



METEOROLOGICAL WARNINGS STUDY GROUP(METWSG)

THIRD MEETING

Montréal, 15 to 18 November 2010

SUMMARY OF DISCUSSIONS

1. HISTORICAL

1.1 The third meeting of the Meteorological Warnings Study Group (METWSG) was held at the International Civil Aviation Organization (ICAO) Headquarters in Montréal, Canada, 15 to 18 November 2010.

1.2 The names and addresses of the participants are listed in Appendix A. Bill Maynard was elected Chairman of the meeting. The meeting was served by the Secretary of the METWSG, Neil Halsey, ICAO Technical Officer, Meteorology from the Meteorology / Aeronautical Information Management Section (MET/AIM) Section of the Air Navigation Bureau.

1.3 The meeting considered the following agenda items:

Agenda Item 1: Opening of the meeting

Agenda Item 2: Election of Chairman

Agenda Item 3: Adoption of working arrangements

Agenda Item 4: Adoption of the agenda

Agenda Item 5: Content and issuance of SIGMET

5.1 Improved issuance of SIGMET

5.2 Quantitative criteria for weather phenomena in SIGMET

5.3 SIGMET in table-driven codes

5.4 Simplification of indication of geographical areas in SIGMET/AIRMET

- Agenda Item 6: Wind shear, turbulence and tsunami warnings**
- 6.1 Reporting of wind shear
 - 6.2 Wind shear detection along approach/take-off paths
 - 6.3 Forecast algorithms for turbulence for use in SIGMET
 - 6.4 Tsunami warnings
- Agenda Item 7: Future work programme – deliverables**
- Agenda Item 8: Any other business**
- Agenda Item 9: Closure of the meeting**

1.4 A list of study notes and information papers issued for the meeting is given in Appendix B.

2. **AGENDA ITEMS 1 TO 4: OPENING OF THE MEETING;
ELECTION OF CHAIRMAN; ADOPTION OF WORKING
ARRANGEMENTS; ADOPTION OF THE AGENDA**

2.1 These items are covered under Section 1: Historical.

3. **AGENDA ITEM 5: CONTENT AND ISSUANCE OF
SIGMET**

3.1 **Improved issuance of SIGMET (Deliverable 1)**

3.1.1 The group recalled that the second meeting of the Meteorological Warnings Study Group (METWSG/2) had tasked an ad hoc group with developing a detailed plan for the conduct of a trial into the issuance of SIGMET advisory information in order to assist meteorological watch office (MWO) in the improved issuance of SIGMET for phenomena, other than volcanic ash, radioactive release and tropical cyclones. This trial had been proposed in order to resolve the continued difficulties being encountered in many States in the issuance and dissemination of SIGMET. These difficulties had persisted in many regions despite a number of actions being undertaken including SIGMET tests to identify problem areas, training material, seminars, regional guides and bilateral agreements whereby neighbouring States issued SIGMET on behalf of another State. The main milestones agreed for the proposed trial are outlined below, as agreed at the METWSG/2 Meeting:

August 2010: Report for consideration by the METWSG/3 Meeting (tentatively, 15 to 18 November 2010)

1. Establish the content of advisory information to support issuance of SIGMET (SIGMET advisory) for phenomena other than volcanic ash, radioactive release and tropical cyclone; develop the corresponding format.

2. Select appropriate regional centre(s) using the following criteria:

- a) a monitoring scheme should be available in the region to easily provide statistics on the impact of the advisory information (use could be made of the web-based monitoring scheme created for use in the Asia/Pacific Regions which could be expanded, if necessary, to cover other regions);
- b) the centres(s) selected should be willing to provide the advisory information required and have access to the necessary NWP capabilities, etc.; and
- c) the centre(s) should be represented in the ad hoc group in order to facilitate a flexible approach to the production of the advisory information.

Note. – The selection of centre(s) for this feasibility study will not influence any decision taken by the ICAO Regions in the future should such centres be required on an operational basis.

3. Propose arrangements for a trial to be conducted by one or two regional centres (that are willing and able to do so) for the issuance of SIGMET advisories with the following aims to:

- a) assess any improvements in the issuance of SIGMET by MWOs which receive the advisory information from the regional centre(s);
- b) assess any improvements in the content of SIGMET for MWOs in receipt of the advisory information including cases where adjacent MWOs are affected;

Note. – The assessments under a) and b) would consist of a comparison of the level of compliance before and during the trial period.

- c) assess the level of added value to users provided by SIGMET issued, based on SIGMET advisory compared to the use of SIGMET advisory alone, and

consider, in association with States and users, the delivery means that could be utilized by the regional centre(s) to distribute the SIGMET advisory .

4. Establish any further training requirements including the need for the review of online training material.

February 2012: Report for consideration by the METWSG/4 Meeting (May 2012)

- a) Oversee the conduct of the trial as agreed by the METWSG/3 Meeting.
- b) prepare a detailed report on the results of the feasibility study addressing the issues outlined above; formulate recommendations for future course of action to the METWSG/4 Meeting.
- c) prepare a list of criteria to be met by a future Regional Centre (e.g. NWP capability, reception of high-resolution satellite data, access to radar networks, etc).

Late 2013/early 2014. WP for the MET/AIM Divisional Meeting including the recommendations and the proposed criteria for establishing regional centres.

WORK PLAN

3.1.2 A work plan for the SIGMET Advisory Ad hoc Group had been established outlining the main activities and target dates for each activity.

3.1.3 **Activity 1** - SIGMET Advisory Format and Dissemination (including the weather phenomena, validity period, format, dissemination means and issue frequency of the SIGMET advisory during the trial).

3.1.4 **Activity 2** - Identification of host State(s) for the SIGMET advisory trial (including the identification of geographical area(s) to be covered by the trial and participating MWOs, along with the data sources, monitoring facilities and forecasting tools required by the host State(s) during the trial).

3.1.5 **Activity 3** - Training Requirements (including a review of current training material and a report on training requirements for both host State(s) and users).

3.1.6 **Activity 4** - Establishment of a Proposal and Plan for the SIGMET advisory trial (including the commencement date, length and hours of coverage of the trial, along with the key performance indicators and means of assessing the impact of the trial).

ACTIVITY 1: FORMAT & DISSEMINATION

3.1.7 **Weather Phenomena** - For the purpose of the feasibility study it had been agreed that the phenomena should be restricted to:

- a) Thunderstorms;
 - 1) obscured (OBSC TS), with hail (OBSC TSGR);
 - 2) embedded (EMBD TS), with hail (EMBD TSGR);
 - 3) frequent (FRQ TS), with hail (FRQ TSGR);
 - 4) squall line (SQL TS), with hail (SQL TSGR);
- b) severe turbulence (SEV TURB);
- c) severe icing (SEV ICE), due to freezing rain (SEV ICE (FZRA)); and
- d) severe mountain wave (SEV MTW)

3.1.8 **Vertical Coverage.** SIGMET advisories were to be issued for phenomena described above which are occurring above 10,000 feet (> FL100). For those phenomena that occurred through this level a lower limit of the phenomena should still be estimated.

3.1.9 **Validity Period** - The validity period for the SIGMET advisory during the trial should be for a period of up to 6 hours. This would allow MWOs responsible for the issuance of SIGMET (up to 4 hours validity) to have sufficient lead time to prepare and disseminate the relevant SIGMET.

3.1.10 **Format** - The format for the SIGMET advisory during the trial was to be both textual and graphical with the textual format having a similar format to existing advisories, and the graphical advisory allowing for multiple phenomena to be depicted on a single chart over multiple flight information region (FIR) (see Appendices C, D and E).

3.1.11 **Monitoring** - Hong Kong, China, had developed a SIGMET monitoring website that would be made available to all participants during the trial.

3.1.12 **Dissemination** - Dissemination for the SIGMET advisory during the trial was to be via AFTN and the Internet.

