

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

**SOUTH AMERICAN OFFICE**

**GUIDE**

**FOR THE PREPARATION, DISSEMINATION**

**AND USE OF SIGMET MESSAGES**

**IN THE CAR/SAM REGIONS**



**NINTH EDITION**

**SEPTEMBER 2010**

***INTERNATIONAL CIVIL AVIATION ORGANIZATION***

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**RECORD OF AMENDMENTS AND CORRIGENDA**

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

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<sup>1</sup> WS/WV/WC

## 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. 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 I – Basic operational requirements and planning criteria (BORPC) and 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:

- *Annex 3 – Meteorological Service for International Air Navigation, seventeenth edition, July 2010, Part I, 7.1 and Part I, Appendix 6;*
- *CAR/SAM Basic ANP: Part I – Basic operational requirements and planning criteria (BORPC), paragraphs 50 and 95; and Part VI – MET, paragraphs 19 and 20;*
- *CAR/SAM FASID ANP: Part VI – MET, Tables MET 1B, MET 3A, MET 3B and MET 3C;*
- *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) 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: [www.icao.int/anb/iavwopsg/](http://www.icao.int/anb/iavwopsg/) under Operational Information);*
- *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds, Doc 9691-AN/954;*
- *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 seventeenth edition of Annex 3, which includes amendment 75, applicable in November 2010, and amendments to CAR/SAM ANP, Basic and FASID, Part VI – MET, approved on 20 and 5 August 2010, respectively.

1.1.5 Considering that some problems have been identified so that MET units in several CAR/SAM States 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 General**

2.1.1 SIGMET is warning information, hence it is of highest priority among other types of meteorological information provided to the aviation users. The primary purpose of SIGMET is for in-flight service, which requires timely transmission of the SIGMET messages to pilots by the ATS units.

2.1.2 Airlines are the main users of the SIGMET information. In the CAR/SAM Regions they contribute to the effectiveness of the SIGMET information through issuance of special air/reports reported by pilots to the ATs units. Special air-reports are among the most valuable sources of information for the Meteorological Watch Offices (MWO) in the preparation of SIGMET. The ATS units receiving special air/reports should forward them to the associated MWOs without delay.

2.1.3 In view of the foregoing, it should be well understood that the effectiveness of the SIGMET information depends strongly on the level of collaboration between the MWOs, ATS units and pilots. That is why, close coordination between these parties, as well as mutual understanding of their needs and responsibilities are essential for the successful implementation of this information.

2.1.4 For the special cases of SIGMET for tropical cyclones and volcanic ash, the MWOs of the CAR/SAM Regions are provided with advisories from the tropical cyclone advisory centre (TCAC) of Miami and from volcanic ash advisory centres (VAAC) of Buenos Aires and Washington, designated in CAR/SAM FASID Tables MET 3A and MET 3B, respectively.

2.1.5 Another use of SIGMET is for the flight planning. This requires global dissemination of SIGMET messages through the international OPMET data banks and the satellite broadcasts ISCS and SADIS. SIGMET should also be distributed to the World Area Forecast Centres (WAFC) London and Washington for use in the preparation of the significant weather (SIGWX) forecasts.

2.1.6 In the next paragraphs, the main responsibilities and coordination links, related to the provision of SIGMET information, are described.

### **2.2 Meteorological Watch Office - responsibilities and procedures related to SIGMET information**

2.2.1 SIGMET information is issued by the meteorological watch offices (MWO) in order to provide timely warning for occurrence or expected occurrence of specified en-route weather phenomena, affecting the safety of flight operations in the MWO's area of responsibility (AOR). SIGMET provides information concerning the location, extent, intensity and expected evolution of the specified phenomena.

2.2.2 Information about the provision of SIGMET information, including details on the designated MWO(s), should be included in the State's Aeronautical Information Publication (AIP) as specified in Annex 15, Aeronautical Information Service, Appendix 1, GEN 3.5.8.

