International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)
Eighth Meeting of the GREPECAS Aeronautical Meteorology Subgroup (AERMETSG/8)
Santiago, Chile, 9 to 13 October 2006

Agenda Item 4: **Implementation of the issuance of SIGMET in the CAR/SAM Regions**

REGIONAL PROGRESS IN THE IMPLEMENTATION OF SIGMET

(Presented by the Secretariat)

SUMMARY

This working paper presents information on the implementation of procedures in the preparation and issuance of SIGMET in CAR/SAM States/Territories, including examples of the deficiencies detected in this regard.

1. Introduction

1.1 Considering that in most States/Territories of ICAO Regions the preparation and issuance of SIGMET, in accordance with the provisions of Annex 3, seems to be one of the most common deficiencies in the MET area, and in view of the importance of SIGMET for international air navigation, the Secretariat has considered a separate item to deal with the implementation of procedures in the preparation and dissemination of SIGMET in CAR/SAM Regions.

2. Discussion

2.1 Guide for the preparation, dissemination and use of SIGMET messages in the CAR/SAM Regions

2.1.1 Following Recommendation 1/12 of MET Divisional MET to assist States/Members of the CAR/SAM Regions to fully implement SIGMET provisions in Annex 3/Technical Standards [C3.1], ICAO South American Regional Office prepared and sent to CAR/SAM States/Territories, in June 2006, the Seventh Edition of the Guide for the preparation, dissemination and use of SIGMET messages in the CAR/SAM Regions, which is included as **Appendix A** to this working paper, incorporating Amendment 1, based on the information received so far from some States.

2.1.2 During the elaboration of the guide, the main problems detected in the preparation and issuance of SIGMET messages were considered, and it is expected that during the Meeting the Secretariat is informed on any additional change regarding the information of each participant State/Territory, related to Appendices E, F, G and H, in order to include them in the amendment.

2.2 CAR/SAM Deficiencies in the preparation and issuance of SIGMET

2.2.1 With a view to eliminate the deficiencies in the preparation and issuance of SIGMET, the Secretariat has taken note of some deficiencies, which were communicated to the respective States on due time. Additionally, the following SIGMET with errors corresponding to CAR/SAM States/Territories were received from IATA; the corrections are included under each:

WSPM31 MPTO 091737
MPZL SIGMET 03 VALID 091737Z / 0912037Z MPTO-
PANAMA FIR EMBD TS OBS AT 1445 UTC FL 460
IN 04.79 DEG N - 05.10 DEG N / 79.83 DEG W - 80.07 DEG W INTSF
AND 04.50 DEG N - 06.25 DEG N / 81.60 DEG W - 83.05 DEG W NC
AND 10.0 DEG N - 11.0 DEG N / 81.00 W - 82.0 DEG W INTSF =

The hour should be 092037
UTC should not be used, but a Z
The word IN should be deleted
The positions should be in minutes, not in tenths of a degree
"." is not used
The positions should be between hyphens, not with "/"
N or W goes at the beginning of the latitude/longitude
The word MOV is missing before W

and

WVCA31 TTPP 111300
TTZP SIGMET 2 VALID 11300/111900 TTPP-
SOUFRIERE HILLS MONTSERRAT N1642 W06210
PIARCO FIR OBS VA CLD SFC/FL090
N1701 W06215 TO N1643 W06210 TO N1643 W06211
TO N1650 W06232 TO N1659 W06234 TO N1701 W06215
MOVMT NW 10/15LTS...LTL CHNG=

The hour shoud be 111300
The order is: TTPP FIR VA ERUPTION MT SOUFRIERE HILLS MONTSERRAT N1642 W06210
The word TO should not be included between the positions. The positions should be between hyphens.
It should say MOV not MOVMT
The movement should be specified in KMH
The changes are specified in: INTSF, WKN, NC LTL CHAG, does not exist

2.2.2 In addition, the Meeting will recall that the Brasilia International OPMET Databank, since 1994, prepares an analysis of the errors detected by the bank in OPMET data in general, for which it is expected that Brazil presents, under this agenda item, the SIGMET detected with error since the AERMETSG/7. Likewise, it is expected that situations detected by any other State are presented during the Meeting.

3. **Action required**

3.1 The Meeting is invited to:

a) take note of the information provided in this paper;

b) analyze the deficiencies presented in the preparation and issuance of SIGMET and take actions towards their elimination.

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APPENDIX A

SIGMET GUIDE

INTERNATIONAL CIVIL AVIATION ORGANIZATION

SOUTH AMERICAN OFFICE

GUIDE

FOR THE PREPARATION, DISSEMINATION

AND USE OF SIGMET MESSAGES

IN THE CAR/SAM REGIONS

SEVENTH EDITION

JUNE 2006

INTERNATIONAL CIVIL AVIATION ORGANIZATION

SOUTH AMERICAN OFFICE

GUIDE

FOR THE PREPARATION, DISSEMINATION

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The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitations of its frontiers or boundaries

RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENTS				CORRIGENDA			
No.	Date applicable	Entered by	Date	No.	Date applicable	Entered by	Date
1				1			
2				2			
3				3			
4				4			
5				5			
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GUIDE FOR THE PREPARATION, DISSEMINATION AND USE OF SIGMET MESSAGES IN THE CAR/SAM REGIONS

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Explanation of terms and expressions

Aerodrome control tower (TWR)*:* A unit established to provide air traffic control service to aerodrome traffic.

Aeronautical information publication (AIP): A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

AIRMET information*:* Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena, which may affect the safety of low-level aircraft operations, and which was not already included in the forecast issued for low-level flights in the flight information region concerned or sub-area thereof.

Air-report (AIREP)*:* A report from an aircraft in flight prepared in conformity with requirements for position, and operational and/or meteorological reporting.

Approach control unit (APP)*:* A unit established to provide air traffic control service to controlled flight arriving at, or departing from, one or more aerodromes.

> *Note: Established in specific aerodromes when it is necessary or convenient to create a separate unit; provides approach control to control aircrafts which approach or depart according to flight instrument rules.*

Area control centre (ACC)*:* A unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction.

ASHTAM: A special series NOTAM notifying by means of specific format, information in activity of a volcano, a volcanic eruption and/or volcanic ash cloud, that is of significance of aircraft operators.

Control area (CTA): A controlled airspace extending upwards from a specific limit above earth.

Flight information centre (FIC)*:* A unit established to provide flight information service and alerting service.

Flight information region (FIR): An airspace of defined dimensions within which information service and alerting service are provided.

International airways volcano watch (IAVW)*:* International arrangements for monitoring and providing to aircraft of volcanic ash in the atmosphere.

International NOTAM office (NOF)*:* An office designated by States for the exchange of NOTAM internationally.

Meteorological watch office (MWO)*:* An office designated by States that accepted the responsibility to provide services within a flight information region (FIR), to watch meteorological conditions in that FIR.

Movement Area: The part of an aerodrome to be used for the take-off, landing and taxiing of aircrafts consisting of the manoeuvring area and aprons.

NOTAM: A noted distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

Rescue coordination center; (RCC)*:* A unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

Rescue subcentre; (RSC): A unit subordinate to a rescue co-ordination centre, established to complement the alter within a specified portion of a search and rescue region.

Restricted area: An airspace of defined dimensions above the land areas or territorial waters of a State, within which the flights of aircrafts is restricted in accordance with certain specified conditions.

SIGMET information*:* Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena, which may affect the safety of aircraft operations.

SNOWTAM: A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format.

Tropical cyclone advisory centre; (TCAC): A meteorological centre designated by regional air navigation agreement to provide advisory information to meteorological watch offices regarding the position, forecast direction and speed of movement, central pressure and maximum surface wind of tropical cyclones.

Volcanic ash advisory centre (VAAC)*:* A meteorological centre designated by regional air navigation agreement to provide advisory information to meteorological watch offices (MWO), area control centers (ACC), flight information centers (FIC), that provide services to flight information region (FIR) in their area of responsibility, to other VAAC, world area forecast centers (WAFC), relevant regional area forecast centres and international OPMET data banks, international NOTAM offices and to designated centers for the functioning of distribution systems by satellite of aeronautical fixed services (ISCS and SADIS), to provide advisory information regarding the lateral and vertical extent and forecast movement of volcanic ash in the atmosphere following volcanic eruptions.

VOLMET broadcast*:* Routine broadcast containing, as appropriate, current aerodrome weather reports, aerodrome forecasts and SIGMET messages for aircraft in flight.

PART 1 INTRODUCTION

1.1 General

1.1.1 The main purpose of this document is to provide guidance for standardization and harmonization of the procedures related to the aeronautical meteorological warnings, known as SIGMET information in CAR/SAM States/Territories. The guidance is complementary to the standards and recommended practices of *Annex 3 – Meteorological Service for International Air Navigation*, and to the *CAR/SAM Air Navigation Plan – ANP Basic, Volume I and FASID, Volume II, Doc 8733, Part VI – Meteorology (MET)*, regarding SIGMET provision.

1.1.2 This Guide is intended to assist meteorological watch offices (MWO) in the CAR/SAM Regions in preparing and disseminating SIGMET information based on operational requirements of CAR/SAM States/Territories.

1.1.3 Regulatory material concerning the provision of SIGMET information is contained in the following ICAO documents:

- *Anxex 3 – Meteorological Service for International Air Navigation*, Part I, 7.1 and Parte I, Appendix 6, 1;
- *CAR/SAM Basic ANP:* Part I – Basic operational requirements and planning criteria (BORPC), paragraph 8.5.2; and Part VI – MET, paragraph 39;
- *CAR/SAM FASID ANP:* Part VI – MET, paragraphs 3 and 5, Tables MET 1A and MET 2B;
- *Annex 11 – Air Traffic Services*, Chapter 4, paragraph 4.2.1 and Chapter 7, paragraph 7.1.2.1*;*
- *Annex 15 – Aeronautical Information Services*, Chapter 5, paragraphs 5.1.1.1 u) 5.3.3 and 5.3.4;
- *Air Traffic Management, Doc. 4444*, Chapter. 9, paragraph 9.1.3.2;
- *PANS/ABC – ICAO Abbreviations and Codes, Doc. 8400;*
- *Regional Supplementary Procedures, Doc. 7030*, Part I, paragraphs 9.2.1 and 9.2.2;
- *Manual of Aeronautical Meteorological Practice, Doc 8896*, Chapter 4*;*
- *Handbook on the International Airways Volcano Watch (IAVW), Doc 9766-AN/968*, First edition – 2000 (available at website: http://www.icao.int, under ICAO Publications, Free Publications);
- *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds, Doc 9691-AN/95;*
- *Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services, Doc. 9377.*

1.1.4 This document has been prepared by the ICAO SAM Regional Office taking into consideration the fifteenth edition of Annex 3, published in June 2004, which includes amendment 73 to the referred Annex, the CAR/SAM ANP, Volume I, Basic and the amendment to CAR/SAM, Volume II, FASID, approved on 4 May 2006.

1.1.5 Considering that some problems have been identified so that MET units in several CAR/SAM States/Territories have available all ICAO documentation and/or the corresponding amendments, information or tables to facilitate consultations for the preparation and dissemination of SIGMET information have been extracted from relevant ICAO documents, with the commitment that this Guide will be revised and updated in a regular basis, in order to align it with ICAO documents and regional procedures and requirements.

PART 2 RESPONSIBILITIES AND COORDINATION

2.1 The responsibilities of pilots and ATS authorities in ensuring the efficient implementation of the air-reporting procedures is of vital importance, since the timely issuance of SIGMET messages is largely dependent on the receipt by MWOs of special air-reports from ATS units.

2.2 Responsibilities of pilots

2.2.1 Pilots should make special aircraft observations and other non-routine aircraft observations during any phase of the flight in accordance to the procedures of Chapter 5 of Annex 3, Part I, paragraph 5.5 and 5.6, prepare the corresponding special air-report and relay it without delay to the ATS unit.

2.3 Responsibilities of the ATS units (ACC/FIC)

2.3.1 On receipt by the ATS units of special air-reports ATS personnel should:

a) relay them to all aircraft concerned; and

b) compile a message and send it to their associated MWO. To assist in the compilation of this message and to ensure a standard structure, instructions have been included in Appendix 1 to the PANS-ATM, *Doc 4444*.

2.4 Responsibilities and procedures related to SIGMET information of meteorological watch offices (MWO)

2.4.1 The preparation and dissemination of information advising pilots and other aeronautical personnel about meteorological conditions which might affect the safety of international civil aviation, is an important function of meteorological watch offices (MWOs), which exist primarily to prepare and broadcast information concerning the occurrence or expected occurrence of specified hazardous en-route weather conditions which might affect the safety of aircraft (SIGMET information) and low-level aircraft operations (AIRMET information).

2.4.2 Requirements for meteorological watch offices (MWO), together with the service to be provided to flight information regions (FIR), upper flight information regions UIR), control areas (CTA) and search and rescue regions (SRR), are described in *CAR/SAM FASID Table MET 1B – Meteorological watch offices.*

2.4.3 Based Conclusion 7/5 of the CAR/SAM/3 RAN meeting (1999), MWOs do not need to issue AIRMET messages for flight information regions (FIRs) in the CAR/SAM Regions, due to low operational density below FL 100. Consequently, no reference will be made to AIRMET information henceforth.

2.4.4 The MWO should provide SIGMET information locally to its associated ATS units, which usually are an Area Control Centre (ACC) or a Flight Information Centre (FIC), and to aerodrome meteorological offices within its own FIR. Likewise, at the international level, it should broadcast SIGMET information to the Brasilia and Washington international OPMET data banks, the ISCS and SADIS uplink stations and other MWOs, in accordance with *CAR/SAM FASID Table 2B – Exchange of SIGMET and special AIREP messages.*

2.4.5 The States should establish local procedures or make the necessary arrangements with other States so that, if an MWO is declared inoperative, its responsibilities be taken on by another. In this case, the

relevant NOTAMs should be issued and, if necessary, amendments be made to the relevant aeronautical information publications (AIPs), and inform the ICAO Regional Office concerned (NACC/SAM).

2.4.6 Since in CAR/SAM States/Territories the MWO are normally not separated from aerodrome meteorological offices, the meteorological authority concerned shall ensure that the MWO obligations and responsibilities are clearly defined and assigned, corresponding operational procedures are established and required meteorological staff should be trained accordingly to their respective functions.

2.4.7 In addition, the MWOs should be adequately equipped. Normally the MWOs use meteorological satellite data and meteorological radars; to the extent required by the MET authority, forecasts prepared by world area forecast centres (WAFC); and special air-report. The latter being an important source of data for the preparation of SIGMETs in most CAR/SAM States.

PART 3 SIGMET INFORMATION

3.1 Objective of SIGMET Information

3.1.1 The purpose of SIGMET information is to advise pilots about the occurrence or expected occurrence of en-route weather phenomena which may affect the safety of air operations. SIGMET information is prepared in accordance with the standards and recommended practices of Chapter 7 and Appendix 6 to Annex 3, strictly following *Table A6-1 – Template for SIGMET and AIRMET messages and special air-reports* of Appendix 6 of the referred Annex.

3.1.2 **Appendix A** includes an abstract of *Table A6-1 – Template for SIGMET and AIRMET messages and special air-reports.*

3.1.3 Based on the referred template, only one of the following phenomena, shall be included in a SIGMET message, using the abbreviations as indicated below:

METEOROLOGICAL PHENOMENA ABBREVIATIONS

(Abstract from Annex 3, Fifteenth edition, July 2004)

a) Subsonic cruising levels (SIGMET):

Obscured thunderstorm	OBSC TS
Embedded thunderstorm	EMBD TS
Frequent thunderstorm	FRQ TS
Squall line thunderstorm	SQL TS
Obscured with hail thunderstorm	OBS TS GR
Embedded with hail thunderstorm	EMBD TS GR
Frequent, with hail thunderstorm	FRQ TS GR
Squall line with hail thunderstorm	SQL TS GR
Tropical cyclone with 10-minute mean surface wind speed of 63 km/h (34 kt) or more y 10 minutos de duración	TC (+ cyclone name)
Severe turbulence	SEV TURB
Severe icing	SEV ICE
Severe icing due to freezing rain	SEV ICE (FZRA)
Severe mountain wave	SEV MTW
Heavy duststorm	HVY DS
Heavy sandstorm	HVY SS
Volcanic ash	VA (+ volcano name, if known)

b) At transonic levels and supersonic cruising levels (SST SIGMET:)

Moderate turbulence	MOD TURB
Severe turbulence	SEV TURB
Isolated cumulonimbus	ISOL CB
Occasional cumulonimbus	OCNL CB
Frequent cumulonimbus	FRQ CB
Hail	GR
Volcanic ash	VA (+volcano name, if known)

3.2 Types of SIGMET

3.2.1 Format of *Table A6-1 – Template for SIGMET and AIRMET messages and special air-reports* of Annex 3 includes all weather phenomena; however, it is convenient to distinguish among the three types of SIGMET, as follows:

- SIGMET for en-route weather phenomena related to TS, CB, TURB, ICE, MTW, DS, SS y GR (WS);
- SIGMET related to volcanic ash clouds (WV) ; and
- SIGMET related to tropical cyclones (WC).

3.3 Structure of SIGMET messages (WS)

3.3.1 Header of the report:

- In accordance with AFTN standardized procedures (Annex 10, Volume II), **"ZCZC"** signal indicating the beginning of the message should always be included;
- Second line includes the message priority Indicator **"FF"**, followed by AFTN addressees of the national or international message, based on CAR/SAM FASID Table MET 2B.
- The following line includes the day of the month and hour of the SIGMET issuance, which will be not more than 6 hours, and preferably not more than 4 hours, before the expected time of occurrence of the phenomenon for which the SIGMET is issued, followed by the AFTN address of the MWO originating the SIGMET.
- The following line corresponds to WMO abbreviated header, which consists of the following three groups:

T_1 T_2 A_1 A_2ii CCCC YYGGgg [CCx]

Group **T_1 T_2 A_1 A_2ii** is the bulletin identification for the SIGMET message, constructed as follows:

T_1 T_2	Message type designator	**WS** – for SIGMET **WV** – for SIGMET related to volcanic ash clouds **WC** – for SIGMET related to tropical cyclones
A_1 A_2	State or Territory designator	Assigned in accordance with Table C1, Part II of Manual on the Global Telecommunication System, Vol. I – Global Aspects (WMO – No. 386)
ii	According to paragraph 2.3.2.2, Part II of Manual on the Global Telecommunication System, Vol. I – Global Aspects (WMO – No. 386), used to indicate if the message is distributed on a global, interregional, regional or national basis.	

CCCC is the ICAO location indicator of the office originating the message (MWO)

YYGGgg corresponds to the date/time group of preparation of the message, where YY is the day and GGgg the hour (GG) and minutes (gg) UTC.

The group **CCx** shall be used only when sending a correction of a SIGMET , which has already been transmitted; the third letter "x" takes the value A for the first correction, B for the second correction, etc. In this, the MWOs shall try to minimize the corrections of the SIGMETs, taking into account their importance to the flight planning including in-flight re-planning.

3.3.2 An example of the header of a SIGMET message is given below (WS):

ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM
251022 SABEYMYX
WSAG31 SABE 251002

Through AFTN, a message with FF priority, was issued to Bolivia, Chile, Dominican Republic, Paraguay, Peru, Uruguay, Brasilia International OPMET data bank and to ISCS and SADIS uplink stations (issued to SADIS by a State of the SAM Region), on the 25th of the month at 10:22 UTC, by the MWO of Aeroparque/Jorge Newbery, SIGMET type, neither related to volcanic ash nor to tropical cyclones, from Argentina, [31(ii) standardized number for SIGMET], prepared by the MWO of Aeroparque/Jorge Newbery on the 25th of the month at 10:00 UTC.

