completely opaque;

d) smoke, dust and/or toxic chemical contamination of cabin air requiring crew to don oxygen masks, thus impacting verbal communication; electronic systems may also be affected;

e) the erosion of external and internal aircraft components;

f) reduced electronic cooling efficiency leading to a wide range of aircraft system failures;

g) the aircraft may have to be manoeuvred in a manner that conflicts with other aircraft; and

h) volcanic ash deposition on a runway may degrade aircraft braking performance, most significantly if the volcanic ash is wet; and in extreme cases, this can lead to runway closure.

Operators are required by ICAO Annex 6 – *Operation of Aircraft* to implement appropriate mitigation measures for volcanic ash in accordance with their safety management system (SMS), as approved by the State of the Operator/Registry. The guidelines provided in this document assume that the ICAO requirements regarding safety management systems have been implemented by the operators. Detailed guidance on Safety Risk Assessments (SRAs) for flight operations with regard to volcanic ash contamination can be found in the manual on *Flight Safety and Volcanic Ash – Risk Management of Flight Operations with Known or Forecast Volcanic Ash Contamination* (ICAO Doc 9974).

This document is an ATM[1] contingency plan including its interfaces with supporting services such as aeronautical information service (AIS) and meteorological (MET) services and that the

[1] ATM is defined "the dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management – safely, economically and

plan therefore primarily addresses the provider States. Distribution of applicable AIS and MET messages related to volcanic ash are set out in relevant ICAO Annexes– namely Annex 15– *Aeronautical Information Services* and Annex 3 – *Meteorological Service for International Air Navigation.*

Volcanic ash can also affect the operation of aircraft at aerodromes. Volcanic ash deposition at an aerodrome, even in very small amounts, can result in the closure of the aerodrome until all the deposited ash has been removed. In extreme cases, the aerodrome may no longer be available for operation at all, resulting in repercussions on the ATM system, e.g. diversions, revised traffic flows, etc.

Some aircraft types or engine technologies are more vulnerable to volcanic ash contaminants than others; therefore, any specific mitigation measures to be applied would have to take into account any such variance. Considering that a commercial aircraft travels about 150 km (80 NM) in 10 minutes and that volcanic ash can rise to flight levels commonly used by turbine-engine aircraft in half that time, a timely response to volcanic eruptions and volcanic ash in the atmosphere is essential.

It is imperative that information on the volcanic activity is disseminated as soon as possible. In order to assist staff in expediting the process of originating and issuing relevant AIS and MET messages, a series of templates should be available for different stages of the volcanic activity. A list of ICAO registered volcanoes **—** see the *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (ICAO Doc 9691) Appendix F **—** should be available at the State's International NOTAM office with volcano name, number and nominal position. In order to ensure the smooth implementation and effectiveness of the contingency plan in case of an actual volcanic eruption, volcanic ash exercises (VOLCEX) should be conducted at a frequency determined by the ICAO Region concerned.

This document has been prepared, and is in line with a proposal for amendment to the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444) paragraph 15.8 *Procedures for an ATC unit when a volcanic ash cloud is reported or forecast* **—** which is expected to become applicable in November 2014.

General considerations during the development of an ATM contingency plan for volcanic ash and anticipated flight crew issues when encountering volcanic ash are provided in Appendices A and B respectively.

— — — — — — — —

efficiently – through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions." (*Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444))

AIR TRAFFIC MANAGEMENT VOLCANIC ASH CONTINGENCY PLAN TEMPLATE

TABLE OF CONTENTS

The eventual inclusion of any or all of the optional appendices listed below is to be determined by the appropriate ICAO Planning and Implementation Regional Group.

APPENDIX G Example safety risk assessment process

APPENDIX H Example table of considerations for planned operations in airspace to/from aerodromes which may be contaminated by volcanic ash

APPENDIX I Example of a hazard log (risk register)

APPENDIX J Example AIS and MET products for dissemination of information

— — — — — — — —

1. TERMINOLOGY

1.1. AREAS OF CONTAMINATION

1.1.1. Information on areas of observed and/or forecast volcanic ash in the atmosphere is provided by means of appropriate MET messages in accordance with Annex 3 – *Meteorological Service for International Air Navigation*.[2]

1.2. DANGER AREAS

1.2.1. If it is considered that the volcanic event could pose a hazard to aviation, a danger area[3] may be declared by NOTAM; however, this option should only be applied over and in the proximity of the volcanic source. Normally, clearances will not be issued through the danger area unless explicitly requested by the flight crew. In this context it should be noted that the final responsibility for aircraft safety rests with the flight crew. Therefore, the final decision regarding route, whether it will be to avoid or proceed through an area of volcanic activity, is the flight crew's responsibility. Wherever this document discusses the possible establishment of danger areas, States are not prevented from establishing restricted or prohibited areas over the sovereign territory of the State if considered necessary by the State concerned.

1.2.2. Although it is the prerogative of the provider State to promulgate a danger area in airspace over the high seas, it should be recognized that restrictions to the freedom of flight over the high seas cannot be imposed in accordance with the United Nations Convention on the Law of the Sea (Montego Bay 1982).

1.3. PHASES OF AN EVENT

1.3.1. The response to a volcanic event that affects air traffic has been divided into four distinct phases in this document — a Pre-Eruption Phase, a Start of Eruption Phase, an On-going Eruption Phase, and a Recovery Phase— as follows:

a) **PRE-ERUPTION PHASE (**when applicable**):** The initial response, "raising the alert", commences when a volcanic eruption is expected.

   1) Appropriate AIS and MET messages may be issued in accordance with Annex 15 and Annex 3 respectively, and disseminated to affected aircraft in flight by the most expeditious means. It should be noted that, sometimes volcanoes erupt unexpectedly without any alert being raised, hence the pre-eruption phase may be omitted.

b) **START OF ERUPTION PHASE** (when applicable)**:** The start of eruption phase commences at the outbreak of the volcanic eruption and entrance of volcanic ash into the atmosphere and mainly pertains to aircraft in flight. Appropriate AIS and MET

[2] Principally this will include volcanic ash advisory messages (issued by volcanic ash advisory centres) and SIGMET information on volcanic ash (issued by meteorological watch offices).

[3] Depending on the State's regulation, the area may be established as a "danger area", "restricted area "or "prohibited area". Over the high seas only "danger area" may be established.

messages may be issued as appropriate in accordance with Annex 15 and Annex 3 respectively, and a danger area may be declared by NOTAM. Normally, clearances will not be issued through the danger area unless explicitly requested by the flight crew.

c) **ON-GOING ERUPTION PHASE:** The on-going eruption phase commences with the issuance of the first volcanic ash advisory (VAA) containing information on the extent and movement of the volcanic ash cloud following completion of the previous reactive responses. Appropriate AIS and MET messages may be issued as appropriate in accordance with Annex 15 and Annex 3 respectively.

d) **RECOVERY PHASE:** The recovery phase commences with the issuance of the first VAA containing a statement that "NO VA EXP" (i.e. "no volcanic ash expected") which normally occurs when it is determined that no volcanic ash is expected in the atmosphere and the volcanic activity has reverted to its pre-eruption state.

Note: These descriptions are amplified in Chapter 3 of this document.

1.3.2. Although the four distinct phases herein describe actions to be undertaken during an actual volcanic event, they are based on a theoretical scenario. Actual eruptions may not always be distinct with respect to ATM actions to be undertaken. Similarly, an eruption may occur without any pre-eruptive activity, or may cease and restart more than once. Hence, the first observation may be the presence of an ash cloud which is already some distance away from the volcano. It is essential that the contingency planning prepares the ATM system for an appropriate response depending on the actual conditions. Therefore, the "Pre-Eruption Phase" and "Start of Eruption Phase" described in this document are annotated "when applicable" in order to provide for flexibility in the application of the contingency plan in those parts of the world with insufficient volcano monitoring and alerting.

1.3.3. Flight crews are required to report observations of volcanic activity by means of a special air-report (Special AIREP). Arrangements should be put in place to ensure that such information is transferred without delay to the appropriate aeronautical institutions responsible for subsequent action. The communication and dissemination of pilot reports on volcanic activity is described in Appendix C.

2. PRE-ERUPTION PHASE

2.1. GENERAL

2.1.1. Where flight operations are planned in areas that are susceptible to volcanic eruptions, ATS units may expect to receive from flight crews the ICAO Volcanic Activity Report (VAR) form (published in the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444) Appendix 1).

2.1.2. The focus of this phase is to gain early recognition of volcanic events. This phase is frequently characterised by a very limited availability of information on the potential extent and severity of the impending eruption. The priority is to ensure the continued safety of aircraft in flight, and there is therefore a requirement to promulgate information as a matter of

urgency. Notwithstanding the potentially limited extent of information available, the pre-eruption phase actions described below should be carried out for every expected eruption.

2.1.3. The initial response, "raising the alert", commences when a volcanic eruption is expected. Initial awareness of the event may be by means of a Special AIREP/VAR and/or from information provided by meteorological or volcanological agencies. Arrangements in each State between designated volcano observatories, meteorological and air traffic management agencies should ensure that alerting information is provided expeditiously by the most appropriate means to provide continued safety of flight.

2.1.4. Emphasis is placed on raising awareness of the hazard and to protect aircraft in flight. The actions are based on well-prepared, well-exercised contingency plans and standard operating procedures. Aircraft are expected to clear or avoid the volcanic ash affected area based on standard operating procedures.

2.2. ORIGINATING ACC ACTIONS *(eruption expected in its own flight information region)*

2.2.1. In the event of significant pre-eruption volcanic activity, which could pose a hazard to aviation, an area control centre (ACC)[4], on receiving information of such an occurrence, should carry out the following:

a) ensure that appropriate AIS messages are originated in accordance with Annex 15. These must provide as precise information as is available regarding the activity of the volcano. It is imperative that this information is issued by the international NOTAM office and disseminated as soon as possible in accordance with the provisions of Annex 15;

b) when so required by the State, define an initial, precautionary danger area in accordance with established procedures. The size of the danger area should encompass a volume of airspace in accordance with the information available, aiming to avoid undue disruption of flight operations;

1) if no such procedures have been established, the danger area should be defined as a circle with a radius of xxx km (xx NM)[5]. The circle should be centred on the estimated or known location of the volcanic activity;

2) although ATC would not normally initiate a clearance through a danger area, it will inform aircraft about the potential hazard and continue to provide normal services. It is the responsibility of the pilot-in-command to determine the safest course of action.

c) advise the associated MET service provider(s) in accordance with national/regional arrangements (unless the initial notification originated from such provider(s)), who will then inform the appropriate air traffic flow management (ATFM) units;

[4] Where the term "ACC" is used throughout this document, it is intended to also include all ATS facilities.
[5] The size of the area is to be agreed in the region concerned and should be based on local knowledge as regards the volcano concerned.

d) alert flights already within the area concerned and offer assistance to enable aircraft to exit the area in the most expeditious and appropriate manner. Flight crews should be provided with all necessary information required to make safe and efficient decisions in dealing with the hazards in the defined area. Aircraft that are close to the area should be offered assistance to remain clear of the area. Flights which would be expected to penetrate the area should be re-cleared onto routes that will keep them clear; and

e) immediately notify other affected ACCs of the event and the location and dimensions of the area concerned. The ACC should also negotiate any re-routings necessary for flights already coordinated but still within adjacent flight information regions (FIRs) and provide any information on potential implications on traffic flow and its capability to handle the expected traffic. It is also expected that adjacent ACCs will be asked to reroute flights not yet coordinated to keep them clear of the area. It should be noted that flight crews may make the decision not to completely avoid the area based on, for example, visual observations; and

f) implement flow management measures if necessary to maintain the required level of safety.

Note 1. — In order to assist staff in expediting the process of composing the AIS messages, a series of templates should be available for this stage of the volcanic activity.

2.2.2. In addition to sending the relevant AIS messages to the normal distribution list, it will be sent to the relevant meteorological facilities.

2.3. ADJACENT ACC ACTIONS

2.3.1. During the pre-eruption phase, ATC will not normally initiate clearances through a danger area; however, it will inform aircraft about the potential hazard and continue to provide normal services. Adjacent ACCs should take the following action to assist:

a) when advised, re-clear flights to which services are being provided and which will be affected by the area; and

b) unless otherwise instructed, continue normal operations and:

1) if one or more routes are affected by the area, suggest re-routings to the affected aircraft onto routes clear of the area; and

2) maintain awareness of the affected area.

2.4. ATFM UNIT ACTIONS

2.4.1. The ATFM unit and the associated volcanic ash advisory centre (VAAC) will determine how their initial communications will take place on the basis of bilateral agreements. Upon reception of preliminary information on volcanic activity from the lead VAAC, the ATFM unit should initiate actions in accordance with its procedures to ensure exchange of information in

order to support CDM between air navigation service providers (ANSPs), meteorological watch offices (MWOs), VAACs and aircraft operators concerned.

3. START OF ERUPTION PHASE

3.1. GENERAL

3.1.1. This phase commences at the outbreak of a volcanic eruption, with volcanic ash being ejected into the atmosphere. The focus of the processes in this phase is to protect aircraft in flight and at aerodromes from the hazards of the eruption through the collection and use of relevant information.

3.1.2. In addition to relevant actions described under the pre-eruption phase, major activities of the start of eruption phase are: Issuance of relevant AIS and MET messages in accordance with Annex 15 and Annex 3 respectively; as well as provision of information and assistance to airborne traffic. As appropriate, danger areas will be declared via NOTAM. This phase will last until such time as the on-going eruption phase can be activated.

3.2. ORIGINATING ACC ACTIONS (eruption in its own FIR)

3.2.1. The ACC providing services in the FIR within which the volcanic eruption takes place should inform flights about the existence, extent and forecast movement of volcanic ash and provide information useful for the safe and efficient conduct of flights.

3.2.2. If necessary, rerouting of traffic should commence immediately or may be in progress if the alerting time has been sufficient to facilitate activation of the pre-eruption phase. The ACC should assist in rerouting aircraft around the danger area as expeditiously as possible. Adjacent ACCs should also take the danger area into account and give similar assistance to aircraft as early as possible.

3.2.3. During the start of eruption phase, although ATC will not normally initiate a clearance through a danger area, it will inform aircraft about the hazard and will continue to provide normal services. It is expected that aircraft will attempt to remain clear of the danger area; however, it is the responsibility of the pilot-in-command to determine the safest course of action.

3.2.4. During the start of eruption phase the ACC should:

a) ensure that a NOTAM is originated to define a danger area delineated cautiously so as to encompass a volume of airspace in accordance with the limited information available. In determining the area, information on upper winds should be taken into account, if available. The purpose is to ensure safety of flight in the absence of any prediction from a competent authority of the extent of contamination;

b) maintain close liaison with MET facilities, who should issue appropriate MET messages in accordance with Annex 3;

c) devise and update ATFM measures when necessary to ensure safety of flight operations, based on these forecasts and in cooperation with aircraft operators and the adjacent ACCs using the CDM process;

d) ensure that reported differences between published information and observations (pilot reports, airborne measurements, etc.) are forwarded as soon as possible to the appropriate authorities to ensure its dissemination to all concerned;

e) begin planning for the on-going eruption phase in conjunction with the aircraft operators, the appropriate ATFM unit and ACCs concerned; and

f) issue appropriate AIS messages in accordance with Annex 15, should significant reductions in intensity of volcanic activity take place during this phase and the airspace no longer is contaminated by volcanic ash. Otherwise, begin CDM planning for the on-going eruption phase in conjunction with aircraft operators, the appropriate ATFM unit and the affected ACCs.

3.3. ADJACENT ACC ACTIONS

3.3.1. During the start of eruption phase, adjacent ACCs should take the following actions:

a) maintain a close liaison with the appropriate ATFM unit and the originating ACC to design, implement and keep up to date ATFM measures which will enable aircraft to ensure safety of flight operations;

b) the adjacent ACC, in cooperation with the originating ACC and aircraft operators, should impose as required additional tactical measures to those issued by the appropriate ATFM unit;

c) maintain awareness of the affected area; and

e) begin planning for the on-going eruption phase in conjunction with the aircraft operators, the appropriate ATFM unit and ACCs concerned.

3.4. ATFM UNIT ACTIONS

3.4.1. During the start of eruption phase, depending on the impact and/or extent of the volcanic ash, the appropriate ATFM unit should organise the exchange of latest information on the developments with the associated VAACs, ANSPs, MWOs and operators concerned in order to support CDM.

4. ON-GOING ERUPTION PHASE

4.1. The on-going eruption phase commences with the issuance of the first volcanic ash advisory (VAA) by the lead VAAC which contains information on the extent and movement of the volcanic ash cloud in accordance with Annex 3 provisions.

Note. — Volcanic ash advisory information in graphical format (VAG) may also be issued by the VAAC, containing the same information as its text-based VAA equivalent.

4.2. The VAA/VAG should be used to:

a) prepare appropriate AIS and MET messages in accordance with Annex 15 and Annex 3 provisions respectively; and

b) plan and apply appropriate ATFM measures.

4.3. The volcanic contamination may affect any combination of airspace; therefore, it is not possible to prescribe measures to be taken for all situations. Furthermore it is not possible to detail the actions to be taken by any particular ACC. The following guidance therefore may prove useful during the on-going eruption phase but should not be considered mandatory or exhaustive:

a) ACCs affected by the movement of the volcanic ash should ensure that appropriate AIS messages are originated in accordance with Annex 15. ACCs concerned and the appropriate ATFM unit should continue to publish details on measures taken to ensure dissemination to all concerned;

b) depending on the impact and/or extent of the volcanic ash, the appropriate ATFM unit may take the initiative to organize teleconferences to exchange the latest information on the developments, in order to support CDM, with the VAACs, ANSPs and MWOs and operators concerned;

c) ACCs and ATFM units should be aware that for the purposes of flight planning, operators could treat the horizontal and vertical extent of the volcanic ash contaminated area to be over-flown as if it were mountainous terrain; and

d) any reported differences between published information and observations (pilot reports, airborne measurements, etc.) should be forwarded as soon as possible to the appropriate authorities (see Appendix C).

5. RECOVERY PHASE

5.1. The recovery phase commences with the issuance of the first VAA/VAG containing a statement that "NO VA EXP" (i.e. "no volcanic ash expected") — which normally occurs when it is determined that the volcanic activity has reverted to its pre-eruption state and the airspace is no longer affected by volcanic ash contamination. Consequently, appropriate AIS messages should be issued in accordance with Annex 15.