2.2.3 All designated MWOs in the CAR/SAM Regions are listed in CAR/FASID Table MET 1B, which is reproduced as **Appendix A** to this Guide.

2.2.4 If, for some reason, a State is not able to meet its obligations for establishing MWO(s) and for provision of SIGMET for the FIR(s) or control area(s) the State is providing air traffic services, arrangements should be made between the meteorological authorities of the States concerned, that another MWO takes over these responsibilities for certain period of time. Such delegation of authority should be

notified by a NOTAM and a letter to the ICAO Regional Office. **Appendix B** includes a list of Back-up MWOs for the CAR/SAM Regions approved by the CAR/SAM Regional Planning and Implementarian Group (GREPECAS).

2.2.5 Taking into consideration that the MWO in the CAR/SAM Regions is not normally a separate administrative unit, but rather operates together with an aerodrome meteorological office, the meteorological authority concerned should ensure that the MWO obligations and responsibilities are clearly defined and assigned to the unit designated to serve as MWO. Corresponding operational procedures should be established and the meteorological staff should be trained accordingly.

2.2.6 In preparing SIGMET information MWOs should strictly follow the format determined in Annex 3. SIGMET should be issued only for those weather phenomena listed in Annex 3 and only when specified criteria for their intensity and spatial extent are met.

*Note: MWOs should not issue SIGMET for weather phenomena of lower intensity or such of transient nature or smaller scale, which does not affect significantly flight safety operations and their transmission to users may lead to unnecessary precautionary measures.*

2.2.7 MWOs should be adequately equipped in order to be able to identify, analyze and forecast (to the extent required) those phenomena for which SIGMET is required. The MWO should make use of all available sources of information, such as special air-reports, information from meteorological satellites and weather radars.

2.2.8 On receipt of a special air-report from the associated ACC or FIC, the MWO should:

- a) issue SIGMET information based on the special-air report; or
- b) send the special air-report for on-ward transmission in case that the issuance of SIGMET information is not warranted (e.g., the phenomenon concerned is of transient nature).

2.2.9 Appropriate telecommunication means should be available at the MWO in order to ensure timely dissemination of SIGMET messages according to a dissemination scheme, which should include transmission to:

- local ATS users;
- aeronautical meteorological offices within their area of responsibility, where SIGMET information is required for briefing and/or flight documentation;
- other MWOs concerned, according to **Appendix I** to this Guide;
- international OPMET data banks of Brasilia and Washington;
- ISCS and SADIS up-link stations; and
- in case of SIGMET related with volcanic ash, the tropical cyclone advisory centre (TCAC) of Miami and the volcanic ash advisory centres (VAAC) of Buenos Aires and Washington and the international OPMET data bank of Vienna.

The international transmission of SIGMET messages, with the AFTN addresses to which they should be sent, is included in **Appendix L** to this Guide.

2.2.10 In issuing SIGMET for tropical cyclones or volcanic ash, MWOs should include, as appropriate, the advisory information received from the TCAC of Miami or VAAC responsible. In addition to the information received from the TCAC and VAAC, MWOs may use the available complementary information from other reliable sources. In such a case the responsibility for this additional information would lie completely on the MWO concerned.

## **2.3 Responsibilities of ATS units**

2.3.1 Close coordination should be established between the MWO and the corresponding ATS unit (ACC or FIC) and arrangements should be in place to ensure:

- receipt without delay and display at the relevant ATS units of SIGMET issued by the associated MWO;
- receipt and display at the ATS unit of SIGMETs issued by MWOs responsible for the adjacent FIRs/ACCs if these SIGMETs are required according to p. 2.3.4 below, (within 1800 km (1000 NM) range from the observed phenomenon); and
- transmission without delay by the ATS unit of special air-reports received through voice communication to the associated MWO.

2.3.2 SIGMET information should be transmitted to aircraft with the least possible delay on the initiative of the responsible ATS unit, by the preferred method of direct transmission followed by acknowledgement or by a general call when the number of aircraft would render the preferred method impracticable.