3.1.13 **Issue Frequency** - The text version of the SIGMET advisory (abbreviated to SMA) during the trial was to be issued for each phenomenon, as required, (similar to current practice with tropical cyclone (TC) and volcanic ash advisories, with an update frequency of no greater than 4 hours, until the phenomena concerned were no longer expected (as per Appendix D). The graphical (web-based) version of the SIGMET advisory (abbreviated to SMG) during the trial may consist of advisory areas (as per Appendix E) for all concerned phenomenon, and will be updated as a new advisory is issued to include all current advisories.

3.1.14 **Cancellation** – SIGMET advisories should be cancelled when the phenomena are no longer occurring, or are no longer expected to occur in the area.

ACTIVITY 2: HOST STATES

3.1.15 **Data Sources** - Data sources used by the host State(s) for the issuance of a SIGMET advisory was to include:

- a) satellite imagery;
- b) radar and lightning data;
- c) surface observations (including SYNOP and METAR/SPECI);
- d) upper air observations (including AMDAR, satellite winds, radiosonde, upper wind, profiler);
- e) numerical weather prediction products (including global and regional NWP); and
- f) world area forecast centre products (including SIGWX and GRIB).

There may be a requirement to obtain additional local data from other States to facilitate a higher accuracy of the product.

3.1.16 **Forecasting Tools** - The host State required systems to facilitate real-time visualization of the meteorological observations mentioned in the previous paragraph, the ability to produce both textual and graphical SIGMET advisories, and the means of disseminating the products via ATFN and the internet.

3.1.17 **Cost-recovery** - Host States were expected to manage the resources required for the feasibility study. As part of the post-trial evaluation, an analysis of the expected costs that may be associated with the establishment of permanent centres was recommended.

3.1.18 **Host States** - Given the requirements for access to a wide range of data sources, and the systems required to produce the SIGMET advisory, the following States had been identified as being able to participate in the trial as a host State: China, France and South Africa.

3.1.19 **Geographical Area** - The ICAO AFI and ASIA/PAC Regions had been identified as areas where multiple deficiencies exist with respect to the issuance of SIGMET and, in part, would be included in the trial. It was envisaged that France will identify FIRs in the northern part of Africa, South Africa, parts of the Southern African Development Community (SADC) and China, parts of Asia (see Appendix F). However it was still to be determined exactly which FIRs would be covered by each host State. China also planned to hold a World Meteorological Organization (WMO) Voluntary Cooperation Programme (VCP) training event for the participating States prior to the SIGMET advisory trial.

ACTIVITY 3: TRAINING REQUIREMENTS

3.1.20 According to the *Working Arrangements between the International Civil Aviation Organization and the World Meteorological Organization* (Doc 7475), training issues concerning personnel working in aeronautical meteorology were within the WMO area of responsibility. The training requirements were hitherto detailed in the Supplement 1 (Aeronautical Meteorology) to *WMO No. 258: Guidelines for the Education and Training of Personnel in Meteorology and Operational Hydrology*. These guidelines specified a basic curriculum for the education and training of forecasters and observers, irrespective of the type of office where a person was working, i.e. an aerodrome office, a Meteorological Watch Office serving an FIR, or, ultimately, in a world area forecast centre (WAFC) providing forecasts for global aviation.

3.1.21 It was noted by the group that competency-based training would be necessary for forecasters at any potential regional advisory centre, as well as those based in the MWOs expected to be in receipt of the advisory information.

ACTIVITY 4: PROPOSAL & PLAN

3.1.22 **Trial Period** - The trial was proposed for a 3-month period during 2011, with the most likely periods being April to June 2011 for the AFI region, and May to July 2011 for the Asia/Pacific Region.

3.1.23 **Stakeholder Notification** - Stakeholders were to be notified via ICAO State letter detailing the aim and conditions of the trial(s) along with the dates for each trial area.

3.1.24 **Assessment** - Assessment of the value of the outcomes of the trial would require analysis of the data consistency and quality, product format, accuracy of dissemination, distribution by a single

source (as opposed to multiple centres) and stakeholder satisfaction. Relevant regional operational meteorological (OPMET) data banks (RODBs) were to be asked to participate during the trial period to help determine accuracy of format, timing and dissemination of the SIGMET advisories and subsequent SIGMETs. The International Air Transport Association (IATA) would also identify airlines that were willing to participate in the assessment phase of the trial and would work closely with them to develop a template to obtain crew feedback. Other means that may contribute to the assessment and verification include SIGMETs and air reports. However, it was noted that that may be hard to verify the SIGMET advisories against SIGMET due to the bias that may be present.

3.1.25 Key Performance Indicators (KPI)

- a) percentage of SIGMETs issued by MWO after receiving SIGMET advisory;
- b) timeliness of SIGMETs issued by MWO;
- c) format of SIGMET issued by MWO compliant with SARPs in Annex 3;
- d) distribution of SIGMET by MWO as per Regional SIGMET Guides;

Note. — For these KPIs, the data was to be collected by relevant RODBs during the trial period and forwarded to the METWSG Ad Hoc Group for analysis.

- e) improved user satisfaction with the SIGMET service; and

Note. — This information would be collected via user surveys and analysed by the METWSG Ad Hoc Group.

- f) improved access to, and monitoring of, graphical SIGMET and SIGMET advisory information.

Hong Kong, China, would provide access to the SIGMET Monitoring Webpage for the trial and collect user feedback on its effectiveness.

3.1.26 The group agreed that the work of the ad hoc group remained unfinished and that the trial itself should take place during 2011, as outlined above, with the aim of providing a detailed report and recommendations for the way forward. Any major decisions regarding the establishment of a future system involving advisory centres would be undertaken by the proposed MET/AIM Divisional Meeting planned for 2014, with draft proposals first being considered by the METWSG/4 Meeting in May 2012, with the possibility of a further meeting of the group, as necessary, in order to finalize the final recommendations during 2013. It was noted that any proposals for consideration by the MET/AIM Divisional Meeting would be expected to facilitate a significant improvement in the global implementation of meteorological information concerning hazardous en-route conditions. Furthermore, it should be recognized that the future data-driven environment envisioned would be expected to focus on the information required rather than any specific product set in the future. It was expected that more detailed information concerning the data-driven environment would be available to the ad-hoc group in sufficient time to enable this consideration to be included in the final recommendations. The group agreed that it was likely that a single solution would not necessarily be applicable to all parts of the world, as the level of implementation was highly variable, and the relative size of FIR in each region was also highly variable. However, it was noted that complex solutions should be avoided, where possible, in order to assist States and users in the future.

The preliminary timetable for actions by the ad hoc group is contained in Appendix G. To this end, the group agreed the following action:

Action Agreed 3/1 — Feasibility study into the issuance of SIGMET advisory information from selected regional centre(s)

That, an ad hoc group (A) consisting of **Albert, Carole, Colin, Herbert, Jun, Keith, Patrick (co-rapporteur), PW (co-rapporteur), Shona (co-rapporteur), Steve, Ndiwa and Zhang** continue to oversee the planning for, and conduct of a feasibility study into the issuance of SIGMET advisory information from selected regional centre(s) using the work plan in Appendix G. An interim report is expected by 15 January 2012 for consideration by the METWSG/4 Meeting.

The group noted with appreciation the extensive efforts outlined by China, France and South Africa for the forthcoming trials, and also by Hong Kong, China, in the proposal to develop a web-based SIGMET monitoring system to support the trials as outlined above. To this end the group agreed the following action:

Action Agreed 3/2 — Global SIGMET monitoring system

That,

- a) **PW** arrange for the development of a web-based SIGMET monitoring system, in consultation with the ICAO ASIA/PAC Regional Office, in time to support the SIGMET advisory trial, and
- b) the **Secretary** arrange for the appropriate RODBs to be invited to participate in the SIGMET advisory trial to ascertain the availability of SIGMET by 15 January 2011.