5.2. ACCs and ATFM units should revert to normal operations as soon as practical.

6. AIR TRAFFIC CONTROL PROCEDURES

6.1. If a volcanic ash cloud is reported or forecasted in the FIR for which the ATS unit is responsible, the following actions should be taken:

a) relay all pertinent information immediately to flight crews whose aircraft could be affected to ensure that they are aware of the ash cloud's position and levels affected;

b) request the intention of the flight crew and endeavour to accommodate requests for re-routing or level changes;

c) suggest appropriate re-routing to the flight crew to avoid an area of reported or forecast ash clouds; and

d) request a special air-report when the route of flight takes the aircraft into or near the forecast ash cloud and provide such special air-report to the appropriate agencies.

Note 1.— The recommended escape manoeuvre for an aircraft which has encountered an ash cloud is to reverse its course and begin a descent if terrain permits.

Note 2. — The final authority as to the disposition of the aircraft, whether it be to avoid or proceed through a reported or forecast volcanic ash cloud, rests with the flight crew.

6.2. When advised by the flight crew that the aircraft has inadvertently entered a volcanic ash cloud, the ATS unit should:

a) take such action applicable to an aircraft in an emergency situation; and

b) not initiate modifications of route or level assigned unless requested by the flight crew or necessitated by airspace requirements or traffic conditions.

Note 1.— General procedures to be applied when a pilot reports an emergency situation are contained in Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444) *Chapter 15, 15.1.1 and 15.1.2.*

Note 2.— Guidance material concerning the effect of volcanic ash and the impact of volcanic ash on aviation operational and support services is provided in Chapters 4 and 5 of the Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds (Doc 9691).

7. ATFM PROCEDURES

7.1. Depending on the impact and/or extent of the volcanic ash and in order to support CDM, the appropriate ATFM unit should organize the exchange of the latest information on the developments with the associated VAACs, ANSPs, MWOs and operators concerned.

7.2. The ATFM unit will apply ATFM measures on request of the ANSPs concerned. The measures should be reviewed and updated in accordance with updated information. Operators should also be advised to maintain watch for relevant AIS and MET messages for the area.

— — — — — — — —

APPENDIX A

GENERAL CONSIDERATIONS DURING THE DEVELOPMENT OF AN ATM CONTINGENCY PLAN FOR VOLCANIC ASH

1. In a contingency plan relating to volcanic ash contamination, certain steps need to be taken to provide a coordinated and controlled response for dealing with an event of this nature. Responsibilities should be clearly defined to ATS personnel. The plan should also identify the officials who need to be contacted, the type of messages that are to be created, the proper distribution of the messages and how to conduct business.

2. ATS personnel need to be trained and be made aware of the potentially hazardous effects if an aircraft encounters a volcanic ash cloud. Some particular aspects include:

a) volcanic ash contamination may extend for hundreds, or even thousands of miles horizontally and reach the stratosphere vertically;

b) volcanic ash may block the pitot-static system of an aircraft, resulting in unreliable airspeed indications;

c) braking conditions at aerodromes where volcanic ash has recently been deposited on the runway will affect the braking ability of the aircraft. This is more pronounced on runways contaminated with wet ash. Flight crews and ATS personnel should be aware of the consequences of volcanic ash being ingested into the engines during landing and taxiing. For departure, it is recommended that pilots avoid operating in visible airborne ash; instead they should allow sufficient time for the particles to settle before initiating a take-off roll, in order to avoid ingestion of ash particles into the engine. In addition, the movement area to be used should be carefully swept before any engine is started;

d) volcanic ash may result in the failure or power loss of one or all engines of an aircraft; and

e) aerodromes with volcanic ash deposition may be declared unsafe for flight operations. This may have consequences for the ATM system.

4. The area control centre (ACC) in conjunction with ATFM units serves as the critical communication link between affected aircraft in flight and the information providers during a volcanic eruption. During episodes of volcanic ash contamination within the flight information region (FIR), the ACC has two major communication roles. First and most important is its ability to communicate directly with aircraft en-route which may encounter the volcanic ash. Based on the information provided in SIGMET information for volcanic ash and volcanic ash advisories (VAAs), and working with MWOs, ATS personnel should be able to advise the flight crew of which flight levels are affected by the volcanic ash and the forecast movement of the contamination. Through the use of various communication means, ATS units have the capability

to coordinate with the flight crew alternative routes which would keep the aircraft away from the volcanic ash cloud.

5. Similarly, through the origination of a NOTAM/ASHTAM for volcanic activity the ACC can disseminate information on the status and activity of a volcano even for pre-eruption increases in volcanic activity. NOTAM/ASHTAM and SIGMET, together with AIREPs, are critical to dispatchers for flight planning purposes. Operators need as much advance notification as possible on the status of a volcano for strategic planning of flights and the safety of the flying public. Dispatchers need to be in communication with flight crews en-route so that a coordinated decision can be made between the flight crew, the dispatcher and ATS regarding alternative routes that are available. The ACC should advise the ATFM unit concerning the availability of alternative routes. It cannot be presumed, however, that an aircraft which is projected to encounter ash will be provided with the most desirable route to avoid the contamination. Other considerations have to be taken into account such as existing traffic levels on other routes and the amount of fuel reserve available for flights which may have to be diverted to other routes to allow for the affected aircraft to divert.

6. The NOTAM/ASHTAM for volcanic activity provides information on the status of activity of a volcano when a change in its activity is, or is expected to be, of operational significance. They are originated by the ACC and issued through the respective international NOTAM office based on the information received from any one of the observing sources and/or advisory information provided by the associated Volcanic Ash Advisory Centre (VAAC). In addition to providing the status of activity of a volcano, the NOTAM/ASHTAM also provides information on the location, extent and movement of the ash contamination and the air routes and flight levels affected. NOTAM can also be used to limit access to the airspace affected by the volcanic ash. Complete guidance on the issuance of NOTAM and ASHTAM is provided in Annex 15 — *Aeronautical Information Services*. Included in Annex 15 is a volcano level of activity colour code chart. The colour code chart alert may be used to provide information on the status of the volcano, with "red" being the most severe, i.e. volcanic eruption in progress with an ash column/cloud reported above flight level 250, and "green" at the other extreme being volcanic activity considered to have ceased and volcano reverted to its normal pre-eruption state. It is very important that NOTAM for volcanic ash be cancelled and ASHTAM be updated as soon as the volcano has reverted to its normal pre-eruption status, no further eruptions are expected by volcanologists and no volcanic ash is detectable or reported within the FIR concerned.

7. It is essential that the procedures to be followed by ATS personnel during a volcanic eruption, as well as supporting services such as MET, AIS and ATFM, should be translated into local staff instructions (adjusted as necessary to take account of local circumstances). It is also essential that such local staff instructions form part of the basic training for all ATS, AIS, ATFM and MET personnel whose jobs would require them to take action in accordance with the procedures. Background information to assist the ACC or flight information centre (FIC) in maintaining an awareness of the status of activity of volcanoes in their FIR(s) is provided in the monthly Scientific Event Alert Network Bulletin published by the United States Smithsonian Institution and sent free of charge to ACCs/FICs requesting it.

— — — — — — — —

APPENDIX B

ANTICIPATED FLIGHT CREW ISSUES WHEN ENCOUNTERING VOLCANIC ASH

1. ATS personnel should be aware that flight crews will be immediately dealing with some or all of the following issues when they encounter volcanic ash:

a) smoke or dust appearing in the cockpit which may prompt the flight crew to don oxygen masks (could interfere with the clarity of voice communications);

b) acrid odour similar to electrical smoke;

c) multiple engine malfunctions, such as stalls, increasing exhaust gas temperature (EGT), torching, flameout, and thrust loss causing an immediate departure from assigned altitude;

d) on engine restart attempts, engines may accelerate to idle very slowly, especially at high altitudes (could result in inability to maintain altitude or Mach number);

e) at night, St. Elmo's fire/static discharges may be observed around the windshield, accompanied by a bright orange glow in the engine inlet(s);

f) possible loss of visibility due to cockpit windows becoming cracked or discoloured, due to the sandblast effect of the ash;

g) because of the abrasive effects of volcanic ash on windshields and landing lights, visibility for approach and landing may be markedly reduced. Forward visibility may be limited to that which is available through the side windows; and/or

h) sharp distinct shadows cast by landing lights as compared to the diffused shadows observed in clouds (this affects visual perception of objects outside the aircraft).

2. Simultaneously, ATS personnel can expect flight crews to be executing contingency procedures such as the following:

a) if possible, the flight crew may immediately reduce thrust to idle;

b) exit volcanic ash cloud as quickly as possible. The shortest distance/time out of the ash may require an immediate, descending 180-degree turn (terrain permitting);

c) don flight crew oxygen masks at 100 per cent (if required);

d) monitor airspeed and pitch attitude. If unreliable airspeed is suspected, or a complete loss of airspeed indication occurs (volcanic ash may block the pitot system), the flight crew will establish the appropriate pitch attitude;

e) land at the nearest suitable aerodrome; and

f) upon landing, thrust reversers may be used as lightly as feasible.

— — — — — — — —

APPENDIX C

COMMUNICATION AND DISSEMINATION OF PILOT REPORTS OF VOLCANIC ACTIVITY

1. INTRODUCTION

1.1 ICAO Annex 3 — *Meteorological Service for International Air Navigation* (paragraph 5.5, g) and h)) prescribes that volcanic ash clouds, volcanic eruptions and pre-eruption volcanic activity, when observed, shall be reported by all aircraft. The ICAO *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444) contain detailed provisions on this special air report requirement in paragraphs 4.12.3 and 4.12.5, and the Volcanic Activity Report form in Appendix 1.

1.2 Experience has shown that reporting and sharing of information on volcanic ash encounters in accordance with the above mentioned provisions (in-flight and post-flight) varies across the world. The efficiency and quality of reporting currently depends heavily on regional characteristics and the level of regional integration. A high level of global harmonization is essential to achieve the desired level of implementation and consistency of the information.

2. PURPOSES OF VOLCANIC ASH REPORTING AND DATA COLLECTION

2.1 The main purposes for volcanic ash reporting and data collection are to:

a) locate the volcanic hazards:
b) notify immediately other aircraft (in-flight) about the hazard;
c) notify other interested parties: ANSPs (ATC, AIS, ATFM), VAACs, MWO, etc to ensure the consistent production of appropriate information and warning products in accordance with existing provisions;
d) analyse collected reports from the post-flight phase in order to:
    1) identify areas of concern;
    2) validate and improve volcanic ash forecasts;
    3) improve existing procedures;
    4) assist in defining better airworthiness requirements; and
    5) share lessons learned, etc.

3. PHASE OF OPERATIONS

3.1 The roles and responsibilities of the participants in the collection, exchange and dissemination of the volcanic information are distinctly different in two distinct phases:

a) in-flight; and
b) post-flight.

3.2 The following section analyses these separately.

4. PARTICIPANTS IN THE REPORTING PROCESS, THEIR ROLES AND RESPONSIBILITIES

4.1 Identification of the participants as well as their roles and responsibilities in general, but specifically during the two different phases of operations, is an important element in improving collection, exchange and dissemination of volcanic information. The number of participants and their roles and responsibilities depends on the phase of operations (in-flight, post-flight), their position in the information chain within one of these two phases and national/regional arrangements. One of the main issues regarding participants' roles and responsibilities is that each of them is, at one time or another, both a data/information provider and user of the information.

4.2 *In-Flight Phase*

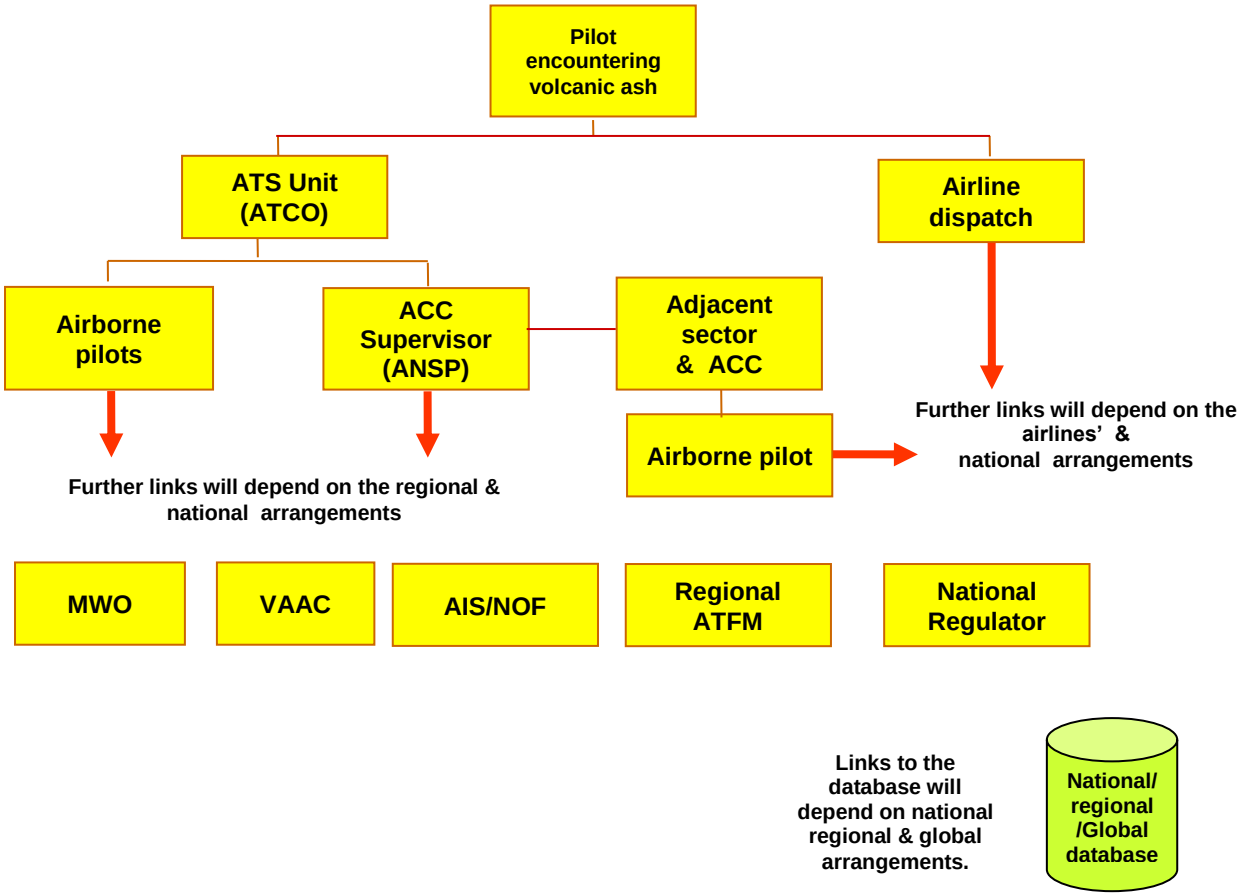
4.2.1 Participants, Roles & Responsibilities

	Participants	Roles & Responsibilities
	Pilots, civil and/or military, observing and/or encountering volcanic activity	To provide as much detailed information as possible about the type, position, colour, smell, dimensions of the volcanic contamination, level and time of the observation and forward VAR Part I immediately to the ATS unit with which the pilot is in radiotelephony (R/T) communication. Record the information required for VAR Part II on the appropriate form as soon as possible after the observation or encounter, and file the report via data link, if available.
	ATS unit receiving the information from the pilot encountering volcanic event	To ensure that information received by an air traffic controller from the pilot has been copied, clarified (if necessary) and disseminated to other pilots as well as to the ACC Supervisor. In addition, air traffic controllers could ask other pilots flying within the same area if they have observed any volcanic activity.
	ATS unit/ACC Supervisor (if applicable) or other responsible person within the Air Navigation Service Provider	To use all means of communication and available forms to ensure that the information received from the air traffic controller has been: passed on to the associated Meteorological organizations in accordance with national/regional arrangements; fully and immediately disseminated across the organization, in particular to adjacent sectors and the associated NOTAM Office (NOF); passed on to the neighbouring sectors and ACCs (if necessary); passed on to the regional ATFM centre if existing (e.g. CFMU in Europe); passed on to the national/regional authority responsible for the handling of contingency situations.
	Neighbouring ANSPs (ACCs etc.)	To ensure that information is provided to flight crews flying towards the area affected by the volcanic contamination; disseminated across the organization and the system prepared to cope with the possible changes of the traffic flows; and that the information is provided to the national authority responsible for the handling of contingency situations and passed on to the NOF and MWO as required.
	MET Watch Office	To use the information originated by flight crews and forwarded by the ATS unit which received the information in accordance with Annex 3.
	VAAC	To use the information originated by flight crews, MWOs and other competent sources in accordance with Annex 3
	AIS / NOF	To publish appropriate AIS messages in accordance with Annex 15

	ATFM unit or centre (if existing)	To ensure that information received is stored and made available for information to all partners in its area of responsibility (ANSPs, airlines, VAAC, MET etc.). As part of the daily activity, coordinate ATFM measures with ACCs concerned.

4.2.2 *In-flight reporting – Sample Flow Chart of the volcanic ash information*

4.2.2.1 The chart below is a graphical representation of a possible path of the in-flight volcanic ash information and may differ between regions depending on regional arrangements. It also gives the position of the volcanic ash participants in the reporting chain. The flow chart is not exhaustive and the path of the information can be extended and new participants could be added depending of the national and regional requirements.