3.4 SIGMET Format

3.4.1 Following *Table A6-1 – Template for SIGMET and AIRMET messages and special air-reports*, SIGMET shall be prepared according to the following sequence:

3.4.2 Location Indicator FIR/CTA (Mandatory)

3.4.2.1 ICAO Location indicator of the ATS unit serving the FIR, which corresponds to column 4 of CAR/SAM FASID Table MET 1B.

Example:

ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM
251022 SABEYMYX
WSAG31 SABE 251002
SAEF

… issued for the flight information region (FIR) EZEIZA.

3.4.3 Identification and sequence number of the message (Mandatory)

3.4.3.1 The SIGMET serial number corresponds to the number of SIGMET messages issued for the flight information region (FIR) starting at 0001 UTC of the day concerned. Those messages containing SIGMET information for subsonic aircraft shall be identified as "SIGMET" and those containing SIGMET information for supersonic aircraft shall be identified as "SIGMET SST". Independent groups of serial numbers shall be used for "SIGMET" and "SIGMET SST" messages. This numbering shall be correlative during each day of issuance and starting again at 00.00 UTC of each day in which such information is issued.

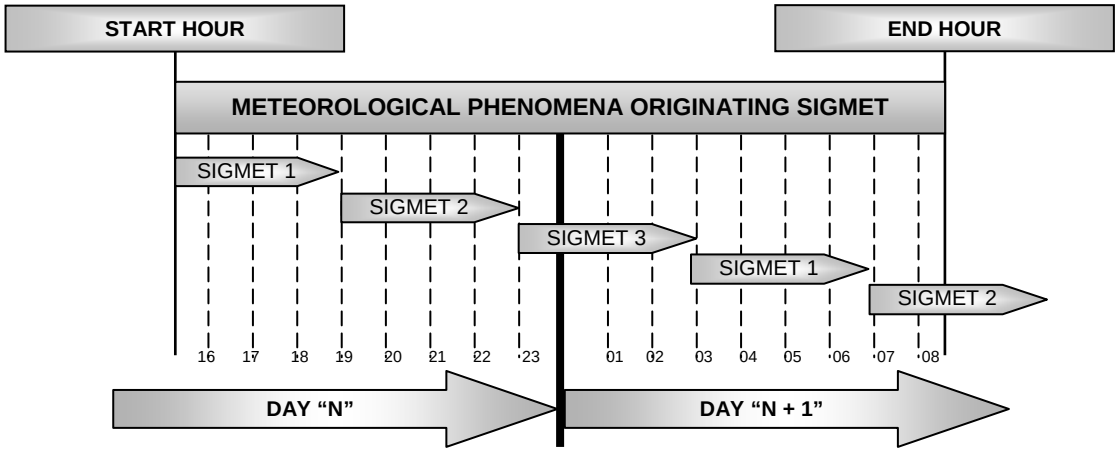


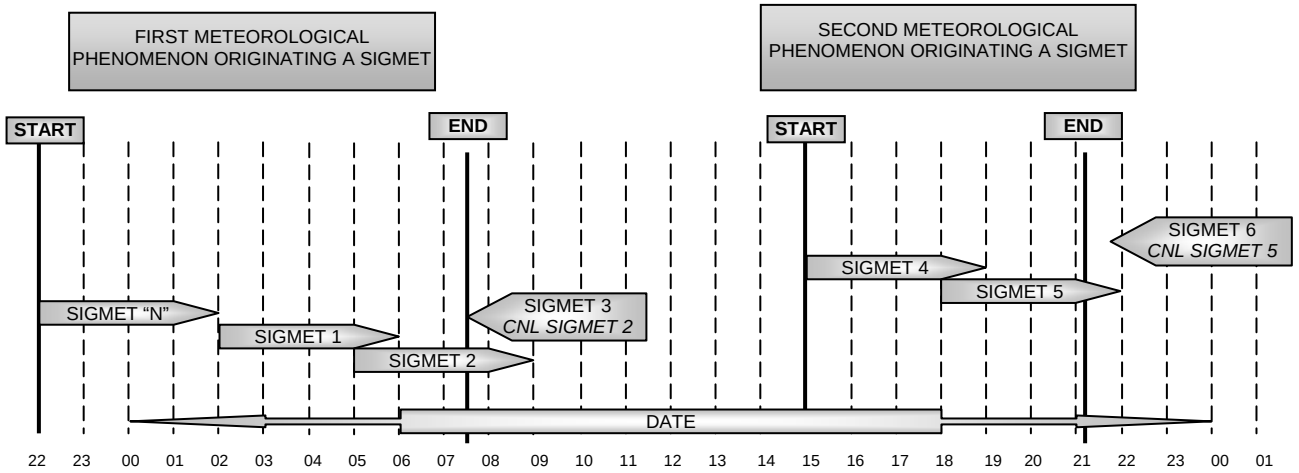
Diagram of sequence and serial numbers of SIGMET messages issued by a MWO

Example:

ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM
251022 SABEYMYX
WSAG31 SABE 251002
SAEF **SIGMET 5**

being the fifth SIGMET issued for that FIR on the 25th.

3.4.3.2 Concerning the serial numbers for SIGMET messages, it should be taken into account that in case of the occurrence or expected occurrence of two meteorological phenomena in the same day, at different hours might require the issuance of SIGMET messages, the SIGMET corresponding to the second significant phenomenon should continue with the next serial number of the SIGMET of cancellation of the first phenomenon, as shown in the following graphic:



3.4.4 Period of validity and MWO location indicator originating the SIGMET (Mandatory)

- The period of validity of a SIGMET with ***ddhhmm/ddhhmm*** format, should not be more than 4 hours *(CAR/SAM ANP, Basic, Part VI – MET);*

- ICAO location indicator of the MWO originating the message followed by a hyphen (-) for separation, (column 2 of CAR/SAM FASID Table MET 1B);

Example:

ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM
251022 SABEYMYX
WSAG31 SABE 251002
SAEF SIGMET 5 **VALID 251020/251400 SABE**–

…valid since 10:20 UTC until 1400 UTC of day 25 prepared, originated by Aeroparque Jorge Newbery MWO.

3.4.5 Location indicator and name of the FIR/CTA for which the SIGMET is issued (Mandatory)

- Location indicator and name of the FIR/CTA for which the SIGMET is issued (columns 3 and 4 respectively of CAR/SAM FASID Table MET 1B).

Example:

ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM
251022 SABEYMYX
WSAG31 SABE 251002
SAEF SIGMET 5 VALID 251020/251400 SABE–
SAEF EZEIZA FIR

… for EZEIZA FIR.

3.4.6 Description of the meteorological phenomenon (Mandatory)

3.4.6.1 SIGMET messages shall be prepared in abbreviated plain language using ICAO abbreviations, *Doc 8400/5 PANS/ABC - ICAO Abbreviations and codes* and numerical values of self-explanatory nature. **Appendix B** presents and abstract of *Doc 8400/5* with the abbreviations commonly used in meteorological messages.

Example:

ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM
251022 SABEYMYX
WSAG31 SABE 251002
SAEF SIGMET 5 VALID 251020/251400 SABE–
SAEF EZEIZA FIR **SEV TURB OBS AT 0955Z SAZM FL210/270 MOV E 25KMH WKN**

… informing that severe turbulence was observed at 09:55 UTC above the airport of Mar del Plata between flight levels 210 and 270, is moving towards the east at 25 km/h and is weakening.

*Note.- For changes in intensity the abbreviations "**INTSF"** (intensifying) or "**NC"** (no change) are used, as appropriate.*

3.4.6.2 SIGMET messages shall contain the information required, as necessary, and in the order indicated in the referred template. Value ranges and resolutions for the numerical elements contained in SIGMET messages are shown in *Table A6-4 of Annex 3*, included as Attachment to Appendix C.

3.4.7 AFTN Procedure to indicate the end of the message

3.4.7.1 Afterwards, and as a standardized AFTN procedure (Annex 10, Volume II) to indicate the end of the message, the following should be included:

- at the end of the text, the sign "=" to indicate the end of the SIGMET message
- in a separate line and to indicate the end of the message, the end of message signal represented by letters **NNNN,** should be included

Example:

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGZZMSAM
251022 SABEYMYX
WSAG31 SABE 251002
SAEF SIGMET 5 VALID 251020/251400 SABE-
SAEF EZEIZA FIR SEV TURB OBS AT 0955Z SAZM FL210/270 MOV E 25KMH WKN=
NNNN
```

3.4.8 Cancellation of SIGMET messages

3.4.8.1 When the phenomena originating the SIGMET is no longer occurring or no longer expected in the area, a cancellation of SIGMET should be issued (CNL SIGMET).

3.4.8.2 The issuance of the cancellation of SIGMET, should be numbered with the next number of the last SIGMET issued, as indicated in the following example:

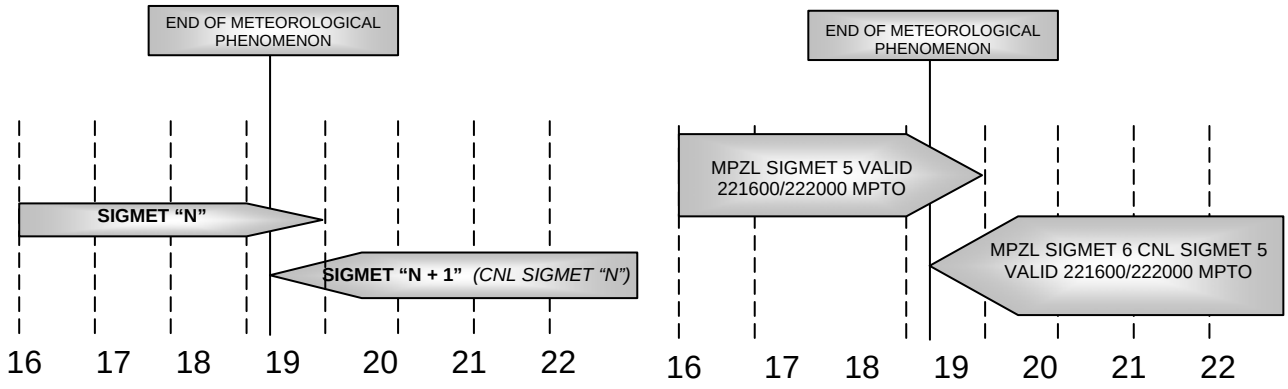


Diagram and example of a cancellation of SIGMET message issued by a MWO

Example:

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGZZMSAM
251022 SABEYMYX
WSAG31 SABE 251002
SAEF SIGMET 5 VALID 251020/251400 SABE–
SAEF SIGMET 6 CNL SIGMET 5 VALID 251020/251400 SABE=
NNNN
```

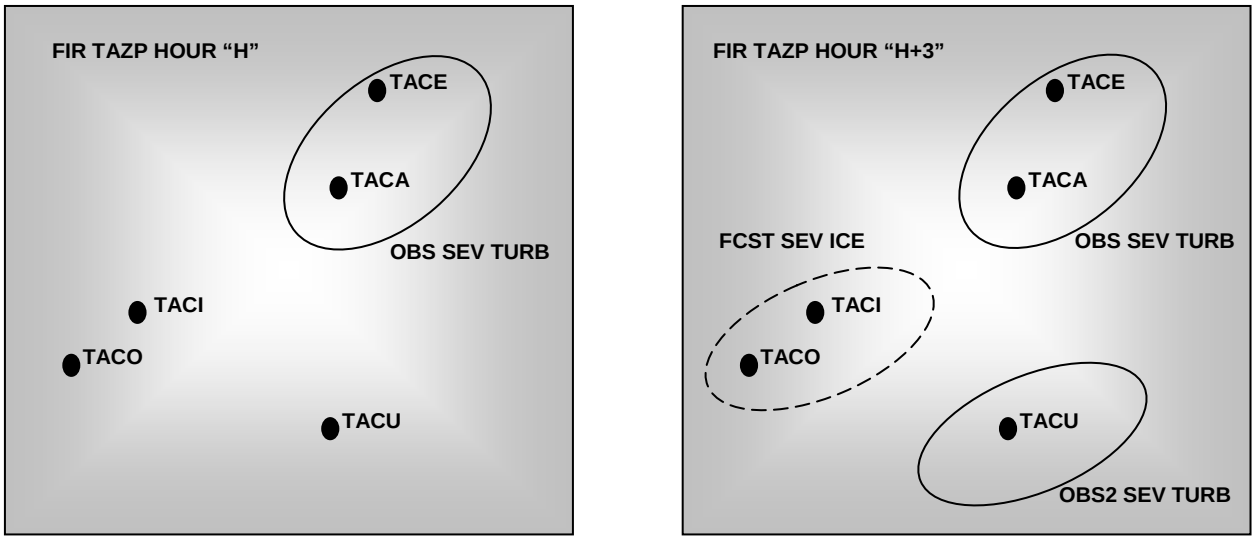
3.4.9 Special cases in the preparation of SIGMET messages

3.4.9.1 Note 8 at the end of *Table A6-1 – Template for SIGMET and AIRMET messages and special air-reports* of Annex 3, indicates that only one meteorological phenomena included in the list should be selected and included in each SIGMET.

3.4.9.2 However, in some cases due to the extension of a FIR, one or more meteorological phenomena, included in the list shown in paragraph 3.1.3 of this Guide, could be observed or the occurrence of another phenomenon could be forecasted.

3.4.9.3 As specified in paragraph 3.1.1, SIGMET are used to advise pilots about the occurrence or expected occurrence of en-route weather phenomena which may affect the safety of air operations and, in this sense, all of them should be reported.

3.4.9.4 As an example, a situation similar to that shown in the figure below could be presented:



3.4.9.5 In a FIR (TAZP*) at a particular hour, an area of severe turbulence is observed, which is affecting two aerodromes TACA* and TACE*. Subsequently, three hours after the occurrence of the first significant weather phenomenon, another area of severe turbulence is observed, affecting another aerodrome TACU*, not associated with the phenomenon that originated the first turbulence and, at the same time, the occurrence of an area with severe icing is forecasted, which will affect two aerodromes located in another area TACO* and TACI*.

* Fictitious location.

3.4.9.6 In this case, the following inconveniences were presented:

a) all these weather phenomena influenced against flight safety and should be informed; and

b) should be distinguished from each other so that, with the current use of computer systems to search and display OPMET information, these phenomena could be presented in the screens without interfering with each other.

3.4.9.7 Considering the above, and in order to provide serial numbers for the particular identification of each phenomena, column 3 of section "Identification" of *Table A6-1 – Template for SIGMET and AIRMET messages and special air-reports*, shown below, should be taken into account.

Element as specified in Chapters 5 and 7	*Detailed content*	*Template*				*Examples*
		SIGMET	*SIGMET SST*[1]	*AIRMET*	*SPECIAL AIR-REPORT*[2]	
Identification (M)	Message identification and sequence number[5] (M)	SIGMET n [nn]	SIGMET SST [nn]n	AIRMET [nn]n	ARS	SIGMET 5 SIGMET A3 SIGMET SST 1 AIRMET 2 ARS

3.4.9.8 To report several weather phenomena occurring simultaneously within a same FIR, the format **SIGMET n [nn]** being **n** a sequence letter for the identification of each weather phenomenon and **[nn]** the identification number of the message indicating the sequence according to paragraph 3.4.3.1.

Example:

1) Commencement of SIGMET sequence

a) SIGMET issued at the occurrence of the first weather phenomenon affecting, in this case, a zone of the FIR EZE, particularly airport SAZM

ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGRRYMYX
251022 SABEYMYX WSAG31
SABE 251002
SAEF SIGMET1 VALID 251020/251400 SABE–
EZEIZA FIR SEV TURB OBS AT 0955Z SAZM FL210 MOV E 25KMH WKN=
NNN

b) SIGMET issued at the occurrence of the second weather phenomenon affecting, in this case, another zone of the FIR EZE, particularly airport SADF

ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGRRYMYX
251327 SABEYMYX
WSAG31 SABE 251322
SAEF SIGMET **A1** VALID **251320/251700** SABE–
EZEIZA FIR SEV TURB OBS AT **1305Z SADF FL150 MOV NE 15KMH WKN=**
NNNN

c) SIGMET issued at the expected occurrence of a third weather phenomenon affecting, in this case, another zone of the FIR EZE, particularly airport SAZS

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
251355 SABEYMYX
WSAG31 SABE 251330
SAEF SIGMET B1 VALID 251800/252200 SABE–
EZEIZA FIR SEV ICE FCST 1800Z SAZS SAZN FL180/230=
NNNN
```

2) Continuation of SIGMET initial sequence

a) Second SIGMET issued at the occurrence of the first weather phenomenon

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
251350 SABEYMYX
WSAG31 SABE 251345
SAEF SIGMET 2 VALID 251400/251800 SABE–
EZEIZA FIR SEV TURB OBS AT 1255Z SAZM FL230 MOV NE 15KMH WKN=
NNNN
```

b) Second SIGMET issued at the occurrence of the second weather phenomenon

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
2511650 SABEYMYX
WSAG31 SABE 251645
SAEF SIGMET A2 VALID 251700/252100 SABE–
EZEIZA FIR SEV TURB OBS AT 1630Z SADF FL170 MOV E 25KMH WKN=
NNNN
```

c) SIGMET issued at the expected occurrence of a third weather phenomenon

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
252155 SABEYMYX
WSAG31 SABE 252130
SAEF SIGMET B2 VALID 252200/260200 SABE–
EZEIZA FIR SEV ICE FCST 2200Z SAZS SAZN FL190/250=
NNNN
```

3) Cancellation of SIGMET

a) Cancellation of the second SIGMET issued at the occurrence of the first weather phenomenon

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
251350 SABEYMYX
WSAG31 SABE 251345
SAEF SIGMET 3 CNL SIGMET 2 VALID 251400/251800 SABE=
NNNN
```

b) Cancellation of the second SIGMET issued at the occurrence of the second weather phenomenon

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
2511650 SABEYMYX
WSAG31 SABE 251645
SAEF SIGMET A3 CNL SIGMET A2 VALID 251700/252100 SABE=
NNNN
```

c) Cancellation of SIGMET issued at the expected occurrence of a third weather phenomenon