3.1.27 The group was also pleased to note a report on the potential use of turbulence algorithms currently in use by the world area forecast centres (WAFCs) and other States, that could be of potential benefit to MWOs in the future to assist in the issuance of SIGMET. It was agreed that these products would be useful in this regard, but that a careful analysis of their operational use would be necessary as these products would not constitute direct guidance. It was noted that world area forecast system (WAFS) products were intended for flight planning purposes on a global basis, and that gridded WAFS products did not provide guidance on the severity of turbulence. It was agreed that use could be made of these products by the host States of the SIGMET advisory trial, in order to assess their future use in assisting MWO for the issuance of SIGMET. Furthermore, the group agreed that additional evaluation of various turbulence algorithms in use could be of benefit in the future. In this regard the group agreed to the following actions:

Action Agreed 3/3 — Use of turbulence algorithms in the issuance of SIGMET information

That, **Colin** and **Steve** arrange for turbulence forecast products to be made available to the host States for the SIGMET advisory trial.

Action Agreed 3/4 — Evaluation of future turbulence products for us in guidance to MWO

That, **members** of the group provide updates on progress made in the development of turbulence forecast products that could be considered for use as guidance to MWO in the issuance of SIGMET by 15 January 2012 for consideration by the METWSG/4 Meeting.

3.1.28 A report was provided to the group describing efforts made in Canada to resolve differences filed against Annex 3 — *Meteorological Service for International Air Navigation* in the provision of SIGMET. The solution involved the issuance of parallel products for domestic and international use, with additional information appended to the domestic product in order to meet the national requirements. The group was pleased to note that a similar solution was being pursued in Australia.

3.1.29 The group was informed of difficulties being experienced in the generation of SIGMET for complex volcanic ash events whereby multiple plumes existed. It was noted that ongoing work by the International Airways Volcano Watch Operations Group (IAVWOPSG) was expected to result in the development of guidance material in this regard. It was also pointed out that there was an error in Annex 3, Appendix 6, Example A6-3 in that the order of elements presented was not consistent with the order presented in Table A6-1. Since this was an editorial amendment the group agreed that this could be incorporated as provided in Appendix H.

3.1.30 The group noted that Annex 3, Appendix 1, Model SVA which had been updated by the International Airways Volcano Watch Operations Group (IAVWOPSG) had not been included in the seventeenth edition of the Annex due to an oversight. The group further noted that this was being pursued by WMO, as Appendix 1 to Annex 3 was the responsibility of WMO under the arrangements in the *Working Arrangements between the International Civil Aviation Organization and the World Meteorological Organization* (Doc 7475).

3.1.31 A further editorial error was noted by the group in the use of footnotes in Table A6-1, which was corrected as shown in Appendix H.

3.2 Quantitative criteria for weather phenomena in SIGMET (Deliverable 2)

Sandstorm and duststorm

3.2.1 The group recalled that the METWSG/2 Meeting had requested WMO to study the establishment of objective criteria for the intensity of sandstorm and duststorm to be used in the issuance

of SIGMET. The group also noted that this work had been carried out in parallel to similar efforts by the Aerodrome Meteorological Observation and Forecast Study Group (AMOFSG) concerning METAR/SPECI and TAF.

3.2.2 The group noted that significant progress had been made with the assistance from experts from States in desert regions. To this end, tentative thresholds had been developed to distinguish between light, moderate and severe sandstorms and duststorms based on visibility and wind speed. A report from WMO indicated that additional work on the creation of a sandstorm and duststorm warning system was ongoing, and that updated advice was expected from the WMO Commission for Basic Systems (CBS). It should also be noted that updated advice based on this WMO input has been requested by the AMOFSG in order to assist them in their work regarding METAR/SPECI and TAF.

3.2.3 The group agreed that it would be beneficial to maintain consistency between the thresholds used for METAR/SPECI and TAF and those used for SIGMET, and noting that the information being provided to the Aerodrome Meteorological Observation and Forecast Study Group (AMOFSG) stems from the same source as that provided to the Meteorological Warnings Study Group (METWSG), it would be appropriate to include any criteria for the issuance of SIGMET alongside (and consistent with) the proposals made by the AMOFSG for METAR/SPECI and TAF. The group agreed the following action:

Action Agreed 3/5 — Intensity criteria for sandstorm and duststorm

That, the **Secretary** ensures that the Annex 3 amendment proposal developed by the AMOFSG regarding criteria for the intensity of sandstorm and duststorm for METAR/SPECI and TAF should also reflect SIGMET criteria including the areal extent in a consistent manner as developed by the AMOFSG/9 Meeting.

3.2.4 It was also noted that as a part of the work of the AMOFSG, the separation of the reporting and forecasting of sandstorm and duststorm (the WMO SYNOP only allows for the reporting of sandstorm **or** duststorm) was under investigation, as the reasons for this separation had been unknown to the AMOFSG. To assist in this regard, it was agreed that the current user perspective on the need for this separation could provide useful assistance to this investigation. The group therefore agreed the following action:

Action Agreed 3/6 — User perspective on the separation of the reporting and forecasting of sandstorm and duststorm

That, **Ndiwa** arrange for IATA feedback on the need for separate observing and forecasting of sandstorm and duststorm and provide a report to the Secretary by 15 May 2011.

Icing

3.2.5 The group recalled that Action Agreed 2/3 from the METWSG/2 Meeting had requested members of the group to provide information regarding the creation of possible criteria for the issuance of SIGMET for icing. The group noted that no information had been provided on this topic, and as a result, no action could have been taken at that stage. However, significant work had been undertaken by the

World Area Forecast System Operations Group (WAFSOPSG) towards the production of gridded forecasts of icing, and with this in mind, the group agreed that this task should remain open pending developments in this area. The group agreed the following action:

Action Agreed 3/7 — Intensity criteria for icing

That, the **Secretary** provide a progress report to the METWSG/4 Meeting concerning work undertaken by the WAFOPSG on icing forecasts.

Thunderstorms

3.2.6 The group noted a proposal to reduce the number of categories for the issuance of SIGMET for thunderstorms. It was suggested that the need for SIGMET in the case of embedded or obscured thunderstorms may no longer exist with the prevalence of radar. To this end, the group agreed that user advice on the need for each of the categories of thunderstorm SIGMET should be sought. The group therefore agreed the following action:

Action Agreed 3/8 — SIGMET categories for thunderstorm

That, **Ndiwa** and **Carole** provide user advice on the need for each of the SIGMET issuance categories for thunderstorm as given in Annex 3, Appendix 6, 1.1.4 by way of a report by 15 January 2012 for consideration at the METWSG/4 Meeting.

3.2.7 It was also noted that the domain for the issuance of SIGMET was somewhat unclear with en-route used in Annex 3, Chapter 7 and cruising levels used in Appendix 6. The group agreed that there would be some benefit in clarifying references to the domain for SIGMET. Therefore, the group agreed the following action:

Action Agreed 3/9 — Description of the domain of SIGMET in Annex 3

That, the **Secretary** provide a draft amendment proposal to Annex 3 for consideration by the METWSG/4 Meeting to rationalize the description of the domain of SIGMET.

3.3 SIGMET in table-driven codes (Deliverable 3)

3.3.1 The group recalled that a brief update had been provided at the METWSG/2 Meeting concerning progress made by the World Meteorological Organization (WMO) on the potential use of Extensible Markup Language (XML)/Geography Markup Language (GML) for the exchange of OPMET data through a study being conducted during 2009.

3.3.2 The group also recalled that the codes used for the dissemination and exchange of meteorological information were the prerogative of WMO under Doc 7475 and that expert teams had been in the process of conducting trials as mentioned above.

3.3.3 The group noted that a successful pilot project (“proof of concept”) on the use of XML had been carried out by the ET on OPMET Data Representation (ET-ODR) which had been established jointly by the Commission for Basic Systems (CBS) and the WMO Commission for Aeronautical

Meteorology (CAeM) in coordination with ICAO. The group noted that international consensus appeared to be emerging for an overall migration of all operational meteorological (OPMET) data towards a weather information exchange model (WXXM) essentially based on the use of XML. The WXXM was expected to form an integral component of both the United States Federal Aviation Administration (FAA) NextGen and EUROCONTROL SESAR programmes. This would have a significant impact on the Annex 3 provisions with a move to a data-oriented (Netcentric) environment.