4.3 *Post-Flight Operations Roles & Responsibilities and order of reporting*

	Participants	Roles & Responsibilities
1.	Civil and/or military pilots/airlines having observed or encountered an eruption or volcanic contamination	To file the volcanic ash report with as much detailed information as possible about the volcanic activity and/or encounter (position, colour, smell, dimensions, FL, time of observation, impact on the flight, etc.). Ensure that the VAR is filed and transmitted to the relevant recipients as soon as possible after landing (if not filed via datalink already during the flight). Make an entry into the Aircraft Maintenance Log (AML) in case of an actual or suspected encounter with volcanic contamination.
2.	ANSP	To provide a summary report of effects of the volcanic activity that affected its operations at least once per day to the national authority with as much detailed information as possible about the number of encounters, impact on air traffic management, etc.).
3.	AOC Maintenance - Post flight Inspection	To report about the observation of the aircraft surfaces, engine, etc, and to provide the information to the national (or regional or global, where applicable) central data repository.
4.	Investigation authority	All aeronautical service providers (including operators, ANSPs, airports, etc) shall investigate the effects of a volcanic activity, analyze the information and search for conclusions; and report the investigation results and relevant information to the national supervisory authority and any central data repository.
5.	National Authority	To handle the national central data repository and report to the regional/global central data repository if any. To analyze reports from its aeronautical service providers and take action as appropriate.
6.	Regional Central Data Repository	To collect the national data and make them available to interested stakeholders under agreed conditions.
7.	MWO	To use the national and regional information coming from national and regional central data repositories.
8.	VAAC	To use the information originated by flight crews, and other competent sources to: a) validate its products accordingly and; b) improve the forecast.
9.	Global Data Repository (and research institutes - where appropriate)	To analyse the information stored in the regional central data repository and provide the research outcomes for lessons learnt process.
10.	Knowledge management (e.g. SKYbrary)	To use the post-flight lessons learnt and disseminate them to interested stakeholders.
11.	ICAO	To review/revise ATM volcanic ash contingency plans.

4.4 *Tools for presenting and sharing the volcanic ash information*

4.4.1 To report, transmit and disseminate the volcanic ash encounter information, different types of tools can be used. The list below is provided to give ideas as to what tools can be used. It could also be split into regulatory and general information tools. At any case, it is not an exhaustive list and can be updated with new elements depending on regional experiences.

a) Radiotelephony and Data link Communications
b) VAR
c) NOTAM/ASHTAM
d) SIGMET
e) VAA/VAG
f) Central data repository e.g. CFMU Network Operations Portal (NOP)
g) Centralized web based sites with the regularly updated information and maps – e.g. EVITA - http://www.eurocontrol.int/services/evita-european-crisis-visualisation-interactive-tool-atfcm
h) Teleconferences
i) Periodic Bulletins with the set of information defined by the data providers and data users; e.g. Smithsonian Institution Weekly Bulletin.
j) Centralized internet-based sites for the sharing of lessons learnt (Knowledge management – e.g. SKYbrary http://www.skybrary.aero/index.php/Main_Page)

— END —

FOLLOW-UP OF ROBEX WG/11
ACTION AGREED

Status on 13 March 2013

√ = completed

No.	Title/Action	Follow-up action (target/completion dates in brackets)
11/1	**Status of OPMET provision in Bhutan.** That, the Secretariat (by way of State Letter) verifies the status of implementation of OPMET information in Bhutan to meet the requirements for international air navigation.	State Letter (April 2013)
11/2	**Follow-up on OPMET monitoring.** That, the Secretariat (with assistance from RODBs and IATA): a) verify the results of RODB and IATA OPMET monitoring; and b) highlight results of OPMET monitoring to States to address problems where OPMET availability, compliance or regularity do not meet requirements.	State Letter (April 2013)
11/3	**IROG back-up procedures.** That, RODBs Brisbane and Tokyo develop and test IROG back-up procedures based on the procedures developed by RODBs Bangkok and Singapore in the ROBEX Handbook, Appendix D.	IROG back-up procedures and back-up test (progress report to next meeting)
11/4	**ROBEX Handbook – updates.** That, a) the Secretariat incorporates updates provided by the meeting in Attachment 9 to the Report in the next amendment to the ROBEX Handbook; and b) States provide the Secretariat with further updates required in time for the next major amendment of the ROBEX Handbook in September 2013.	ROBEX Handbook amendment (April 2013) Submission of updates for the ROBEX Handbook (July 2013) ROBEX Handbook amendment (September 2013)
11/5	**ASIA/PAC ICD – updates.** That, a) the Secretariat incorporates updates provided by the meeting in Attachment 10 to the Report in the next amendment to the ASIA/PAC ICD; and b) States provide the Secretariat with further updates required in time for the next major amendment of the	ASIA/PAC ICD amendment (April 2013) Submission of updates for the ASIA/PAC ICD (July 2013) ASIA/PAC ICD amendment (September 2013)

	ASIA/PAC ICD in September 2013.	
11/6	**FASID – updates.** That, the Secretariat with assistance from States primarily concerned develop proposal for amendment to FASID as agreed by the meeting in section 4 of the Report.	Proposal for amendment of FASID (April 2013)
11/7	**Follow-up on VAAC back-up test.** That, the VAAC provider States review the VAAC back-up test procedures and amend if necessary to ensure: a) instructions for States are clear on what action is and is not required by MWOs; and b) best practice to disseminate VAA in a secure manner to reach all known users, preferably via the AFTN.	VAAC back-up test procedures reviewed and amended if necessary (August 2013)
11/8	**Follow-up on SIGMET monitoring.** That, the Secretariat promulgate the results of SIGMET monitoring by RODBs Singapore and Brisbane presented in the Appendix L to this Report, which indicated that no SIGMET were issued by Afghanistan, Nauru, Papua New Guinea and Solomon Islands, to the States concerned in order to urgently facilitate the establishment and implementation of effective corrective action plans to address deficiencies related to SIGMET not provided in accordance with requirements.	State Letter (April 2013)
11/9	**SIGMET Guide – updates.** That, the Secretariat incorporates: a) updates provided by the meeting in Appendix N to the Report in the next amendment to the SIGMET Guide; and b) an example to report a situation when no ash is expected in the forecast section of a SIGMET in time for the next major amendment of the SIGMET Guide in September 2013.	SIGMET Guide amendments (April 2013) (September 2013)

– – – – – – – – – – – –

WS SIGMET Test Results presented by RODB Singapore

Table 1: States/MWOs that did not participate in WS SIGMET Test 8

State	MWO
Afghanistan	Kabul (OAKB)
Australia	Cairns (YBCS), for YBBB FIR
Bangladesh	Dhaka (VGHS)
French Polynesia	Tahiti (NTAA)
Indonesia	Jakarta (WIII)
Mongolia	Ulaanbaatar (ZMUB)
Nauru	Port Moresby (AYPY), by agreement
Nepal	Kathmandu (VNKT)
Papua New Guinea	Port Moresby (AYPY)
Philippines	Manila (RPLL)
Solomon Islands	Port Moresby (AYPY) , by agreement
Sri Lanka	Colombo (VCBI)
DPR Korea	Sunan (ZKPY)

Note: States/MWOs in highlighted text indicate non-participation in any SIGMET tests to date

Table 2: WAFC (London) and RODB reception of SIGMET test messages in WS SIGMET test No. 8 (2012)

No. of test SIGMET issued	No. of test SIGMET received by:						
	WAFC London (EGRR)	RODBs (average)	RODB Bangkok (VTBB)	RODB Brisbane (YBBN)	RODB Singapore (WSSS)	RODB Tokyo (RJTD)	RODB Nadi (NFFN)
48	39 (81%)	43.6 (91%)	44 (92%)	45 (94%)	48 (100%)	38 (79%)	43 (90%)

Figure 1: Comparison of WAFC (London) and RODB (APAC) reception of WS SIGMET test No. 8 (2012)

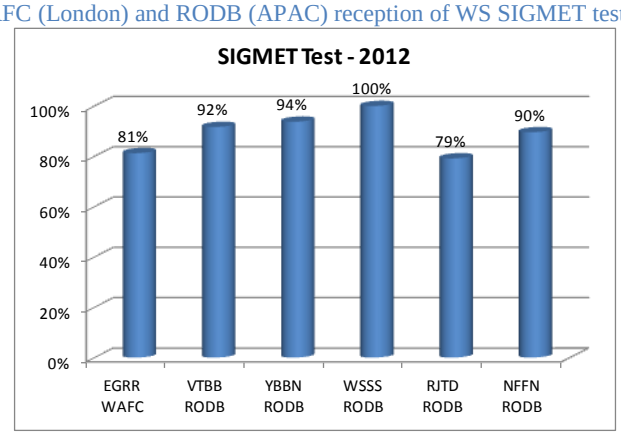


Table 3: EUR region ROC, RODB and SADIS user reception of SIGMET test messages in WS SIGMET test No. 8 (2012)

No. of test SIGMET issued	No. of test SIGMET received by:				
	ROC Vienna (LOWM)	ROC Toulouse (LFPW)	ROC London (EGGY)	SADIS User De Bilt (EHDB)	RODB Brussels (EBBR)
48	44 (92%)	38 (79%)	44 (92%)	42 (88%)	35 (73%)

Figure 2: Comparison of WAFC, RODB, ROC and SADIS user reception of WS SIGMET test No. 8 (2012)

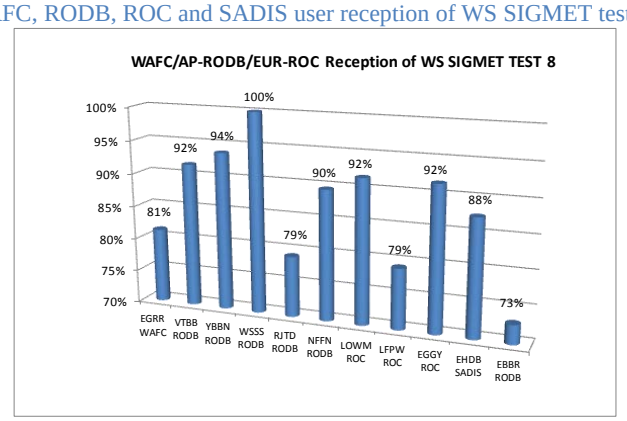


Table 4: Participation (States & MWOs) in SIGMET Tests No. 1-8 (2006 – 2012)

SIGMET Test		State participation	MWO participation	Test SIGMET issued
1	Feb 2006	44%	55%	56%
2	Feb 2007	42%	53%	48%
3	Jan 2008	50%	59%	62%
4	Feb 2009	41%	63%	67%
5	Nov 2009	70%	81%	80%
6	Nov 2010	55%	73%	73%
7	Nov 2011	62%	80%	79%
8	Nov 2012	55%	75%	76%

Figure 3: Comparison of participation (States & MWOs) in SIGMET Tests No. 1-8 (2006 – 2012)

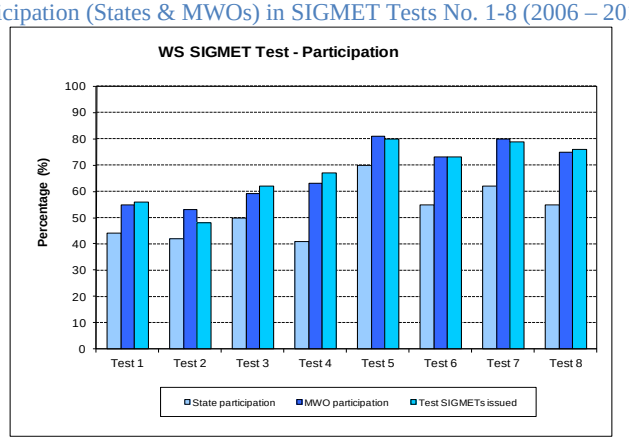


Table 5: WAFC (London) & APAC RODB reception of SIGMET tests No.1 to 8

SIGMET test	WAFC London	RODB (average)	RODB Bangkok	RODB Brisbane	RODB Singapore	RODB Tokyo	RODB Nadi
1 (Feb 2006)		75%	45%	90%	80%	85%	
2 (Feb 2007)		84%	68%	90%	94%	84%	
3 (Jan 2008)		91%	76%	95%	100%	92%	
4 (Feb 2009)		93%	86%	93%	100%	93%	
5 (Nov 2009)		90%	82%	90%	98%	90%	
6 (Nov 2010)		90%	87%	98%	100%	98%	67%
7 (Nov 2011)		89%	84%	90%	100%	94%	76%
8 (Nov 2012)	81%	91%	92%	94%	100%	79%	90%

Figure 4: Comparison of WAFC (London) & APAC RODB reception of SIGMET tests No.1 to 8