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
252155 SABEYMYX
WSAG31 SABE 252130
SAEF SIGMET B3 CNL SIGMET B2 VALID 252200/260200 SABE=
NNNN
```

PART 4 SIGMET RELATED TO VOLCANIC ASH (WV) AND TO TROPICAL CYCLONES (WC)

4.1 General

4.1.1 In the special case of SIGMET messages concerning volcanic ash (WV) and tropical cyclones (WC), elements such as the trajectory forecast, distinguish the type of SIGMET and consider other national and international addressees, should be included.

4.1.2 In order to assist MWOs in the preparation of the forecast contained in tropical cyclone SIGMET messages, the Miami tropical cyclone advisory centre (TCAC) has been designated to prepare and send the required advisory information to the CAR/SAM MWOs under its responsibility. *CAR/SAM FASID Table MET 3A* shows the area of responsibility of the TCAC and the MWOs to which advisory information should be sent. Advisory information should be issued concerning tropical cyclones that have an average ground wind speed equal to or above 63 Km/h (34kt) for a period of 10 minutes.

4.1.3 In order to assist MWOs in the preparation of the forecast contained in volcanic ash SIGMET messages, the Buenos Aires and Washington volcanic ash advisory centres (VAACs) have been assigned the task of preparing and sending the required advisory information to the CAR/SAM MWOs and ACCs under their responsibility, after volcanic ash clouds have been reported/detected. *CAR/SAM FASID Table MET 3B* describes the area of responsibility of the VAACs, MWOs and ACCs to which the advisory information should be sent.

4.1.4 *ICAO Doc. 9766 – AN/968, Handbook on the international airways volcano watch (IAVW), Second edition – 2004*, describes in detail the general measures and operational procedures to be taken by Area Control Centres (ACC), Flight Information Centres (FIC), International NOTAM Offices (NOF), Meteorological Watch Offices (MWO) and Volcanic Ash Advisory Centres (VAAC), for the dissemination of information on volcanic eruptions and the resulting volcanic ash clouds, which might affect the routes used by international flights, as well as those measures to be taken prior to a volcanic eruption.

4.1.5 Additionally, *ICAO Doc. 9691-AN/954 - Manual on volcanic ash, radioactive material and toxic chemical clouds, First edition – 2001*, complements the above referred Document, with procedures and emergency plans to mitigate the effects of volcanic ash clouds.

4.1.6 *CAR/SAM FASID Table MET 3C*, included as **Appendix C,** shows the selected State volcano observatories for direct notification of significant pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash in the atmosphere and the VAACs, MWOs and ACCs to which the observatories should sent the notification, which is included in.

4.1.7 States volcano observatories should send the following information to their associated ACCs, MWOs and VAACs:

a) significant pre-eruption volcanic activity: the date/hour (UTC) of report; name and, if known, number of the volcano; location (latitude/longitude); and description of volcanic activity; and

b) volcanic eruption: the date/hour (UTC) of report and time of eruption (UTC), if different to the time of the report; name and, if known, number of the volcano; location (latitude/longitude); and description of the eruption, including whether an ash column was ejected and, if so, an estimate of height of ash column and the extent of any visible volcanic ash cloud, during and following an eruption.

Note.- Pre-eruption volcanic activity in this context means unusual and/or increasing volcanic activity which could presage a volcanic eruption.

4.1.8 On receipt of information on volcanic eruption or volcanic ash cloud from the volcano observatory, ACC/FIC, VAAC and/or any other source, the MWO should take the following measures:

- notify the designated VAAC on the observation of a volcanic eruption or volcanic ash clouds in order to provide advice on volcanic ash trajectories in the FIR for which the State is responsible, provide the relevant available details and request advice on the extent and trajectory of the volcanic ash. Special air-reports on pre-eruption volcanic activity, volcanic eruption or the presence of volcanic ash clouds received from a MWO, should specifically be transmitted to their associated VAACs, WAFC London, WAFC Washington and International OPMET databank of Vienna;

- advise the associated ACC/FIC as soon as possible and provide regular information based on the advisory received from the VAAC on the horizontal and vertical extent of the cloud and the trajectory of the cloud; and

- issue a SIGMET message on volcanic ash with a period of validity of six hours, including an "outlook" giving information concerning the trajectory of volcanic ash cloud for up to twelve hours beyond the period of validity, on the basis of the advisory information provided by the concerned VAAC. Include in the list of SIGMET addresses all the VAACs, the WAFC London and WAFC Washington, the International OPMET databank of Vienna and the International OPMET databanks of Brasilia and Washington in charge. Keep continuous coordination with the associated ACC/FIC and NOTAM International Office (NOF), to ensure the standardization in the issuance and contents of the SIGMET and ASHTAM or NOTAM related to volcanic ash clouds.

4.1.9 In the event that an aerodrome meteorological office becomes aware of a pre-eruption activity, a volcanic eruption or a volcanic ash cloud from any source, this information should be passed immediately to the associated MWO for its onward transmission to the ACC/FIC.

4.2 Tropical cyclone and volcanic ash advisories

4.2.1 Responsibilities of the Miami Tropical Cyclones Advisory Centre

4.2.1.1 The Miami TCAC will take the necessary provisions to monitor the development of tropical cyclones based on *CAR/SAM FASID Table MET 3A*, using geostationary and polar-orbiting satellite data, radar data and other meteorological information. Additionally, advisory information concerning the position of the cyclone centre, its direction and speed of movement, central pressure and maximum surface wind near the centre, will be issued in abbreviated plain language, to the MWOs in its area of responsibility, other TCACs, whose areas of responsibility may be affected, and the World Area Forecast Centres (WAFC) of London and Washington, the international OPMET data banks of Brasilia and Washington, ISCS and SADIS.

4.2.1.2 Advisory information on tropical cyclones should be prepared in accordance to the template presented in *Table A2-2 - Template for advisory message for tropical cyclones* of Appendix 2 of Annex 3.

4.2.1.3 Updated advisory information will also be issued to the MWOs for each tropical cyclone, as necessary, but at least every six hours, in accordance with the requirements of *CAR/SAM FASID Table MET 3A.* **Appendix D** includes the AFTN addresses to which the Miami TCAC should transmit tropical cyclone advisories based on the referred Table.

4.2.1.4 Advisory information on tropical cyclones should be prepared based on Table A2-2 - *Template for advisory message for tropical cyclones* of Annex 3.

Example A2-2: Advisory message for tropical cyclones

Abstract from Appendix 2 to ICAO Annex 3 – Meteorological Service for International Air Navigation

TC ADVISORY	
DTG:	19970925/1600z
TCAC	YUFO
TC:	GLORIA
NR:	01
PSN:	N2706 W07306
MOV:	NW 20KMH
C:	965HPA
MAX WIND:	90KMH
FCST PSN + 12HR:	26/0400Z N2830 W07430
FCST MAX WIND + 12 HR:	90KMH
FCST MAX WIND + 12 HR:	26/1000Z N2852 W07500
FCST PSN + 18 HR:	85KMH
FCST PSN + 24 HR:	26/1600Z N2912 W07530
FCST MAX WIND + 24 HR:	80KMH
NEXT MSG:	19970925/2000Z

4.2.2 Responsibilities of the Buenos Aires and Washington Volcanic Ash Advisory Centres

4.2.2.1 The associated VAAC will activate the volcanic ash numerical trajectory/dispersion model in order to forecast the movement of any volcanic ash "cloud" which has been detected or reported, will prepare and issue advisory information to the MWOs, ACCs, FICs, other VAACs whose areas of responsibility may be affected, the World Area Forecast Centres (WAFC) of London and Washington, the international OPMET data banks of Brasilia and Washington, ISCS, SADIS and to airlines requiring advisory information through the AFTN address provided specifically for this purpose.

4.2.2.2 In order for the VAACs to begin watching for volcanic ash based on satellite data and volcanic ash trajectory forecasts, MWOs should immediately report to the VAAC on the occurrence of volcanic eruptions and volcanic ash clouds observed in the FIRs under their responsibility. In particular, special air-reports on volcanic activity or volcanic ash clouds received at the MWOs should be immediately transmitted to the corresponding VAAC.

4.2.2.3 Updated advisory information will be issued as necessary, but at least every six hours until such time as the volcanic ash "cloud" is no longer identifiable from satellite data, no further reports of volcanic ash are received from the area, and no further eruptions of the volcano are reported and transmit it according to the requirements of *CAR/SAM FASID Table MET 3B*. **Appendix E** includes the AFTN addresses to which VAAC Buenos Aires and VAAC Washington should transmit volcanic ash advisories, based on the referred Table.

4.2.2.4 The advisory information on volcanic ash issued in abbreviated plain language, using approved ICAO abbreviations and numerical values of self-explanatory nature, should be in accordance with the template shown in *Table A2-1 – Template for advisory message for volcanic ash* of Annex 3.

4.2.2.5 When no approved ICAO abbreviations are available, English plain language text, to be kept to a minimum, should be used.

4.2.2.6 An example of an advisory message for volcanic ash, abstracted from Annex 3, is shown below.

Example A2-1: Advisory message for volcanic ash

Abstract of Appendix 2 to ICAO Annex 3 – Meteorological Service for International Air Navigation

VOLCANIC ASH ADVISORY

ISSUED:	20000402/0700Z
VAAC:	TOKYO
VOLCANO:	USUZAN 805-03
LOCATION:	N4230E14048
AREA:	JAPAN
SUMMIT ELEVATION:	732M
ADVISORY NUMBER:	2000/432
INFORMATION SOURCE:	GMS – JMA
AVIATION COLOUR CODE:	RED
ERUPTION DETAILS:	ERUPTED 20000402/0614Z ERUPTION OBS ASH TO ABV FL300
OBS ASH DATE/TIME:	02/0645Z
OBS ASH CLD:	FL150/350N4230E14048-N4300E14130-N4246E14230-N4232E14150-N4230E14048 SFC/FL150 MOV NE 25KT FL150/350 MOV E 30KT
FCST ASH CLD + 6 HR:	02/1245Z SFC/FL200 N4230E14048-N4232E14150-N4238E14300-N4246 E14230 FL200/350 N4230E14048-N4232E14150N4238E14300-N4246E14230 FL350/600 NO
FCST ASH CLD + 12 HR:	ASH EXP 02/1845Z SFC/FL300
FCST ASH CLD + 18 HR:	N4230E14048-N4232E14150-N4238E14300-N4246E14230 FL300/600 NO
NEXT ADVISORY:	ASH EXP 03/0045Z SFC/FL600 NO ASH EXP 20000402/1300Z
REMARKS:	ASH CLOUDS CAN NO LONGER BE DETECTED ON SATELLITE IMAGE

4.3 Preparation and format of SIGMET messages related to tropical cyclones (WC) and volcanic ash (WV)

4.3.1 Only the information differing from that used for the preparation of SIGMET (WS), which is shown in paragraph 3.3.1, will be included.

4.3.2 Header of the message

…

- The following line includes the day of the month and hour of the SIGMET (WV and WC) issuance, which will be up to 12 hours prior to the commencement of the period of validity, or as soon as possible if advance warning of the existence of these phenomena is not available. These SIGMET should be updated at least every 6 hours.

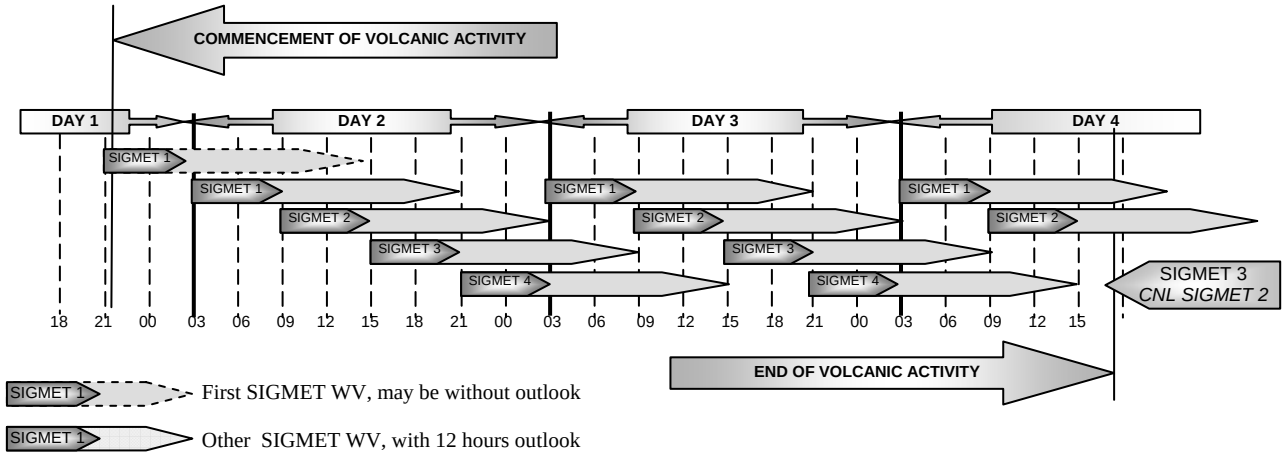
- For SIGMET on volcanic ash and tropical cyclones, the group **$T_1T_2A_1A_2$ii** of WMO abbreviated header should be used, respectively, as follows:

  - **T_1T_2** should always be **WV** for SIGMET on volcanic ash;
  - **T_1T_2** should always be **WC** for SIGMET on tropical cyclones;
  - **A_2 A_2** corresponds to the WMO State geographical designator; and
  - **ii** should always be number **31.**

…

4.3.3 Period of validity of the message

4.3.3.1 In accordance with CAR/SAM ANP, Vol. I, Basic, the period of validity of SIGMET (WV and WC) with format ***ddhhmm/ddhhmm***., should be six hours and an outlook should be added for an additional period of up to 12 hours, with the expected trajectory of volcanic ash clouds and the positions of the tropical cyclone centre, respectively.



4.3.4 Description of the phenomenon

4.3.4.1 Description of the tropical cyclone

4.3.4.1.1 *Table **A6-1** Template for SIGMET and AIRMET messages and special air-reports of Annex 3,* includes several ways to refer to the position of the phenomena described in the message.

- the abbreviation [**TC**] followed by the name of the tropical cyclone [**GLORIA**]**;** time of observation (Z) [**OBS AT1600Z**]; a latitude central point (L_a) followed by 4 characters and one for longitude (L_o) followed by 5 characters indicating the degrees and minutes [**N2706 W07306**], followed by the cloud top cumulonimbus [**CB TOP**] and by the flight level [**FL500**]**;** continuing with the abbreviation "**WI**" indicating the distance in nautical miles from the centre of the cyclone [**WI 150NM OF CENTRE**]; direction and speed of the expected movement and changes [**MOV NW 10KT NC**], followed by the time of the outlook position centre of the cyclone in latitude and longitude points [**FCST 2200Z TC CENTRE N2740 W07345**];

  In a separate line the Outlook received from the Miami TCAC is included, starting with the abbreviation **OTLK**.

Example of SIGMET on tropical cyclone:

ZCZC
FF …
…
…
YUCC SIGMET 3 VALID 251600/252200 YUDO–
YUCC AMSWELL FIR **TC GLORIA OBS AT 1600Z N2706 W07306 CB TOP FL500 WI 150NM OF CENTRE MOV NW 10KT NC FCST 2200Z TC CENTRE N2740 W07345=**
OTLK TC CENTRE 260400 N2830 W07430 261000 N2912 W07530=
NNN

Third SIGMET message issued for the AMSWELL flight information region (identified by YUCC* Amswell area control centre), by the meteorological watch office Donlon/International* (YUSO*) since 0001 UTC; the message is valid from 1600 UTC until 2200 UTC on the 25th of the month;* ***the tropical cyclone Gloria was observed at 1600 UTC centres at 27 degrees 06 minutes north and 73 degrees 06 minutes west with cloud top cumulonimbus reaching flight level 500 up to a distance of 150 nautical miles from the centre; the tropical cyclone is expected to move towards the northeast at 10 knots with no changes in intensity; the outlook position of the centre of the tropical cyclone at 2200 UTC is expected to be 27 degrees 40 minutes north and 73 degrees 45 minutes west.***

Outlook