3.3.4 It was noted that the ET-ODR, at its meeting held in Paris, France, on 26 October 2009 had agreed that the following major milestones had been necessary to complete the migration:

- a) replacement of the binary universal form for the representation of meteorological data (BUFR) code form by XML as far as the bilateral use of table-driven codes for METAR/SPECI and TAF are concerned (2013);
- b) endorsement of the future use of the WXXM by the planned conjoint ICAO/WMO MET/AIM Divisional Meeting (2014);
- c) start of implementation of WXXM (2016); and
- d) completion of implementation (2019/2022).

3.3.5 The ET-ODR had also concurred that a number of steps would be required to enable the above transition. In particular, the following intermediate milestones (completion dates and the responsible organization in brackets) had been considered necessary for the:

- a) Air Navigation Commission (ANC) to consider the results of the pilot project and to agree that the BUFR code form, used on a bilateral basis for METAR/SPECI and TAF, be replaced by XML as of Amendment 76 to Annex 3 (first half of 2010; ICAO);
- b) Commission for Basic Systems (CBS) IPET-MDI (Inter-Programme Expert Team on Metadata and Data Interoperability) to undertake further tests using various models, including the WXXM, and to prepare documentation for the Extraordinary Session of the CBS (CBS-Ext. (2010)) (second half of 2010; WMO);

Note. — IPET-MDI was previously known as the CT-MTRC.

- c) CBS-Ext. (2010) to endorse the XML model(s) for MET data in general, including OPMET, and to agree that WMO be responsible for the future governance and maintenance of these data models (second half of 2010; WMO);
- d) WMO Executive Committee to approve the use of the XML model(s) (first half of 2011; WMO); and
- e) CBS IPET-DRC (Inter-Programme Expert Team on Data Representation on Codes) to begin the maintenance of the data models, ensuring that an appropriate provisions and/or references be included in the *Manual on Codes* (WMO – No. 306) (second half of 2011; WMO).

3.3.6 It was noted that in order to achieve a) above, the Air Navigation Commission (ANC), at its twelfth Meeting of the 184th Session, agreed that the Secretariat should develop a draft amendment to

Annex 3 as a part of Amendment 76, replacing the use of binary universal form for the representation of meteorological data (BUFR) for the exchange of METAR/SPECI and TAF under bilateral agreement by the use of XML.

3.3.7 The group agreed that, whereas it was the role of the AMOFSG to establish a roadmap for the necessary amendments to Annex 3 for METAR, SPECI and TAF as well as the general transition to WXXM, there was a need for a similar transition for the coding of SIGMET. This would involve a move from the use of binary universal form for the representation of meteorological data (BUFR) for the exchange of graphical SIGMET, as was currently enabled to the use of XML. Furthermore, it would be necessary for WMO to develop the appropriate code tables for SIGMET using XML rather than the BUFR, as had been developed but not as yet validated under the usual procedures under the remit of the WMO CBS. This should be carried out once the formal WMO approval is provided by the CBS in November 2010. To this end the group agreed the following actions:

Action Agreed 3/10 — Enabling the transition to the use of XML for the exchange of graphical SIGMET

That, a proposal to replace BUFR by XML for the exchange of graphical SIGMET, included in the Appendix H, be forwarded by the **Secretary** as part of draft Amendment 76 to Annex 3.

Note. — The precise nature of the code form used will be coordinated with WMO, slight variation may be developed (eg. XML/GML).

Action Agreed 3/11 — Request to WMO to develop XML code tables for the exchange of SIGMET

That, **Herbert** arrange for WMO to develop the appropriate XML code tables for SIGMET to replace those previously developed for BUFR, and report on progress by 15 January 2012 for consideration by the METWSG/4 Meeting.

3.4 Simplification of indication of geographical areas in SIGMET/AIRMET (Deliverable 4)

3.4.1 The group recalled that Action Agreed 2/4 called upon the need to simplify the description of the geographical areas of phenomena in SIGMET and AIRMET, as difficulties were being encountered in the interpretation of such descriptions. To this end the METWSG/2 Meeting had proposed a number of simplifications, to render the SIGMET easier to use, and had requested that a draft amendment proposal to Annex 3 be circulated amongst the members of the group for comment. To this end, METWSG Memo/12 had been circulated to the group on 12 May 2010, containing a draft amendment proposal to which one minor comment was received.

3.4.2 The group noted the slightly amended proposal but suggested that the introduction of an explicit method for describing the forecast position of phenomena should be an option, rather than a replacement, for the previous description of a movement. This was to avoid the use of lengthy messages in cases where it may not be necessary to describe two polygons. The group agreed the following action:

Action Agreed 3/12 — Description of geographical areas of phenomena in SIGMET and AIRMET

That, a proposal to simplify the description of geographical areas of phenomena in SIGMET and AIRMET, included in the Appendix H be forwarded by the **Secretary** as part of draft Amendment 76 to Annex 3.

3.4.3 A report was noted by the group concerning difficulties experienced in the issuance of AIRMET in situations where both low cloud and reduced visibility were in evidence, leading to the application of instrument flight rules. The AIRMET requirements specify that two AIRMETs should be issued in this case, and it was suggested that a combined AIRMET for both cloud and low visibility could be considered, or even the possibility of issuing an AIRMET for the combination of these conditions (perhaps using IFR as the phenomenon description). The group noted that the use of two phenomena in a single AIRMET was not catered for in the SIGMET/AIRMET template (Annex 3, Table A6-1). The group also noted that the principle in Annex 3 has always been to report the meteorological conditions whenever possible rather than any operational decision since any change to procedures would then lead to consequential amendments to Annex 3. The group agreed that this issue needed further consideration, taking the views of other States that issue AIRMET, with perhaps the concept of creating a combination phenomenon rather akin to cloud and visibility OK (CAVOK) to indicate a combined reduction in the height of cloud base and visibility below a certain threshold. A further question was raised regarding the need for including vertical visibility in AIRMET in situations involving widespread fog. The group agreed the following action:

Action Agreed 3/13 — Low cloud and visibility in AIRMET

That, the **Secretary** investigate the practices carried out in States that issue AIRMET in situations where both the height of cloud base and visibility are reduced leading to the introduction of instrument flight rules at an aerodrome and of any need for including vertical visibility in AIRMET and report back to the METWSG/4 Meeting.

4. AGENDA ITEM 6: WIND SHEAR, TURBULENCE AND TSUNAMI WARNINGS

4.1 Reporting of wind shear (Deliverable 5)

4.1.1 The group noted that the *Manual on Low-Level Wind Shear* (Doc 9817) had been updated by the Secretariat to reflect the changes stemming from Amendment 75 to Annex 3 — *Meteorological Service for International Air Navigation*. The group noted that this task had therefore been deleted from the deliverables of the group as per Action Agreed 2/7.

4.2 **Wind shear detection along approach/take-off paths** **(Deliverable 6)**

4.2.1 The group recalled that an ad hoc group had been established by Action Agreed 2/6 to consider the need for adding the terms “expected” and “reported” to the phraseologies used for wind shear alerts.

4.2.2 The group noted that diverging views had been expressed regarding the benefits and any associated risks of implementing additional terms in the wind shear alert. In particular, the implication was to modify the use of wind shear alerts to a semi-automatic system rather than the fully automatic system as described in Annex 3 at the time. As a result the group agreed that the user needs should be more rigorously assessed and that the ad hoc group established at the METWSG/2 Meeting should be tasked with assessing user needs for phraseology in wind shear alerts and for the wind shear provisions in Annex 3 including wind shear warnings and the inclusion of wind shear in METAR/SPECI and local reports for consideration by the METWSG/4 Meeting. Furthermore, the group agreed that risk assessment considerations for any changes should be borne in mind together with any training needs related to future changes in the associated provisions. It was noted that this course of action would delay the implementation of any amendments to Annex 3 until November 2016 as a part of Amendment 77 along with any associated amendment to *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444). The group is invited to formulate the following draft action:

Action Agreed 3/14 — User assessment of wind shear provisions in Annex 3 and PANS-ATM (Doc 4444)

That, an ad hoc group (B) consisting of **Carole, Colin, Herbert, Juan, Ndiwa, PW (co-rapporteur)** and **Steve (co-rapporteur)** be established with the purpose of further assessing the current and the future use of the wind shear provisions contained in Annex 3 and Doc 4444, in particular, by:

- a) analyzing current practices and understanding the usage of the existing services;
- b) evaluating issues associated with any proposed changes in the light of safety risk management and training that would be required both by ANSP and airlines, and
- c) providing a report on findings by 15 January 2012 for consideration at the METWSG/4 Meeting.