2.3.3 SIGMET information transmitted to aircraft-in-flight should cover a portion of the route up to two hours flying time ahead of the aircraft. SIGMET should be transmitted only during the time corresponding to their period of validity (p. 3.4.4 refers).

2.3.4 Air traffic controllers should ascertain whether any of the valid SIGMETs may affect any of the aircraft they are controlling, either within or outside the FIR/CTA boundary, up to a distance of 1000 NM (1800 KM), which corresponds to two hours flying time ahead of the current position of the aircraft. If this is the case, the controllers should at their own initiative transmit the SIGMET promptly to the aircraft-in-flight likely to be affected. If necessary, the controller should pass to the aircraft available SIGMETs issued for the adjacent FIR/CTA, which the aircraft will be entering, if relevant to the expected flight route.

2.3.5 The ATS units concerned should also transmit to aircraft-in-flight the special air reports received, for which SIGMET has not been issued. Once a SIGMET for the weather phenomenon reported in the special air report is made available this obligation of the ATS unit expires.

## **2.4 Responsibilities of pilots**

2.4.1 Timely issuance of SIGMET information is largely dependent on the prompt receipt by MWOs of special air-reports. That is why, it is essential that pilots prepare and transmit such reports to the ATS units whenever any of the specified en-route conditions are encountered or observed.

2.4.2 It should be emphasized that, even when automatic dependent surveillance (ADS) is being used for routine air-reports, pilots should continue to make special air-reports.

## 2.5 Coordination between MWOs and the TCACs and VAACs

2.5.1 Amongst the phenomena for which SIGMET information is required, the volcanic ash clouds and tropical cyclones are of particular importance for the planning of long-haul flights.

2.5.2 Volcanic Ash Advisory Centres (VAAC) and Tropical Cyclone Advisory Centres (TCAC) have been designated to provide volcanic ash (VA) and tropical cyclones (TC) advisories to the users and assist MWOs in the preparation of the forecast part of the SIGMETs for those phenomena. Close coordination should be established between the MWO and its responsible TCAC and/or VAAC.

2.5.3 Information regarding the VAACs and TCACs serving CAR/SAM Regions with their corresponding areas of responsibility and lists of MWOs and ACCs to which advisories are to be sent, is provided in FASID Tables MET 3A and MET 3B of CAR/SAM FASID. These tables are reproduced in **Appendices C and D** to this Guide. Additional information is also included in Part 4.

2.5.4 Tropical cyclones (TC) and volcanic ash (VA) advisories are required for global exchange through the satellite distribution systems, SADIS and ISCS. They are used by the operators during the preflight planning. Nevertheless, it should be emphasized that SIGMET information is still of higher operational status and is required especially for in-flight re-planning. SIGMETs should be transmitted to aircraft-in-flight through voice communication or VOLMET or D-VOLMET thus providing vital information for making in-flight decisions regarding large-scale route deviations due to volcanic ash clouds or tropical cyclones.

**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 E** 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:

<b>METEOROLOGICAL PHENOMENA</b>	<b>ABBREVIATIONS</b>
<i>(Abstract from Annex 3, Sixteenth edition, 2007)</i>	

**At cruising levels (irrespective of altitude):**

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 .....	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)
Radioactive cloud .....	RDOACT CLD

**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, 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 **Appendix J** to this Guide;
- 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; and
- the following line corresponds to WMO abbreviated header, which consists of the following three groups:

**T<sub>1</sub> T<sub>2</sub> A<sub>1</sub> A<sub>2</sub>ii CCCC YYGGgg [CCx]**

Group **T<sub>1</sub> T<sub>2</sub> A<sub>1</sub> A<sub>2</sub>ii<sup>1</sup>** is the bulletin identification for the SIGMET message, constructed as follows:

<b>T<sub>1</sub> T<sub>2</sub></b>	Message type designator	<b>WS</b> – for SIGMET <b>WV</b> – for SIGMET related to volcanic ash clouds <b>WC</b> – for SIGMET related to tropical cyclones
<b>A<sub>1</sub> A<sub>2</sub></b>	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)
<b>ii</b>	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 the flight and re-planning.