It is expected that on the day 26 of the month at 0400 UTC the centre of the cyclone will be located at 28 degrees 30 minutes north and 74 degrees 30 minutes west, and at 29 degrees 12 minutes north and 75 degrees 30 minutes west, respectively.

4.3.4.2 Description of a message with information about an eruption

4.3.4.2.1 In order to ensure an immediate transmission of the initial information to aircraft, the first SIGMET on volcanic ash issued, may only contain information indicating that a volcanic ash cloud has been notified, together with the date, time and location. It is not necessary to wait for additional detailed information, not even for information regarding SIGMET "outlook". This information could be included in subsequent SIGMET as the corresponding volcano observatory provides additional information or the associated VAAC provides advisory information.

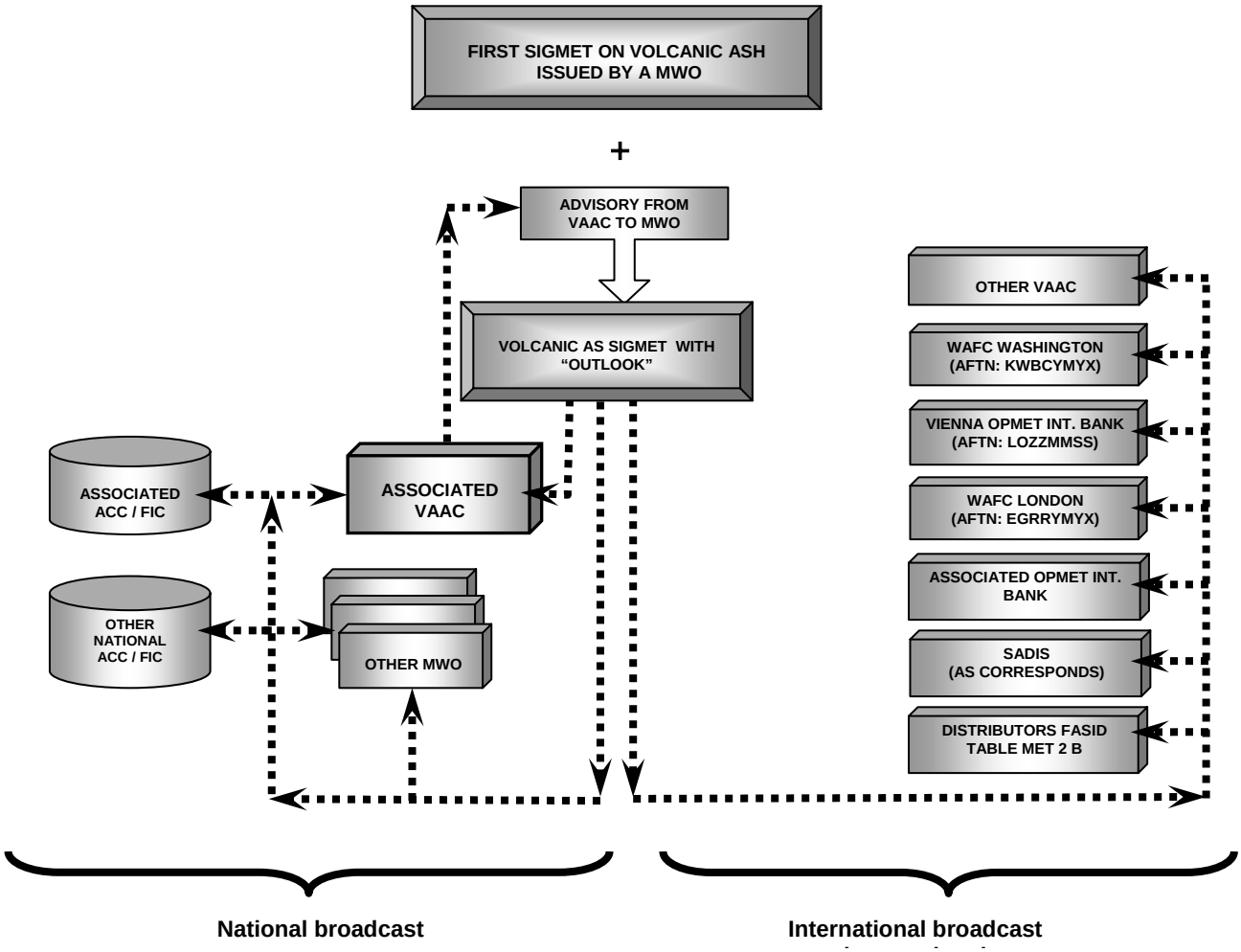


Diagram of information feedback between the associated VAAC and the MWO for the issuance of SIGMET on volcanic ash "with outlook"

Example of the first SIGMET on volcanic ash:

ZCZC
FF SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGRRYMYX
251022 SABEYMYX WVAG31
SABE 251002 SAEF
SIGMET 1 VALID 251020/251600 SABE-
EZEIZA FIR VA LASCAR S2337 W06773 **VA CLD OBS AT 09:55Z TOP FL190 VA CLD APRX S21 W067 TO S25 W064 TO S23 W058 TO S27 W056 MOV NNW 20 KT INTSF. FCST 1600Z VA CLD APRX S22 W068 – S26 W063 – S24 W060 – S27 W057**=
NNN

Corresponds to the first SIGMET message on volcanic ash (WV) issued by the Aeroparque Jorge Newbery MWO valid from 10:20 UTC to 16:00 UTC of the 25th of the month prepared by the Aeroparque Jorge Newbery MWO for EZEIZA flight information region, informing on a volcanic ash cloud originated by the eruption of Lascar volcano located at S23.37 W067.70 observed at 09:55 Z, which covers the area defined by coordinates 21 South 67 West, 25 South 64 West, 23 South 58 West and 27 South 56 West, with a limit at flight level 190 and moving NNW at a speed of 20 knots and intensifying. It is expected that towards the end of the period the ash cloud covers the area comprised between 22 South 68 West, 26 South 63 West, 24 South 60 West and 27 South 57 West.

4.3.4.2.2 *Table **A6-1** Template for SIGMET and AIRMET messages and special air-reports of Annex 3*, includes several ways to refer to the position of the phenomena described in the message. Examples abstracted from Annex 3, related to SIGMET on volcanic ash Outlook are shown below:

- Abbreviations **VA ERUPTION** followed by the name of the volcano, if known, its location in geographical coordinates [**VA ERUPTION MT ASHVAL LOC S1500 E07348**]; time of the observation of the volcanic ash cloud, in/between the affected flight levels and the approximate area in kilometers [**VA CLD OBS AT 1100Z FL310/450 APRX 220KM BY 35KM**] followed by the geographical points (latitude and longitude) [**S1500 E07348 – S1530 E07642**]; continuing with the expected direction of the volcanic ash cloud movement in kilometers by hour [**E07642 MOV ESE 65KMH**] and finally the UTC hour in which the location of the volcanic ash cloud is expected, in an approximated area delimited by geographical points, separated from each other by a hyphen: [**FCST 1700Z VA CLD APRX S1506 E07500 – S1518 E0812 – S1712 E08330 – S1824 E07836**];

- In a separate line the Outlook received from the Miami TCAC, is included, starting with the abbreviation **OTLK.**

Example of SIGMET on volcanic ash with outlook:

ZCZC
FF …
…
…
YUDO SIGMET 2 VALID 211100/211700 YUDO–
YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL LOC S1500 E07348 VA CLD OBS AT 1100Z FL310/450 APRX 220KM BY 35KM S1500 E07348 – S1530 E07642 MOV ESE 65KMH FCST 1700Z VA CLD APRX S1506 E07500 – S1518 E0812 – S1712 E08330 – S1824 E07836=
OTLK 212300Z VA CLD APRX S600 E07836 – S1642 E084212 – S1824 E08900 – S1906 E08100 220500Z VA CLD APRX S1700 E08100 – S1812 E08636 – S2000 E09224 – S2130 E08418=
NNN

Outlook:

It is expected that the 21st of the month at 2300 UTC the volcanic ash cloud is located approximately in an area delimited by the following points: 16 degrees south and 78 degrees 6 minutes east, 16 degrees 42 minutes south and 84 degrees 12 minutes east, 18 degrees 24 minutes south and 89 degrees east, and 19 degrees 6 minutes south and 81 degrees east; it is expected that the 22nd of the month at 0500 UTC the volcanic ash cloud is located approximately in an area delimited by the following points: 17 degrees south and 81 degrees east, 18 degrees 12 minutes south and 86 degrees 36 minutes east, 20 degrees 24 minutes east, and 21 degrees 30 minutes south and 84 degrees 18 minutes east.

PART 5 SIGMET EXCHANGE

5.1 According to *Table MET 1B* of the *CAR/SAM FASID*, each MWO of the CAR/SAM States is assigned the responsibility of issuing SIGMET information for designated areas, usually for one or more FIRs and/or upper flight information regions (UIRs). Some MWOs are only responsible for lower FIRs, while others are responsible for the UIRs over those FIRs. In this respect, the MWOs should make the necessary coordinations in order to prevent problems resulting from SIGMET information not being compatible to the FIR and UIR.

5.2 Each MWO should take steps for the transmission of SIGMET messages locally to other FIRs, to the associated ACCs/FICs and to all aerodrome meteorological offices within its own FIR, for their use in briefings and, if applicable, for their inclusion in flight documentation.

5.3 Even though suppliers of ICAO documentation are clearly defined, each State has the faculty to make coordinations among air traffic services, aeronautical information services and aeronautical meteorology services, in order to include in their distribution list, nationwide, all the necessary addressees to undertake the task of providing safety to air operations.

5.4 These coordinations are perfectly standardized through paragraphs 7.1.6 of Annex 3 - Meteorological Service for International Air Navigation and 5.1.1 of the Manual on coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services, Doc 9377 AN/915.

5.5 The exchange of SIGMET messages, on an international level, should be strictly based on *Table MET 2B of the CAR/SAM FASID*, and those concerning volcanic ash should take due account of the operational procedures for the dissemination of volcanic eruption information contained in *ICAO Doc. 9766 – AN/968, Handbook on the international airways volcano watch (IAVW), Second edition - 2004.*

5.6 SIGMETs and special air-reports which have not been used for the preparation of SIGMETs should be sent to MWOs so that they can be made available to the aircraft prior to departure and to all airborne aircraft anticipating their route up to a distance equivalent to two hours of flight. In the case of non-stop flights with extremely long routes, SIGMETs and special air-reports for all of the foreseen route should be made available at the departure aerodrome.

5.7 Notwithstanding the above, SIGMETs and special air-reports concerning tropical cyclones and volcanic ash clouds should be made available at the departure aerodrome for the whole route, when it is a non-stop flight crossing areas which might be affected by said phenomena.

5.8 Likewise, provisions should be adopted for the immediate transmission to ATS units of information concerning hazardous weather, including SIGMET information, special air-reports, wind shear advisories, aerodrome and storm advisories, to make sure that said information will be duly and timely available for ground-air transmissions.

5.9 **Appendix F** contains a Table with the requirements for the transmission of SIGMET (WS, WC, WV) and special air-reports (UA).

PART 6 International Airways Volcano Watch (IAVW)

6.1 Operational procedures and contact list

6.1 The operational procedures for the dissemination of information on volcanic eruptions and the resulting volcanic ash clouds in areas which might affect the routes used by international flights, the general measures to be taken prior to a volcanic eruption and those to be taken upon the occurrence of a volcanic eruption by Area Control Centres (ACC), Flight Information Centres (FIC), International NOTAM Offices (NOF), Meteorological Watch Offices (MWO) and Volcanic Ash Advisory Centres (VAAC) are shown in detail in ICAO *Doc. 9766 – AN/968, Handbook on the international airways volcano watch (IAVW), Second edition – 2004*, available in the website www.icao.int/anb/iavwopsg/.

6.2 Annex 15, Twelfth edition, July 2004, presents in Appendix 3, the instructions to complete the ASHTAM format, and the abbreviated header: **TTAAiiii CCCC MMYYGGgg (BBB),** to be used after the usual header of AFTN communications, to facilitate the automatic treatment of ASHTAM messages in computarized data banks.

TTAAiiii CCCC MMYYGGgg (BBB)

T T	ASHTAM data designator		
A A	State or Territory designator		
iiii	ASHTAM serial number expressed by a group of four characters		
CCCC	Four letter location indicator corresponding to the flight information region concerned		
MMYYGGgg	Date, time of the report	**MM**	Month
		YY	Date
		GGgg	Hours (GG) and minutes (gg) UTC
(BBB)	Group capable to correct an ASHTAM message disseminated previously with the same serial number	**COR**	

6.3 Contact list

6.3.1 In order to facilitate the use of the contact list, **Appendix G** includes an abstract of Doc 9766-AN/968 – Second edition 2004, of contact information for the ACCs, MWOs, NOFs and volcanic observatories of SAM States under the responsibility of the VAAC Buenos Aires, and **Appendix H** contains contact information for the ACCs, MWOs, NOFs and volcanic observatories of CAR/SAM States under the responsibility of the VAAC Washington.

6.3.2 The States concerned should keep this list updated for the ICAO Lima and Mexico Regional Offices in order to keep international airways volcano watch (IAVW) operative.

6.3.3 Likewise, **Appendix I** includes a list of CAR/SAM States/Territories volcanoes, abstracted from the list of crossed references of volcanoes and navigation aids of Appendix H to *Doc. 9691-AN/954.*

- FIN -

Table A6-1. template for SIGMET and AIRMET messages and special air-reports (uplink)

Extract from Annex 3, Appendix 6 – Technical specifications related to SIGMET and AIRMET information, aerodrome warnings and wind shear warnings

Key: **M** = inclusion mandatory, part of every message
C = inclusion conditional, included whenever applicable
= = a double line indicates that the text following it should be placed on the subsequent line

Note.— The ranges and resolutions for the numerical elements included in SIGMET/AIRMET messages and in special air-reports are shown in Table A5-2 of this appendix.

Element as specified in Chapters 5 and 7	*Detailed content*	*Template(s)*				*Examples*
		SIGMET	*SIGMET SST*[1]	*AIRMET*	*SPECIAL AIR-REPORT*[2]	
Location indicator of FIR/CTA (M)3	ICAO location indicator of the ATS unit serving the FIR or CTA to which the SIGMET/ AIRMET refers (M)	nnnn			—	YUCC[4] YUDD[4]
Identification (M)	Message identification and sequence number[5] (M)	SIGMET [nn]n	SIGMET SST [nn]n	AIRMET [nn]n	ARS	SIGMET 5 SIGMET A3 SIGMET SST 1 AIRMET 2 ARS
Validity period (M)	Date-time groups indicating the period of validity in UTC (M)	VÁLIDO nnnnnn/nnnnnn			—[6]	VALID 221215/221600 VALID 101520/101800 VALID 251600/252200
Location indicator of MWO (M)	Location indicator of MWO originating the message with a separating hyphen (M)	nnnn—				YUDO—[4] YUSO—[4]
Name of the FIR/ CTA *or* aircraft identification (M)	Location indicator and name of the FIR/ CTA[7] for which the SIGMET/AIRMET is issued *or* aircraft radiotelephony call sign (M)	nnnn nnnnnnnnnn FIR[/UIR] *o* nnnn nnnnnnnnnn CTA		Nnnn nnnnnnnnnn FIR[/n]	nnnnnn	YUCC AMSWELL FIR[4] YUDD SHANLON FIR/UIR[4] YUCC AMSWELL FIR/2[4] YUDD SHANLON FIR[4] VA812
IF THE SIGMET IS TO BE CANCELLED SEE FOR DETAILS AT THE END OF THE TEMPLATE						

Element as specified in Chapters 5 and 7	*Detailed content*	*Template(s)*				*Examples*
		SIGMET	*SIGMET SST*[1]	*AIRMET*	*SPECIAL AIR-REPORT*[2]	
Phenomenon (M)[8]	Description of phenomenon causing the issuance of SIGMET/AIRMET (C)	OBSC[9] TS [GR][10] EMBD[12] TS [GR] FRQ[13] TS [GR] SQL[14] TS [GR] TC nnnnnnnnnn SEV TURB[11] SEV ICE[19] SEV ICE (FZRA)[20] SEV MTW[21] HVY DS HVY SS VA[ERUPTION] [MT nnnnnnnnnn] [LOC Nnn[nn] *o* Snn[nn] Ennn[nn] *o* Wnnn[nn]] VA CLD	MOD TURB[11] SEV TURB ISOL[15] CB[16] OCNL[18] CB FRQ[13] CB GR VA[ERUPTION] [MT nnnnnnnnnn] [LOC Nnn[nn] o Snn[nn] Ennn[nn] *o* Wnnn[nn]] VA CLD	SFC WSPD nn[n]KMH (*o* SFC WSPD nn[n]KT) SFC VIS nnnnM (nn)[17] ISOL[15] TS[GR][10] OCNL[18] TS[GR] MT OBSC BKN CLD nnn/[ABV]nnnnM (BKN CLD nnn/[ABV]nnnnFT) OVC CLD nnn/[ABV]nnnnM (*o* OVC CLD nnn/[ABV]nnnnFT) ISOL[15] CB[16] OCNL[18] CB FRQ[13] CB ISOL[15] TCU[16] OCNL[18] TCU[16] FRQ[13] TCU MOD TURB[11] MOD ICE[19] MOD MTW[21]	TS TSGR SEV TURB SEV ICE SEV MTW HVY SS VA CLD [FL nnn/nnn] VA [MT nnnnnnnnnn] MOD TURB[11] GR[10] CB[16]	SEV TURB FRQ TS OBSC TSGR EMD TSGR TC GLORIA VA ERUPTION MT ASHVAL LOC S15 E073 VA CLD MOD TURB MOD MTW ISOL CB BKN CLD 120/900M (BKN CLD 400/3000FT) OVC CLD 270/ABV3000M (OVC CLD 900/ABV10000FT) SEV ICE
Observed or forecast phenomenon (M)	Indication whether the information is observed and expected to continue, *or* forecast (M)	OBS [AT nnnnZ] FCST OBS [AT nnnnZ] AND FCST			OBS AT nnnnZ	OBS AT 1210Z OBS OBS AND FCST
Location (C)	Location (referring to latitude and longitude (in degrees and minutes) *or* locations or geographic features well known internationally)	Nnn[nn] Wnnn[nn] *o* Nnn[nn] Ennn[nn] *o* Snn[nn] Wnnn[nn] *o* Snn[nn] Ennn[nn] *o* N OF Nnn[nn] *o* S OF Nnn[nn] *o* N OF Snn[nn] *o* S OF Snn[nn] *o* [AND] W OF Wnnn[nn] *o* E OF Wnnn[nn] *o* W OF Ennn[nn] *o* E OF Ennn[nn] *o* [N OF, NE OF, E OF, SE OF, S OF, SW OF, W OF, NW OF] nnnnnnnnnnnn *o* WI Nnn[nn] *o* Snn[nn] Wnnn[nn] *o* Ennn[nn] — Nnn[nn] *o* Snn[nn] Wnnn[nn] *o* Ennn[nn] — Nnn[nn] *o* Snn[nn] Wnnn[nn] *o* Ennn[nn] — [Nnn[nn] *o* Snn[nn] Wnnn[nn] *o* Ennn[nn] — Nnn[nn] *o* Snn[nn] Wnnn[nn] *o* Ennn[nn]]			NnnnnWnnnnn *o* NnnnnWnnnnn *o* SnnnnWnnnnn *o* SnnnnEnnnnn	S OF N54 N OF N50 N2020 W07005 YUSB[4] N2706 W07306 N48 E010 N OF N1515 AND W OF E13530; W OF E1554; WI N6030 E02550 - N6055 E02500 - N6050 E02630

Element as specified in Chapters 5 and 7	*Detailed content*	*Template(s)*				*Examples*
		SIGMET	*SIGMET SST*[1]	*AIRMET*	*SPECIAL AIR-REPORT*[2]	