4.2.3 The group was informed of problems encountered with the receipt of air reports of turbulence reporting “moderate to severe” in addition to the permissible reports of “moderate” and “severe”. Over a two-year period, reports of “moderate to severe” accounted for 5.3 per cent of all turbulence reports by en-route aircraft in the Hong Kong flight information region (FIR). These reports

were expected to cause problems with the inclusion of the mandatory reporting of moderate turbulence, as well as severe turbulence, in special air reports as a part of Amendment 75 to Annex 3. The group agreed that, in the short term, these non-compliant reports should be treated as “severe” by meteorologists responsible for SIGMET/AIRMET, but that the long-term solution would be to provide appropriate guidance to pilots to ensure that the air reporting provisions were implemented correctly. To this end, the group noted that work was ongoing by the International Federation of Air Line Pilots’ Associations (IFALPA) to address this problem for turbulence, and agreed the following actions:

Action Agreed 3/15 — Guidance on the manual observation and reporting of turbulence

- a) that **Carole** provides a report on progress made to assist pilots in the reporting of turbulence, with particular regard to the severity, by 15 January 2012 for consideration by the METWSG/4 Meeting, and
- b) the **Secretary** provides a report on any guidance to pilots currently available from ICAO on the reporting of turbulence and icing, for consideration at the METWSG/4 Meeting.

4.3 Forecast algorithms for turbulence for use in SIGMET (deliverable 7)

4.3.1 This item was discussed under agenda item 5.1, paragraph 3.1.29 refers.

4.4 Tsunami warnings (Deliverable 8)

4.4.1 The group noted that the ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG), at its twentieth Meeting held in Bangkok, Thailand, 7 to 11 September 2009 had formulated its Conclusion 20/69 b). This conclusion had requested that ICAO consider developing Annex 3 provisions and guidance material, as necessary, related to the issuance of aerodrome warnings on tsunami, as the implementation of the existing provisions had been considered to be problematic.

4.4.2 The group agreed that, the intent of the inclusion of tsunami in the list of phenomena in aerodrome warnings was simply to relay any notification of an impending impact from a State emergency response structure to those concerned at an aerodrome, so that emergency measures could take place. It was noted that tsunami was not a meteorological phenomena, but also recognized that the aerodrome warning was a convenient pre-existing means to get such information to the authorities concerned. With this in mind, the group agreed that an ad hoc group could consider the form of any appropriate guidance that could be provided to assist States in this respect. Furthermore, the group agreed that in order to prepare appropriate guidance, a better understanding of the existing capabilities of the States involved would be necessary. The group, therefore, agreed the following action:

Action Agreed 3/16 — Guidance on the issuance of tsunami warnings

That, an ad hoc group (C) consisting of **Bill; Herbert, Juan, Jun, Ndiwa, Steve (co-rapporteur)** and **Shona (co-rapporteur)** is develop guidance on the provision of aerodrome warnings for tsunami, and in particular:

- a) examine existing capabilities of relevant countries to issue public tsunami warnings and the processes for States to forward them to meteorological service providers;
- b) determine the capabilities of meteorological service providers to extract tsunami information specifically relating to aerodromes (including land inundation) from public tsunami warnings;
- c) recommend how information on tsunami warnings can be included in aerodrome warning;
- d) establish guidance material to support meteorological service providers on the issuance of aerodrome warning for tsunami; and
- e) produce a report by 15 January 2012 for consideration by the METWSG/4 Meeting.

5. AGENDA ITEM 7: FUTURE WORK PROGRAMME – DELIVERABLES

5.1 The group was informed that the expected deliverables of the group would be updated accordingly and placed on the group's website.

6. ANY OTHER BUSINESS

6.1 A report was provided to the group that ice particles had caused a number of engine flame-outs and that it could be expected in the future that concerns would be expressed about prolonged flight through dense cirrus.

6.2 The meeting noted that, at a recent meeting of the UK House of Commons Select Committee on Science and Technology, a review had been conducted on the use of scientific advice and evidence in emergencies following the Eyjafjallajökull eruption. The committee had received evidence

from British Airways and the Royal Aeronautical Society, who had noted during the discussion that the issue of ice at high altitudes had been a significant one, and was causing somewhere between one and ten power losses per year across the world's airline fleet, and for that reason, could be considered more significant than the risk associated with volcanic ash.

6.3 Whilst no such concerns had been expressed directly to ICAO, the group agreed that members should be encouraged to provide any information on research into this phenomenon at the next meeting of the group. The group agreed the following action:

Action Agreed 3/17 — Ice particles

That, **members** provide details of any research into the effects of ice particles on engines by 15 January 2012, for consideration by the METWSG/4 Meeting.

6.4 The group noted that enquiries had been received in some States about ozone levels at higher latitudes in both the northern and southern hemispheres in respect of safe concentration for crew and passengers. The group agreed that these enquiries could easily be dealt with by the States concerned and that no action was warranted at that stage.

6.5 The meeting noted that further discussions were required to enable SIGMET and AIRMET messages to be used in an information-based environment. Members were requested to provide reports considering the various issues associated with the dissemination and display of information concerning hazardous meteorological conditions and the use of object based techniques. The group felt that the current requirement for any textual information to be completely consistent with any graphic was too restrictive.

Action Agreed 3/18 — Future information-based dissemination and display for hazardous meteorological conditions

That, **members** provide reports on progress made in the dissemination and display of information concerning hazardous meteorological conditions, including the use of object-based techniques.

6.6 The group agreed that there was a need for further meetings of the group owing to the expected workload and the importance of the issues at hand. The meeting was tentatively scheduled for May 2012, excluding the final week, and it was expected that dates could be finalized in the early part of 2011 in order to allow members to plan accordingly. It was noted that meetings were normally expected to take place in Montréal.

APPENDIX A
LIST OF PARTICIPANTS

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APPENDIX B
LIST OF DOCUMENTATION

SN no.	Number of pages	Presented by	Title	Agenda item
1	3	Secretary	Provisional agenda	4
2	11	Secretary	Progress report on the content and issuance of SIGMET	5
3	3	Secretary	Work programme of the group	7
4	3	Secretary	Progress report on wind shear, turbulence and tsunami warnings	6
5	26	Colin Hord, Rapporteur of METWSG/2 ad hoc group C	Use of turbulence algorithms in the generation of SIGMET	5.1
6	3	Zhang Zhongfeng	Special aircraft observations and special air report	6
7	3	Ndiwa Wachina	Low level wind shear phraseology change	6.2
8	4	Herbert Puempel	Quantitative criteria for "Sandstorm and Dust Storm" (Updated proposal following consultation with regional experts)	5.2
9 <i>revised</i>	17	Sue O'Rourke – Co-Rapporteur of METWSG/2 ad hoc group A	SIGMET advisory	5.1
10 <i>revised</i>	3	Bill Maynard	SIGMET issuance criteria	5.1 & 5.2
11	2	Bill Maynard	Ice particle weather	7
12	3	Bill Maynard	IMC in AIRMET	5.4

SN no.	Number of pages	Presented by	Title	Agenda item
13	2	Bill Maynard	Lines in AIRMET and SIGMET	5.1
14	3	Sue O'Rourke, Co-rapporteur of METWSG/2 ad hoc group A	Regional warning centres	5.1
15	4	Steven Albersheim	SIGMET template in Annex 3 for complex volcanic ash SIGMET	5.1
16	4	Steven Albersheim	Safety assessment for wind shear phraseology	6.2
17	2	Steven Albersheim	Inclusion of reported in the phraseologies used for wind shear alerts	6.2
18	2	Steven Albersheim	Inclusion of expected in the phraseologies used for wind shear alerts	6.2
19	4	Zhang Zhongfeng	Monitoring of global SIGMETs and advisories	5.1