<sup>1</sup> **Appendix F** includes WMO headers for SIGMET used by MWOs in the CAR/SAM Regions.

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

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX
SBBRYZYX KWBCYMYX EGZZMSAM
251022 SABEYMYX
WSAG31 SABE 2510022
```

*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 25<sup>th</sup> 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 25<sup>th</sup> of the month at 10:00 UTC.*

### 3.4 SIGMET message Format

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

#### 3.4.2 ICAO Location Indicator of the ATS unit serving the FIR or 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 MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGZZMSAM
251022 SABEYMYX
WSAG31 SABE 251002
SAEF
```

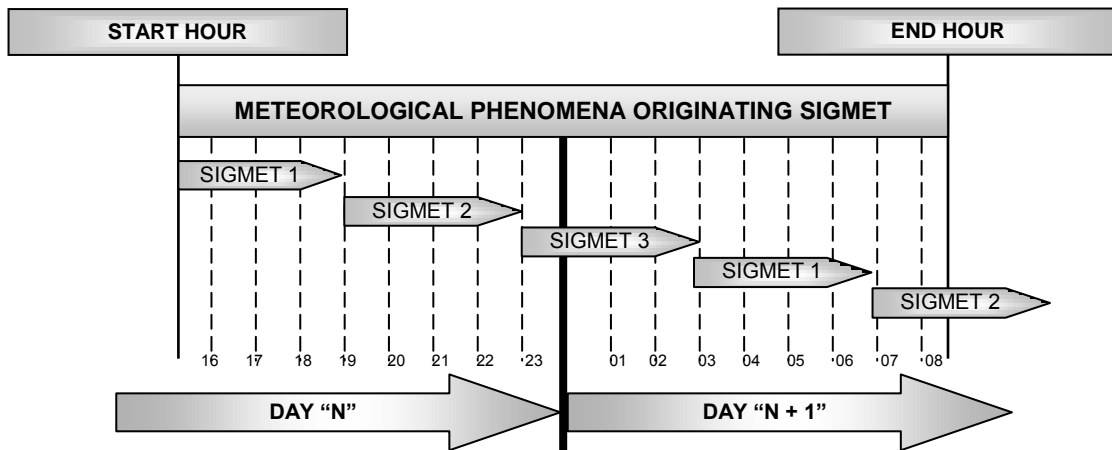
*... issued for the flight information region (FIR) EZEIZA.*

#### 3.4.3 Identification and sequence number of the message (Mandatory)

3.4.3.1 The sequence number of SIGMET messages corresponds to the number of SIGMET messages issued for the flight information region (FIR) starting at 0001 UTC of the day concerned. The meteorological watch offices whose area of responsibility encompasses more than one FIR and/or CTA shall issue separate SIGMET messages for each FIR and/or CTA within its area of responsibility. 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.

<sup>2</sup> In an AFTN message in **ITA-2** format, the letters **NNNN** are used at the end of the message (Figure 4.1, Annex 10, Volume II, Chapter 4, refers); and

- In an AFTN message in **IA5** format, the letters **NNNN** are not used at the end of the message (Figure 4-4, Annex 10, Volume II, Chapter 4, refers).