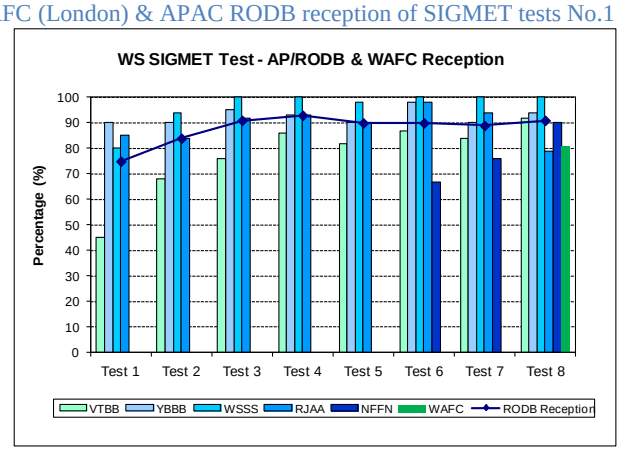


Table 6: WS SIGMET Test results received from WAFC London and APAC RODBs

State	Meteorological Watch Office (MWO)		Area Served	SIGMET Guide			Transmitted Header						WAFC	RODB Reception					
	Location	MWO	Name	TTAAii	CCCC	FIR	Priority	TTAAii	CCCC	YYGGgg	MWO	FIR / UIR	EGRR	VTBB	YBBN	WSSS	RJTD	NFFN	Remarks
Afghanistan	KABUL AD	OAKB	Kabul FIR and SSR	WSAH31	OAKB	OAKX													Not in Asia/Pac Region
Australia	ADELAIDE/Adelaide	YPRM	Melbourne FIR	WSAU21	APRM	YMMM	FF	WSAU21	APRM	210202	YPRM	YMMM	√	02:03	02:04	02:02	02:02	02:02	
	BRISBANE/Brisbane	YBRF	Brisbane FIR	WSAU21	ABRF	YBBB	FF	WSAU21	ABRF	210204	YBRF	YBBB	√	02:05	02:06	02:04	02:04	02:04	
	BRISBANE/Brisbane	YBRF	Melbourne FIR	WSAU21	ABRF	YMMM	FF	WSAU21	ABRF	210205	YBRF	YMMM	√	02:06	02:08	02:05	02:05	02:05	
	CAIRNS/Cairns Intl	YBCS	Brisbane FIR	WSAU21	ABCS	YBBB													
	DARWIN/Darwin	YPDM	Brisbane FIR	WSAU21	ADRM	YBBB	FF	WSAU21	ADRM	210201	YPDM	YBBB	√	02:02	02:04	02:01	02:01	02:01	
	DARWIN/Darwin	YPDM	Melbourne FIR	WSAU21	ADRM	YMMM	FF	WSAU21	ADRM	210201	YPDM	YMMM		02:02	02:02	02:02	02:02	02:01	
	HOBART/Hobart	YMHF	Melbourne FIR	WSAU21	AMHF	YMMM	FF	WSAU21	AMHF	210200	YMHF	YMMM	√	02:01	02:01	02:00	02:00	02:00	
	MELBOURNE/Melbourne	YMRF	Brisbane FIR	WSAU21	AMRF	YBBB	FF	WSAU21	AMRF	210159	YMRF	YBBB		02:00		01:59		01:59	
	MELBOURNE/Melbourne	YMRF	Melbourne FIR	WSAU21	AMRF	YMMM	FF	WSAU21	AMRF	210159	YMRF	YMMM	√	02:00	02:00	01:59		01:59	
	MELBOURNE/World Met. Centre	YMMC	Brisbane FIR	WSAU21	AMMC	YBBB	FF	WSAU21	AMMC	210201	YMMC	YBBB	√	02:04	02:05	02:03	02:03	02:03	
	MELBOURNE/World Met. Centre	YMMC	Melbourne FIR	WSAU21	AMMC	YMMM	FF	WSAU21	AMMC	210204	YMMC	YMMM	√	02:08	02:07	02:07	02:08	02:07	
	PERTH/Perth	YPRF	Brisbane FIR	WSAU21	APRF	YBBB	FF	WSAU21	APRF	210201	YPRF	YBBB	√	02:02	02:03	02:01	02:01	02:01	
	PERTH/Perth	YPRF	Melbourne FIR	WSAU21	APRF	YMMM	FF	WSAU21	APRF	210202	YPRF	YMMM		02:03	02:03	02:02	02:02	02:02	
	SYDNEY/Sydney	YSRF	Brisbane FIR	WSAU21	ASRF	YBBB	FF	WSAU21	ASRF	210157	YSRF	YBBB	√	01:58	01:59	01:57		01:57	
	SYDNEY/Sydney	YSRF	Melbourne FIR	WSAU21	ASRF	YMMM	FF	WSAU21	ASRF	210157	YSRF	YMMM	√	01:58	01:59	01:57		01:57	
Bangladesh	DHAKA/Zia Intl	VGHS	Dhaka FIR & SRR	WSBW20	VGHS	VGFR													
Cambodia	CHENGDU/Shuangliu for PHNOM-PENH (VDPP)	ZUUU	Phnom-Penh FIR & SRR	WSKP31	ZUUU	VDPP	FF	WSKP31	ZUUU	210205	ZUUU	VDPP	√	02:05	02:08	02:05	02:05	02:05	
China	BEIJING/Capital	ZBAA	Beijing FIR & SRR	WSCI33	ZBAA	ZBPE	FF	WSCI33	ZBAA	210205	ZBAA	ZBPE	√	02:02	02:02	02:01	02:01	01:59	
	GUANGZHOU/Baiyan	ZGGG	Guangzhou FIR & SRR	WSCI35	ZGGG	ZGZU	FF	WSCI35	ZGGG	210205	ZGGG	ZGZU	√	02:05	02:13	02:03	02:04	02:02	
	CHENGDU/Shuangliu	ZUUU	Kunming FIR & SRR	WSCI36	ZUUU	ZPKM	FF	WSCI36	ZUUU	210200	ZUUU	ZPKM	√	02:01	02:01	02:00	02:00	02:01	
	XIAN/Xianyang	ZLXY	Lanzhou FIR and SRR	WSCI37	ZLXY	ZLHW	FF	WSCI37	ZLXY	210200	ZLXY	ZLHW	√	02:08	02:04	02:07	02:08	02:01	
	HAIKOU/Meilan	ZJHK	Sanya FIR & SRR	WSCI35	ZJHK	ZJSA	FF	WSCI35	ZJHK	210205	ZJHK	ZJSA	√	02:09	02:12	02:07	02:08	02:08	
	SHANGHAI/Hongqiao	ZSSS	Shanghai FIR & SRR	WSCI34	ZSSS	ZSHA	GG	WSCI34	ZSSS	210205	ZSSS	ZSHA	√	02:01	02:02	02:00	02:00	02:00	
	SHENYANG/Taoxian	ZYTX	Shenyang FIR & SRR	WSCI38	ZYTX	ZYSH	FF	WSCI38	ZYTX	210205	ZYTX	ZYSH	√	02:13	02:09	02:13	02:06	02:13	
	TAIBEI/Taibei Intl	RCTP	Taibei FIR & SRR	WSCI31	RCTP	RCAA	FF	WSCI31	RCTP	210205	RCTP	RCAA	√	02:06	02:07	02:05	02:05		
	URUMQI/Diwopu	ZWWW	Urumqi FIR & SRR	WSCI39	ZWWW	ZWUQ	GG	WSCI39	ZWWW	210200	ZWWW	ZWUQ		02:01	02:34	02:00	02:10	02:00	
	WUHAN/Tianhe	ZHHH	Wuhan FIR & SRR	WSCI45	ZHHH	ZHWH	FF	WSCI45	ZHHH	210200	ZHHH	ZHWH	√	02:02	02:33	02:02	02:02	02:12	
	HONG KONG/Hong Kong Intl	VHHH	Hong Kong FIR & SRR	WSSS20	VHHH	VHHK	FF	WSSS20	VHHH	210200	VHHH	VHHK	√	02:01	02:02	02:01	02:00	02:00	
DPR Korea	SUNAN	ZKPY	Pyongyang FIR & SRR	WSKR31	ZKPY	ZKKP													
Fiji	NADI/Nadi Intl	NFFN	Nadi FIR & SRR	WSFJ01,02..	NFFN	NFFF	FF	WSFJ03	NFFN	210000	NFFN	NFFF	√	02:03	02:04	02:02	02:02	02:02	incorrect DTG in AHL
French Polynesia	TAHITI/Faaa	NTAA	Tahiti FIR & SRR	WSPF21,22	NTAA	NTTT													
India	CHENNAI/Chennai	VOMM	Chennai FIR & SRR	WSIN31	VOMM	VOMF	FF	WSIN31	VOMM	210205	VOMM	VOMF	√	02:06	02:07	02:06	02:06	02:06	
	DELHI/Indira Ghandi Intl	VIDP	Delhi FIR & SRR	WSIN31	VIDP	VIDF	FF	WSIN31	VIDP	210205	VIDP	VIDF		05:25	05:26	05:24	05:24	05:24	
	KOLKATA	VECC	Kolkata FIR & SRR	WSIN31	VECC	VECF	FF	WSIN31	VECC	210200	VECC	VECF	√	02:01	02:02	02:00	02:01	02:01	
	MUMBAI/Chhatrapati Shivaji Intl.	VABB	Mumbai FIR & SRR	WSIN31	VABB	VABF	FF	WSIN31	VABB	210205	VABB	VABB		01:28	01:29	01:28	02:03	01:27	
Indonesia	JAKARTA/Soekarno-Hatta	WIII	Jakarta FIR/UIR & SRR	WSID20	WIII	WIIF													
	UJUNG PANDANG/Hasanuddin	WAAA	Ujung Pandang FIR/UIR & SRR	WSID21	WAAA	WAAF	FF	WSID21	WAAA	210205	WAAA	WAAF			02:09	02:07			
Japan	TOKYO (CITY)	RJTD	Fukuoka FIR & Tokyo SRR	WSJP31	RJTD	RJJJ	FF	WSJP31	RJTD	210205	RJTD	RJJJ	√	02:06	02:06	02:05	02:05	02:05	
Lao PDR	VIENTIANE/Wattay	VLVT	Vientiane FIR & SRR	WSLA31	VLVT	VLVT	FF	WSLA31	VLVT	210205	VLVT	VLVT		01:57	01:57	01:56		01:56	
Malaysia	SEPANG/KL International Airport	WMKK	Kota Kimabalu FIR & SRR	WSMS31	WMKK	WBFC	FF	WSMS31	WMKK	210157	WMKK	WBFC	√	01:58	01:59	01:57	02:40	01:57	RJTD received AHL as WSMS31 WMKK 210240
	SEPANG/KL International Airport	WMKK	Kuala Lumpur FIR & SRR	WSMS31	WMKK	WMFC	FF	WSMS31	WMKK	210200	WMKK	WMFC	√	02:02	02:02	02:01	02:01	02:01	
Maldives	MALE/Intl	VRMM	Male FIR & SRR	WSMV31	VRMM	VRMF													
Mongolia	ULAANBAATAR	ZMUB	Ulaanbaatar FIR & SRR	WSMO31	ZMUB	ZMUB													
Myanmar	YANGON/Yangon International	VYYY	Yangon FIR & SRR	WSBM31	VYYY	VYYY													
Nauru	PORT MORESBY on behalf of NAURU (ANYN)	AYPY	Nauru FIR & SRR	WSNW20	AYPY	ANAU													
Nepal	KATHMANDU	VNKT	Kathmandu FIR & SRR	WSNP31	VNKT	VNSM													
New Zealand	WELLINGTON (Aviation Weather Centre)	NZKL	New Zealand FIR & SRR	WSNZ21	NZKL	NZZC	FF	WSNZ21	NZZC	210200	NZKL	NZZC	√	02:01	02:01	02:00	02:00	02:00	
	WELLINGTON (Aviation Weather Centre)	NZKL	Auckland Oceanic FIR & SRR	WSPS21	NZKL	NZZO	FF	WSPS21	NZKL	210200	NZKL	NZZO	√	02:01	02:02	02:00	02:00	02:00	
Pakistan	KARACHI/Jinnah Intl	OPKC	Karachi FIR & SRR	WSPK31	OPKC	OPKR	FF	WSPK31	OPKC	210200	OPKC	OPKR	√	01:56	01:56	01:59		01:55	
	LAHORE/Allama Iqbal Intl	OPLA	Lahore Fir & SRR	WSPK31	OPLA	OPLR	GG	WSPK31	OPLA	210201	OPLA	OPLR	√	02:02	02:03	02:01	02:01	02:01	
Papua New Guinea	PORT MORESBY/Intl	AYPY	Port Moresby FIR & SRR	WSNG20	AYPY	AYPY													
Phillippines	MANILA/Ninoy Aquino Intl, Pasay City, Metro Manila	RPLL	Manila FIR & SRR	WSPH31	RPLL	RPHI													
Republic of Korea	INCHEON	RKSI	Incheon FIR & SRR	WSKO31	RKSI	RKRR	FF	WSKO31	RKSI	210200	RSKI	RKRR	√	02:01	02:02	02:00	02:00	02:00	
Singapore	SINGAPORE/Changi	WSSS	Singapore FIR & SRR	WSSR20	WSSS	WSJC	FF	WSSR20	WSSS	210200	WSSS	WSJC	√	02:01	02:02	02:00	02:00	02:00	
Solomon Islands	PORT MORESBY on behalf of HONIARA (Henderson - AGGH)	AYPY	Honiara FIR & SRR	WSSO20	AYPY	AGGG													
Sri Lanka	COLOMBO/Bandaranaike Intl Airport Colombo	VCBI	Colombo FIR & SRR	WSSB31	VCBI	VCBI													
Thailand	BANGKOK/Suvarnabhumi Intl Airport	VTBS	Bangkok FIR & SRR	WSTH31	VTBS	VTBB	FF	WSTH31	VTBS	210200	VTBS	VTBB	√	02:01	02:02	02:01	02:01	02:01	
United States	ANCHORAGE/Anchorage Intl	PAWU	Anchorage FIR	WSAK01-09	PAWU	PAZA	DD	WSAK01	PAWU	210200	PAWU	PAZA				02:04			
	HONOLULU/Honolulu Intl	PHFO	Oakland Oceanic & Honolulu SRR	WSPA01-13	PHFO	KZAK	DD	WSPA01	PHFO	210200	PHFO	KZAK	√		02:01	02:04			
	KANSAS CITY	KKCI	Oakland Oceanic FIR	WSPN01-13	KKCI	KZAK	DD	WSPN01	KKCI	210200	KKCI	KZAK	√		02:02	02:04			
Vietnam	Gia Lam	VVGL	Hanoi FIR & SRR	WSVS31	VVGL	VVNB	FF	WSVS31	VVGL	210200	VVGL	VVNB	√	02:02	02:03	02:01	02:01	02:01	
	Gia Lam	VVGL	Ho-Chi-Minh FIR & SRR	WSVS31	VVGL	VVTS	FF	WSVS31	VVGL	210200	VVGL	VVTS	√	02:05		02:04	02:01	02:04	

Table 7: WS SIGMET results received from WAFC London, APAC RODBs and EUR ROCs, RODBs and SADIS User

State	Meteorological Watch Office (MWO)		Area Served	SIGMET Guide			Transmitted Header						WAFC	RODB Reception					EUR ROC, RODB & SADIS Reception					Remarks
	Location	MWO	Name	TTAAii	CCCC	FIR	Priority	TTAAii	CCCC	YYGGgg	MWO	FIR / UIR	EGRR	VTBB	YBBN	WSSS	RJTD	NFFN	LOWM	LFPW	EGGY	EHDB	EBBR	
Afghanistan	KABUL AD	OAKB	Kabul FIR and SSR	WSAH31	OAKB	OAKX																		
Australia	ADELAIDE/Adelaide	YPRM	Melbourne FIR	WSAU21	APRM	YMMM	FF	WSAU21	APRM	210202	YPRM	YMMM	√	02:03	02:04	02:02	02:02	02:02	02:04	02:02	02:02	02:02	02:02	
	BRISBANE/Brisbane	YBRF	Brisbane FIR	WSAU21	ABRF	YBBB	FF	WSAU21	ABRF	210204	YBRF	YBBB	√	02:05	02:06	02:04	02:04	02:04	02:05	02:04	02:04	02:04	02:04	
	BRISBANE/Brisbane	YBRF	Melbourne FIR	WSAU21	ABRF	YMMM	FF	WSAU21	ABRF	210205	YBRF	YMMM	√	02:06	02:08	02:05	02:05	02:05	02:06	02:05	02:05	02:05	02:05	
	CAIRNS/Cairns Intl	YBCS	Brisbane FIR	WSAU21	ABCS	YBBB																		
	DARWIN/Darw in	YPDM	Brisbane FIR	WSAU21	ADRM	YBBB	FF	WSAU21	ADRM	210201	YPDM	YBBB	√	02:02	02:04	02:01	02:01	02:01	02:02	02:01	02:01	02:02	02:01	
	DARWIN/Darw in	YPDM	Melbourne FIR	WSAU21	ADRM	YMMM	FF	WSAU21	ADRM	210201	YPDM	YMMM		02:02	02:02	02:02	02:02	02:01	02:03	02:02	02:02	02:02	02:02	
	HOBART/Hobart	YMHF	Melbourne FIR	WSAU21	AMHF	YMMM	FF	WSAU21	AMHF	210200	YMHF	YMMM	√	02:01	02:01	02:00	02:00	02:00	02:02	00:56	02:00	02:02	02:01	
	MELBOURNE/Melbourne	YMRF	Brisbane FIR	WSAU21	AMRF	YBBB	FF	WSAU21	AMRF	210159	YMRF	YBBB		02:00		01:59		01:59	02:00	02:00	01:59	01:36	01:59	
	MELBOURNE/Melbourne	YMRF	Melbourne FIR	WSAU21	AMRF	YMMM	FF	WSAU21	AMRF	210159	YMRF	YMMM	√	02:00	02:00	01:59		01:59	02:00		01:59	01:59	01:59	
	MELBOURNE/World Met. Centre	YMMC	Brisbane FIR	WSAU21	AMMC	YBBB	FF	WSAU21	AMMC	210201	YMMC	YBBB	√	02:04	02:05	02:03	02:03	02:03	02:04	02:03	02:03	02:03	02:03	
	MELBOURNE/World Met. Centre	YMMC	Melbourne FIR	WSAU21	AMMC	YMMM	FF	WSAU21	AMMC	210204	YMMC	YMMM	√	02:08	2:10	02:07	02:08	02:07	02:08		02:03	02:07	02:07	
	PERTH/Perth	YPRF	Brisbane FIR	WSAU21	APRF	YBBB	FF	WSAU21	APRF	210201	YPRF	YBBB	√	02:02	02:03	02:01	02:01	02:01	02:03		02:01	02:02	02:02	
	PERTH/Perth	YPRF	Melbourne FIR	WSAU21	APRF	YMMM	FF	WSAU21	APRF	210202	YPRF	YMMM		02:03	02:03	02:02	02:02	02:02	02:03	13:58	02:01	02:02	02:02	
	SYDNEY/Sydney	YSRF	Brisbane FIR	WSAU21	ASRF	YBBB	FF	WSAU21	ASRF	210157	YSRF	YBBB	√	01:58	01:59	01:57		01:57	01:58	01:57	01:57	01:57	01:57	
	SYDNEY/Sydney	YSRF	Melbourne FIR	WSAU21	ASRF	YMMM	FF	WSAU21	ASRF	210157	YSRF	YMMM	√	01:58	01:59	01:57		01:57	01:58	01:57	01:57	01:57	01:57	
Bangladesh	DHAKA/Zia Intl	VGHS	Dhaka FIR & SRR	WSBW20	VGHS	VGFR																		EUR users recieved actual SIGMET at 03:04/03:05
Cambodia	CHENGDU/Shuangliu for PHNOM-PENH (VDPP)	ZUUU	Phnom-Penh FIR & SRR	WSKP31	ZUUU	VDPP	FF	WSKP31	ZUUU	210205	ZUUU	VDPP	√	02:05	02:08	02:05	02:05	02:05	02:06	02:05	02:05	02:05		
China	BEIJING/Capital	ZBAA	Beijing FIR & SRR	WSCI33	ZBAA	ZBPE	FF	WSCI33	ZBAA	210205	ZBAA	ZBPE	√	02:02	02:02	02:01	02:01	01:59	02:02	02:01	02:01	02:01	02:01	
	GUANGZHOU/Baiyan	ZGGG	Guangzhou FIR & SRR	WSCI35	ZGGG	ZGZU	FF	WSCI35	ZGGG	210205	ZGGG	ZGZU	√	02:05	02:13	02:03	02:04	02:02	02:04	02:03	02:03	02:03	02:03	
	CHENGDU/Shuangliu	ZUUU	Kunming FIR & SRR	WSCI36	ZUUU	ZPKM	FF	WSCI36	ZUUU	210200	ZUUU	ZPKM	√	02:01	02:01	02:00	02:00	02:01	02:01	02:00	02:00	02:00	02:00	
	XI'AN/Xianyang	ZLXY	Lanzhou FIR and SRR	WSCI37	ZLXY	ZLHW	FF	WSCI37	ZLXY	210200	ZLXY	ZLHW	√	02:08	02:04	02:07	02:08	02:01	02:04	02:03	02:04	02:03	02:03	
	HAIKOU/Meilan	ZJHK	Sanya FIR & SRR	WSCI35	ZJHK	ZJSA	FF	WSCI35	ZJHK	210205	ZJHK	ZJSA	√	02:09	02:12	02:07	02:08	02:08	02:09	02:08	02:08	02:08	02:08	
	SHANGHAI/Hongqiao	ZSSS	Shanghai FIR & SRR	WSCI34	ZSSS	ZSHA	GG	WSCI34	ZSSS	210205	ZSSS	ZSHA	√	02:01	02:02	02:00	02:00	02:00	02:02		02:00	02:01	02:00	
	SHENYANG/Taoxian	ZYTX	Shenyang FIR & SRR	WSCI38	ZYTX	ZYSH	FF	WSCI38	ZYTX	210205	ZYTX	ZYSH	√	02:13	02:09	02:13	02:06	02:13	02:07	02:06	02:10	02:06	02:06	
	TAIBEI/Taibei Intl	RCTP	Taibei FIR & SRR	WSCI31	RCTP	RCAA	FF	WSCI31	RCTP	210205	RCTP	RCAA	√	02:06	02:07	02:05	02:05		02:06	02:05	02:05	02:05	02:05	
	URUMQI/Diw opu	ZWWW	Urumqi FIR & SRR	WSCI39	ZWWW	ZWUQ	GG	WSCI39	ZWWW	210200	ZWWW	ZWUQ		02:01	02:34	02:00	02:10	02:00		02:02	02:00			
	WUHAN/Tianhe	ZHHH	Wuhan FIR & SRR	WSCI45	ZHHH	ZHWH	FF	WSCI45	ZHHH	210200	ZHHH	ZHWH	√	02:02	02:33	02:02	02:02	02:12	02:03		02:02	02:02	02:02	
	HONG KONG/Hong Kong Intl	VHHH	Hong Kong FIR & SRR	WSSS20	VHHH	VHHK	FF	WSSS20	VHHH	210200	VHHH	VHHK	√	02:01	02:02	02:01	02:00	02:00	02:02	02:01	02:01	02:00	02:00	
DPR Korea	SUNAN	ZKPY	Pyongyang FIR & SRR	WSKR31	ZKPY	ZKKP																		
Fiji	NADI/Nadi Intl	NFFN	Nadi FIR & SRR	WSFJ01,02,	NFFN	NFFF	FF	WSFJ03	NFFN	210000	NFFN	NFFF	√	02:03	02:04	02:02	02:02	02:02	02:03		02:02	02:02	02:02	Incorrect DTG in AHL
French Polynesia	TAHITI/Faaa	NTAA	Tahiti FIR & SRR	WSPF21,22	NTAA	NTTT																		
India	CHENNAI/Chennai	VOMM	Chennai FIR & SRR	WSIN31	VOMM	VOMF	FF	WSIN31	VOMM	210205	VOMM	VOMF	√	02:06	02:07	02:06	02:06	02:06	02:07	02:06	02:06	02:06	02:06	
	DELHI/Indira Ghandi Intl	VIDP	Delhi FIR & SRR	WSIN31	VIDP	VIDF	FF	WSIN31	VIDP	210205	VIDP	VIDF		05:25	05:26	05:24	05:24	05:24		01:44	05:17			
	KOLKATA	VECC	Kolkata FIR & SRR	WSIN31	VECC	VECF	FF	WSIN31	VECC	210200	VECC	VECF	√	02:01	02:02	02:00	02:01	02:01	02:02	02:01	02:00	02:01	02:00	
	MUMBAI/Chhatrapati Shivaji Intl.	VABB	Mumbai FIR & SRR	WSIN31	VABB	VABF	FF	WSIN31	VABB	210205	VABB	VABB		01:28	01:29	01:28	02:03	01:27	01:28	01:44	01:28			
Indonesia	JAKARTA/Soekamo-Hatta	WIII	Jakarta FIR/UIR & SRR	WSID20	WIII	WIIF																		
	UJUNG PANDANG/Hasanuddin	WAAA	Ujung Pandang FIR/UIR & SRR	WSID21	WAAA	WAAF	FF	WSID21	WAAA	210205	WAAA	WAAF			02:09	02:07								
Japan	TOKYO (CITY)	RJTD	Fukuoka FIR & Tokyo SRR	WSJP31	RJTD	RJJJ	FF	WSJP31	RJTD	210205	RJTD	RJJJ	√	02:06	02:06	02:05	02:05	02:05	02:06	02:05	02:05	02:05	02:05	
Lao PDR	VIENTIANE/Wattay	VLVT	Vientiane FIR & SRR	WSLA31	VLVT	VLVT	FF	WSLA31	VLVT	210205	VLVT	VLVT		01:57	01:57	01:56		01:56						
Malaysia	SEPANG/KL International Airport	WMKK	Kota Kimabalu FIR & SRR	WSMS31	WMKK	WBFC	FF	WSMS31	WMKK	210157	WMKK	WBFC	√	01:58	01:59	01:57	02:40	01:57	01:58	01:57	01:57	01:57		RJTD received AHL as WSMS31 WMKK 210240
	SEPANG/KL International Airport	WMKK	Kuala Lumpur FIR & SRR	WSMS31	WMKK	WMFC	FF	WSMS31	WMKK	210200	WMKK	WMFC	√	02:02	02:02	02:01	02:01	02:01	02:02	02:01	02:01	02:01	02:01	
Maldives	MALE/Intl	VRMM	Male FIR & SRR	WSMV31	VRMM	VRMF																		
Mongolia	ULAANBAATAR	ZMUB	Ulaanbaatar FIR & SRR	WSMO31	ZMUB	ZMUB																		
Myanmar	YANGON/Yangon International	VYYY	Yangon FIR & SRR	WSBM31	VYYY	VYYY																		
Nauru	PORT MORESBY on behalf of NAURU (ANYN)	AYPY	Nauru FIR & SRR	WSNW20	AYPY	ANAU																		
Nepal	KATHMANDU	VNKT	Kathmandu FIR & SRR	WSNP31	VNKT	VNSM																		
New Zealand	WELLINGTON (Aviation Weather Centre)	NZKL	New Zealand FIR & SRR	WSNZ21	NZKL	NZZC	FF	WSNZ21	NZZC	210200	NZKL	NZZC	√	:02:01	02:01	02:00	02:00	02:00	02:01	02:00	02:00	02:00	02:00	
	WELLINGTON (Aviation Weather Centre)	NZKL	Auckland Oceanic FIR & SRR	WSPS21	NZKL	NZZO	FF	WSPS21	NZKL	210200	NZKL	NZZO	√	02:01	02:02	02:00	02:00	02:00	02:03	02:00	02:00	02:00		
Pakistan	KARACHI/Jinnah Intl	OPKC	Karachi FIR & SRR	WSPK31	OPKC	OPKR	FF	WSPK31	OPKC	210200	OPKC	OPKR	√	01:56	01:56	01:59		01:55	01:56	02:01	01:55	01:55	01:55	
	LAHORE/Allama Iqbal Intl	OPLA	Lahore Fir & SRR	WSPK31	OPLA	OPLR	GG	WSPK31	OPLA	210201	OPLA	OPLR	√	02:02	02:03	02:01	02:01	02:01	02:02		02:01	02:01	02:01	
Papua New Guinea	PORT MORESBY/Intl	AYPY	Port Moresby FIR & SRR	WSNG20	AYPY	AYPY																		
Phillippines	MANILA/Ninoy Aquino Intl, Pasay City, Metro Manila	RPLL	Manila FIR & SRR	WSPH31	RPLL	RPHI																		
Republic of Korea	INCHEON	RKSI	Incheon FIR & SRR	WSKO31	RKSI	RKRR	FF	WSKO31	RKSI	210200	RSKI	RKRR	√	02:01	02:02	02:00	02:00	02:00	02:01	02:00	02:00	02:00	02:00	
Singapore	SINGAPORE/Changi	WSSS	Singapore FIR & SRR	WSSR20	WSSS	WSJC	FF	WSSR20	WSSS	210200	WSSS	WSJC	√	02:01	02:02	02:00	02:00	02:00	02:01	02:00	02:00	02:00	02:00	
Solomon Islands	PORT MORESBY on behalf of HONIARA (Henderson - AGGH)	AYPY	Honiara FIR & SRR	WSSO20	AYPY	AGGG																		
Sri Lanka	COLOMBO/Bandaranaike Intl Airport Colombo	VCBI	Colombo FIR & SRR	WSSB31	VCBI	VCBI																		
Thailand	BANGKOK/Suvarnabhumi Intl Airport	VTBS	Bangkok FIR & SRR	WSTH31	VTBS	VTBB	FF	WSTH31	VTBS	210200	VTBS	VTBB	√	02:01	02:02	02:01	02:01	02:01	02:02	02:01	02:01	02:01		
United States	ANCHORAGE/Anchorage Intl	PAWU	Anchorage FIR	WSAK01-09	PAWU	PAZA	DD	WSAK01	PAWU	210200	PAWU	PAZA				02:04			02:03	02:01				
	HONOLULU/Honolulu Intl	PHFO	Oakland Oceanic & Honolulu SRR	WSPA01-13	PHFO	KZAK	DD	WSPA01	PHFO	210200	PHFO	KZAK	√		02:01	02:04			02:11	02:10	02:12	02:10		
	KANSAS CITY	KKCI	Oakland Oceanic FIR	WSPN01-13	KKCI	KZAK	DD	WSPN01	KKCI	210200	KKCI	KZAK	√		02:02	02:04			02:12	02:11	02:11	02:11		
Vietnam	Gia Lam	VVGL	Hanoi FIR & SRR	WSVS31	VVGL	VVNB	FF	WSVS31	VVGL	210200	VVGL	VVNB	√	02:02	02:03	02:01	02:01	02:01	02:02	02:01	02:01	02:01	02:01	
	Gia Lam	VVGL	Ho-Chi-Minh FIR & SRR	WSVS31	VVGL	VVTS	FF	WSVS31	VVGL	210200	VVGL	VVTS	√	02:05		02:04	02:01	02:04	02:05			02:04		