LIST OF INFORMATION PAPERS

IP no.	Number of pages	Presented by	Title	Agenda item
1	3	Secretary	Arrangements for the meeting	3
2	4	Secretary	List of working papers	-
3 <i>(not issued)</i>	-	-	-	-
4	4	Keith Mackersy	Graphical SIGMET - SVA Model, Appendix 1, Annex 3	5.1
5	2	Bill Maynard	Hazardous lithometeor threshold	5.2
6	2	Bill Maynard	Ozone	8
7 <i>revised</i>	2	Bill Maynard	Parallel domestic and international SIGMETS	5.1
8	3	Zhang Zhongfeng	Activities taken by China to improve SIGMET issuance	5
9	5	Zhang Zhongfeng	Activities taken by China on SIGMET advisory feasibility study	5
10	3	Steven Albersheim	International volcanic ash task force (IVATF) tasks pertaining to SIGMET information	5.4
11	6	Jun Ryuzaki	Indices of significant weather for issuance of SIGMET	6.3

**LIST OF PAPERS
IN ORDER OF AGENDA ITEM**

(INFORMATION PAPERS IN BRACKETS)

Agenda Item	WP No.
3	(1)
4	1
5	2, (8), (9)
5.1	5, 9 <i>rev</i> , 10 <i>rev</i> , 13, 14, 15, 19, (4), (7 <i>rev</i>)
5.2	8, 10, (5)
5.4	12, (10)
6	4, 6
6.2	7, 16, 17, 18
6.3	(11)
7	3, 11
8	(6)

APPENDIX C

TEMPLATE FOR SIGMET ADVISORY (TEXT)

	Element	Detailed content	Template	Examples
1	Identification of the type of message	Type of message and sequence number	SMA n[n]n	SMA A2 SMA F13
2	Time of Origin	Year, month, day, time in UTC of issue	DTG: nnnnnnnn/nnnnZ	ISSUED 20110327/2153Z
3	Name of SAC	Name of SIGMET Advisory Centre	SAC: nnnn	SAC: ASIA SAC: AFI SAC: PAC
4	Validity period	Day-time groups indicating the period of validity in UTC	VALID: nnnnnn/nnnnnn	VALID: 272200/280400
5	FIR	ICAO location indicator of the FIR/s to which the SIGMET Advisory refers	FIR: nnnn[/nnnn]/[nnnn]	FIR: VNSM/ZPKM
IF THE SIGMET ADVISORY IS TO BE CANCELLED SEE DETAILS AT THE END OF THE TEMPLATE				
6	Phenomenon	Description of the phenomenon	PHENOMENON: OBSC TS[GR] <i>or</i> EMBD TS[GR] <i>or</i> FRQ TS[GR] <i>or</i> SQL TS[GR] <i>or</i> SEV TURB <i>or</i> SEV ICE [(FZRA)] <i>or</i> SEV MTW	PHENOMENON: OBSC TS PHENOMENON: OBSC TSGR PHENOMENON: EMBD TS PHENOMENON: EMBD TSGR PHENOMENON: FRQ TS PHENOMENON: FRQ TSGR PHENOMENON: SQL TS PHENOMENON: SQL TSGR PHENOMENON: SEV TURB PHENOMENON: SEV ICE PHENOMENON: SEV ICE (FZRA) PHENOMENON: SEV MTW
7	Observed or forecast	Indication whether the information is observed and expected to continue, or forecast	OBS [AT nnnnZ] FCST	OBS OBS AT 1210Z FCST
8	Location	Location (referring to latitude/longitude in degrees and minutes) or aeronautical locations	LOCATION: Nnn[nn] Wnnn[nn] <i>or</i> Nnn[nn] Ennn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Snn[nn] Ennn[nn] <i>or</i> LOCATION: N OF Nnn[nn] <i>or</i> S OF Nnn[nn] <i>or</i> N OF Snn[nn] <i>or</i> S OF Snn[nn] <i>or</i> [AND] W OF Wnnn[nn] <i>or</i> E OF Wnnn[nn] <i>or</i> W OF Ennn[nn] <i>or</i> E OF Ennn[nn] <i>or</i> LOCATION: [N OF, NE OF, E OF, SE OF, S OF, SW OF, W OF, NW OF] [LINE] Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] <i>or</i> LOCATION: [N OF, NE OF, E OF, SE OF, S OF, SW OF, W OF, NW OF, AT]	LOCATION: N48 E010 LOCATION: N2020 W07005 LOCATION: S OF N54 LOCATION: W OF E1554 LOCATION: N OF N1515 AND W OF E13530 LOCATION: N OF LINE S2520 LOCATION: AT YMML LOCATION: WI N6030 E02550 –

			<p>nnnnnnnnnnnn or LOCATION: WI Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – [Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]</p>	<p>N6055 E02500 – N6050 E02630</p>
	Level	Flight level and extent	<p>LEVEL: FLnnn or LEVEL: SFC/FLnnn or LEVEL: FLnnn/nnn or LEVEL: TOP FLnnn or LEVEL: [TOP] ABV FLnnn or</p>	<p>LEVEL: FL180 LEVEL: SFC/FL078 LEVEL: FL050/080 LEVEL: TOP FL390 LEVEL: TOP ABV FL100</p>
9	Movement	Movement or expected movement (direction and speed) with reference to one of the sixteen points of the compass, or stationary	<p>MOVEMENT: MOV N [nnKT] or MOV NNE [nnKT] or MOV NE [nnKT] or MOV ENE [nnKT] or MOV E [nnKT] or MOV ESE [nnKT] or MOV SE [nnKT] or MOV SSE [nnKT] or MOV S[nnKT] or MOV SSW [nnKT] or MOV SW [nnKT] or MOV WSW [nnKT] or MOV W [nnKT] or MOV WNW [nnKT] or MOV NW [nnKT] or MOV NNW [nnKT] or STNR</p>	<p>MOVEMENT: MOV SE MOVEMENT: MOV N 20KT MOVEMENT: STNR</p>
10	Changes in intensity	Expected changes in intensity	<p>INTENSITY: INTSF or WKN or NC or</p>	<p>INTENSITY: INTSF INTENSITY: WKN INTENSITY: NC</p>
11	Remarks	Remarks, as necessary	<p>RMK:</p>	<p>RMK: NIL</p>
12	Next advisory	Year, month, day and time in UTC	<p>NXT ADVISORY: nnnnnnnn/nnnnZ or NO LATER THAN nnnnnnnn/nnnnZ or WILL BE ISSUED BY nnnnnnnn/nnnnZ</p>	<p>NXT ADVISORY: 20090402/1300Z</p>
OR				
13	Cancellation	Cancellation of SIGMET Advisory referring to its identification	<p>CNL SMA n[n]n nnnnnn/nnnnnn</p>	<p>CNL SMA F13 272200/280400</p>

APPENDIX D

EXAMPLE OF SIGMET ADVISORY TEXT (SMA)