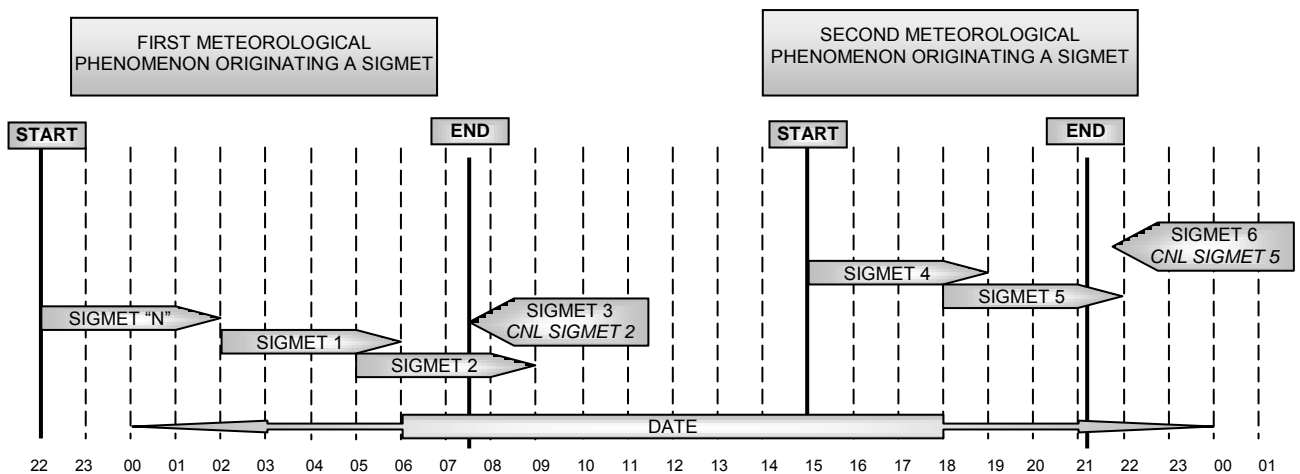
**Diagram of sequence and serial numbers of SIGMET messages issued by a MWO**

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 25<sup>th</sup>.*

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. In this particular case, it shall be taken into account that the SIGMET message corresponding to the second significant phenomenon should continue with the next serial number of the SIGMET message of cancellation of the first phenomenon, as shown in the following graphic:



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

- The period of validity of a SIGMET message with *ddhhmm/ddhhmm* format, should not be more than 4 hours;
- 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 MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX
SBBRYZYX KWBCYMYX EGZMSAM
251022 SABEYMYX
WSAG31 SABE 251002
SAEF SIGMET 5 VALID 251020/251400 SABE-
```

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

- In the special case of SIGMET messages for volcanic ash clouds and tropical cyclones, the period of validity will be extended to 6 hours.

### 3.4.5 Location indicator and name of the FIR/CTA to which the SIGMET is referred (Mandatory)<sup>3</sup>

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

Example:

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX
SBBRYZYX KWBCYMYX EGZMSAM
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 G** presents an abstract of *Doc 8400/5* with the abbreviations commonly used in meteorological messages.

<sup>3</sup> **Appendix F** includes a list of ICAO location indicators and name of the FIRs of the CAR/SAM Regions, based on CAR/SAM FASID Table MET 1B.

Example:

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSYMYX 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 14KT 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 **Appendix H**.

### 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

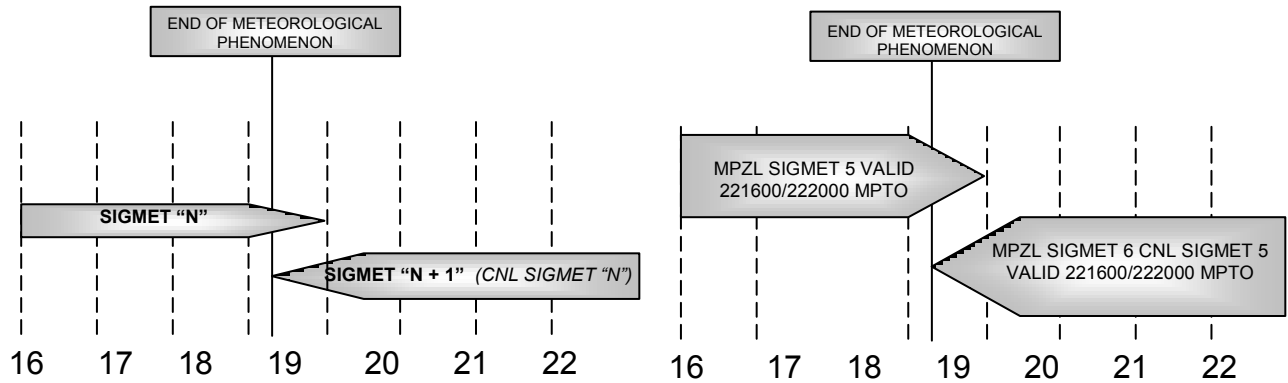
Example:

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSYMYX 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 14KT WKN=
NNNN
```