Level (C)	Flight level *and* extent [22] (C)	FLnnn *o* FLnnn/nnn *o* TOP FLnnn *o* [TOP] ABV FLnnn *o*[TOP] BLW FLnnn *o* BLW nnnnM (*o* BLW nnnnFT) *o*[23] CB TOP [ABV] FLnnn WI nnnKM OF CENTRE (*o* CB TOP [ABV] FLnnn WI nnnNM OF CENTRE) *o* CB TOP [BLW] FLnnn WI nnnKM OF CENTRE (*o* CB TOP [BLW] FLnnn WI nnnNM OF CENTRE) *o*[24] FLnnn/nnn [APRX nnnKM BY nnnKM] [Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn] – Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn] [– Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn]] [– Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn]]] (*o* FLnnn/nnn [APRX nnnNM BY nnnNM] [Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn] – Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn] [– Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn]] [– Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn]])			FLnnn	FL180 FL050/080 TOP FL390 BLW FL200 TOP ABV FL100 FL310/450 CB TOP FL500 WI 270KM OF CENTRE (CB TOP FL500 WI 150NM OF CENTRE) FL310/350 APRX 220KM BY 35KM FL390
Movement or expected movement (C)	Movement or expected movement (direction and speed) with reference to one of the eight points of compass, or stationary (C)	MOV N[nnKMH] *o* MOV NE [nnKMH] *o* MOV E [nnKMH] *o* MOV SE [nnKMH] *o* MOV S [nnKMH] *o* MOV SW [nnKMH] *o* MOV W [nnKMH] *o* MOV NW [nnKMH] (o MOV N [nnKT] *o* MOV NE [nnKT] *o* MOV E [nnKT] *o* MOV SE [nnKT] *o* MOV S [nnKT] *o* MOV SW [nnKMH] *o* MOV W [nnKT] *o* MOV NW [nnKT]) *o* STNR			—	MOV E 40 KMH (MOV E 20KT) MOV SE STNR
Changes in intensity (C)	Expected changes in intensity (C)	INTSF *o* WKN *o* NC			—	WKN
Forecast position (C)[22]	Forecast position of volcanic ash cloud *or* the centre of the TC at the end of the validity period of the SIGMET message (C)	FCST nnnnZ TC CENTRE Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn] *o* FCST nnnnZ VA CLD APRX Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn] - Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn] [- Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn]] [- Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn]]	—		—	FCST 2200Z TC CENTRE N2740 W07345 FCST 1700Z VA CLD APRX S15 E075 – S15 E081 – S17 E083 – S18 E079 – S15 E075
Outlook[22] (C)	Outlook providing information beyond the period of validity of the trajectory of the volcanic ash cloud and positions of the tropical cyclone centre (C)	OTLK nnnnnn TC CENTRE Nnnnn *o* SnnnnWnnnnn *o* Ennnnn nnnnnn TC CENTRE Nnnnn *o* SnnnnWnnnnn *o* Ennnnn *o* OTLK nnnnn VA CLD APRX [Flnnn/nnn][25] Nnn[nn] *o* Snn[nn] Wnnn[nn] *o* Ennn[nn] – Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn] – Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn] [– Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn]] [– Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn]] nnnnnn VA CLD APRX Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn] – Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Enn[nn] – Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn] [– Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn]] [– Nnn[nn] *o* Snn[nn]Wnnn[nn] *o* Ennn[nn]]		—		OTLK 260400 TC CENTRE N28030 W07430 261000 TC CENTRE N3100 W07600 OTLK 212300 VA CLD APRX S16 E078 – S17 E084 – S18 E089 – S19 E081 – S16 E078 220300 VA CLD APRX S17 E081 – S18 E086 – S20 E092 – S21 E084 – S17 E081

Element as specified in Chapters 5 and 7	*Detailed content*	*Template(s)*				*Examples*
		SIGMET	*SIGMET SST*[1]	*AIRMET*	*SPECIAL AIR-REPORT*[2]	
OR						
Cancellation of SIGMET/ AIRMET[26] (C)	Cancellation of SIGMET/AIRMET referring to its identification	CNL SIGMET [nn]n nnnnnn/nnnnnn o CNL SIGMET [nn]n nnnnnn/nnnnnn [VA MOV TO nnnn FIR][24]	CNL SIGMET SST [nn]n nnnnnn/nnnnnn	CNL AIRMET [nn]n nnnnnn/nnnnnn	—	CNL SIGMET 2 101200/101600[26] CNL SIGMET 3 251030/251430 VA MOV TO YUDO FIR[26.] CNL SIGMET SST 1 212330/220130[26] CNL AIRMET 151520/151800[26]

Notes.—

1. In accordance with 1.1.2.
2. No wind and temperature to be uplinked to other aircraft in flight in accordance with 3.2.
3. See 4.1.
4. Fictitious location.
5. In accordance with 1.1.3 and 2.1.2.
6. See 3.1.
7. See 2.1.3.
8. In accordance with 1.1.4 and 2.1.4.
9. In accordance with 4.2.1 a).
10. In accordance with 4.2.4.
11. In accordance with 4.2.5 and 4.2.6.
12. In accordance with 4.2.1 b).
13. In accordance with 4.2.2.
14. In accordance with 4.2.3.
15. In accordance with 4.2.1 c).
16. The use of cumulonimbus, CB, is restricted to AIRMETs and SIGMETs related to SST flight during transonic and supersonic cruise; the use of towering cumulus, TCU, is restricted to AIRMETs in accordance with 1.1.4 and 2.1.4.
17. In accordance with 2.1.4.
18. In accordance with 4.2.1 d).
19. In accordance with 4.2.7.
20. In accordance with 4.2.7.
21. In accordance with 4.2.8.
22. Only for SIGMET messages for volcanic ash cloud and tropical cyclones.
23. Only for SIGMET messages for tropical cyclones.
24. Only for SIGMET messages for volcanic ash.
25. Up to four layers (or levels) in accordance with 4.2.9.
26. End of the message (as the SIGMET/AIRMET message is being cancelled).

Note.— In accordance with 1.15 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.

Abstract of Doc 8400/5 – PANS/ABS-ICAO Abbreviations and Codes

Common abbreviations in meteorological messages

A

ABT About
ABV Above
AC Altocumulus
ACT Active *or* activated *or* activity
AD Aerodrome
ADS The address (*when this abbreviation is used to request a repetition, the question mark (IMI) precedes the abbreviation, e.g. IMI ADS*) (*to be used in AFS as a procedure signal*)
ADZ Advise
AFT After . . . *(time or place)*
AFTN Aeronautical fixed telecommunication network
AIREP Air-report
AIRMET Information concerning en-route weather phenomena which may affect the safety of low-level aircraft operations
ALT Altitude
AMD Amend *or* amended *(used to indicate amended meteorological message; message type designator)*
APCH Approach
APRX Approximate *or* approximately
AS Altostratus
AT . . . At *(followed by time at which weather change is forecast to occur)*
ATS Air traffic services

B

BASE Cloud base
BCFG Fog patches
BECMG Becoming
BKN Broken
BL . . . Blowing *(followed by DU = dust, SA = sand or SN = snow)*
BLW Below . . .
BR Mist
BTL Between layers
BTN Between

C

C Degrees Celsius *(Centigrade)*
CAT Clear air turbulence
CAVOK *(to be pronounced "KAV-OH-KAY")* Visibility, cloud and present weather better than prescribed values or conditions
CB *(to be pronounced "CEE BEE")* Cumulonimbus
CC Cirrocumulus
CI Cirrus
CLD Cloud
CONT Continue(s) *or* continued

COV Cover *or* covered *or* covering
CS Cirrostratus
CTA Control area
CU Cumulus

D

D Downward *(tendency in RVR during previous 10 minutes)*
DEG Degrees
DIF Diffuse
DIST Distance
DP Dew point temperature
DR . . . Low drifting *(followed by DU = dust, SA = sand or SN = snow)*
DS Dust storm
DTRT Deteriorate *or* deteriorating
DU Dust
DUC Dense upper cloud
DZ Drizzle

E

E East *or* eastern longitude
EMBD Embedded in a layer *(to indicate cumulonimbus embedded in layers of other clouds)*
END Stop-end *(related to RVR)*
EXC Except
EXTD Extend *or* extending

F

FBL Light *(used to indicate the intensity of weather phenomena, interference or static reports, e.g. FBL RA = light rain)*
FC Funnel cloud *(tornado or water spout)*
FCST Forecast
FEW Few
FG Fog
FIR‡ Flight information region
FL Flight level
FLUC Fluctuating *or* fluctuation *or* fluctuated
FM . . . From *(followed by time weather change is forecast to begin)*
FREQ Frequency
FRONT Front *(relating to weather)*
FRQ Frequent
FT Feet *(dimensional unit)*
FU Smoke
FZ Freezing
FZDZ Freezing drizzle
FZFG Freezing fog
FZRA Freezing rain

G

GAMET Area forecast for low-level flights
GR Hail
GRIB Processed meteorological data in the form of grid point values expressed in binary form *(aeronautical meteorological code)*
GS Small hail and/or snow pellets

H

HPA Hectopascal
HR Hours
HURCN Hurricane
HVY Heavy *(used to indicate the intensity of weather phenomena, e.g. HVY RA = heavy rain)*
HZ Haze

I

IC Ice crystals *(very small ice crystals in suspension, also known as diamond dust)*
ICE Icing
IMC‡ Instrument meteorological conditions
INC In cloud
INTSF Intensify *or* intensifying
ISOL Isolated

J

JTST Jet stream

K

KG Kilograms
KMH Kilometres per hour
KT Knots

L

LAT Latitude
LOC Local *or* locally *or* location *or* located
LONG Longitude
LVL Level
LYR Layer *or* layered

M

M Metres (preceded by figures)
MAX Maximum
MBST Microburst
MET Meteorological *or* meteorology
METAR Aviation routine weather report *(in aeronautical meteorological code)*
MID Mid-point (related to RVR)
MIFG Shallow fog
MNM Minimum
MOD Moderate *(used to indicate the intensity of weather phenomena, interference or static reports, e.g. MOD RA = moderate rain)*
MON Above mountains

MOV Move *or* moving *or* movement
MS Minus
MSL Mean sea level
MT Mountain
MTW Mountain waves
MWO Meteorological watch office

N

N No distinct tendency *(in RVR during previous 10 minutes)*
N North *or* northern latitude
NC No change
NE North-east
NIL None *or* I have nothing to send to you
NM Nautical miles
NOSIG No significant change *(used in trend-type landing forecasts)*
NOTAM A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations
NS Nimbostratus
NSC Nil significant cloud
NSW Nil significant weather
NW North-west

O

OBS Observe *or* observed *or* observation
OBSC Obscure *or* obscured *or* obscuring
OCNL Occasional *or* occasionally
OM Outer marker
OPMET Operational meteorological *(information)*
OTLK Outlook *(used in SIGMET messages for volcanic ash and tropical cyclones)*
OVC Overcast

P

PARL Parallel
PERM Permanent
PO Dust/sand whirls *(dust devils)*
PRFG Aerodrome partially covered by fog
PROB Probability
PS Plus

Q

QFE Atmospheric pressure at aerodrome elevation *(or at runway threshold)*
QNH Altimeter sub-scale setting to obtain elevation when on the ground

R

RA Rain
RAFC Regional area forecast centre
RE Recent *(used to qualify weather phenomena, e.g. RERA = recent rain)*
RNAV *(to be pronounced "AR-NAV")* Area navigation

ROBEX Regional OPMET bulletin exchange *(scheme)*
ROFOR Route forecast *(in aeronautical meteorological code)*
RTD Delayed *(used to indicate delayed meteorological message; message type designator)*
RVR Runway visual range
RWY Runway

S

S South *or* southern latitude
SA Sand
SARPS Standards and Recommended Practices [ICAO]
SC Stratocumulus
SCT Scattered
SEV Severe *(used e.g. to qualify icing and turbulence reports)*
SFC Surface
SH Showers *(followed by RA = rain, SN = snow, PE = ice pellets, GR = hail, GS = small hail and/or snow pellets or combinations thereof, e.g. SHRASN = showers of rain and snow)*
SIGMET Information concerning en-route weather phenomena which may affect the safety of aircraft operations
SKC Sky clear
SN Snow
SPECI Aviation selected special weather report *(in aeronautical meteorological code)*
SPOT Spot wind
SQ Squall
SS Sandstorm
SST Supersonic transport
ST Stratus
STNR Stationary
SW South-west

T

T Temperature
TAF Aerodrome forecast
TC Tropical cyclone
TCU Towering cumulus
TDO Tornado
TEMPO Temporary *or* temporarily
TL Till *(followed by time by which weather change is forecast to end)*
TO To . . . (place)
TOP Cloud top
TS Thunderstorm *(in aerodrome reports and forecasts, TS used alone means thunder heard but no precipitation at the aerodrome)*
TS . . . Thunderstorm *(followed by RA = RAIN, SN = snow, PE = ice pellets, GR = hail, GS = small hail and/or snow pellets or combinations thereof, e.g. TSRASN = thunderstorm with rain and snow)*
TURB Turbulence

U

U	Upward *(tendency in RVR during previous 10 minutes)*
UIR	Upper flight information region
UTC	Coordinated Universal Time

V

VA	Volcanic ash
VER	Vertical
VHF	Very high frequency [30 to 300 MHz]
VIS	Visibility
VMC	Visual meteorological conditions
VOLMET	Meteorological information for aircraft in flight
VRB	Variable

W

W	West *or* western longitude
WAFC	World area forecast centre
WDSPR	Widespread
WI	Within
WINTEM	Forecast upper wind and temperature for aviation
WKN	Weaken *or* weakening
WRNG	Warning
WS	Wind shear
WX	Weather

Z

Z	Coordinated Universal Time *(in meteorological messages)*

Abstract of ICAO CAR/SAM Air Navigation Plan (Doc 8733), Volume II, FASID

|*Editorial Note. — Include new table*

FASID Table MET 3C
TABLA MET 3C DEL FASID

SELECTED STATE VOLCANO OBSERVATORIES
OBSERVATORIOS VULCANOLÓGICOS DE ESTADOS SELECCIONADOS

EXPLANATION OF THE TABLE

Column

1 Provider State of the volcano observatory.

2 Name of the volcano observatory.

3 Location of the volcanic ash advisory centre (VAAC) to which the information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.

4 Area control centre (ACC) to which the information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.

5 ICAO location indicator assigned to the ACC in Column 4.

6. Meteorological watch office (MWO) to which information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.

7 ICAO location indicator assigned to the MWO in Column 6.

EXPLICACIÓN DE LA TABLA

Columna

1 Estado Proveedor del observatorio vulcanológico.

2 Nombre del observatorio vulcanológico.

3 Centro de aviso de ceniza volcánica (VAAC) al cual se debe enviar la información relacionada con actividad volcánica previa a una erupción, una erupción volcánica y/o nubes de ceniza volcánica.

4 Centro de Control de Área (ACC) al cual se debe enviar la información relacionada con actividad precursora de erupción volcánica, una erupción volcánica y/o nubes de ceniza volcánica.

5 Indicador de lugar de la OACI asignado al ACC de la Columna 4.

6 Oficina de vigilancia meteorológica (MWO) a la cual se debe enviar la información relacionada con actividad volcánica previa a una erupción, una erupción volcánica y/o nubes de ceniza volcánica

7 Indicador de lugar de la OACI asignado a la MWO de la Columna 6.

Table MET 3C — Tabla MET 3C

Provider State of volcano observatory Estado Proveedor del observatorio vulcanológico	Volcano observatory Observatorio vulcanológico	VAAC to which the information is to be sent VAAC al cual se debe enviar la información	ACC to which the information is to be sent ACC a la cual se debe enviar la información		MWO to which information is to be sent MWO a la cual se debe enviar la información	
			Name Nombre	ICAO Loc Ind. Ind. de lugar OACI	Name Nombre	ICAO Loc Ind. Ind. De lugar OACI
1	2	3	4	5	6	7
Argentina	Servicio Geológico y Minero Argentino (SEGEMAR)	Buenos Aires	Ezeiza Comodoro Rivadavia Córdoba Mendoza Resistencia	SAEF/ SAEU SAVF/ SAVU SACF/ SACU SAMF/ SAMV SARR/ SAEU	Buenos Aires (Aeroparque) Comodoro Rivadavia Córdoba Mendoza Resistencia	SABE SAVC SACO SAME SARE