SMA A08

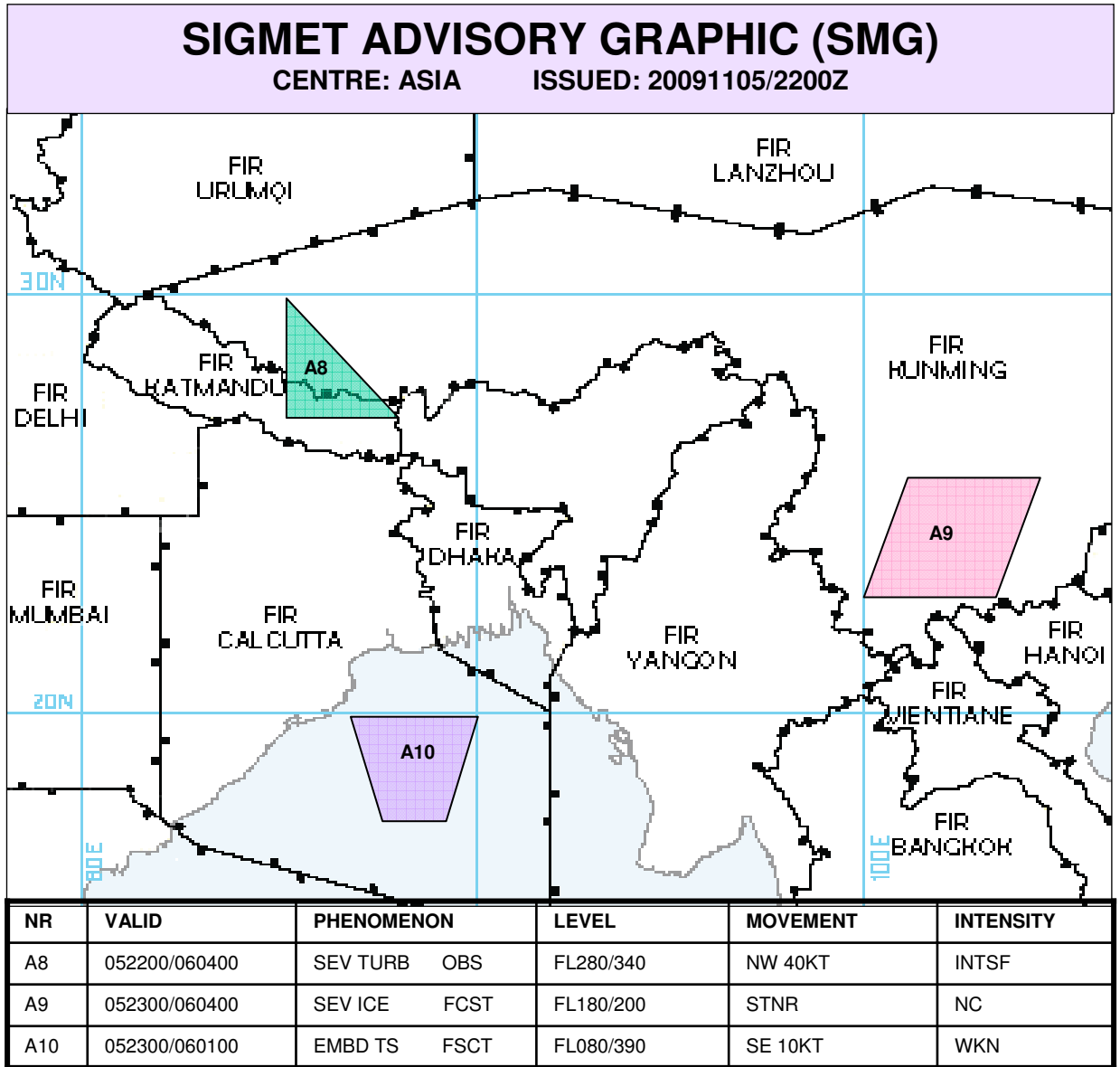
DTG: 20091105/2200Z
SAC: ASIA
VALID: 052200/060400
FIR: VNISM/ZPKM
PHENOMENON: SEV TURB
OBS AT 2230Z
LOCATION: WI N3000 E08500 – N2700 E08800 – N2700 E08500
LEVEL: FL280/340
MOVEMENT: MOV NW 40KT
INTENSITY: WKN
RMK: NIL
NXT ADVISORY: 20091106/0100Z

SMA A09

DTG: 20091105/2200Z
SAC: ASIA
VALID: 052300/060400
FIR: ZPKM
PHENOMENON: SEV ICE
FCST
LOCATION: WI N2530 E10130 – N2530 E10400 – N2230 E103000 – N2230 E10000
LEVEL: FL180/200
MOVEMENT: STNR
INTENSITY: NC
RMK: NIL
NXT ADVISORY: 20091106/0100Z

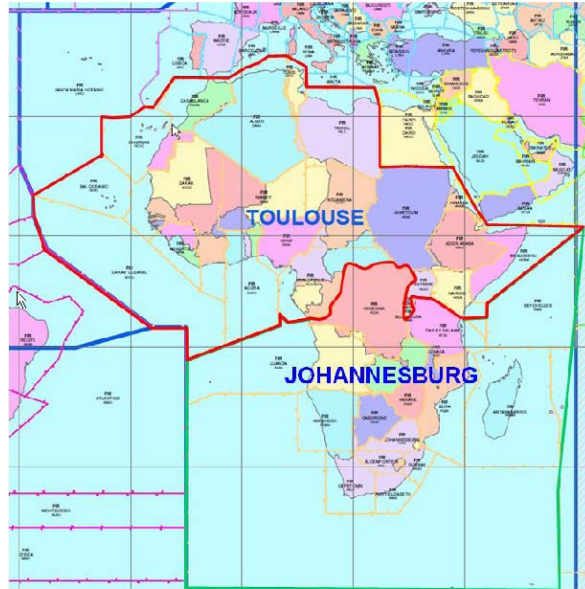
APPENDIX E

EXAMPLE OF SIGMET ADVISORY GRAPHIC (SMG)



APPENDIX F

**POSSIBLE AREAS OF COVERAGE FOR CHINA, FRANCE AND SOUTH AFRICA
TRIAL CENTRES**



APPENDIX G

PRELIMINARY SCHEDULE FOR THE CONDUCT OF THE SIGMET ADVISORY TRIAL

April to July 2011: the conduct of SIGMET advisory trial

Planning

- To define a WMO header for the text (Herbert, November 2010)
- Host States to coordinate with the appropriate RODBs (Albert, Patrick and Zhang, December 2010)
- To prepare feedback form, one for users, one for MWOs and one for the host States (Patrick, PW and Shona, December 2010)
- IATA and IFALPA to identify the airlines to participate in the trial for providing feedback (Carole and Ndiwa, December 2010)
- IATA and IFALPA to actively engage AOCs of the relevant airlines to participate in the trial (Carole and Ndiwa, December 2010)
- The relevant States to be invited to join the trial by State Letter to be issued by ICAO, with reference to regional SIGMET guide and webpage on the training documents of SIGMET advisory (Secretary, January 2011)
- Host States to establish contact with MWOs and develop a participation list (Albert, Patrick and Zhang, February 2011)
- WAFC Provider States to arrange for the supply of forecast guidance products for use by host States in the trial (Colin and Steve, February 2011)

Conduct of the trial

- China as the regional SIGMET advisory centre for Asia, South Africa as the centre for SADC region, and France as the centre for the northern part of Africa
- Host States to consider issuing a NOTAM to notify users of the commencement of the trial (Albert, Patrick and Zhang, March 2011)
- SIGMET advisories to be provided through AFTN and webpage to the MWOs, user panels of IATA and IFALPA (April to July 2011)

Evaluation

- Availability of SIGMETs and SIGMET advisories to be monitored by the SIGMET monitoring webpage of Hong Kong, China, RODBs, IATA and possibly WAFCs during the trial (April to July 2011)
- IATA and IFALPA to collect aviation industry feedback (Carole and Ndiwa, August to September 2011)
- Host States to collect feedback from MWOs on the use of the SIGMET advisory (Albert, Patrick and Zhang, August to September 2011)

February 2012: Report for consideration by the METWSG/4 Meeting (May 2012)

- To summarize the availability, timeliness, format and distribution of SIGMETs during the SIGMET advisory trial for those MWOs participating in the trial
- To summarize user feedback in the trial
- To summarize the feedback from MWOs participating in the trial, e.g. usefulness of the SIGMET advisories
- Host States to report experience in the trial
- To propose the various options on the way forward for MET/AIM Divisional Meeting, such as bilateral agreement between States, more training, and consideration of establishing regional centres

Late 2013/early 2014: WP for the MET/AIM Divisional Meeting including the recommendations to improve issuance of SIGMETs in view of resolving the persistent implementation problems with the availability of SIGMET

- To report the results of SIGMET advisory trial
- To recommend the various options on the way forward

Note.— The MET/AIM Divisional Meeting working paper will be presented by the Secretariat following the advice of the METWSG. An additional METWSG Meeting could be used to finalize this input ahead of the normal schedule of meetings, i.e. earlier than November 2013.