### 3.4.8 Cancellation of SIGMET messages

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

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



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

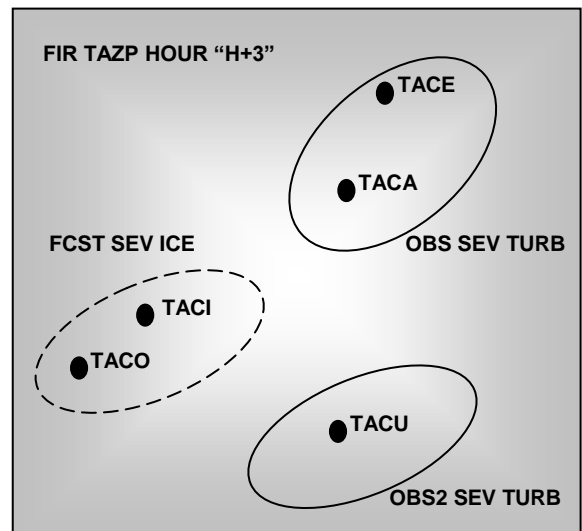
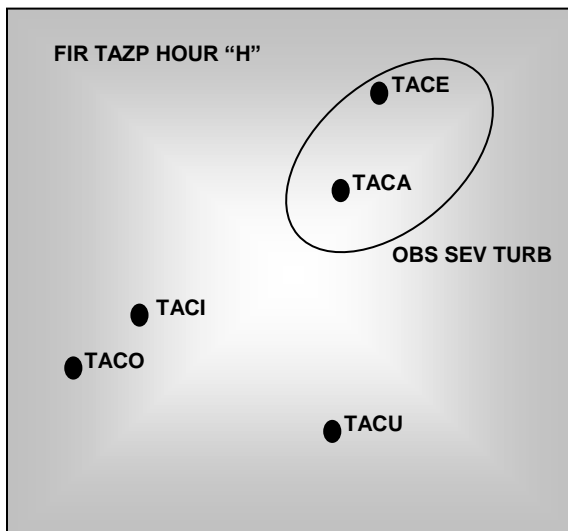
Example:

```
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 In case that, due to the extension of a FIR, more than one 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, as specified in paragraph 3.1.3, SIGMET messages 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.

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



3.4.9.3 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\*.

3.4.9.4 In this case, the following situations were presented:

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

<sup>1</sup> Fictitious location.

- 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.

3.4.9.5 Considering the above, and in order to provide serial numbers for the particular identification of each phenomenon, some examples are presented hereunder:

### 1) Commencement of SIGMET sequence

- a) SIGMET message 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 MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
251022 SABEYMYX WSAG31
SABE 251002
SAEF SIGMET1 VALID 251020/251400 SABE-
SAEF EZEIZA FIR SEV TURB OBS AT 0955Z SAZM FL210/270 MOV E 14KT WKN=
NNNN
```

- b) SIGMET message 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 MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
251327 SABEYMYX
WSAG31 SABE 251322
SAEF SIGMET A1 VALID 251320/251700 SABE-
SAEF EZEIZA FIR SEV TURB OBS AT 1305Z SADF FL150 MOV NE 08KT WKN=
NNNN
```

- c) SIGMET message 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 MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
251355 SABEYMYX
WSAG31 SABE 251330
SAEF SIGMET B1 VALID 251800/252200 SABE-
SAEF EZEIZA FIR SEV ICE FCST 1800Z FL180/230=
NNNN
```