WS SIGMET Test Results presented by RODB Tokyo

Figure 5: Availability of the SIGMET test for TC

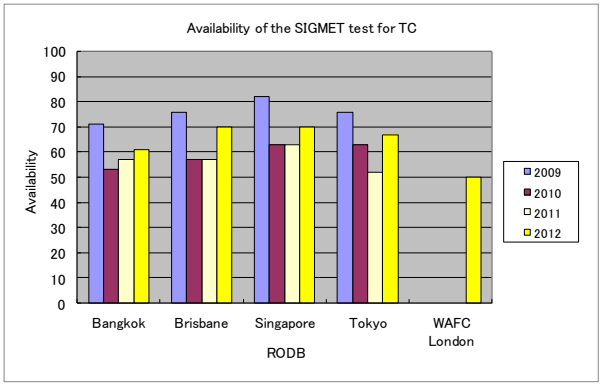


Table 8: Results of the SIGMET test for TC

Header According to SIGMET Guide				Test Result						Received Time(UTC)				
MWO	TTAAii	CCCC	FIR	Priority	TTAAii	CCCC	YYGGgg	MWO	FIR	WSSS	VTBB	YBBN	RJTD	LOWN
AYPY	WCNW20	AYPY	ANAU	–	–	–	–	–	–	–	–	–	–	–
AYPY	WCNG20	AYPY	AYPY	–	–	–	–	–	–	–	–	–	–	–
AYPY	WCSO20	AYPY	AGGG	–	–	–	–	–	–	–	–	–	–	–
KKCI	WCPN01–13	KKCI	KZAK	DD	WCPN01	KKCI	070200	KKCI	KZAK	0204	–	0200	0207	0204
NFFN	WCFJ01,02,…	NFFN	NFFF	FF	WCFJ01	NFFN	070000	NFFN	NFFF	0158	0159	0158	0206	0158
NTAA	WCPF21	NTAA	NTTT	–	–	–	–	–	–	–	–	–	–	–
NZKL	WCNZ21	NZKL	NZZC	–	–	–	–	–	–	–	–	–	–	–
NZKL	WCPS21	NZKL	NZZO	FF	WCPS21	NZKL	070201	NZKL	NZZO	0201	0202	0201	0201	0201
OPKC	WCPK31	OPKC	OPKR	GG	WCPK31	OPKC	070205	OPKC	OPKR	0209	0210	0209	0210	–
OPLA	WCPK31	OPLA	OPLR	GG	WSPK31	OPLA	070200	OPLA	OPLA	0206	–	0204	–	–
PAWU	WCAK01–09	PAWU	PAZA	–	–	–	–	–	–	–	–	–	–	–
PHFO	WCPA01–13	PHFO	KZAK	DD	WCPA01	PHFO	070200	PHFO	KZAK	0204	–	0200	0207	–
RCTP	WCCI31	RCTP	RCAA	–	–	–	–	–	–	–		–	–	–
RJTD	WCJP31	RJTD	RJJJ	FF	WCJP31	RJTD	070205	RJTD	RJJJ	0205	0206	0205	0213	0205
RKSI	WCKO31	RKSI	RKRR	FF	WCKO31	RKSI	070204	RKSI	RKRR	0204	0205	0204	0204	–
RPLL	WCPH31	RPLL	RPHI	FF	WCPH31	RPLL	070200	RPLL	RPHI	0205	0205	0204	0205	0204
VABB	WCIN31	VABB	VABF	FF	WCIN31	VABB	070205	VABB	VABF	0205	0206	0204	0436	0205
VCBI	WCSB31	VCBI	VCBI	–	–	–	–	–	–	–	–	–	–	–
VECC	WCIN31	VECC	VECF	FF	WCIN31	VECC	070201	VECC	VECF	0204	0205	0204	0204	0207
VGHS	WCBW20	VGHS	VGFR	FF	WCBW20	VGHS	070206	VGHS	VGHS	0218	0219	0214	0218	–
VHHH	WCSS20	VHHH	VHHK	FF	WCSS20	VHHH	070201	VHHH	VHHK	0202	0203	0201	0202	0202
VIDP	WCIN31	VIDP	VIDF	FF	WCIN31	VIDP	070205	VIDP	VIDF	0218	0219	0204	0218	–
VLVT	WCLA31	VLVT	VLVT	FF	WCLA31	VLVT	070205	VLVT	VLVT	0200	0201	0200	0200	–
VOMM	WCIN31	VOMM	VOMF	FF	WCIN31	VOMM	070205	VOMM	VOMF	0205	0206	0204	0205	0205
VRMM	WCMV31	VRMM	VRMF	DD	WCMV31	VRMM	070205	VRMM	VRMF	0204	0205	0153	0204	0204
VTBS	WCTH31	VTBS	VTBB	FF	WCTH31	VTBS	070205	VTBS	VTBB	0203:	0203	0202	0203	–
VVGL	WCVS31	VVGL	VVNB	FF	WCVS31	VVGL	070201	VVGL	VVNB	0202	0203	0201	0202	0202
VVGL	WCVS31	VVGL	VVTS	FF	WCVS31	VVGL	070202	VVGL	VVTS	0204	0205	0201	0204	0204
VYYY	WCBM31	VYYY	VYYY	–	–	–	–	–	–	–	–	–	–	–
WAAA	WCID21	WAAA	WAAZ	–	–	–	–	–	–	–	–	–	–	–
WIII	WCID20	WIII	WIIZ	–	–	–	–	–	–	–	–	–	–	–
WMKK	WCMS31	WMKK	WBFC	FF	WCMS31	WMKK	070200	WMKK	WBFC	0200	0201	0200	0200	0200
WMKK	WCMS31	WMKK	WMFC	FF	WCMS31	WMKK	070200	WMKK	WMFC	0207	0208	0200	0207	0207
WSSS	WCSR20	WSSS	WSJC	FF	WCSR20	WSSS	070205	WSSS	WSJC	0205	0206	0205	0205	0205
YBRF	WCAU01	ABRF	YBBB	DD	WCAU01	ABRF	070229	ABRF	YBBB	0229	–	0229	0306	–
YBRF	WCAU01	ABRF	YMMM	–	–	–	–	–	–	–	–	–	–	–
YDRM	WCAU01	ADRM	YBBB	DD	WCAU01	ADRM	070214	ADRM	YBBB	0214	0215	0214	0221	0214
YDRM	WCAU01	ADRM	YMMM	–	–	–	–	–	–	–	–	–	–	–
YPRF	WCAU01	APRF	YBBB	DD	WCAU01	APRF	070224	APRF	YBBB	0228	0225	0224	0224	0224
YPRF	WCAU01	APRF	YMMM	DD	WCAU01	APRF	070224	APRF	YMMM	0228	0225	0224	0224	0224
ZBAA	WCCI33	ZBAA	ZBPE	FF	WCCI33	ZBAA	070205	ZBAA	ZBPE	0213	0214	0211	0213	0213
ZGGG	WCCI35	ZGGG	ZGZU	FF	WCCI35	ZGGG	070205	ZGGG	ZGZU	0204	0205	0203	0204	0203
ZJHK	WCCI35	ZJHK	ZJSA	FF	WCCI35	ZJHK	070205	ZJHK	ZJSA	0206	0206	0203	0206	0207
ZKPY	WCKR31	ZKPY	ZKKP	–	–	–	–	–	–	–	–	–	–	–
ZSSS	WCCI34	ZSSS	ZSHA	FF	WCCI34	ZSSS	070205	ZSSS	ZSHA	0204	0204	0200	0203	0203
ZUUU	WCKP31	ZUUU	VDPP	FF	WCKP31	ZUUU	070235	ZUUU	VDPP	0234	0235	0234	0234	0234
Not Listed in SIGMET Guide				GG	WCBD01	WBSB	070000	WBSB	WBSB	0224	0225	–	–	–
				FF	WCAE20	OMAA	070900	OMAA	OMAE	0938	0921	0930	–	–
				FF	WCIR31	OIII	070914	OIII	OIIX	0939	0940	0939	–	–