Chile	Southern Andes Volcano Observatory (SAVO) Departamento de Ciencias Físicas, Temuco Servicio Nacional de Geología y Minería (SERNAGEOMIN), Santiago	Buenos Aires	Antofagasta Puerto Montt Punta Arenas Santiago	SCFZ SCTZ SCCZ SCEZ	Antofagasta Puerto Montt Punta Arenas Santiago	SCFA SCTE SCCI SCEL
Colombia	INGEOMINAS - Observatorio Vulcanológico de Colombia, Manizales	Washington	Barranquilla Bogotá	SKEC SKED	Santa Fe de Bogotá Santa Fe de Bogotá	SKBO SKBO
Costa Rica	Observatorio Vulcanológico y Sismológico de Costa Rica, (OVSICORI-UNA), Heredia Obs. Sismológicao y vulcanológico de Arenal y Miravalles, San José	Washington	Central American	MHTG	Tegucigalpa	MHTG
Ecuador	Instituto Geofísico, Quito	Washington	Guayaquil	SEGU	Guayaquil	SEGU
El Salvador	Servicio Nacional de Estudios Territoriales (SNET), Ministerio de Medio Ambiente y Recursos Naturales, El Salvador	Washington	Central American	MHTG	Tegucigalpa	MHTG
French Antilles (France)	GUADELOUPE, Observatoire volcanologique de la Soufriere MARTINIQUE, Observatoire volcanologique de la Pelée	Washington Washington	Piarco	TTZP	Port of Spain	TTPP
Guatemala	INSIVUMEH Sección Vulcanología, Ciudad de Guatemala	Washington	Central American	MHTG	Tegucigalpa	MHTG
Guyana	Guyana Geology and Mines Commission	Washington	Georgetown	SYGC	Timheri	SYCJ
México	Centro Nacional de Prevención de Desastres (CENAPRED) Centro Universitario de Investigaciones en Ciencias del Ambiente, Universidad de Colima Instituto de Geofísica, UNAM Observatorio Vulcanológico, Universidad de Colima	Washington	Mazatlán México	MMZT MMEX	México México	MMMX MMMX

Provider State of volcano observatory Estado Proveedor del observatorio vulcanológico	Volcano observatory Observatorio vulcanológico	VAAC to which the information is to be sent VAAC al cual se debe enviar la información	ACC to which the information is to be sent ACC a la cual se debe enviar la información		MWO to which information is to be sent MWO a la cual se debe enviar la información	
			Name Nombre	ICAO Loc Ind. Ind. de lugar OACI	Name Nombre	ICAO Loc Ind. Ind. De lugar OACI
1	2	3	4	5	6	7
Montserrat (U.K.)	Montserrat Volcano Observatory	Washington	Piarco	TTZP	Port of Spain Port of Spain Port of Spain Port of Spain	TTPP TTPP TTPP TTPP
Nicaragua	Dirección General del Inst. Nicaragüense de Estudios Territoriales (INETER), Managua Dirección de Vulcanología	Washington	Central American	MHTG	Tegucigalpa	MHTG
Panamá	Instituto de Geociencias	Washington	Panamá/Tocumen	MPZL	Panamá	MPTO
Perú	Instituto Geofísico del Perú (IGP), Arequipa	Buenos Aires and/y Washington	Lima	SPIM	Lima	SPIM
Trinidad y Tabago	Seismic Research Unit, University of Indies St. Augustine	Washington	Piarco	TTZP	Port of Spain	TTPP

Note.—- Contact information of VAACs is shown in Doc 9766, Part 4 and contact information of volcano observatories, ACCs and MWOs is shown in Doc 9766 Part 5, available at web page: www.icao.int.

Nota.— La información de contacto de los VAAC se presenta en la parte 4 del Doc 9766 y la información de contacto de los observatorios vulcanológicos, de los ACC y de las MWO se presenta en la Parte 5 del Doc 9766, disponible en la página web: www.icao.int.

AFTN ADDRESSES TO WHICH THE MIAMI TCAC SHOULD TRANSMIT TROPICAL CYCLONE ADVISORIES BASED ON CAR/SAM FASID TABLE MET 2B

Tropical Cyclone Advisory Centre (TCAC)	Addressee	AFTN Address
Miami (United States)	Bogota	SKBOYMYX/SKZZMAMX
	Caracas	SVMIYMYX/SVZZMAMX
	Cayenne	SOCAYMYX/SOZZMAMX
	Havana	MUHAYMYX
	Timehri	SYCJYMYX/SYZZMAMX
	Kingston	MKJPYMYX
	Mexico	MMMXYMYX
	Kansas City	*
	Panama	MPTOYMYX/MPZZMAMX
	Port of Spain	TTPPYMYX
	Port-au-Prince	MTPPYMYX
	Recife	SBREYMYX
	Santo Domingo	MDSDYMYX
	Tegucigalpa	MHTGYMYX
	Willemstad	TNCCYMYX
	Zandery	SMJPYMYX/SMZZMAMX
	Int. OPMET Bank of Brasilia	SBBRYZYX
	ISCS	KWBCYMYX
	SADIS	EGZZMNAM

* Any information provided to Kansas City from the Washington VAAC is provided over internal NWS circuits.

AFTN ADDRESSES TO WHICH VAAC BUENOS AIRES AND VAAC WASHINGTON SHOULD TRANSMIT VOLCANIC ASH ADVISORIES BASED ON CAR/SAM FASID TABLE MET 2B AND DOC 9766-AN/968, PART 5

VAAC BUENOS AIRES		
Addressee	**MWO AFTN Address**	**ACC AFTN Address**
Antofagasta/Santiago	SCFAYMYX / SCZZMAMX	SCFAZRZX
Asunción	SGASYMYX / SGZZMAMX	SGASZRZX / SGZZMAMX
Brasilia	SBBSYMYX	SBBRZRZX
Buenos Aires (Aeroparque)	SABEYMYX / SAZZMAMX	SAEZZRZX
Comodoro Rivadavia	SAVCYMYX / SAZZMAMX	SAVCZRZX
Cordoba	SACOYMYX / SAZZMAMX	SACOZRZX
Curitiba	SBCWYMYX	SBCWZRZX
La Paz	SLLPYMYX / SLZZMAMX	SLLPZRZX
Lima-Callao	SPIMYMYX / SPZZMAMX	SPIMZQZX
Manaus	SBAZYMYX	SBAZZRZX
Mendoza	SAMEYMYX / SAZZMAMX	SAMEZRZX
Montevideo	SUMUYMYX / SUZZMAMX	SUEOZQZX
Puerto Montt	SCTEYMYX / SCZZMAMX	SCTEZRZX
Punta Arenas	SCCIYMYX / SCZZMAMX	SCCIZRZX
Recife	SBREYMYX	SBRFZRZX / SBAOZRZX
Resistencia	SAREYMYX / SAZZMAMX	SAREZRZX
Santiago	SCZZMAMX / SCELYMYX	SCELZRZX
OPMET Bank of Brasilia	SBBRYZYX	- - -
ISCS	KWBCYMYX	- - -
SADIS	EGZZMSAM	- - -

VAAC WASHINGTON		
Addressee	**MWO AFTN Address**	**ACC AFTN Address**
Amazónica	SBMUYFTH	SBAZZRZX
Caracas	SVMIYMYX / SVZZMAMX	SVZMZQZX
Cayenne	SOCAYMYX / SOZZMAMX	SOOOZQZX
Guayaquil	SEGUYMYX / SEGUZXBF	SEGUZQZX
Habana	MUHAYMYX	MUFHZQZX
Kansas City	*	
Kingston	MKJPYMYX	
Lima-Callao	SPIMYMYX / SPZZMAMX	SPIMZQZX
México	MMMXYMYX	
Panamá	MPTOYMYX / MPZZMAMX	MPZLZQZX / MPPCICPX
Port of Spain	TTPPYMYX	TTZPZQZX
Port-au-Prince	MTPPYMYX	
Recife	SBREYMYX	SBRFZRZX / SBAOZRZX
Santa Fe de Bogotá	SKBOYMYX / SKZZMAMX	SKBQZQZX / SKBOZQZX
Santo Domingo	MOSOYMYX	
Tegucigalpa	MHTGYMYX	MHTGZQZX
Timehri	SYCJYMYX / SYZZMAMX	SYCJZQZX
Willemstad	TNCCYMYX	
Zandery	SMJPYMYX / SMZZMAMX	
OPMET Bank of Brasilia	SBBRYZYX	- - -
ISCS	KWBCYMYX	- - -
SADIS	EGZZMNAM	- - -

* Any information provided to Kansas City from the Washington VAAC is provided over internal NWS circuits.

INTERNATIONAL TRANSMISSION OF SIGMET MESSAGES (WS/WC/WV) AND SPECIAL AIR-REPORTS (UA) IN THE STATES/TERRITORIES OF THE CAR/SAM REGIONS BASED ON CAR/SAM FASID TABLE MET 2B

Note: According to the explanation of CAR/SAM FASID Table MET 2B, "S" means that the exchange of SIGMET WS, WC, WV and special AIREPs (column 5), is required and "s´" that only SIGMET WV and/or WC are required, therefore, when preparing the AFTN routing lists, the AFTN addresses of both rows should be included, as required.

STATE MWO	ICAO Location Ind.	FIR, UIR and/or SRR	ICAO Location Ind.	WS, WC, WV, UA	AFTN Addresses (based on CAR/SAM FASID Table MET 2B)
1	2	3	4	5	6
ARGENTINA					
BuenosAires/ Aeroparque	SABE	Ezeiza FIR/SRR Ezeiza ACC/UIR	SAEF SAEU	WS, WV, UA	SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
				WV	SKZZMAMX MUHAYMYX SEZZMAMX MKJPYMYX MMMXYMYX TNCCYMYX TTPPYMYX SBBRYZYX KWBCYMYX LOZZMMSS EGZZMSAM
Comodoro Rivadavia	SAVC	Comodoro Rivadavia FIR/SRR Comodoro Rivadavia ACC/UIR	SAVF SAVU	WS, WV, UA	SCZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
Córdoba	SACO	Córdoba FIR/SRR Córdoba ACC/UIR	SACF SACU	WS, WV, UA	SLZZMAMX SCZZMAMX MDSDYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
Mendoza	SAME	Mendoza FIR/SRR Mendoza ACC/UIR	SAMF SAMV	WS, WV, UA	SCZZMAMX SGZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
Resistencia	SARE	Resistencia FIR/SRR Resistencia ACC/UIR	SARR SAEU	WS, WV, UA	SLZZMAMX SCZZMAMX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
BOLIVIA					
La Paz	SLLP	La Paz FIR/SRR	SLLP	WS, WV, UA	TNCCYMYX SCZZMAMX SKZZMAMX MPZZMAMX SGZZMAMX SPZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
BRAZIL					
Brasilia/Cindacta I	SBBS	Brasilia FIR/UIR/SRR	SBBS	WS, WV, UA	SAZZMAMX SLZZMAMX SCZZMAMX SKZZMAMX MDSDYMYX SEZZMAMX SGZZMAMX SPZZMAMX TJSJYMYX SMZZMAMX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
Curitiba/Cindacta II	SBCW	Curitiba FIR/UIR/UTA/SRR	SBCW	WS, WV, UA	SAZZMAMX SLZZMAMX SCZZMAMX MPZZMAMX SGZZMAMX SPZZMAMX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
Manaus/Cindacta IV	SBAZ	Amazónica FIR/UIR/ SRR	SBAZ	WS, WC, WV, UA	SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX MDSDYMYX SEZZMAMX SOZZMAMX SYZZMAMX MTPPYMYX MKJPYMYX TNCCYMYX MPZZMAMX SGZZMAMX SPZZMAMX TJSJYMYX SMZZMAMX TTPPYMYX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
Recife/Cindacta III	SBRE	Recife FIR/UIR/SRR Atlántico FIR/UIR/SRR	SBRE SBAO	WS, WV, UA	SOZZMAMX SGZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
CHILE					
Antofagasta Santiago	SCFA SCEL	Antofagasta FIR/SRR	SCFZ	WS, WV, UA	SAZZMAMX SLZZMAMX SKZZMAMX SEZZMAMX SPZZMAMX SGZZMAMX MPZZMAMX SBBRYZYX KWBCYMYX
Puerto Montt	SCTE	Puerto Montt FIR/SRR	SCTZ	WS, WV, UA	SLZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
Punta Arenas	SCCI	Punta Arenas FIR/SRR	SCEZ	WS, WV, UA	SAZZMAMX SLZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS

STATE MWO	ICAO Location Ind.	FIR, UIR and/or SRR	ICAO Location Ind.	WS, WC, WV, UA	AFTN Addresses (based on CAR/SAM FASID Table MET 2B)
Santiago	SCEL	Santiago FIR/SRR	SCEZ	WS, WV, UA	SAZZMAMX SLZZMAMX MDSDYMYX MPZZMAMX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
				WV	SKZZMAMX MUHAYMYX MDSDYMYX SEZZMAMX MKJPYMYX SVZZMAMX SBBRYZYX KWBCYMYX LOZZMMSS EGZZMSAM
COLOMBIA					
Santa Fe de Bogotá	SKBO	Santa Fe de Bogotá FIR/SRR Barranquilla FIR under FL200 (Bogota UIR)	SKED SKEC	WS, WV, UA	SAZZMZMX SLZZMAMX SCZZMAMX MUHAYMYX MDSDYMYX SEZZMAMX SOZZMAMX SYZZMAMX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX MPZZMAMX SPZZMAMX TJSJYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
				WV	TTPPYMYX SBBRYZYX KWBCYMYX LOZZMMSS EGZZMSA
CUBA					
Habana	MUHA	Habana FIR/SRR	MUFH	WS, WC, WV, UA	SAZZMAMX MYNNYMYX SLZZMAMX SCZZMAMX SKZZMAMX MDSDYMYX SYZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX MPZZMAMX SGZZMAMX SPZZMAMX TJSJYMYX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMSS
				WC, WV	SEZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMSS
DOMINICAN REPUBLIC					
Santo Domingo	MDSD	Santo Domingo FIR/SRR	MDCS	WS, WC, WV, UA	MUHAYMYX TFFFYMYX TFFRYMYX SOZZMAMX SYZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX MPZZMAMX TJSJYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMSS
				WC, WV	MYNNYMYX SKZZMAMX TTPPYMYX TUPJYMYX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMSS
ECUADOR					
Guayaquil	SEGU	Guayaquil FIR/SRR	SEGU	WS, WV, UA	SAZZMAMX SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX MMMXYMYX TNCCYMYX MPZZMAMX SPZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
				WV	MHTGYMYX SBBRYZYX KWBCYMYX LOZZMMSS EGZZMSAM
FRENCH GUIANA					
Cayenne	SOCA	Rochambeau FIR Cayenne SRR	SOOO	WS, WV, UA	TFFFYMYX TFFRYMYX SYZZMAMX TNCCYMYX SMZZMAMX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMSS
				WV	MYNNYMYX SBBRYZYX KWBCYMYX EGRRYMYX LOZZMMSS EGZZMSAM
GUYANA					
Timehri	SYCJ	Georgetown FIR/SRR	SYGC	WS, WV, UA	SAZZMAMX MUHAYMYX MDSDYMYX SOZZMAMX TNCCYMYX SPZZMAMX TJSJYMYX SMZZMAMX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMS
				WV	MKJPYMYX SBBRYZYX KWBCYMYX EGRRYMYX LOZZMMSS EGZZMSAM
HONDURAS					
Tegucigalpa[1]	MHTH	FIR/SRR Centroamericana	MHTH	WS, WC, WV, UA	SKZZMAMX MUHAYMYX MDSDYMYX MTPPYMYX MKJPYMYX TNCCYMYX MPZZMAMX SPZZMAMX SGZZMAMX SPZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMS

[1] La MWO de Tegucigalpa presta servicios a las FIR/SRR de Centroamérica, que está a cargo de la Corporación Centroamericana para los Servicios de Navegación aérea (COCESSNA), conformada por Belice, Costa Rica, El Salvador, Honduras y Nicaragua.

STATE MWO	ICAO Location Ind.	FIR, UIR and/or SRR	ICAO Location Ind.	WS, WC, WV, UA	AFTN Addresses (based on CAR/SAM FASID Table MET 2B)
				WC, WV	MROCYMYX SEZZMAMX MSSSYMYX MGGTYMYX MMMXYMYX MNMGYMYX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMS
JAMAICA					
Kingston	MKJP	Kingston FIR/SRR	MKJK	WS, WC, WV, UA	SAZZMAMX MYNNYMYX SCZZMAMX SKZZMAMX MUHAYMYX SOZZMAMX SYZZMAMX MTPPYMYX MHTGYMYX MMMXYMYX TNCCYMYX MPZZMAMX SPZZMAMX TJSJYMYX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMS
				WC, WV	MDSDYMYX SEZZMAMX EGZZMCAR SIGMET WV will also be sent to LOZZMMS
MÉXICO					
México	MMMX	Mazatlan Oceanic FIR/UIR México FIR/UIR/SRR	MMZT MMEX	WS, WC, WV, UA	SAZZMAMX MYNNYMYX SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX SOZZMAMX SEZZMAMX MHTGYMYX MKJPYMYX MPZZMAMX SGZZMAMX SPZZMAMX TJSJYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMS
				WC, WV	TBPBYMYX MTPPYMYX TNCCYMYX TTPPYMYX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMS
NETHERLANDS ANTILLES					
Willemstad	TNCC	Curacao FIR/SRR	TNCF	WS, WC, WV, UA	SAZZMZMX MYNNYMYX SKZZMAMX MUHAYMYX MDSDYMYX SEZZMAMX TFFFYMYX TFFRYMYX SOZZMAMX SYZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX MMMXYMYX MPZZMAMX SPZZMAMX TJSJYMYX SMZZMAMX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMS
				WC, WV	TBPBYMYX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMS
PANAMA					
Panamá	MPTO	Panamá FIR/SRR	MPZL	WS, WV, UA	SAZZMZMX MYNNYMYX SLZZMAMX SCZZMAMX SKZZMAMX MDSDYMYX SEZZMAMX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX SPZZMAMX TJSJYMYX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMS
				WV	TBPBYMYX MUHAYMYX MTPPYMYX TTPPYMYX SBBRYZYX KWBCYMYX LOZZMMSS EGZZMSAM
PARAGUAY					
Asunción	SGAS	Asunción FIR/UIR/SRR	SGFA	WS, WV, UA	SLZZMAMX SCZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMS
PERU					
Lima - Callao	SPIM	Lima FIR/UIR/SRR	SPIM	WS, WV, UA	SAZZMAMX SLZZMAMX SCZZMAMX SKZZMAMX MDSDYMYX SEZZMAMX TFFFYMYX TFFRYMYX MMMXYMYX TNCCYMYX MPZZMAMX SGZZMAMX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMS
				WV	MUHAYMYX MHTGYMYX MKJPYMYX TTPPYMYX SBBRYZYX KWBCYMYX LOZZMMSS EGZZMSAM
SURINAME					
Zandery	SMJP	Paramaribo FIR/UIR	SMPM	WS, WC. WV, UA	SOZZMAMX SYZZMAMX TNCCYMYX SPZZMAMX TJSJYMYX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMS
				WV	MDSDYMYX MTPPYMYX MKJPYMYX MPZZMAMX SBBRYZYX KWBCYMYX LOZZMMSS EGZZMSAM

STATE MWO	ICAO Location Ind.	FIR, UIR and/or SRR	ICAO Location Ind.	WS, WC, WV, UA	AFTN Addresses (based on CAR/SAM FASID Table MET 2B)
TRINIDAD AND TOBAGO					
Port of Spain	TTPP	Piarco FIR/SRR	TTZP	WS, WC, WV, UA	SAZZMAMX MDSDYMYX TFFFYMYX TFFRYMYX SOZZMAMX SYZZMAMX MTPPYMYX MKJPYMYX TNCCYMYX SPZZMAMX TJSJYMYX SMZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMS
				WC, WV	MYNNYMYX SKZZMAMX MUHAYMYX MMMXYMYX MPZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR SIGMET WV will also be sent to LOZZMMS
UNITED STATES					
Kansas City	KKCI	Houston Oceanic FIR Miami Oceanic FIR/SRR Nassau FIR San Juan FIR/SRR	KZHU KZMA MYNA TJZS	WS, WC, WV, UA	SAZZMAMX MYNNYMYX SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX MDSDYMYX TFFFYMYX TFFRYMYX SOZZMAMX SYZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX TNCCYMYX MPZZMAMX SGZZMAMX SPZZMAMX SMZZMAMX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMNAM SIGMET WV will also be sent to LOZZMMS