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Element as specified in Chapter 5 and Appendix 6	Detailed content	Template(s)			Examples
		SIGMET	AIRMET	SPECIAL AIR-REPORT ¹	

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Location (C) ²⁶	Location (referring to latitude and longitude (in degrees and minutes)	Nnn[nn] Wnnn[nn] <i>or</i> Nnn[nn] Ennn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Snn[nn] Ennn[nn] <i>or</i> N OF Nnn[nn] <i>or</i> S OF Nnn[nn] <i>or</i> N OF Snn[nn] <i>or</i> S OF Snn[nn] <i>or</i> [AND] W OF Wnnn[nn] <i>or</i> E OF Wnnn[nn] <i>or</i> W OF Ennn[nn] <i>or</i> E OF Ennn[nn] <i>or</i> [N OF, NE OF, E OF, SE OF, S OF, SW OF, W OF, NW OF] [LINE] Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] <i>or</i> W ²⁷ Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – [Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]]	NnnnnWnnnnn <i>or</i> NnnnnEnnnnn <i>or</i> SnnnnWnnnnn <i>or</i> SnnnnEnnnnn	S OF N54 N OF N50 N2020 W07005 N2706 W07306 N48 E010 N OF N1515 AND W OF E13530 W OF E1554 N OF LINE S2520 W11510 - S2520 W12010 WI N6030 E02550 – N6055 E02500 – N6050 E02630
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Forecast position (C) ^{20,26}	Forecast position of volcanic ash cloud <i>or</i> the centre of the TC <i>or</i> other hazardous phenomena ²⁸ at the end of the validity period of the SIGMET message (C)	FCST nnnnZ TC CENTRE Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] <i>or</i> FCST nnnnZ VA CLD APRX [nnKM WID LINE ²³ BTN (nnNM WID LINE BTN)] Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] [– Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]] [– Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]] [AND] ²⁹ Or [FCST nnnn Z Nnn[nn] Wnnn[nn] <i>or</i> Nnn[nn] Ennn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Snn[nn] Ennn[nn] <i>or</i> N OF Nnn[nn] <i>or</i> S OF Nnn[nn] <i>or</i> N OF Snn[nn] <i>or</i> S OF Snn[nn] <i>or</i>	–	–	FCST 2200Z TC CENTRE N2740 W07345 FCST 1700Z VA CLD APRX S15 E075 – S15 E081 – S17 E083 – S18 E079 – S15 E075
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Element as specified in Chapter 5 and Appendix 6	Detailed content	Template(s)			Examples
		SIGMET	AIRMET	SPECIAL AIR-REPORT ¹	
		[AND] W OF Wnnn[nn] or E OF Wnnn[nn] or W OF Ennn[nn] or E OF Ennn[nn] or [N OF, NE OF, E OF, SE OF, S OF, SW OF, W OF, NW OF] [LINE] Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] or W ²⁷ Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – [Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]			

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Notes.—

1. No wind and temperature to be uplinked to other aircraft in flight in accordance with 3.2.
2. See 4.1.
3. Fictitious location.
4. In accordance with 1.1.3 and 2.1.2.
5. See 3.1.
6. See 2.1.3.
7. In accordance with 1.1.4 and 2.1.4.
8. In accordance with 4.2.1 a).
9. In accordance with 4.2.4.
10. In accordance with 4.2.1 b).
11. In accordance with 4.2.2.
12. In accordance with 4.2.3.
13. In accordance with 4.2.5 and 4.2.6.
14. In accordance with 4.2.7.
15. In accordance with 4.2.8.
16. In accordance with 2.1.4.
17. In accordance with 4.2.1 c).
18. In accordance with 4.2.1 d).
19. The use of cumulonimbus, CB and towering cumulus, TCU, is restricted to AIRMETs in accordance with 2.1.4.
21. Only for SIGMET messages for tropical cyclones.
22. Only for SIGMET messages for volcanic ash.
23. A straight line between two points drawn on a map in the Mercator projection or a straight line between two points which crosses lines of longitude at a constant angle.
24. End of the message (as the SIGMET/AIRMET message is being cancelled).
25. Used for unnamed tropical cyclones.
26. In the case of the same phenomenon covering more than one area within the FIR, these elements can be repeated, as necessary.
27. The number of coordinates should be kept to a minimum and should not normally exceed seven.
28. Optionally can be used in addition to Movement or Expected Movement.
29. To be used for two volcanic ash clouds or two centres of tropical cyclones simultaneously affecting the FIR concerned.

Note.— In accordance with 1.1.5 and 2.1.5, severe or moderate icing and severe or moderate turbulence (SEV ICE, MOD ICE, SEV TURB, MOD TURB) associated with thunderstorms, cumulonimbus clouds or tropical cyclones should not be included.

**Example A6-1. SIGMET and AIRMET message
and the corresponding cancellations**

SIGMET YUDD SIGMET 2 VALID 101200/101600 YUSO — YUDD SHANLON FIR/UIR OBSC TS FCST S OF N54 AND E OF W012 TOP FL390 WKN FCST 1600Z S OF N54 AND E OF W010	Cancellation of SIGMET YUDD SIGMET 3 VALID 101345/101600 YUSO — YUDD SHANLON FIR/UIR CNL SIGMET 2 101200/101600
AIRMET YUDD AIRMET 1 VALID 151520/151800 YUSO — YUDD SHANLON FIR ISOL TS OBS N OF S50 TOP ABV FL100 STNR WKN	Cancellation of AIRMET YUDD AIRMET 2 VALID 151650/151800 YUSO — YUDD SHANLON FIR CNL AIRMET 1 151520/151800

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Example A6-3. SIGMET message for volcanic ash

YUDD SIGMET 2 VALID 211100/211700 YUSO –
YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL PSN S1500 E07348 VA CLD OBS AT 1100Z
APRX 220KM BY 35KM S1500 E07348 - S1530 E07642 FL310/450 MOV SE 65KMH FCST 1700Z VA
CLD APRX S1506 E07500 - S1518 E08112 - S1712 E08330 - S1824 E07836

Meaning:

The second SIGMET message issued for the SHANLON* flight information region (identified by YUDD Shanlon area control centre/upper flight information region) by the Shanlon/International* meteorological watch office (YUSO) since 0001 UTC; the message is valid from 1100 UTC to 1700 UTC on the 21st of the month; volcanic ash eruption of Mount Ashval* located at 15 degrees south and 73 degrees 48 minutes east; volcanic ash cloud observed at 1100 UTC in an approximate area of 220 km by 35 km between 15 degrees south and 73 degrees 48 minutes east, and 15 degrees 30 minutes south and 76 degrees 42 minutes east; between flight levels 310 and 450, the volcanic ash cloud is expected to move southeastwards at 65 kilometres per hour; at 1700 UTC the volcanic ash cloud is forecast to be located approximately in an area bounded by the following points: 15 degrees 6 minutes south and 75 degrees east, 15 degrees 18 minutes south and 81 degrees 12 minutes east, 17 degrees 12 minutes south and 83 degrees 30 minutes east, and 18 degrees 24 minutes south and 78 degrees 36 minutes east.

* Fictitious locations

Example A6-4. SIGMET message for severe turbulence

YUCC SIGMET 5 VALID 221215/221600 YUDO –
YUCC AMSWELL FIR SEV TURB OBS AT 1210Z N2020 W07005 FL250 MOV E 40KMH WKN FCST
1600Z S OF N2020 E OF W06950

Meaning:

The fifth SIGMET message issued for the AMSWELL* flight information region (identified by YUCC Amswell area control centre) by the Donlon/International* meteorological watch office (YUDO) since 0001 UTC; the message is valid from 1215 UTC to 1600 UTC on the 22nd of the month; severe turbulence was observed at 1210 UTC 20 degrees 20 minutes north and 70 degrees 5 minutes west at flight level 250; the turbulence is expected to weaken in intensity; forecast position at 1600 UTC at south of 20 degrees 20 minutes north and east of 70 degrees 5 minutes west.

* Fictitious locations

— END —