Figure 6: Availability of the SIGMET test for VA

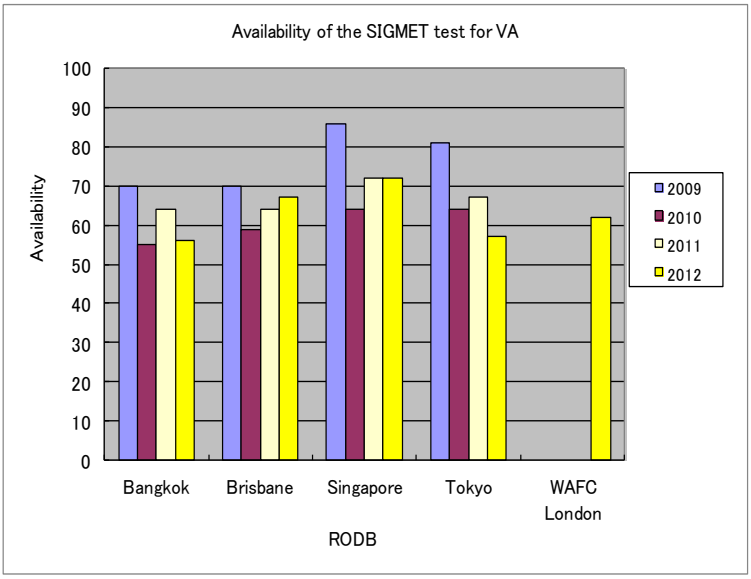


Table 9: Results of the SIGMET test for VA

Header According to SIGMET Guide				Test Result						Received Time(UTC)				
MWO	TTAAii	CCCC	FIR	Priority	TTAAii	CCCC	YYGGgg	MWO	FIR	WSSS	VTBB	YBBN	RJTD	LOWN
AYPY	WVNW20	AYPY	ANAU	–	–	–	–	–	–	–	–	–	–	–
AYPY	WVNG20	AYPY	AYPY	–	–	–	–	–	–	–	–	–	–	–
AYPY	WVSO20	AYPY	AGGG	–	–	–	–	–	–	–	–	–	–	–
KKCI	WVPN01-13	KKCI	KZAK	–	–	–	–	–	–	–	–	–	–	0214
NFFN	WVFJ01,02,…	NFFN	NFFF	FF	WVFJ01	NFFN	140000	NFFN	NFFF	0203	0204	0203	0203	0203
NTAA	WVPF21	NTAA	NTTT	–	–	–	–	–	–	–	–	–	–	–
NZKL	WVNZ21	NZKL	NZZC	FF	WVNZ21	NZKL	140201	NZKL	NZZC	0202	0202	0201	0202	0201
NZKL	WVPS21	NZKL	NZZO	FF	WVPS21	NZKL	140201	NZKL	NZZO	0201	0202	0201	0201	0201
OAKB	WVAH31	OAKB	OAKX	–	–	–	–	–	–	–	–	–	–	–
OPKC	WVPK31	OPKC	OPKR	DD	WVPK31	OPKC	140205	OPKC	OPKR	0203	0204	0203	0203	–
OPLA	WVPK31	OPLA	OPLR	FF	WVPK31	OPLA	140200	OPLA	OPLR	0159	0157	0152	–	0203
PAWU	WVAK01-09	PAWU	PAZA	DD	WSAK01	PAWU	140201	PAWU	PAZA	0205	–	–	–	–
PHFO	WVPA01-13	PHFO	KZAK	–	–	–	140202	–	–	–	–	–	–	0204
RCTP	WVCI31	RCTP	RCAA	FF	WVCI31	RCTP	140203	RCTP	RCAA	0202	0203	0203	0202	0204
RJTD	WVJP31	RJTD	RJJJ	FF	WVJP31	RJTD	140205	RJTD	RJJJ	0205	0206	0205	0212	0205
RKSI	WVKO31	RKSI	RKRR	FF	WVKO31	RKSI	140203	RKSI	RKRR	0203	0204	0203	0203	0203
RPLL	WVPH31	RPLL	RPHI	FF	WVPH31	RPLL	140200	RPLL	RPHI	0200	0201	0200	0200	0200
UELL	WVRA32	RUYK	UELL	FF	WVRA32	RUYK	140202	RUYK	UELL	0203	0203	0202	–	0204
UEST	WVRA38	RUYK	UEST	FF	WVRA38	RUYK	140204	RUYK	UEST	0207	0209	0208	0209	0207
UHHH	WVRA31	RUHB	UHHH	FF	WVRA31	RUHB	140152	RUHB	UHHH	0205	0205	0203	0204	0205
UHMA	WVRA31	RUPV	UHMP	–	–	–	–	–	–	–	–	–	–	–
UHMA	WVRA32	RUPV	UHMA	FF	WVRA32	RUPV	140205	RUPV	UHMA	0207	0209	0208	0209	0207
UHMM	WVRA31	RUMG	UHMM	FF	WVRA31	RUMG	140205	RUMG	UHMM	0215		–	–	–
UHPP	WVRA31	RUPK	UHPP	FF	WVRA31	RUPK	140202	RUPK	UHPP	0204	0212	0204	0204	0205
UIAA	WVRA31	RUCH	UIAA	FF	WVRA31	RUCH	140205	RUCH	UIAA	0208	0208	0207	0216	0208
UIII	WVRA31	RUIR	UIII	FF	WVRA31	RUIR	140201	RUIR	UIII	0204	0204	0202	0212	0205
VABB	WVIN31	VABB	VABF	–	–	–	–	–	–	–	–	–	–	–
VCBI	WVSB31	VCBI	VCBI	–	–	–	–	–	–	–	–	–	–	–
VECC	WVIN31	VECC	VECF	–	–	–	–	–	–	–	–	–	–	–
VGHS	WVBW20	VGHS	VGFR	FF	WVBW20	VGHS	140209	VGHS	VGFR	0221	0212	0212	0209	–
VHHH	WVSS20	VHHH	VHHK	FF	WVSS20	VHHH	140202	VHHH	VHHK	0203	0204	0203	0203	0203
VIDP	WVIN31	VIDP	VIDF	FF	WVIN31	VIDP	140205	VIDP	VIDF	0210	0211	0205	0210	–
VLVT	WVLA31	VLVT	VLVT	FF	WVLA31	VLVT	140205	VLVT	VLVT	0253	0254	0248	0253	–
VOMM	WVIN31	VOMM	VOMF	FF	WVIN31	VOMM	140204	VOMM	VOMF	0206	0207	0200	0206	0206
VRMM	WVMV31	VRMM	VRMF	DD	WCMV31	VRMM	070226	VRMM	VRMF	–	0231	0231	–	–
VTBS	WVTH31	VTBS	VTBB	FF	WVTH31	VTBS	140203	VTBS	VTBB	0201	0202	0201	0201	0201
VVGL	WVVS31	VVGL	VVNB	FF	WVVS31	VVGL	140201	VVGL	VVNB	0203	0204	0201	0203	0205
VVGL	WVVS31	VVGL	VVTS	FF	WVVS31	VVGL	140203	VVGL	VVTS	0205	0206	–	–	0207
VYYY	WVBM31	VYYY	VYYY	–	–	–	–	–	–	–	–	–	–	–
WAAA	WVID21	WAAA	WAAZ	FF	WVID21	WAAA	140200	WAAA	WAAF	0200	–	0200	–	0202
WIII	WVID20	WIII	WIIZ	–	–	–	–	–	–	–	–	–	–	–
WMKK	WVMS31	WMKK	WBFC	FF	WVMS31	WMKK	140200	WMKK	WBFC	0201	0202	0155	–	0201
WMKK	WVMS31	WMKK	WMFC	FF	WVMS31	WMKK	140205	WMKK	WMFC	0200	0201	0155	0200	–
WSSS	WVSR20	WSSS	WSJC	FF	WVSR20	WSSS	140207	WSSS	WSJC	0208	0209	0203	0208	0210
YDRM	WVAU01	ADRM	YBBB	DD	WVAU01	ADRM	140204	ADRM	YBBB	0204	0205	0204	0204	0204
YDRM	WVAU01	ADRM	YMMM	DD	WVAU01	ADRM	140205	ADRM	YMMM	0205	0206	0204	–	0205
ZBAA	WVCI33	ZBAA	ZBPE	FF	WVCI33	ZBAA	140205	ZBAA	ZBPE	0201	0202	0159	0201	0201
ZGGG	WVCI35	ZGGG	ZGZU	FF	WVCI35	ZGGG	140205	ZGGG	ZGZU	0211	0207	0205	0206	0211
ZHHH	WVCI45	ZHHH	ZHWH	FF	WSCI45	ZHHH	140210	ZHHH	ZHWH	0216	0217	–	–	–
ZJHK	WVCI35	ZJHK	ZJSA	FF	WVCI35	ZJHK	140216	ZJHK	ZJSA	0217	0218	0217	0217	0217
ZKPY	WVKR31	ZKPY	ZKKP	–	–	–	–	–	–	–	–	–	–	–
ZLXY	WVCI37	ZLXY	ZLHW	FF	WVCI37	ZLXY	140206	ZLXY	ZLHW	0207	0208	0207	0207	0207
ZMUB	WVMO31	ZMUB	ZMUB	–	–	–	–	–	–	–	–	–	–	–
ZSSS	WVCI34	ZSSS	ZSHA	FF	WVCI34	ZSSS	140205	ZSSS	ZSHA	0206	0202	0201	0202	0202
ZUUU	WVKP31	VDPP	VDPP	FF	WVPK31	ZUUU	140205	ZUUU	VDPP	0205	0206	0203	0205	0205
ZUUU	WVCI36	ZUUU	ZPKM	FF	WVCI36	ZUUU	140202	ZUUU	ZPKM	0202	0203	0159	0202	0202
ZWWW	WVCI39	ZWWW	ZWUQ	FF	WVCI39	ZWWW	140201	ZWWW	ZWUQ	0208	0209	0209	0208	0209
ZYTX	WVCI38	ZYTX	ZYSH	FF	WVCI38	ZYTX	140205	ZYTX	ZYSH	0202	0202	0201	0201	0202
NOT Listed on SIGMET Guide				FF	WVMG31	FMMI	140210	FMMI	FMMM	0217				0212
				GG	WVBD20	WBSB	140205	WBSB	WBSB	0632	0632			
				GG	WVZA31	FAJS	140630	FAJS	FAJS	0636	0637			

WS SIGMET test format errors reported by RODB Singapore

State	MWO	FIR/ACC served	Error and remedy	Message Content
Australia	YMHF	YMMM	**Equals sign (=) missing from end of SIGMET message**;correct end of message for SIGMET should be an equals sign (=)	FF WSSSYMYX 210200 YMHFYMYX WSAU21 AMHF 210200 YMMM SIGMET Z99 VALID 210200/210210 YMHF- YMMM MELBOURNE FIR THIS IS A TEST SIGMET PLEASE DISREGARD STS: **??**
Australia	YMRF	YBBB YMMM	**Equals sign (=) missing from end of SIGMET message**; correct end of message for SIGMET should be an equals sign (=)	FF WSSSYMYX 210159 YMRFYMYX WSAU21 AMRF 210159 YBBB SIGMET Z99 VALID 210200/210210 YMRF- YBBB BRISBANE FIR THIS IS A TEST SIGMET PLEASE DISREGARD STS:**??** FF WSSSYMYX 210159 YMRFYMYX WSAU21 AMRF 210159 YMMM SIGMET Z99 VALID 210200/210210 YMRF- YMMM MELBOURNE FIR THIS IS A TEST SIGMET PLEASE DISREGARD STS: **??**
Australia	YPDM	YBBB YMMM	**Equals sign (=) missing from end of SIGMET message**; correct end of message for SIGMET should be an equals sign (=)	FF WSSSYMYX 210201 YPDMYMYX WSAU21 ADRM 210201 YBBB SIGMET Z99 VALID 210200/210210 YPDM- YBBB BRISBANE FIR THIS IS A TEST SIGMET PLEASE DISREGARD= STS:THIS IS A TEST SIGMET PLEASE DISREGARD FF WSSSYMYX 210201 YPDMYMYX WSAU21 ADRM 210201 YMMM SIGMET Z99 VALID 210200/210210 YPDM- YMMM MELBOURNE FIR THIS IS A TEST SIGMET PLEASE DISREGARD= STS:THIS IS A TEST SIGMET PLEASE DISREGARD

State	MWO	FIR/ACC served	Error and remedy	Message Content
Australia	YPRF	YBBB YMMM	**Equals sign (=) missing from end of SIGMET message**; correct end of message for SIGMET should be an equals sign (=)	FF WSSSYMYX 210202 YPRFYMYX WSAU21 APRF 210202 YMMM SIGMET PH01 VALID 210201/210211 YPRF- YMMM MELBOURNE FIR THIS IS A TEST SIGMET PLEASE DISREGARD STS:NEW FF WSSSYMYX 210201 YPRFYMYX WSAU21 APRF 210201 YBBB SIGMET PH01 VALID 210201/210211 YPRF- YBBB BRISBANE FIR THIS IS A TEST SIGMET PLEASE DISREGARD STS:NEW
Australia	YPRF	YBBB YMMM	**Incorrect sequence number PH01 used for test SIGMET**; correct sequence number for test SIGMET is **Z99**	FF WSSSYMYX 210201 YPRFYMYX WSAU21 APRF 210201 YBBB SIGMET **PH01** VALID 210201/210211 YPRF- YBBB BRISBANE FIR THIS IS A TEST SIGMET PLEASE DISREGARD STS:NEW FF WSSSYMYX 210202 YPRFYMYX WSAU21 APRF 210202 YMMM SIGMET **PH01** VALID 210201/210211 YPRF- YMMM MELBOURNE FIR THIS IS A TEST SIGMET PLEASE DISREGARD STS:NEW

State	MWO	FIR/ACC served	Error and remedy	Message Content
Australia	YSRF	YBBB YMMM	**Equals sign (=) missing from end of SIGMET message**; correct end of message for SIGMET should be an equals sign (=)	FF WSSSYMYX 210157 YSRFYMYX WSAU21 ASRF 210157 YMMM SIGMET Z99 VALID 210200/210210 YSRF- YMMM MELBOURNE FIR THIS IS A TEST SIGMET PLEASE DISREGARD STS:TEST FF WSSSYMYX 210157 YSRFYMYX WSAU21 ASRF 210157 YBBB SIGMET Z99 VALID 210200/210210 YSRF- YBBB BRISBANE FIR THIS IS A TEST PLEASE DISREGARD STS: THIS IS A TEST PLEASE DISREGARD
China	ZSSS	ZSHA	**Incorrect priority GG** for SIGMET; correct priority for SIGMET is **FF**	**GG** WSSSYMYX 210200 ZSSSYMYX WSCI34 ZSSS 210205 ZSHA SIGMET Z99 VALID 210205/210215 ZSSS- THIS IS A TEST SIGMET,PLEASE DISREGARD=
China	ZWWW	ZWUQ	**Incorrect priority GG** for SIGMET; correct priority for SIGMET is **FF**	**GG** WSSSYMYX 210201 ZWWWYZYX WSCI39 ZWWW 210200 ZWUQ SIGEMET Z99 VALID 210200/210210 ZWWW- THIS IS A TEST SIGMET, PLEASE DISREGARD=
Fiji	NFFN	NFFF	**Incorrect DTG (YYGGgg) 210000**; correct DTG should indicate time of issue, e.g., **210200** (Note: date/time received = 210202)	FF WSSSYMYX 210202 NFFNYMYX WSFJ03 NFFN **210000** NFFF SIGMET Z99 VALID 210200/210210 NFFN- THIS IS A TEST SIGMET, PLEASE DISREGARD=
India	VAAB	VABF	**Incorrect FIR identifier VABB used for SIGMET**; correct FIR identifier is **VABF**	FF WSSSYMYX 210125 VABBYMYX WSIN31 VABB 210205 **VABB** SIGMET Z99 VALID 210205/210215 VABB- THIS IS TEST SIGMET,PLEASE DISREGARD.
India	VABB	VABF	**Equals sign (=) missing from end of SIGMET message**; correct end of message for SIGMET should be an equals sign (=)	FF WSSSYMYX 210125 VABBYMYX WSIN31 VABB 210205 VABB SIGMET Z99 VALID 210205/210215 VABB- THIS IS TEST SIGMET,PLEASE DISREGARD.

State	MWO	FIR/ACC served	Error and remedy	Message Content
India	VABB	VABF	**Incorrect WMO Heading WCIN31 used for WS SIGMET test**; correct WMO Heading for WS SIGMET test is **WSIN31**	FF WSSSYMYX 210132 VABBYMYX **WCIN31** VABB 210205 VABB SIGMET Z99 VALID 210205/210215 VABB- THIS IS TEST SIGMET,PLEASE DISREGARD.=
Pakistan	OPKC	OPKR	**Equals sign (=) missing from end of SIGMET message**; correct end of message for SIGMET should be an equals sign (=)	FF WSSSYMYX 210159 OPKCYNYA WSPK31 OPKC 210200 OPKR SIGMET Z99 VALID 210200/210210 OPKC- THIS IS A TEST SIGMET, PLEASE DISREGARD.
Pakistan	OPLA	OPLR	**Incorrect priority GG** for SIGMET; correct priority for SIGMET is **FF**	**GG** WSSSYMYX 210201 OPLAYMYX WSPK31 OPLA 210200 OPLR SIGMET 299 VALID 210200/210210 OPLA- TEST SIGMET PLEASE DISREGARD=
United States	KKCI	KZAK	**Equals sign (=) missing from end of SIGMET message**; correct end of message for SIGMET should be an equals sign (=)	WSPN01 KKCI 210200 SIGP0A KZAK SIGMET ALFA 1 VALID 210200/210215 KKCI- OAKLAND OCEANIC FIR. TEST TEST TEST. THIS IS A TEST SIGMET.
United States	KKCI	KZAK	**Incorrect sequence number ALFA 1 used for test SIGMET**; correct sequence number for test SIGMET is **Z99**	WSPN01 KKCI 210200 SIGP0A KZAK SIGMET **ALFA 1** VALID 210200/210215 KKCI- OAKLAND OCEANIC FIR. TEST TEST TEST. THIS IS A TEST SIGMET.
United States	PAWU	PAZA	**Incorrect sequence number INDIA 1 used for test SIGMET**; correct sequence number for test SIGMET is **Z99**	WSAK01 PAWU 210200 SIGAK1 ANCI WS 210200 PAZA SIGMET **INDIA 1** VALID 210200/210210 PANC- ANCHORAGE FIR. THIS IS A TEST SIGMET. PLEASE DISREGARD=
United States	PHFO	KZAK	**Equals sign (=) missing from end of SIGMET message**; correct end of message for SIGMET should be an equals sign (=)	WSPA01 PHFO 210200 SIGPAN KZAK SIGMET NOVEMBER 1 VALID 210200/210215 PHFO- OAKLAND OCEANIC FIR. TEST TEST TEST. THIS IS A TEST SIGMET. PLEASE DISREGARD.

State	MWO	FIR/ACC served	Error and remedy	Message Content
United States	PHFO	KZAK	**Incorrect sequence number NOVEMBER 1 used for test SIGMET**; correct sequence number for test SIGMET is **Z99**	WSPA01 PHFO 210200 SIGPAN KZAK SIGMET **NOVEMBER 1** VALID 210200/210215 PHFO- OAKLAND OCEANIC FIR. TEST TEST TEST. THIS IS A TEST SIGMET. PLEASE DISREGARD.
			Invalid WMO Heading WVBD31 used for WS SIGMET test; valid WMO Heading for WS SIGMET test should conform with **Appendix H of SIGMET Guide**	GG WSSSYMYX 210212 WBSBYMYX **WVBD31** WBSB 210204 WBSB SIGMET Z99 VALID 210210/210220 WBSB- THIS IS A TEST SIGMET PLEASE DISREGARD=

– – – – – – – – – – – – –

Table 1: List of SIGMET headings monitored over the period 0000 UTC 01/08/2012 to 2359 UTC 30/09/2012

State	WMO Abbreviated Heading	FIR
Afghanistan	WSAH31 OAKB	OAKX
Bangladesh	WSBW20 VGHS	VGFR
Nauru	WSNW20 AYPY	ANAU
Papua New Guinea	WSNG20 AYPY	AYPY
Solomon Islands	WSSO20 AYPY	AGGG
Sri Lanka	WSSB31 VCBI	VCBI
SIGMET in surrounding FIRs (for comparison)		
Pakistan	WSPK31 OPKC	OPKR
India	WSIN31 VIDP	VIDF
India	WSIN31 VECC	VECF
Myanmar	WSBM31 VYYY	VYYY
Australia (FIR-BN)	WSAU21 YBRF	YBBB
Fiji	WSFJ01 NFFN	NFFF
Maldives	WSMV31 VRMM	VRMF
India	WSIN31 VOMM	VOMF

Table 2: Number of days WS SIGMET received from monitored States (0000 UTC 01/08/2012 to 2359 UTC 30/09/2012)

State	WS SIGMET WMO Abbreviated Heading	Number of days when SIGMET messages were received			
		August 2012		September 2012	
		Singapore RODB	Brisbane RODB	Singapore RODB	Brisbane RODB
Afghanistan	**WSAH31 OAKB**	**0**	**0**	**0**	**0**
Pakistan	WSPK31 OPKC	14	0	14	0
India	WSIN31 VIDP	26	27	15	11
Bangladesh	**WSBW20 VGHS**	**31**	**31**	**30**	**30**
India	WSIN31 VECC	29	13	28	24
Myanmar	WSBM31 VYYY	5	4	2	2
Nauru	**WSNW20 AYPY**	**0**	**0**	**0**	**0**
Papua New Guinea	**WSNG20 AYPY**	**0**	**0**	**0**	**0**
Solomon Islands	**WSSO20 AYPY**	**0**	**0**	**0**	**0**
Australia (BN)	WSAU21 YBRF (BN)	0	0	3	0
Fiji	WSFJ01 NFFN	11	11	9	9
Sri Lanka	**WSSB31 VCBI**	**7**	**7**	**4**	**4**
Maldives	WSMV31 VRMM	6	0	7	0
India	WSIN31 VOMM	30	30	28	27

Table 3: Number[1] of WS SIGMET messages received from monitored States in August 2012