## 2) Continuation of SIGMET initial sequence

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

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
251350 SABEYMYX
WSAG31 SABE 251345
SAEF SIGMET 2 VALID 251400/251800 SABE-
SAEF EZEIZA FIR SEV TURB OBS AT 1255Z SAZM FL230 MOV NE 14KT WKN=
NNNN
```

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

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
2511650 SABEYMYX
WSAG31 SABE 251645
SAEF SIGMET A2 VALID 251700/252100 SABE-
SAEF EZEIZA FIR SEV TURB OBS AT 1630Z FL170 MOV E 14KT WKN=
NNNN
```

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

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

### 3) Cancellation of SIGMET message

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

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
251350 SABEYMYX
SAEF SIGMET 3 VALID 251530/251800 SABE-
SAEF EZEIZA FIR CNL SIGMET 2 251400/251800=
NNNN
```

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

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
2511650 SABEYMYX
SAEF SIGMET A3 VALID 251800/252100 SABE-
SAEF EZEIZA CNL SIGMET A2 VALID 251700/252100 SABE=
NNNN
```

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

```
ZCZC
FF SLZZMAMX SCZZMAMX MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX
KWBCYMYX EGRRYMYX
252155 SABEYMYX
SIGMET B3 VALID 252350/260200 SABE-
SAEF EZEIZA 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), specific elements such as trajectory forecast position of volcanic ash cloud or the centre of the tropical cyclone (TC), 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 position of the centre of the TC 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, the period of operation of the TCAC and the MWOs to which advisory information should be sent. The advisory information on tropical cyclones shall be issued when the maximum of the 10-minute mean surface wind speed is expected to reach or exceed 63 Km/h (34kt).

4.1.3 In order to assist MWOs in the preparation of the forecast position of volcanic ash clouds at the end of the validity period of 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, Second edition – 2007*, 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 I**, 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 send 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 report 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 advisory information 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 or aircraft encounter with volcanic ash received in the MWOs, 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 practicable, whether or not the volcanic ash was identified from satellite images/data and, if possible, 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;
- issue a SIGMET message for volcanic ash for a validity period of 6 hours, and if in a position to do so, in graphical format based on the advisory information provided by the VAAC concerned. Update SIGMET information every 6 hours. 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 SIGMET messages and ASHTAM or NOTAM related to volcanic ash clouds;