				WC,WV	TQPFYMYX TAPAYMYX TNCCYMYX TBPBYMYX MWCRYMYX MDSDYMYX SEZZMAMX TGPYYMYX MMMXYMYX TRPMYMYX TJSJYMYX TKPKYMYX TLPLYMYX TVSVYMYX TTPPYMYX MBGTYMYX TUPJYMYX TISTYMYX SBBRYZYX KWBCYMYX EGZZMNAM SIGMET WV will also be sent to LOZZMMS
URUGUAY					
Montevideo	SUMU	Montevideo FIR/SRR	SUEO	WS, WV, UA	SAZZMAMX SCZZMAMX SKZZMAMX SGZZMAMX SPZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMS
VENEZUELA					
Caracas	SVMI	Maiquetia FIR/UIR/SRR	SVZM	WS, WV, UA	SAZZMAMX MYNNYMYX SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX MDSDYMYX SEZZMAMX TFFFYMYX TFFRYMYX SOZZMAMX SYZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX MPZZMAMX SGZZMAMX SPZZMAMX TJSJYMYX SMZZMAMX TTPPYMYX SBBRYZYX KWBCYMYX EGZZMSAM SIGMET WV will also be sent to LOZZMMS
				WV	SUZZMAMX SBBRYZYX KWBCYMYX LOZZMMSS EGZZMSAM

Contact information of the ACC, MWO, NOF and Volcano Observatories of SAM States under the responsibility of VACC Buenos Aires

VAAC BUENOS AIRES:
AFTN: SAZZMAMX Tel. (5411) 51676767 Ext 18238/18233
Telefax: (5411) 51676705
Optional fax: (5411) 51676709
E-mail: bue.vaac@meteofa.mil.ar
E-mail Opcional: metaer@meteofa.mil.ar // gflores@meteofa.mil.ar

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
ARGENTINA						
Volcano Observatory or Authority	Servicio Geológico y Minero Argentino (SEGEMAR)	N/A	N/A	(5411) 4349 - 3176	(5411) 4349 - 3176	olapid@secind.mecon.gov.ar
FIR	**EZEIZA**					
ACC	Ezeiza	SAEF	SAEZZRZX	(5411) 4480 - 2203	(54 11) 4480 - 2203	
MWO	Aeroparque	SABE	SABEYMYX SAZZMAMX	(5411) 4514 - 1612	(54 11) 4514 - 1612	omaaer@meteofa.mil.ar
FIR	**CORDOBA**					
ACC	Córdoba	SACF	SACOZRZX	(54351) 4335 - 350	(54351) 4335 - 350	acccba@hotmail.com
MWO	Córdoba	SACO	SACOYMYX SAZZMAMX	(54351) 4341 - 479	(54 351) 4756 - 427	omacba@meteofa.mil.ar
FIR	**MENDOZA**					
ACC	Mendoza	SAMF	SAMEZRZX	(54261) 4487 - 486	(54261) 4487 - 486	apelplumerillo@ciudad.com.ar
MWO	Mendoza	SAME	SAMEYMYX SAZZMAMX	(54261) 4487 - 468	(54 261) 4487 - 468	omadoz@meteofa.mil.ar
FIR	**COMODORO RIVADAVIA**					
ACC	Comodoro Rivadavia	SAVF	SAVCZRZX	(54297) 4548 - 375		
MWO	Comodoro Rivadavia	SAVC	SAVCYMYX SAZZMAMX	(54297) 4548 - 018	(54297) 4548 - 018	omacrv@meteofa.mil.ar
FIR	**RESISTENCIA**					
ACC	Resistencia	SARR	SAREZRZX	(54372) 2440 - 939	(54372) 2440 - 939	
MWO	Resistencia	SARE	SAREYMYX SAZZMAMX	(54372) 2436 - 278	(54372) 2436 - 285	omasis@meteofa.mil.ar
NOF	Ezeiza	SAEZ	SAEZYNYX	(5411) 4480 - 2260	(54 11) 4480 - 2260	notamezeiza@yahoo.com.ar
BOLIVIA						
FIR	**LA PAZ**					
ACC	La Paz	SLLP	SLLPZRZX	(5912) 2810 - 203	(5912) 2810 - 203	
MWO	La Paz	SLLP	SLLPYMYX	(5912) 2810 - 238		
NOF	La Paz	SLLP	SLLPYNYX	(5912) 2116 - 963	(5912) 2810 – 022	aisbolivia@yahoo.es

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
BRAZIL						
FIR			**AMAZONICA**			
ACC	Amazonica	SBAZ	SBAZZRZX	(5592) 3625 - 5311	(5592) 3652 - 5425	
MWO	Manaus	SBAZ	SBAZYMYX	(5592) 3652 - 5375	(5592) 3652 - 5384	cmvmanaus@bol.com.br
FIR			**BRASILIA**			
ACC	Brasilia	SBBS	SBBRZRZX	(5561) 3364 - 8404	(55 61) 3364 - 8418	
MWO	Brasilia	SBBR	SBBSYMYX	(5561) 3364 - 8358		cmvbrasilia@ig.com.br
FIR			**RECIFE**			
ACC	Recife	SBRE	SBRFZRZX	(55 81) 3462 - 2742	(55 81) 3462 - 4927	
MWO	Recife	SBRF	SBREYMYX	(55 81) 3461 - 8093		oacmv@cindacta3.gov.br
FIR			**ATLANTICO**			
ACC	Atlántico	SBAO	SBAOZRZX	(55 81) 3461- 8707		oacc-atlantico@cindacta3.gov.br
MWO	Recife	SBRE	SBREYMYX	(55 81) 3461 - 8093		oacmv@cindacta3.gov.br
FIR			**CURITIBA**			
ACC	Curitiba	SBCW	SBCWZRZX	(55 41) 3251 - 5511	(5541) 3251 - 5509	
MWO	Curitiba	SBCW	SBCWYMYX	(55 41) 3251 - 5313	(5541) 3251 - 5374	cmvprevisores@cindacta2.gov.br
NOF	Brasília	SBBR	SBBRYNYX	(55 61) 3648 - 353	(5561) 3364 - 8354	
CHILE						
Volcano Observatory or Authority	Southern Andes Volcano Observatory (SAVO)	N/A	N/A	(5645) 270 - 700 Cel.: (5645) 09 6430 - 245	(5592) 6250 - 371	dvasualto@sernageomin.cl hmoreno@sernageomin.cl
	SERNAGEOMIN, Santiago	N/A	N/A	(562) 737 - 5050 Cel.: (56 45) 09 6495 - 377	(562) 737 - 9253	jnaranjo@sernageomin.cl josénaranjo@manquehue.net
FIR			**ANTOFAGASTA**			
ACC	Antofagasta	SCFA	SCFAZRZX	(5655) 227 944 Anexo 1425	N/A	appantofagasta@dgac.cl
MWO	Antofagasta	SCFA	SCFAYMYX SCZZMAMX	(5655) 227 - 944 Anexos 1421, 1460, 1466	(5655) 225 - 022	cmrnorte@dgac.cl jaravena@dgac.cl
FIR			**SANTIAGO**			
ACC	Santiago	SCEL	SCELZRZX	(252) 7672 - 001 (562) 4363 - 004	(562) 7671 - 636	cta.accu@dgac.cl cta_acol@dgac.cl
MWO	Santiago	SCEL	SCELYMYX SCZZMAMX	(562) 6019 - 214 (562) 4363 - 224 (562) 4363 - 435	(562) 6019 - 214	metaer@meteochile.cl bcoopmet@meteochile.cl
NOF	Santiago	SCEL	SCELZPZX	(562) 436 - 3227	(562) 601 - 9366	operaciones_amb@dgac.cl
FIR			**PUERTO MONTT**			
ACC	Puerto Montt	SCTE	SCTEZRZX	(5665) 4862 - 34 (5665) 4862 - 36	(5665) 486 - 298	mcofre@dgac.cl
MWO	Puerto Montt	SCTE	SCTEYMYX SCZZMAMX	(5665) 486 - 225 (5665) 486 - 226	(56 65) 486 - 226	tiempodelsur@tiempodelsur.cl
FIR			**PUNTA ARENAS**			
ACC	Punta Arenas	SCCI	SCCIZRZX	(5661) 219 - 131 Anexo 5414		fortiz@dgac.cl
MWO	Punta Arenas	SCCI	SCCIYMYX SCZZMAMX	(5661) 219 - 131 Anexos 5464 y 5423	(5661) 219 - 131 Anexo 5464	meteoparenas@dgac.cl

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
PARAGUAY						
FIR	**ASUNCION**					
ACC	Asunción	SGFA	SGASZRZX SGZZMAMX	(59521) 646 - 082	(59521) 646 - 081	acc.sgas@dinac.gov.py
MWO	Asunción	SGAS	SGASYMYX SGZZMAMX	(59521) 646 - 095	(59521) 646 - 095	aeronautica_dmh@dinac.gov.py
NOF	Asunción	SGAS	SGASYNYX SGZZMAMX	(59521) 646 - 952	(59521) 2299 - 49	
PERU						
Volcano Observatory or Authority	Instituto Geofísico del Perú Arequipa	N/A	N/A	(5154) 251 - 373	(5154) 251 - 373	Orlando Macedo omacedo@geo.ig.gob.pe
	Instituto Geofísico del Perú Lima	N/A	N/A	(511) 317 - 2325	(511) 317 - 2321	Edmundo Norabuena enorab@nazca.igp.gob.pe
FIR	**LIMA-CALLAO**					
ACC	Lima-Callao	SPIM	SPIMZQZX	(511) 626 1157 (511) 575 0886 (511) 575 1995 (511) 626 1158		acclima@corpac.gob.pe jmontalvo@corpac.gob.pe
MWO	Lima-Callao	SPIM	SPIMYMYX SPZZMAMX	(511) 626 1181 (511) 626 1180	(511) 6261 - 180	pronostico@corpac.gob.pe
NOF	Lima-Callao	SPIM	SPIMYNYX SPIMYOYX	(511) 626 1173 (511) 626 1172 (511) 414 1435	(511) 4141 - 435	aisaro@corpac.gob.pe
URUGUAY						
FIR	**MONTEVIDEO**					
ACC	Montevideo	SUEO	SUEOZQZX	(5982) 6040 – 295	(5982) 6040 - 298	jopdta@adinet.com.uy
MWO	Montevideo	SUMU	SUMUYMYX	(5982) 2001 - 807	(5982) 6040 - 242	dame@adinet.com.uy sballesteros@adinet.com.uy
NOF	Montevideo	SUMU	SUMUYNYX	(5982) 6040 - 067	(5982) 6040 - 067	ais@adinet.com.uy

Contact information of the ACC, MWO, NOF and Volcano Observatories of CAR/SAM States under the responsibility of VACC Washington

VAAC WASHINGTON:
AFTN: KWBCYMYX Tel.: 1 301 7638444 Fax: 1 301 7638333
E-mail: w-vaac@noaa.gov Grace.Swanson@noaa.gov

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
ANTIGUA AND BARBUDA						
Volcano Observatory or Authority						
FIR	**PIARCO**					
ACC	Porto f Spain	TTZP	TTZPZQZX	(1 868) 6694 - 852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 6694 - 392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 6694 - 128 (1 868) 6259 - 843	(1 868) 6691 – 716	
BRAZIL						
FIR	**AMAZONICA**					
ACC	Amazonica	SBAZ	SBAZZRZX	(5592) 625 - 1401 (5592) 652 - 0311	(5592) 6250 - 371	
MWO	Manaus	SBAZ	SBAZYMYX	(5592) 652 - 0415		cmvmanaus@bol.com.br
FIR	**BRASILIA**					
ACC	Brasilia	SBBS	SBBRZRZX	(5561) 364 - 8404	(55 61) 364 - 8418	
MWO	Brasilia	SBBR	SBBSYMYX	(5561) 364 - 8358		cmvbrasilia@ig.com.br
FIR	**RECIFE**					
ACC	Recife	SBRE	SBRFZRZX	(55 81) 3462 - 2742	(55 81) 3462 - 4927	
MWO	Recife	SBRF	SBREYMYX	(55 81) 3461 - 8093		cmvre@ig.com.br
FIR	**ATLANTICO**					
ACC	Atlántico	SBAO	SBAOZRZX	(55 81) 3461- 8707		
MWO	Recife	SBRE	SBREYMYX	(55 81) 3461 - 8093		cmvre@ig.com.br
FIR	**CURITIBA**					
ACC	Curitiba	SBCW	SBCWZRZX	(55 41) 3563 - 475	(5541) 2515 - 484	
MWO	Curitiba	SBCW	SBCWYMYX	(55 41) 3566 - 216		cmvct@softone.com.br
NOF	Brasília	SBBR	SBBRYNYX	(55 61) 3648 - 353	(5561) 3364 - 8354	
COLOMBIA						
Volcano Observatory or Authority	Manizales	N/A	N/A	(5768) 843 - 020	(5768) 843 - 018	ovsm@ingeominas.gov.co
	Pasto	N/A	N/A	(5727) 314 - 752 (5727) 310 - 514 (5727) 312 - 595	(5727) 310 - 514	ovt@ingeominas.gov.co
	Popayan	N/A	N/A	(5728) 242 - 341 (5728) 242 - 057 (5728) 240 - 210	(5728) 241 - 255	

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
FIR	**BARRANQUILLA**					
ACC	Barranquilla	SKBQ	SKBQZQZX	(575) 3348 - 075 (575) 3348 - 503	(575) 3348 - 503	Maritza.lopez@aerocivil.gov.co
MWO	Bogotá	SKBQ	SKBQYMYX	(571) 4138 - 792 (571) 2662 - 481	(571) 4138 - 440	
FIR	**BOGOTA**					
ACC	Bogotá	SKBO	SKBOZQZX	(571) 4139 - 998 (571) 2663 - 460 (571) 4135 - 445	(571) 4135 - 376	jgaviria@aerocivil.gov.co
MWO	Bogotá	SKBO	SKBOYMYX	(571) 4138 - 792 (571) 2662 - 481	(571) 4138 - 440	
NOF	Bogotá	SKBO	SKBOYNYX	(571) 2662 - 552	(517) 4138 - 631	ais@aerocivil.gov.co
COSTA RICA						
Volcano Observatory or Authority	Observatorio Vulcanológico y Sismológico de Costa Rica (OVSICORI-UNA) Heredia	N/A	N/A	(506) 2610 - 781 (506) 2610 - 611 (506) 2773 - 304 (506) 2773 - 306	(506) 2610 - 303	ovsicori@una.ac.cr
	Observatorio Sismológico y Vulcanológico de Arenal y Miravalles San José	N/A	N/A	(506) 2574 - 220	(506) 6955 - 033	
	Chiripa Site	N/A	N/A	(506) 6956 - 522	(506) 6955 - 193	gainduni@cariari.ucr.ac.cr wtaylor@cariari.ucr.ac.cr
FIR	**CENTROAMERICANA**					
ACC	Tegucigalpa	MHTG	MHTGZQZX	(504) 2331 - 503	(504) 2331 - 219	
MWO*	Tegucigalpa	MHTG	MHTGYMYX	(504) 2349 - 499 (504) 2331 - 111 (504) 2337 – 114	(504) 2338 - 075 (504) 2349 - 500	
*Via National ATS/MET units of Alajuela/Intl. Juan Santamaría Airport	Meteorological Office	MROC	MROCYMYX	(506) 4412 - 398	(506) 4427 - 036	
	AIS	MROC	MROCYOYX	(506) 4433 - 170	(506) 4414 - 781	
NOF	Tegucigalpa	MHTG	MHTGYNYX	(504) 2331 - 141/42 /43 (504) 2331 - 349 (504) 2342 - 407	(504) 2331 - 141 (504) 2331 - 349	
ECUADOR						
Volcano Observatory or Authority	Instituto Geofísico, Quito	N/A	N/A	(5932) 2225 - 655 (5932) 2225 - 627	(5932) 2567 - 847	geofisico@igepn.edu.ec geofisico@accessinter.net http://www.igepn.edu.ec
FIR	**GUAYAQUIL**					
ACC	Guayaquil	SEGU	SEGUZQZX	(5934) 2282 - 851	(5934) 2396 - 073	accgquil@yahoo.com.mx
MWO	Guayaquil	SEGU	SEGUYMYX	(5934) 2392 - 712	(5934) 2283 - 748	meteorología_guayaquil@yahoo.com fmancero@dgac.gov.ec
NOF	Guayaquil	SEGU	SEGUYNYX	(5934) 2285 - 661	(5934) 2285 - 661	

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
EL SALVADOR						
Volcano Observatory or Authority	Instituto Geotécnico de El Salvador			(503) 2229 - 688	(503) 2229 - 800	
FIR				**CENTROAMERICANA**		
ACC	Tegucigalpa	MHTG	MHTGZQZX	(504) 2331 - 503	(504) 2331 - 219	
MWO*	Tegucigalpa	MHTG	MHTGYMYX	(504) 2349 - 499 (504) 2331 - 111 (504) 2337 - 114	(504) 2338 - 075 (504) 2349 - 500	
*Via national ATS/MET units of San Salvador/Ilopango Intl.	OMA			(503) 2950 - 304 (503) 2950 - 626	(503 9 2950 - 304	dgrnr@es.com.sv
	AIS			(503) 2950 - 433		
San Salvador/El Salvador Intl.	OMA			(503) 3399 - 435 (503) 3399 - 424	(503) 3399 - 435	
	AIS			(503) 339 9455		
NOF	Tegucigalpa	MHTG	MHTGYNYX	(504) 2331 - 141/42 /43 (504) 2331 - 349 (504) 2342 - 407	(504) 2331 - 141 (504) 2331 - 349	
FRENCH ANTILLES						
Volcano Observatory or Authority	**GUADELOUPE** Observatoire volcanologique de la Soufriere	N/A	N/A	(590) 9911 – 33	(590) 991 - 134	komorow@ipgp.jussieu.fr
	MARTINIQUE Observatoire volcanologique de la Montagne Pelée	N/A	N/A	(596) 7841 - 41	(596) 558 - 080	viode@ipgp.jussieu.fr
FIR				**PIARCO**		
ACC	Port of Spain	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 - 716	
FRENCH GUIANA						
FIR				**ROCHAMBEAU**		
ACC	Rochambeau	SOCA	SOOOZQZX	(594) 359 - 3 06	(594) 359 - 3 98	yves-j.mattei@aviation-civile.gouv.fr
MWO	CVM Rochambeau	SOCA	SOCAYMYX	(594) 353 - 5 35	(594) 356 - 0 89	philippe.livenais@meteo.fr
NOF	Rochambeau	SOCA	SOOYNYX	(594) 359 - 3 08	(594) 304 - 124	gerard.clavaret@aviation/civile.gov
GUATEMALA						
Volcano Observatory or Authority	INSIVUMEH Sección Vulcanología Ciudad de Guatemala			(502) 3314 - 967 (502) 3319 - 183 (502) 3324 - 741	(502) 3315 - 005	
FIR				**CENTROAMERICANA**		
ACC	Tegucigalpa	MHTG	MHTGZQZX	(504) 2331 - 503	(504) 2331 - 219	
MWO*	Tegucigalpa	MHTG	MHTGYMYX	(504) 2349 - 499	(504) 2338 - 075	

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
				(504) 2331 - 111 (504) 2337 - 114	(504) 2349 - 500	
*Via national ATS/MET units of Guatemala/La Aurora Intl.	AIS			(502) 3315 - 484		
	OMA			(502) 3314 - 897		
NOF	Tegucigalpa	MHTG	MHTGYNYX	(504) 2331 - 141/42 /43 (504) 2331 - 349 (504) 2342 - 407	(504) 2331 - 141 (504) 2331 - 349	
GUYANA						
Volcano Observatory or Authority	Guyana Geology and Mines Comisión			(5922) 53047	(5922) 53047	ggmc@sdnp.org.gy
FIR	**GEORGETOWN**					
ACC	Georgetown	SYCJ	SYCJZQZX	(592) 2612 - 245	(592) 2612 - 279	
MWO	Timehri	SYCJ	SYCJYMYX	(592) 2612 - 216	(592) 2612 - 284	
NOF	Timehri	SYCJ	SYCJYNYX	(592) 2612 - 269	(592) 2612 - 279	
HONDURAS						
FIR	**CENTROAMERICANA**					
ACC	Tegucigalpa	MHTG	MHTGZQZX	(504) 2331 - 503	(504) 2331 - 219	
MWO*	Tegucigalpa	MHTG	MHTGYMYX	(504) 2349 - 499 (504) 2331 - 111 (504) 2337 - 114	(504) 2338 - 075 (504) 2349 - 500	
NOF	Tegucigalpa	MHTG	MHTGYNYX	(504) 2331 - 141/42 /43 (504) 2331 - 349 (504) 2342 - 407	(504) 2331 - 141 (504) 2331 - 349	
MEXICO						
MÉXICO Observatorio u Organismo de Vulcanología	Centro Nacional de Prevención de Desastres (CENAPRED)			+52 (55) 5606-8837 +52 (55) 5424-6100	+52 (55) 5606-1608	rqw@cenapred.unam.mx http://www.cenapred.unam.mx
	Centro Universitario de Investigación en Ciencias del Ambiente, Universidad de Colima			+52 (312) 3161-137 Ext. 51151	+52 (312) 3161-137 Ext. 31152	galindo@ucol.mx
	Instituto de Geofísica, UNAM Observatorio de volcanes, Universidad de Colima			+52 (312) 3161-134 Ext. 47208	+52 (312) 3161-134 Ext. 47208	tonatiuh@cgic.ucol.mx http://www.ucol.mx/volcan
FIR	**MAZATLÁN OCEANIC**					
FIC	Radio Mexico	MMID	MMIDZQZX	+52 (999) 9461-347	+52 (999) 9461-237	centromerida@hotmail.com
MWO	México	MMMX	MMMXYMYT	+52 (55) 5716-6678	+52 (55) 5802-8519	hvargast@sct.gob.mx
FIR	**MEXICO**					
ACC	Centro Mexico Centro Merida Centro Mazatlan Centro Monterrey	MMEX MMID MMZT MMTY	MMEXZQZX MMIDZQZX MMZTZQZX MMTYZQZX	+52 (55) 5716 - 6655 +52 (999) 9461- 347 +52 (669) 9181 – 092 +52 (81) 8369 - 0846	+52 (55) 5716-4199 +52 (999) 9461-237 +52 (669) 9822-820 +52 (81) 8369- 0884	centro_mexico@yahoo.com centromerida@hotmail.com josegalindo@hotmail.com felipe1822@yahoo.com.mx

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
MWO	Centro de Análisis y Pronósticos Meteorológicos Aeronáuticos (CAPMA), SENEAM, SCT.	MMMX	MMMXYMYT	+52 (55) 5716-6678	+52 (55) 5802-8519	hvargast@sct.gob.mx