WS SIGMET WMO Abbreviated Heading[2]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	No of days SIGMET issued
WSAH31 OAKB (SR)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
WSAH31 OAKB (AU)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
WSPK31OPKC (SR)	0	1	0	0	1	0	0	2	0	0	0	0	3	0	1	0	0	0	0	0	0	1	2	0	1	2	2	3	3	2	2	14
WSPK31 OPKC (AU)																																
WSIN31 VIDP (SR)	3	0	0	0	0	0	4	4	5	5	6	2	5	2	2	2	2	3	5	3	4	4	4	3	4	5	5	3	5	4	3	26
WSIN31 VIDP (AU)	23	10					12	24	24	24	23	24	23	25	24	23	23	24	24	24	24	24	23	23	24	26	24	32	24	18	23	27
WSBW20 VGHS (SR)	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**8**	**8**	**5**	**8**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**5**	**31**
WSBW20 VGHS (AU)	**8**	**12**	**10**	**9**	**11**	**9**	**9**	**8**	**6**	**9**	**8**	**9**	**7**	**9**	**8**	**11**	**7**	**8**	**9**	**9**	**11**	**7**	**10**	**12**	**9**	**8**	**8**	**9**	**7**	**4**	**7**	**31**
WSIN31 VECC (SR)	6	7	8	8	8	8	8	7	8	8	8	8	8	8	7	6	6	6	6	6	8	7	3	8	8	5	1	0	3	5	0	29
WSIN31 VECC (AU)			3	8			3				9				9	3			9			7	18	20				3	25	15		13
WSBM31 VYYY (SR)	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	5
WSBM31 VYYY (AU)															1	4		1	4													4
WSNW20 AYPY (SR)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
WSNW20 AYPY (AU)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
WSNG20 AYPY (SR)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
WSNG20 AYPY (AU)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
WSSO20 AYPY (SR)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
WSSO20 AYPY (AU)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
WSAU21 YBRF (SR)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSAU21 YBRF (AU)																																0
WSFJ01 NFFN (SR)	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	0	0	0	1	4	4	1	0	0	0	4	1	0	1	1	3	11

[1] SIGMET messages received counted by RODB Brisbane include duplicates (containing different AFTN addresses)
[2] (SR) indicates SIGMET reception by RODB Singapore; (AU) indicates SIGMET reception by RODB Brisbane

WS SIGMET WMO Abbreviated Heading[2]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	No of days SIGMET issued
WSFJ01 NFFN (AU)											2	13							2	13	21	2				8	2		2	5	7	11
WSSB31 VCBI (SR)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**2**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**7**
WSSB31 VCBI (AU)														**2**	**1**		**2**					**1**	**1**		**1**						**1**	**7**
WSMV31 VRMM (SR)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	6
WSMV31 VRMM (AU)																																
WSIN31 VOMM (SR)	4	5	5	7	8	5	4	7	8	3	7	8	3	6	4	4	5	5	2	0	3	6	3	8	7	7	6	8	8	8	6	30
WSIN31 VOMM (AU)	16	26	25	25	29	15	18	27	29	10	21	29	21	28	22	14	16	21	7		11	32	10	31	23	28	24	33	26	27	19	30

Table 4: Number[3] of WS SIGMET messages received from monitored States in September 2012

WS SIGMET WMO Abbreviated Heading[4]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		No of days SIGMET issued
WSAH31 OAKB (SR)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**
WSAH31 OAKB (AU)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**
WSPK31 OPKC (SR)	5	1	2	3	4	6	4	4	3	3	6	4	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		14
WSPK31 OPKC (AU)																																0
WSIN31 VIDP (SR)	0	5	4	4	0	1	3	2	1	0	2	3	3	5	5	4	1	2	0	0	0	0	0	0	0	0	0	0	0	0		15
WSIN31 VIDP (AU)	23	24	24	25	24	24	26	24	24	9	10																					11
WSBW20 VGHS (SR)	**6**	**6**	**5**	**7**	**4**	**6**	**6**	**6**	**6**	**5**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**		**30**
WSBW20 VGHS (AU)	**8**	**8**	**9**	**8**	**12**	**9**	**14**	**9**	**7**	**7**	**11**	**6**	**8**	**7**	**9**	**8**	**9**	**9**	**9**	**8**	**6**	**9**	**9**	**8**	**8**	**9**	**8**	**9**	**7**	**9**		**30**
WSIN31 VECC (SR)	5	6	7	7	7	3	5	7	3	4	0	0	5	4	6	5	6	5	6	6	3	4	3	1	3	3	1	3	3	5		28
WSIN31 VECC (AU)						15	29	40	9	25		5	12	18	6	38	30	12	15	21	15	10	3	10	3	12	3	12	14	15		24
WSBM31 VYYY (SR)	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2

[3] SIGMET messages received counted by RODB Brisbane include duplicates (containing different AFTN addresses)
[4] (SR) indicates SIGMET reception by RODB Singapore; (AU) indicates SIGMET reception by RODB Brisbane

WSBM31 VYYY (AU)							1	2																							2
WSNW20 AYPY (SR)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**
WSNW20 AYPY (AU)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**
WSNG20 AYPY (SR)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**
WSNG20 AYPY (AU)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**
WSSO20 AYPY (SR)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**
WSSO20 AYPY (AU)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**
WSAU21 YBRF (SR)	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0		3
WSAU21 YBRF (AU)																															0
WSFJ01 NFFN (SR)	2	4	5	0	0	0	2	2	0	0	0	0	0	0	0	2	4	6	0	0	0	5	0	0	0	0	0	0	0		9
WSFJ01 NFFN (AU)	5	4	11				5	7								5	13	5				10									9
WSSB31 VCBI (SR)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**		**4**
WSSB31 VCBI (AU)								**1**								**1**						**1**	**1**								**4**
WSMV31 VRMM (SR)	1	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0		7
WSMV31 VRMM (AU)																															0
WSIN31 VOMM (SR)	3	8	7	7	0	2	7	7	8	5	2	2	5	5	8	7	4	2	6	5	0	2	1	3	4	8	6	6	8	8	28
WSIN31 VOMM (AU)	12	32	31	23		8	25	29	28	17	8	7	20	22	28	26	22	12	21	18		6	3	12	28		25	24	34	29	27

– – – – – – – – – – – – –

Asia/Pacific Regional SIGMET Guide – list of updates for 2012

Section	Para.	Details of changes	Purpose of changes	References
28 September 2012				
Part 3	3.1.6	"… The ~~inclusion of the moderate category in the~~ reporting of turbulence and icing used in special air-reports ~~will commence with Amendment 75 to Annex 3 (Table A4-2 of Appendix 4 and Table A6-1 of Appendix 6). This~~ includes both severe and moderate categories, which …"	Remove redundant references to Amendment 75 to Annex 3	METWARN/I TF, OPMET/M TF/10
	3.4.5.2	"…, NN is used for the TC name. The reference NN ~~replaces~~ is used (instead of NIL) ~~in Amendment 75 to Annex 3~~ to avoid confusion by the users."		
Appendix G	1.2	"…is to be issued (FCST AT <GGgg>Z ~~in accordance with Amendment 75 to Annex 3~~): …"		
Appendix H	Table	ICAO location indicator "~~YDRM~~ YPDM" for MWO location "Darwin"	Align with FASID MET Table 1B	
Appendix F	2.	"In describing lines or polygons, the lat~~,~~ /long values of the respective points are separated by the combination space-hyphen-space, as in the following examples: …"	Corrigenda	Email liaison with ROBEX WG (Aug-Sep 2012)
Appendix I	Table	WMO Heading "FVPS01-05 …" for NZKL	Corrigendum	
Appendix J	2.2	"... Therefore, for the WC and WV SIGMET tests the issuance of TEST SIGMET by the MWO should normally be triggered by a test advisory issued by the respective TCAC or VAAC."	Enable test SIGMET to be issued in cases where test advisory is not received	
	2.3	"The Regional OPMET Data Banks (RODB) and World Area Forecast Centres (WAFC) will monitor the dissemination by filing all TEST SIGMETs and advisories and the corresponding reception times…"	Specify WAFC participation in SIGMET tests	
	2.4	"… The results of the tests should be reported to the Conjoint meeting of the ~~OPMET/M TF~~ Regional OPMET Bulletin Exchange Working Group (ROBEX WG) and ~~METWARN/I TF~~ Meteorological Hazards Task Force (MET/H TF) and to the ~~CNS/MET~~ Meteorology Sub-group (MET SG) meetings."	Align with the MET group name changes decided at CNS/MET SG/16 and APANPIRG/22	
	3.1.1.4	"… ~~3) MWOs in MID Region under TCAC New Delhi plan to participate in WC SIGMET test (10 November 2010)~~"	Remove redundant reference to SIGMET test 2010	METWARN/I TF, OPMET/M TF/10
	3.1.1.5	"World Area Forecast Centres (WAFC): London, Washington"	Specify WAFC participation in SIGMET tests	Email liaison with ROBEX WG (Aug-Sep 2012)
	3.1.2.1 3.1.2.2 3.1.2.3	"3.1.2.1 … The structure of the TEST advisories should follow the standard format given in Annex 3 with indication that it is a test message as shown ~~on pages J-7 and J-8~~ in **Section 4** of these procedures." "3.1.2.2 …" "3.1.2.3 … The WMO heading and the first line of the SIGMET should be valid ones, while the body of the message should contain only explanatory note regarding the test in plain language, as shown ~~on pages J-7 and J-8~~ in **Section 4** of these procedures…"	Apply missing paragraph numbering; realign references to examples of test formats	
	3.1.2	"…~~To avoid over-writing of a valid SIGMET, a TEST SIGMET for VA or TC should not be sent in the case where there is a valid SIGMET of the same type for the MWO's area of responsibility. However, in this case the responsible MWO should notify the WV/WC SIGMET test focal point as given in 3.4.3 so that they can be excluded from the analysis.~~"	Remove instructions that are no longer necessary because procedures to avoid over-writing of valid SIGMET are provided (see paragraphs 3.3-3.3.1.1)	
	3.2.1 3.2.1.1 3.2.1.2	"3.2.1 …" "3.2.1.1 …" "3.2.1.2 …"	Realign paragraph numbering	
	3.2.1.2	"…*Notes: 2) that FASID Tables MET 1B is reproduced in the Regional SIGMET Guide:* http://www.bangkok.icao.int/edocs/sigmet_guide4.pdf"	Corrigenda	
	3.2.1.3	"World Area Forecast Centres (WAFC): London, Washington"	Specify WAFC participation in SIGMET tests	

Section	Para.	Details of changes	Purpose of changes	References
	3.2.2 3.2.2.1 3.2.2.2 3.3.1 3.3.1.1	"3.2.~~3~~2 …" "3.2.~~3~~2.1 …" "3.2.~~3~~2.2 … The WMO heading and the first line of the SIGMET bulletin should be valid ones, while the body of the message should contain an explanatory text on the tests as shown ~~on pages J-7 and J-8~~ in **Section 4** of these procedures…" "3.~~2.4~~3.1 …" "3.~~2.4~~3.1.1 … ~~If a test SIGMET is not issued due to active SIGMET, please notify the SIGMET tests focal points below and the ICAO Regional Office, Bangkok~~"	Realign paragraph numbering; realign references to examples of test formats; move procedures to avoid over-writing of valid SIGMET into (3.3) common procedures for all test SIGMET; remove procedure that is no longer necessary due to use of Z99	
	3.3.2 3.3.2.1 3.3.2.2 3.3.2.3	"3.3.~~1~~2 …" "3.3.~~1~~2.1 …" "3.3.~~1~~2.2 …" "3.3.~~1~~2.3 …"	Realign paragraph numbering	
	3.3.3 3.3.3.1 3.3.3.2 3.3.3.3 3.3.3.4 3.3.4 3.3.4.1	"3.3.~~2~~3 …" "3.3.3.1 All TEST TC/VA advisories should be sent by the TCACs and VAACs to the MWOs listed in FASID Tables MET 3A and 3B respectively, and also to the five ASIA/PAC RODBs and the two WAFCs. The AFTN addresses for the RODBs and WAFCs are listed in 3.3.3.2 below." "3.3.~~2.1~~3.2 All TEST SIGMETs ~~and TC/VA advisories~~ should be sent by the MWOs to the five ASIA/PAC RODBs~~. The AFTN addresses to be used by the MWOs, TCACs and VAACs are as follows~~ and the two WAFCs at the following AFTN addresses: RODBs Bangkok VTBBYPYX Brisbane YBBBYPYX Nadi NFZZRFXX Singapore WSZZYPYM Tokyo RJTDYPYX WAFCs London EGZZMASI Washington KWBCYMYX …" "3.3.~~2.2~~3.3 …" "3.3.~~2.3~~3.4 …" "3.3.~~3~~4 …" "3.3.~~3~~4.1 …"	Realign paragraph numbering; clarify the distribution of test advisories by TCACs/VAACs and test SIGMETs by MWOs; include WAFCs in distribution of test advisory/test SIGMET	
	3.4.1	"The RODBs and WAFCs should file all incoming TEST advisories and SIGMETs and perform an analysis of the availability, timeliness of arrival and the correctness of the WMO bulletin headings. A SIGMET TEST Summary Table, as shown ~~on page J-10~~ in **Section 5** of these procedures, should be prepared by each RODB and WAFC and sent to the SIGMET test focal point given in section 3.4.3, with a copy to the ICAO Bangkok Regional Office."	Specify WAFC participation in SIGMET tests; realign reference to example of test summary table	
	3.4.2	"The SIGMET test focal points should prepare the final report of the test and present to the Regional Office. A summary report should be submitted to the next ~~CNS/MET Sub-group~~ ROBEX WG and MET SG meetings."	Align with the MET group name changes decided at CNS/MET SG/16 and APANPIRG/22	

Section	Para.	Details of changes	Purpose of changes	References
	3.4.3	"WS SIGMET summary table sent to: Ms. CHUA Guat Mui ~~Principal~~ Chief Technical Officer Weather Services Department Meteorological Service~~s~~ Singapore …" "WV/WC SIGMET summary table sent to: ~~Mr. Osamu Hamada~~ Junichi Ishida（Mr) … Tel: +81 (3) 3212 8341 ~~Ext.3351~~ … e-mail: ~~o-hamada@met.kishou.go.jp~~ j-ishida@met.kishou.go.jp" "ALL Summary Tables and any enquiries about SIGMET tests sent to: ICAO Regional Office, Bangkok e-mail: icao_apac@bangkok.icao.int ~~cc: ckeohan@bangkok.icao.int~~"	Update contact details	METWARN/I TF, OPMET/M TF/10
	4 4.1 4.2 4.3 4.4 4.5 5	"**4.** …" "4.1 …" "4.2 …" "4.3 … *Example:* WVJP31 RJTD 170205 RJJJ SIGMET ~~1~~Z99 VALID 170205/170215 RJTD- THIS IS A TEST SIGMET, PLEASE DISREGARD. TEST VA ADVISORY NUMBER 1 RECEIVED AT 170200Z=" "4.4 … *Example:* WCJP31 RJTD 100205 RJJJ SIGMET ~~1~~Z99 VALID 100205/100215 RJTD- THIS IS A TEST SIGMET, PLEASE DISREGARD. TEST TCADVISORY NUMBER 1 RECEIVER AT 180200Z=" "4.5 … *Example:* WSJP31 RJTD 240205 RJJJ SIGMET ~~1~~Z99 VALID 240205/240215 RJTD- THIS IS A TEST SIGMET, PLEASE DISREGARD= … *2) ~~Actual~~Z99 SIGMET number to be used in all TEST SIGMETs*" "**5.** …"	Realign paragraph numbering; specify the use of Z99 numbering for all test SIGMETs in examples and notes	Email liaison with ROBEX WG (Aug-Sep 2012)
Appendix K	all	New Appendix to include VAAC back-up procedures.	Improve regional guidance	METWARN/I TF, OPMET/M TF/10
Appendix L	all	New Appendix to include VAAC back-up test procedures.		
16 October 2012				
Appendix J	4.1	"… RMK: THIS IS A TEST VA ADVISORY. MWO SHOULD NOW ISSUE A TEST SIGMET FOR VA~~, UNLESS THERE IS A VALID SIGMET FOR VA~~…"	To harmonize the sample test Advisory with 3.3.1, special procedure to use test SIGMET sequence number Z99 to avoid over-writing valid SIGMET of same type.	Email liaison with ROBEX WG (also endorsed by CNS/MET SG/15, July 2011)
	4.2	"… RMK: THIS IS A TEST TC ADVISORY. MWO SHOULD NOW ISSUE A TEST SIGMET FOR TC, ~~UNLESS THERE IS A VAILD SIGMET FOR TC~~…"		
Appendix K	Title	"DRAFT ASIA/PAC VAAC BACK-UP PROCEDURES"	Title changed to indicate VAAC back-up and VAAC back-up test procedures are in draft format (pending LOA between VAACs).	Email liaison with Tokyo VAAC
Appendix L	Title	"DRAFT TOKYO/DARWIN VAAC BACK-UP TEST PROCEDURES"		

Asia/Pacific Regional SIGMET Guide – list of proposed updates for 2013

Section	Amendment	Reason
2.1.5, 2.2.9, 2.5.4, 3.5.2, 3.5.3 and 3.5.4	Reflect the decommissioning of ISCS in the text.	ISCS decommissioned

_ _ _ _ _ _ _ _ _ _ _ _ _

International Civil Aviation Organization

THIRD MEETING OF THE ASIA/PACIFIC METEOROLOGICAL HAZARDS TASK FORCE (MET/H TF/3)

Bangkok, Thailand, 13 – 15 March 2013

LIST OF PARTICIPANTS

STATE/ORGANIZATION/ NAME	DESIGNATION/ADDRESS	TEL/FAX/E-MAIL
AUSTRALIA (3)		
Susan E. O'Rourke	Section Head, Meteorological Authority Strategy, Parliamentary, International & Communications Branch GPO Box 1289 Melbourne VIC 3001 **AUSTRALIA**	Tel: +61 (3) 9669 4662 Fax: +61 (3) 9669 4473 E-mail: s.o'rourke@bom.gov.au
Mr. Michael I. Berechree	National Manager Aviation Weather Services Weather & Ocean Services Branch GPO Box 1289 Melbourne VIC 3001 **AUSTRALIA**	Tel: +61 (3) 9669 4586 Fax: +61 (3) 9669 4695 E-mail: srav@bom.gov.au m.berechree@bom.gov.au
Mr. Tim A. Hailes	National Manager, Regional Aviation Weather Service Australian Bureau of Meteorology Weather & Ocean Services Branch GPO Box 1289 Melbourne VIC 3001 **AUSTRALIA**	Tel: +61 (3) 9669 4273 Fax: +61 (3) 9669 4695 E-mail: sral@bom.gov.au t.hailes@bom..gov.au
BHUTAN (1)		
Mr. Tashi Dukpa	Deputy Chief of Aviation Meteorology/ Deputy Director Department of Civil Aviation Paro International Airport Paro **BHUTAN**	Tel: +975 8 271 404 Fax: +975 8 272 756 E-mail: tashi.dukpa@dca.gov.bt
CAMBODIA (2)		
Mr. Heang Vanday	Chief of Navigation Office Meteorological of State Secretariat of Civil Aviation State Secretariat of Civil Aviation #62, Preah Norodom Blvd. Phonom Penh **CAMBODIA**	Tel: + Fax: + E-mail:

STATE/ORGANIZATION/ NAME	DESIGNATION/ADDRESS	TEL/FAX/E-MAIL
Mr. Chvea Thol	Officer of State Secretariat of Civil Aviation State Secretariat of Civil Aviation #62, Preah Norodom Blvd. Phonom Penh **CAMBODIA**	Tel: Fax: E-mail:
CHINA (2)		
Mr. Shi Bujiu	Deputy Director MET Division North China Air Traffic Management Bureau Beijing 100261 **PEOPLE'S REPUBLIC OF CHINA**	Tel: +86 (10) 6459 2335 Fax: +86 (10) 6733 2446 E-mail: shibujiu@263.net
Ms. Zou Juan	Engineer Aviation Meteorological Center Air Traffic Management Bureau of CAAC P.O. Box 2272, Shilihe Chaoyang District Beijing 100022 **PEOPLE'S REPUBLIC OF CHINA**	Tel: +86 (10) 879 22180 Fax: +86 (10) 879 22180 E-mail: zoujuan@atmb.net.cn
HONG KONG, CHINA (1)		
Mr. Chan Pak Wai	Senior Scientific Officer Hong Kong Observatory 134A Nathan Road Kowloon **HONG KONG, CHINA**	Tel: +852 2926 8435 Fax: +852 2375 2645 E-mail: pwchan@hko.gov.hk
INDONESIA (2)		
Mr. Mustari Heru Jatmika	Chief of Aeronautical Meteorology Division Indonesian Meteorological, Climatological & Geophysical Agency Jalan Angkasa I, No. 2 Kemyoran Jakarta Pusat **INDONESIA**	Tel: +62 (21) 4246321 Fax: +62 (21) 6546315 E-mail: emhadjatmiko@yahoo.co.id
Mr. Zulkarnain	Senior Forecaster of Aeronautical Meteorological Information Sub-division Indonesian Meteorological, Climatological & Geophysical Agency Jalan Angkasa I, No. 2 Kemyoran Jakarta Pusat **INDONESIA**	Tel: +62 (21) 424 6321 Fax: +62 (21) 654 6315 E-mail: zulkarnain@bmkg.go.id cillo_85@yahoo.com
JAPAN (2)		
Mr. Junichi Ishida	Senior Scientific Officer Japan Meteorological Agency 1-3-4 Otemachi, Chiyoda-ku Tokyo 100-8122 **JAPAN**	Tel: +81 (3) 3212 8341 Ext. 3351 Fax: E-mail: j-ishida@met.kishou.go.jp

STATE/ORGANIZATION/ NAME	DESIGNATION/ADDRESS	TEL/FAX/E-MAIL
Mr. Mitsuo Mitsuru	Scientific Officer Japan Meteorological Agency 1-3-4 Otemachi, Chiyoda-ku Tokyo 100-8122 **JAPAN**	Tel: +81 (3) 3212 8341 Ext. 3514 Fax: E-mail: mitsuo.mitsuru-a@met.kishou.go.jp
LAO PDR (2)		
Mr. Bounteum Sysouphanthavong	Deputy Head of Weather Forecasting and Aeronautical Division Department of Meteorology and Hydrology Avenue Souphanouvong Ban Akard, Sikhotabong District Vientiane Capital **LAO PDR**	Tel: Fax: E-mail: s.bounteum@hotmail.com
Mr. Viengkhone Phommavong	Chief of ACC Lao Air Traffic Management Wattay International Airport P.O. Box 2985 Vientiane **LAO PDR**	Tel: Fax: E-mail: viengkhonephommavong@yahoo.com
MALAYSIA (1)		
Mr. Jailan B. Simon	Director Malaysian Meteorological Department KL International Airport Meteorological Office 1st Floor, Airport Administration Centre 64000 Sepang, Selangor D.E. **MALAYSIA**	Tel: +603 8787 2360 Fax: +603 8787 1019 E-mail: jailan@met.gov.my jbssimon@gmail.com
NEW ZEALAND (2)		
Mr. Keith W. Mackersy	Senior Meteorological Specialist Civil Aviation Authority of New Zealand P.O. Box 3555 Wellington 6140 **NEW ZEALAND**	Tel: +64 (4) 560 9400 Fax: +64 (4) 569 2024 E-mail: keith.mackersy@caa.govt.nz
Mr. Charly Zisseler	Observer CIT Lao Ltd Ban Nakham P.O. Box 10082 Vientiane **LAO PDR**	Tel: +856 (21) 820 663 Fax: +856 (21) 213 128 E-mail: charly.zisseler.citlao@gmail.com
PHILIPPINES (2)		
Ms. Hannagrace Cristi	Senior Weather Specialist Philippines Atmospheric, Geophysical and Astronomical Services Administration Department of Science and Technology Room 415, IPT Building Ninoy Aquino International Airport (NAIA) Terminal 1, Paranaque City **PHILIPPINES**	Tel: +63 (2) 852 2927 Fax: +63 (2) 832 3023 E-mail: hannacristi@yahoo.com

STATE/ORGANIZATION/ NAME	DESIGNATION/ADDRESS	TEL/FAX/E-MAIL
Ms. Susan Susie D. Hingpit	Senior Weather Specialist Philippines Atmospheric, Geophysical and Astronomical Services Administration Department of Science and Technology Room 415, IPT Building Ninoy Aquino International Airport (NAIA) Terminal 1, Paranaque City **PHILIPPINES**	Tel: +63 (2) 852 2927 Fax: +63 (2) 832 3023 E-mail: ssdhingpit@yahoo.com
REPUBLIC OF KOREA (2)		
Ms. Jeon Miyeong	Assistant Director/Forecast Division 272 Gonghang-Ro Joon-ku Incheon City **REPUBLIC OF KOREA**	Tel: +82 (32) 740 2800 Fax: +82 (32) 740 2817 E-mail: Junmy12@korea.kr
Ms. Park Ji eun	Assistant Director/Forecast Division 272 Gonghang-Ro Joon-ku Incheon City **REPUBLIC OF KOREA**	Tel: +82 (32) 740 2800 Fax: +82 (32) 740 2817 E-mail: jieuni@korea.kr
SINGAPORE (2)		
Mr. Michael Shee	ATC Manager (ATM Operations Planning) Civil Aviation Authority of Singapore Singapore Changi Airport P.O. Box 11 Singapore 918141 **SINGAPORE**	Tel: +65 6541 2454 Fax: +65 6545 6516 E-mail: michael_shee@caas.gov.sg
Mr. Chow Kwokwah	Senior Meteorologist Officer National Environment Agency Main Meteorological Office Meteorological Service Singapore **SINGAPORE**	Tel: +65 6542 4715 Fax: +65 6545 7192 E-mail: chow_kwok_wah@nea.gov.sg
THAILAND (12)		
Mr. Perapol Begkhuntod	Acting Director, Weather Monitoring Division Thai Meteorological Department Bureau of Aeronautical Meteorology 6th Floor, ATC Complex Suvarnabhumi International Airport Bang Phli, Samut Prakarn 10540 **THAILAND**	Tel: +66 (2) 134 0011-14 Ext. 213 Fax: +66 (2) 134 0009 E-mail: pira@tmd.go.th
Mr. Bancha Kaewngam	Meteorologist Thai Meteorological Department Bureau of Aeronautical Meteorology 6th Floor, ATC Complex Suvarnabhumi International Airport Bang Phli, Samut Prakarn 10540 **THAILAND**	Tel: +66 (2) 134 0007 Fax: +66 (2) 134 0010 E-mail:

STATE/ORGANIZATION/ NAME	DESIGNATION/ADDRESS	TEL/FAX/E-MAIL
Mr. Sarunpat Santivechkul	Department Manager Thai Airways International Public Co., Ltd. Operations Control & Planning Department BKKOP-P, 8th Floor OPC Building Suvarnabhumi International Airport Bang Phli, Samut Prakarn 10540 **THAILAND**	Tel: +66 (2) 137 1231 Fax: +66 (2) 137 1244 E-mail: sarunpat.s@thaiairways.com
Wing Commander Lorrat Manimont	Specialist Airports of Thailand Public Co., Ltd. Aerodrome Standards & Safety Office 333 Cherdwutagard Road Don Muang Bangkok 10210 **THAILAND**	Tel: +66 (2) 535 3430 Fax: +66 (2) 535 2530 E-mail: lorrat@airportthai.com
Ms. Kanokwan Toechamroen	Aerodrome Safety Specialist Airports of Thailand Public Co., Ltd. 999 Moo 1, Nongprue Bangphli Samutprakarn 10540 **THAILAND**	Tel: +66 (2) 132 5663 Fax: +66 (2) 132 5665 E-mail: kanokwan.r@airportthai.co.th
Mr. Thavit Nowvaratkoonchai	Engineering Manager Aeronautical Radio of Thailand Ltd. 102 Ngamduplee Tungmahamek Sathorn, Bangkok 10120 **THAILAND**	Tel: +66 (2) 285 9579 Fax: +66 (2) 287 8645 E-mail: thavit.no@aerothai.co.th
Ms. Jutatip Ratanasing	Systems Manager Aeronautical Radio of Thailand Ltd. 102 Ngamduplee Tungmahamek Sathorn, Bangkok 10120 **THAILAND**	Tel: +66 (2) 287 8454 Fax: +66 (2) 287 8620 E-mail: jutatip.ra@aerothai.co.th
Mr. Worapong Jirojkul	Systems Engineer Aeronautical Radio of Thailand Ltd. 102 Ngamduplee Tungmahamek Sathorn, Bangkok 10120 **THAILAND**	Tel: +66 (2) 287 8075 Fax: +66 (2) 287 8645 E-mail: worapong.ji@aerothai.co.th
Ms. Sujin Promduang	General Administrative Manager Aeronautical Radio of Thailand Ltd. 102 Ngamduplee Tungmahamek Sathorn, Bangkok 10120 **THAILAND**	Tel: +66 (2) 285 9083 Fax: +66 (2) 287 8645 E-mail: sujin.pr@aerothai.co.th

STATE/ORGANIZATION/ NAME	DESIGNATION/ADDRESS	TEL/FAX/E-MAIL
Mr. Worapoj Yodjabog	General Administrative Manager Aeronautical Radio of Thailand Ltd. 102 Ngamduplee Tungmahamek Sathorn, Bangkok 10120 **THAILAND**	Tel: +66 (2) 287 8407 Fax: +66 (2) 287 8645 E-mail: worapoj.yo@aerothai.co.th
Ms. Naiyana Lawanyavuth	Aeronautical Communication and ATS Manager Aeronautical Radio of Thailand Ltd. 102 Ngamduplee Tungmahamek Sathorn, Bangkok 10120 **THAILAND**	Tel: +66 (2) 285 9084 Fax: +66 (2) 287 8645 E-mail: naiyana.la@aerothai.co.th
Ms. Narissara Na Rangsri	Aeronautical Communication and ATS Manager Aeronautical Radio of Thailand Ltd. 102 Ngamduplee Tungmahamek Sathorn, Bangkok 10120 **THAILAND**	Tel: +66 (2) 285 9084 Fax: +66 (2) 287 8645 E-mail: narissara.na@aerothai.co.th
VIET NAM (3)		
Mr. Dao Son Hai	Deputy Director of Air Navigation Department Civil Aviation Authority of Viet Nam 119 Nguyen Son Street Long Bien District Hanoi **THE SOCIALIST REPUBLIC OF VIET NAM**	Tel: +84 (4) 3827 4191 Fax: +84 (4) 3827 4194 E-mail: dsh@caa.gov.vn
Mr. Dang Dinh Tuat	Deputy Manager of Safety and Security Division ATS Department 200/6 Nguyen Son Street Long Bien District Hanoi **THE SOCIALIST REPUBLIC OF VIET NAM**	Tel: +84 (4) 3873 0320 Fax: +84 (4) 3827 2597 E-mail: dangdinhtuat@yahoo.com
Mr. Nguyen Duc Chinh	Deputy Director of Noibai Operation Control Centre Airports Corporation of Viet Nam Noibai International Airport Socson, Hanoi **THE SOCIALIST REPUBLIC OF VIET NAM**	Tel: +84 (4) 3584 4444 Fax: +84 (4) 3886 6825 E-mail: ndchinh@vietnamairport.vn
IATA (1)		

STATE/ORGANIZATION/ NAME	DESIGNATION/ADDRESS	TEL/FAX/E-MAIL
Mr. Hans Rudi Sonnabend	Head of Meteorological Services Lufthansa Systems AG FRA AF/L-P-MET AM Prime Parc 2 D-65479 Rauheim **GERMANY**	Tel: +49 69 696 90362 Fax: +49 69 696 94736 E-mail: hans-rudi.sonnabend@lhsystems.com
ICAO (1)		
Mr. Peter C. Dunda	Regional Officer MET International Civil Aviation Organization 252/1, Vibhavadee Rangsit Road Ladyao, Chatuchak Bangkok 10900 **THAILAND**	Tel: +66 (2) 537 8189 Ext. 153 Fax: +66 (2) 537 8199 E-mail:

International Civil Aviation Organization

THIRD MEETING OF THE ASIA/PACIFIC METEOROLOGICAL HAZARDS TASK FORCE (MET/H TF/3)

Bangkok, Thailand, 13 – 15 March 2013

LIST OF WORKING AND INFORMATION PAPERS

WP/IP No.	Agenda Item	Subject	Presented by
WP/1	-	Provisional Agenda	Secretariat
WP/2	1 (b)	Review of METWARN/I TF/2 Meeting and Action Items	Secretariat
WP/3	1 (b)	Review of APANPIRG/23 Conclusions and Progress	Secretariat
WP/4	2 (a)	Global Progress on Guidance on Radioactive Cloud	Secretariat
WP/5	2 (a)	Global Progress on Guidance on Tsunami	Secretariat
WP/6	3	Meteorological Hazards Contingency Plan Template	MET/H TF/ Chair
WP/7	1 (b)	Review of TOR & Work Programme of the MET/H TF Meeting	MET/H TF/ Chair
LIST OF INFORMATION PAPERS			
IP/1	-	Meeting Bulletin	Secretariat
IP/2	2 (a)	Termination of Radioactive Cloud SIGMET on Fukushima Incident	Japan
IP/3	3	Outcomes of Volcanic Ash Exercise in Kamchatka in 2013 (VOLKAM13)	Japan
CONJOINT PAPERS			
WP/C1	c 1	Darwin Tokyo VAAC Back-up Test	Australia
WP/C2	c 2 (c)	Update on SIGMET Guide	Secretariat
WP/C3	c 2 (e)	Regional User Readiness for the Migration to GRIB2	Secretariat
WP/C4	c 2 (a)	Review of WS SIGMET Test 8	Singapore

WP/IP No.	Agenda Item	Subject	Presented by
WP/C5	c 2 (a)	Progress with SIGMET Tests – WC and WV	Japan
WP/C6	c 2 (b)	SIGMET Monitoring	Singapore
WP/C7	c 1	Report on Back-up Test Conducted by between the VAAC Tokyo and Darwin	Japan
WP/C8	c 2 (d)	Preparation for SIGMET Advisory at Japan Meteorological Agency	Japan

– – – – – – – – – – – –

Wednesday, 13 March 2013

0830 – 0900	*Registration*		
0900 – 1030	Welcome address and Opening remarks		Secretariat
	Introduction of participants		
	Conjoint (with ROBEX WG/11) **Agenda Item C1: VAAC Backup Tests**	WP/C1 WP/C7	Australia Japan
1030 – 1045	***Group Photo & Coffee/Tea Break***		
1045 – 1200	**Conjoint (with ROBEX WG/11)** **Agenda Item C2: SIGMET** a) SIGMET tests **Agenda Item C2: SIGMET** b) Regional SIGMET monitoring and coordination	 WP/C4 WP/C5 WP/C6	 Singapore Japan Singapore
1200 – 1300	***Lunch Break***		
1300 – 1430	**Conjoint (with ROBEX WG/11)** **Agenda Item C2: SIGMET** c) Review SIGMET Guide d) Advisory information e) Other business **Closing of the conjoint session (and ROBEX WG/11 meeting)**	 WP/C2 WP/C8 WP/C3	 Secretariat Japan Secretariat
1430 – 1445	***Coffee/Tea Break***		
1445 – 1600	**Agenda Item 1:** a) Adoption of provisional agenda and working arrangements for the meeting - Election of chairperson for next meeting b) Review of the TOR and follow-up action on the METWARN/I TF/2 meeting and relevant APANPIRG/23 Conclusions	 WP/1 WP/2 WP/3 WP/7	 Chairperson Secretariat Secretariat Chairperson

Thursday, 14 March 2013

0900 - 1030	**Agenda Item 2: Review educational material** a) Monitor the developments of IAVWOPSG and METWSG with reference to guidance on radioactive cloud and Tsunami b) Other necessary guidance	WP/4 WP/5 IP/2	Secretariat Secretariat Japan
1030 – 1045	***Coffee/Tea Break***		
1045 - 1200	**Agenda Item 3: Review progress on contingency plans**	WP/6 IP/3	Australia Japan
1200 – 1300	***Lunch Break***		
1300 – 1430	**Agenda Item 4: Aerodrome Warnings** **Agenda Item 5: Future Work Programme and review of TOR**	WP/7	Chairperson
1430 – 1445	***Break***		
1445 – 1600	**Agenda Item 6: Any other business** Date of next meeting		

Friday, 15 March 2013

0900 - 1030	**Review of the Report**		
1030 – 1045	***Coffee/Tea Break***		
1045 - 1200	**Review of the Report *(continued)…*** **Closing of the meeting**		

– – – – –