NOF	México	MMMX	MMMXYNYX	+52 (55) 5716-6615	+52 (55) 5716-6615	jvillanu@sct.gob.mx
MONTSERRAT (U..K)						
Volcano Observatory or Authority	Montserrat Volcano Observatory	N/A	N/A	1* 664** 491 5647 1 664 491 0002 * For Canada, USA and the Caribbean only ** Or 868	1 664 491 2423	mvo@candw.ag
	British Geologial Survey	N/A	N/A	44 115 936 3100 44 115 936 3200		u.name@bgs.sc.uk
FIR	**PIARCO**					
ACC	Porto f Spain	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 - 716	
NICARAGUA						
Volcano Observatory or Authority	Dirección General del Instituto Nicaragüense de Estudios Territoriales (INETER), Managua	N/A	N/A	505 2 492 757 505 2 492 759 505 2 496 986	505 2 491 890	ineter.disup@netport.com.ni
	Dirección de Meteorología	N/A	N/A	505 2 492 755	505 2 492 755	metineter@ibw.com.ni
	Dirección de Vulcanología	N/A	N/A	505 2 492 761 505 2 496 987	505 2 491082	
FIR	**CENTROAMERICANA**					
ACC	Tegucigalpa	MHTG	MHTGZQZX	(504) 2331 - 503	(504) 2331 - 219	
MWO*	Tegucigalpa	MHTG	MHTGYMYX	(504) 2349 - 499 (504) 2331 - 111 (504) 2337 - 114	(504) 2338 - 075 (504) 2349 - 500	
*Via national ATS/MET units of Managua/Oma				505 233 1925 505 233 1321	505 233 1610	
AIS (airport)					505 233 1765	
NOF	Tegucigalpa	MHTG	MHTGYNYX	(504) 2331 - 141/42 /43 (504) 2331 - 349 (504) 2342 - 407	(504) 2331 - 141 (504) 2331 - 349	
PANAMA						
Volcano Observatory or Authority	Instituto de Geociencia			(507) 2637703 (507) 6750410	(507) 2637671	igc2@ancon.up.ac.pa

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
FIR	**PANAMA**					
ACC	Panamá	MPZL	MPZLZQZX MPPCICPX	(507) 3159807	(507) 3159849	mailto@aeronautica.gob.pa
MWO	Panamá	MPTO	MPTOYMYX	(507) 2382611 (507) 2382612	(507) 2384678	meteortoc@hotmail.com
NOF	Panamá	MPTO	MPTOYNYX	(507) 2382615 (507) 2382616	(507) 2382617	aisnof@seronautica.gob.pa
PERU						
Volcano Observatory or Authority	Instituto Geofísico del Perú Arequipa	N/A	N/A	(5154) 251 - 373	(5154) 251 - 373	Orlando Macedo omacedo@geo.ig.gob.pe
	Instituto Geofísico del Perú Lima	N/A	N/A	(511) 317 - 2325	(511) 317 - 2321	Edmundo Norabuena enorab@nazca.igp.gob.pe
FIR	**LIMA-CALLAO**					
ACC	Lima-Callao	SPIM	SPIMZQZX	(511) 626 1157 (511) 575 0886 (511) 575 1995 (511) 626 1158		acclima@corpac.gob.pe jmontalvo@corpac.gob.pe
MWO	Lima-Callao	SPIM	SPIMYMYX SPZZMAMX	(511) 626 1181 (511) 626 1180	(511) 6261 - 180	pronostico@corpac.gob.pe
NOF	Lima-Callao	SPIM	SPIMYNYX SPIMYOYX	(511) 626 1173 (511) 626 1172 (511) 414 1435	(511) 4141 - 435	aisaro@corpac.gob.pe
SAINT KITTS AND NEVIS						
Volcano Observatory or Authority						
FIR	**PIARCO**					
ACC	Porto f Spain	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 - 716	
SAINT LUCIA						
Volcano Observatory or Authority						
FIR	**PIARCO**					
ACC	Porto f Spain	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 - 716	

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
SAINT VINCENT AND THE GRENADINES						
Volcano Observatory or Authority						
FIR	**PIARCO**					
ACC	Porto f Spain	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 - 716	
SURINAME						
FIR	**PARAMARIBO**					
ACC						
MWO						
NOF						
TRINIDAD AND TOBAGO						
FIR	**PIARCO**					
ACC	Porto f Spain	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 - 716	
VENEZUELA						
Volcano Observatory or Authority	Maiquetía		SVMIYMYQ	(58212) 303 1522	(58212) 303 1522	OFIMETMIO@hotmail.COM
FIR	**MAIQUETIA**					
ACC	Maiquetía	SVZM	SVZMZQZX	(58212) 355 - 2216	(58212) 355 - 2216	acc@inac.gov.ve
MWO	Maiquetía	SVZZ	SVMIYMYX	(58212) 303 - 1522	(58212) 303 - 1522	ovmmaiquetia@inac.gov.ve
NOF	Maiquetía	SVZZ	SVMIYNYX	(58212) 355 - 1325	(58212) 355 - 1325	nofmaiquetia@inac.gov.ve

Abstract of Doc. 9691-AN/954, Appendix H

Cross- reference list of volcanoes and navigation aids

MEXICO - CENTRAL AMERICA

Name of the volcano	Country/State Region	Numer of the volcano	Volcano Lat/Long		Radial (MAG BRG) and distance from reference Navigation Aid	
ACATENANGO	GUATEMALA	1402-08	N14 30.0	W090 52.3	251°/20NM	LA AURORA (GUAT. CITY) (AUR) VOR/DME
ALMOLONGA	GUATEMALA	1402-04	N14.48.4	W091 28.5	083°/52NM	TAPACHULA (TAP) VOR/DME
ARENAL	COSTA RICA	1405-033	N10 27.5	W084.42.1	313°/39NM	EL COCO (SAN JOSÉ) (TÍO) VOR/DME
ATITLÁN	GUATEMALA	1402-06	N14 34.6	W091 11.1	265°/38NM	LA AURORA (GUAT. CITY) (AUR) VOR/DME
BARCENA	MÉXICO-IS	1401-02	N19. 15.4	W110 48.0	185°/240NM	CABOS (SAN JOSÉ DEL CABO) (SJD) VOR/DME
BARÚ	PANAMÁ	1407-01	N08 48.0	W082 33.3	342°/25NM	DAVID (DAV) VOR/DME
BARVA	COSTA RICA	1405-05	N10 08.1	W084 06.0	040°/12NM	EL COCO (SAN JOSÉ) (TÍO) VOR/DME
CERRO NEGRO	NICARAGUA	1404-07	N12 30.2	W086 42.1	157°/96NM	TONCONTÍN (TEGUCIGALPA) (TNT) VOR/DME
COLIMA COMPLEX	MÉXICO	1401-04	N19 30.5	W103 37.1	342°/14NM	COLIMA (COL) VOR/DME
CONCEPCIÓN	NICARAGUA	1404-12	N11 32.2	W085 37.2	353°/56NM	LIBERIA (LIB) VOR/DME
CONCHAGUITA	EL SALVADOR	1403-12	N13 12.4	W087 45.5	209°/58NM	TONCONTÍN (TEGUCIGALPA) (TNT) VOR/DME
COSIGUINA	NICARAGUA	1404-01	N12 58.5	W087 33.4	193°/65NM	TONCONTÍN (TEGUCIGALPA) (TNT) VOR/DME
EL CHICHÓN	MÉXICO	1401-12	N17 21.4	W093 13.4	005°/36NM	TUXTLA (TUXTLA GUTIÉRREZ) (TGZ) VOR/DME
FUEGO	GUATEMALA	1402-09	N14 28.2	W090 52.5	247°/21NM	LA AURORA (GUAT. CITY) (AUR) VOR/DME
ILOPANGO	EL SALVADOR	1403-06	N13 40.2	W089 03.1	102°/3NM	ILOPANGO (SAN SALVADOR) (YSV) VOR/DME
IRAZÚ	COSTA RICA	1405-06	N09 58.4	W083 51.1	089°/22NM	EL COCO (SAN JOSÉ) (TÍO) VOR/DME
IZALCO	EL SALVADOR	1403-03	N13 48.4	W089 37.6	280°/31NM	ILOPANGO (SAN SALVADOR) (YSV) VOR/DME
LA YEGUADA	PANAMÁ	1407-02	N08 31.2	W080 54.4	004°/26NM	SANTIAGO (STG) VOR
LAGUNA VERDE	EL SALVADOR	1403-01	N13 53.3	W089 47.1	283°/40NM	ILOPANGO (SAN SALVADOR) (YSV) VOR/DME
LAS PILAS	NICARAGUA	1404-08	N12 29.4	W086 41.2	156°/96NM	TONCONTIN (TEGUCIGALPA) (TNT) VOR/DME
MASAYA	NICARAGUA	1404-10	N11 59.0	W086 09.4	334°/90NM	LIBERIA (LIB) VOR/DME
MICHOACÁN-GUANAJUATO	MÉXICO	1401-06	N19 28.5	W102 15.0	285°/12NM	URUAPÁN (UPN) VOR/DME
MIRAVALLES	COSTA RICA	1405-03	N10 44.5	W085 09.1	066°/25NM	LIBERIA (LIB) VOR/DME
MOMOTOMBO	NICARAGUA	1404-09	N12 25.2	W086 32.2	153°/104NM	TONCONTÍN (TEGUCIGALPA) (TNT) VOR/DME
PACAYA	GUATEMALA	1402-11	N14 22.5	W090 36.0	194°/13NM	LA AURORA (GUAT. CITY) (AUR) VOR/DME
PICO DE ORIZABA	MÉXICO	1401-10	N19 01.5	W097 16.1	256°/61NM	VERACRUZ (VER) VOR/DME
PICOS PINACATE	MÉXICO	1401-001	N31 46.2	W113 29.5	349°/25NM	PEÑASCO (PUNTA PEÑASCO) (PPE) VOR/DME
POAS	COSTA RICA	1405-04	N10 12.0	W084 13.6	360°/12NM	EL COCO (SAN JOSÉ) (TÍO) VOR/DME
POPOCATEPETL	MÉXICO	1401-09	N19 01.2	W098 37.2	233°/16NM	PUEBLA (PBC) VOR/DME
RINCÓN DE LA VIEJA	COSTA RICA	1405-02	N10 49.5	W085 19.3	040°/19NM	LIBERIA (LIB) VOR/DME
SAN CRISTÓBAL	NICARAGUA	1404-02	N12 42.1	W087 00.1	166°/80NM	TONCONTÍN (TEGUCIGALPA) (TNT) VOR/DME
SAN MIGUEL	EL SALVADOR	1403-10	N13 25.5	W088 16.2	087°/45NM	EL SALVADOR (SAN SALVADOR) (CAT) VOR/DME
SAN SALVADOR	EL SALVADOR	1403-05	N13 44.1	W089 17.1	282°/10NM	ILOPANGO (SAN SALVADOR) (YSV) VOR/DME

Name of the volcano	Country/State Region	Numer of the volcano	Volcano Lat/Long		Radial (MAG BRG) and distance from reference Navigation Aid	
SANTA ANA	EL SALVADOR	1403-02	N13 51.1	W089 37.5	284°/31NM	ILOPANGO (SAN SALVADOR) (YSV) VOR/DME
SANTA MARÍA	GUATEMALA	1402-03	N14 45.2	W091 33.1	087°/47NM	TAPACHULA (TAP) VOR/DME
SOCORRO	MÉXICO-IS	1401-021	N18 45.0	W110 57.0	184°/271NM	CABOS (SAN JOSÉ DEL CABO) (SJD) VOR/DME
TACANA	MÉXICO	1401-13	N15 07.5	W092 06.5	032°/25NM	TAPACHULA (TAP) VOR/DME
TELICA	NICARAGUA	1404-04	N12 36.1	W086 50.4	161°/88NM	TONCONTIN (TEGUCIGALPA) (TNT) VOR/DME
TRES VÍRGENES	MÉXICO	1401-01	N27 28.1	W112 35.3	289°/19NM	ROSALÍA (SANTA ROSALÍA) (SRL) VOR/DME
TURRIALBA	COSTA RICA	1405-07	N10 01.5	W083 46.1	083°/27NM	EL COCO (SAN JOSÉ) (TÍO) VOR/DME
VOLCÁN CEBORUCO	MÉXICO	1401-03	N21 07.3	W104 30.0	124°/25NM	TEPIC (TNY) VOR/DME
VOLCÁN DE SAN MARTÍN	MÉXICO	1401-11	N18 34.2	W095 10.1	304°/43NM	MINATITLÁN (MTT) VOR/DME

SOUTH AMERICAN - CARRIBBEAN

Name of the volcano	Country/State Region	Numer of the volcano	Volcano Lat/Long		Radial (MAG BRG) and distance from reference Navigation Aid	
ANTISANA	ECUADOR	1502-03	S00 28.5	W078 08.2	047°/39NM	LATACUNGA (LTV) VOR/DME
ANTUCO	CHILE-C	1507-08	S37 24.2	W071 20.6	081°/51NM	LOS ANGELES (MAD) VOR
ARACAR	ARGENTINA	1505-107	S24 16.1	W067 46.1	152°/122NM	EL LOA (CALAMA) (LOA) VOR/DME
CALBUCO	CHILE-S	1508-02	S41 18.4	W072 36.0	061°/23NM	PUERTO MONTT (MON) VOR/DME
CALLAQUI	CHILE-C	1507-081	S37 54.4	W071 24.4	113°/57NM	LOS ANGELES (MAD) VOR
CARRAN-LOS VENADOS	CHILE-C	1507-14	S40 21.0	W072 04.1	239°/48NM	SAN MARTÍN DE LOS ANDES (CHP) VOR/DME
CERRO QUIZAPU AZUL	CHILE-C	1507-06	535 39.1	W070 45.4	144°/46NM	CURICO (ICO) VOR/DME
CERRO AZUL	GALÁPAGOS	1503-06	S00 54.0	W091 25.1	274°/631NM	SALINAS (SAV) VOR/DME
CERRO BRAVO	COLOMBIA	1501-011	N05 05.3	W075 18.0	255°/23NM	MARIQUITA (MQU) VOR
CERRO HUDSON	CHILE-S	1508-057	S45 54.0	W072 58.1	137°/50NM	PUERTO (PAR) VOR/DME
CERRO YANTELES	CHILE-S	1508-051	S43 25.1	W072 49.3	236°/82NM	ESQUEL (ESQ) VOR
CHACANA	ECUADOR	1502-022	S00 22.3	W078 15.0	033°/39NM	LATACUNGA (LTV) VOR/DME
CORCOVADO	CHILE-S	1508-05	S43 10.5	W072 48.0	246°/76NM	ESQUEL (ESQ) VOR
CORDÓN CAULLE	CHILE-C	1507-141	S40 30.4	W072 12.0	232°/57NM	SAN MARTÍN DE LOS ANDES (CHP) VOR/DME
COTOPAXI	ECUADOR	1502-05	S00 40.4	W078 26.1	036°/18NM	LATACUNGA (LTV) VOR/DME
CUMBAL	COLOMBIA	1501-10	N00 58.5	W077 52.5	236°/43NM	PASTO (PST) VOR7DME
DESCABEZADO GRANDE	CHILE-C	1507-05	S35 34.5	W070 45.0	141°/43NM	CURICO (ICO) VOR/DME
DOÑA JUANA	COLOMBIA	1501-07	N01 28.1	W076 55.1	085°/22NM	PASTO (PST) VOR/DME
EL MISTI	PERÚ	1504-01	S16 17.4	W071 24.3	079°/11NM	AREQUIPA (EQU) VOR/DME
FERNANDINA	GALÁPAGOS	1503-01	S00 22.1	W091 33.0	266°/76NM	GALÁPAGOS (ISLA BALTRA) (GLV) VOR/DME
GALERAS	COLOMBIA	1501-08	N01 13.1	W077 22.1	204°/11NM	PASTO (PST) VOR/DME
GUAGUA PICHINCHA	ECUADOR	1502-02	S00 10.2	W078 35.5	001°/45NM	LATACUNGA (LTV) VOR/DME
GUALLATIR	CHILE-N	1505-02	S18 25.1	W069 10.1	107°/67NM	TACNA (TCA) VOR/DME
HUAYNAPUTINA	PERÚ	1504-03	S16 36.3	W070 51.0	111°/46NM	AREQUIPA (EQU) VOR/DME
HUEQUI	CHILE-S	1508-03	S42 21.4	W072 34.5	146°/601NM	PUERTO MONTT (MON) VOR/DME
HUILA	COLOMBIA	1501-05	N02 55.1	W076 03.0	1465°/36NM	CALI (CLO) VOR/DME
ISLUGA	CHILE-N	1505-03	S19 09.0	W068 49.5	12019°/98NM	ARICA (ARI) VOR/DME
KICK-'EM-JENNY	W ANTILLAS	1600-16	N12 18.0	W061 37.5	040°/20NM	POINT SALINES (ST GEORGE'S) (GND) VOR/DME
LASCAR	CHILE-N	1505-10	S23 22.1	W067 43.5	131°/82NM	EL LOA (CALAMA) (LOA) VOR/DME
LAUTARO	CHILE-S	1508-06	S49 00.4	W073 33.0	128°/95NM	ISLOTE SAN PEDRO (ISP) VOR/DME
LLAIMA	CHILE-C	1507-11	S38 42.0	W071 42.0	075°/43NM	TEMUCO (TCO) VOR/DME
LLULLAILLACO	CHILE-N	1505-11	S24 43.1	W068 31.5	125°/129NM	ANTOFAGASTA (FAG) VOR/DME
LONQUIMAY	CHILE-C	1507-10	S38 22.1	W071 34.5	055°/54NM	TEMUCO (TCO) VOR/DME
MAIPO	CHILE-C	1507-021	S34.09.4	W069 49.4	127°/58NM	LOS CERRILLOS (SANTIAGO) (SCL) VOR/DME
MARCHENA	GALÁPAGOS	1503-08	N00 19.5	W090 28.1	046°/497NM	BANDA ACEH (BAC) VOR/DME
MICOTRÍN	W ANTILLAS	1600-10	N15 19.5	W061 19.5	351°/47NM	FORT DE FRANCE (FOF) VOR/DME
MINCHINMAVIDA	CHILE-S	1508-04	S42 46.5	W072 25.5	265°/58NM	ESQUEL (ESQ) VOR
MOCHO-CHOSHUENCO	CHILE-C	1507-13	S39 55.4	W072 01.5	270°/43NM	SAN MARTÍN DE LOS ANDES (CHP0 VOR/DME)
MONTAGNE PELEE	W ANTILLAS	1600-12	N14 49.1	W061 10.1	341°/16NM	FORT DE FRANCE (FOF) VOR/DME
MONTE BURNEY	CHILE-S	1508-07	S52 19.5	W073 24.0	208°/50NM	PUERTO NATALES (PNT) VOR/DME
MORNE PATATES	W ANTILLAS	1600-11	N15 13.1	W061 22.1	344°/42NM	FORT DE FRANCE (FOF) VOR/DME
MOUNT LIAMUIGA	W ANTILLAS	1600-03	N17 22.1	W062 48.0	167°/43NM	SAINT MAARTEN (PJM) VOR/DME
NEGRO DE MAYASQUER	COLOMBIA	1501-11	N00 49.4	W077 57.3	262°/17NM	IPIALES (IPI) VOR
NEVADOS DE CHILLÁN	CHILE-C	1507-07	S36 51.5	W071 22.3	110°/36NM	CHILLÁN (CHI) VOR/DME
OLCA-PARUMA	CHILE-N	1505-05	S20 55.5	W068 28.5	015°/96NM	EL LOA (CALAMA) (LOA) VOR/DME
OSORNO	CHILE-S	1508-01	S41 06.0	W072 30.0	042°/33NM	PUERTO MONTT (MON) VOR/DME
PINTA	GALÁPAGOS	1503-07	N00 34.5	W090 45.0	328°/67NM	BANDA ACEH (BAC) VOR/DME
PLANCHÓN-PETEROA	CHILE-C	1507-04	S35 14.2	W070 34.1	110°/35NM	CURICO (ICO) VOR/DME
PUNTIGUDO-CORDON CEN	CHILE-C	1507-16	S40 57.0	W072 15.4	042°/47NM	PUERTO MONTT (MON) VOR/DME

Name of the volcano	Country/State Region	Numer of the volcano	Volcano Lat/Long		Radial (MAG BRG) and distance from reference Navigation Aid	
PURACÉ	COLOMBIA	1501-06	N02 18.0	W076 24.0	058°/54NM	MERCADERES (MER) VOR
PUTANA	CHILE-N	1505-09	S22 33.4	W067 51.4	095°/56NM	EL LOA (CALAMA) (LOA) VOR/DME
QUALIBOU	W ANTILLAS	1600-14	N13 49.5	W061 03.0	336°/7NM	HEWANORRA (SAINT LUCIA) (BNE) VOR/DME
QUILOTOA	ECUADOR	1502-06	S00 51.0	W078 54.0	284°/17NM	LATACUNGA (LTV) VOR/DME
REVENTADOR	ECUADOR	1502-01	S00 04.4	W077 39.2	048°/76NM	LATACUNGA (LTV) VOR/DME
ROBINSON CRUSOE	CHILE-IS	1506-02	S33 39.2	W078 51.0	292°/340NM	CONCEPCIÓN (CAR) VOR/DME
RUIZ	COLOMBIA	1501-02	N04 53.4	W075 19.2	234°/30NM	MARIQUITA (MQU) VOR
SABA	W ANTILLAS	1600-01	N17 37.5	W063 13.5	206°/25NM	SAINT MAARTEN (PJM) VOR/DME
SABAYANCA	PERÚ	1504-003	S15 46.5	W071 51.0	338°/36NM	AREQUIPA (EQU) VOR/DME
SAN JOSÉ	CHILE-C	1507-02	S33 46.6	W069 53.5	107°/43NM	LOS CERRILLOS (SANTIAGO) (SCL) VOR/DME
SAN PEDRO	CHILE-N	1505-07	S21 52.5	W068 24.0	037°/45NM	EL LOA (CALAMA) (LOA) VOR/DME
SANGAY	ECUADOR	1502-09	S02 01.5	W078 19.5	210°/36NM	PASTAZA (SHELL MERA) (PAV) VOR/DME
SANTIAGO	GALÁPAGOS	1503-09	S00 13.1	W090 46.1	287°/31NM	GALÁPAGOS (ISLA BALTRA) (GLV) VOR/DME
SIERRA NEGRA	GALÁPAGOS	1503-05	S00 49.5	W091 10.1	275°/617NM	SALINAS (SAV) VOR/DME
SOUFRIERE GUADELOUPE	W ANTILLAS	1600-06	N16 03.0	W061 40.1	224°/15NM	POINTE A PITRE (PPR) VOR/DME
SOUFRIERE HILLS	W ANTILLAS	1600-05	N16 43.1	W062 10.5	235°/32NM	V.C. BIRD (SAINT JOHNS) (ANU) VOR/DME
SOUFRIERE ST VINCENT	W ANTILLAS	1600-15	N13 19.5	W061 10.5	219°/26NM	HEWANORRA (SAINT LUCIA) (BNE) VOR/DME
SUMACO	ECUADOR	1502-04	S00 33.4	W077 39.0	021°/60NM	PASTAZA (PAV) VOR/DME
TINGUIRIRICA	CHILE-C	1507-03	S34 48.5	W070 21.1	071°/43NM	CURICO (ICO) VOR/DME
TOLIMA	COLOMBIA	1501-03	N04 40.1	W075 19.5	324°/21NM	IBAGUE (BG) VOR/DME
TUNGURAHUA	ECUADOR	1502-08	S01 27.6	W078 26.3	149°/12NM	AMBATO (AMV) VOR/DME
TUPUNGATITO	CHILE-C	1507-01	S33 24.0	W069 48.0	077°/45NM	LOS CERRILLOS (SANTIAGO) (SCL) VOR/DME
TUTUPACA	PERÚ	1504-04	S17 01.3	W070 21.3	359°/65NM	TACNA (TCA) VOR/DME
UBINAS	PERÚ	1504-02	S16 21.2	W070 54.1	093°/39NM	AREQUIPA (EQU) VOR/DME
VILLARRICA	CHILE-C	1507-12	S38 25.1	W071 57.0	132°/50NM	TEMUCO (TCO) VOR/DME
VOLCÁN ALCEDO	GALÁPAGOS	1503-04	S00 25.5	W091 07.1	264°/50NM	GALÁPAGOS (ISLA BALTRA) (GLV) VOR/DME
VOLCÁN VIEDMA	CHILE-S	1508-061	S49.25.1	W073 16.5	131°/121NM	ISLOTE SAN PEDRO (ISP) VOR/DME
VOLCÁN WOLF	GALÁPAGOS	1503-02	N00 01.1	W091 21.0	052°/524NM	GALÁPAGOS (ISLA BALTRA) (GLV) VOR/DME
YUCAMANE	PERÚ	1504-05	S17 10.5	W070 12.0	007°/56NM	TACNA (TCA) VOR/DME