- in the event that the WMO becomes aware of the occurrence of pre-eruption activity, a volcanic eruption or ash cloud from any source other than its associated ACC/FIC, that information should be passed **immediately** to the associated ACC/FIC; and
- in the event that a meteorological office becomes aware of the occurrence of pre-eruption activity, a volcanic eruption or ash cloud from any source, the information should be passed **immediately** to its associated MWO for 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 J** 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.

4.2.1.5 An example of advisory message for tropical cyclones abstracted from Appendix 2 to ICAO Annex 3 is shown below:

### **Example A2-2: Advisory message for tropical cyclones**

TC ADVISORY	
DTG:	20040925/1600Z
TCAC:	YUFO
TC:	GLORIA
NR:	01
PSN:	N2706 W07306
MOV:	NW 20KMH
C: 965	HPA
MAX WIND:	22MPS
FCST PSN +6 HR:	25/2200Z N2748 W07350
FCST MAX WIND +6 HR:	22MPS
FCST PSN +12 HR:	26/0400Z N2830 W07430
FCST MAX WIND +12 HR:	22MPS
FCST PSN +18 HR:	26/1000Z N2852 W07500
FCST MAX WIND +18 HR:	21MPS
FCST PSN +24 HR:	26/1600Z N2912 W07530
FCST MAX WIND +24 HR:	20MPS
RMK:	NIL
NXT MSG:	20040925/2000Z

## **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 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 K** includes the AFTN addresses to which VAAC Buenos Aires and VAAC Washington should transmit volcanic ash advisories, based on the referred Table.

4.2.2.3 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.

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

4.2.2.5 In the event of interruption of operation of one VAAC, its functions should be carried out by another VAAC or another meteorological centre, as designated by the VAAC Provider State concerned (Annex 3, Chapter 3, 3.5.3).

4.2.2.6 An example of an advisory message for volcanic ash, abstracted from Appendix 2 to ICAO Annex 3 is shown below.

#### Example A2-1: Advisory message for volcanic ash

FVFE01 RJTD 230130	
VA ADVISORY	
DTG:	20080923/0130Z
VAAC:	TOKYO
VOLCANO:	KARYMSKY 1000-13
PSN:	N5403 E15927
AREA:	RUSSIA
SUMMIT ELEV:	1536M
ADVISORY NR:	2008/4
INFO SOURCE:	MTSAT-1R KVERT KEMSD
AVIATION COLOUR CODE:	RED
ERUPTION DETAILS:	ERUPTION AT 20080923/0000Z FL300 REPORTED
OBS VA DTG:	23/0100Z
OBS VA CLD:	FL250/300 N5400 E15930 – N5400 E16100 – N5300 E15945 MOV SE 20KT SFC/FL200 N5130 E16130 – N5130 E16230 – N5230 E16230 – N5230 E16130 MOV SE 15KT
FCST VA CLD +6 HR:	23/0700Z FL250/350 N5130 E16030 – N5130 E16230 – N5330 E16230 – N5330 E16030 SFC/FL180 N4830 E16330 – N4830 E16630 – N5130 E16630 – N5130 E16330
FCST VA CLD +12 HR:	23/1300Z SFC/FL270 N4830 E16130 – N4830 E16600 – N5300 E16600 – N5300 E16130
FCST VA CLD +18 HR:	23/1900Z NO VA EXP
RMK:	LATEST REP FM KVERT (0120Z) INDICATES ERUPTION HAS CEASED. TWO DISPERSING VA CLD ARE EVIDENT ON SATELLITE IMAGERY
NXT ADVISORY:	20080923/0730Z

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

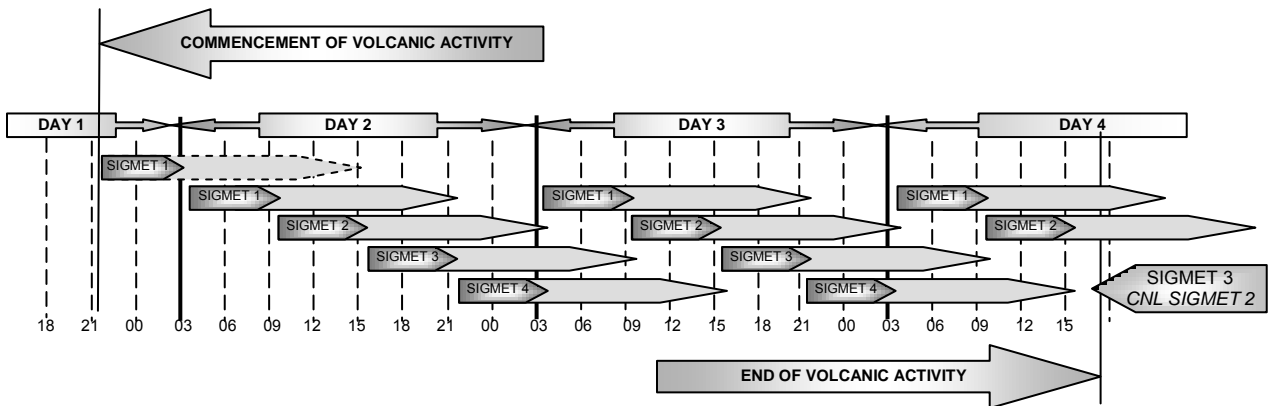
4.3.1 Only the information differing from that used for the preparation of SIGMET (WS), which is shown in paragraph 3.3.1, will be included.

### 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<sub>1</sub>T<sub>2</sub>A<sub>1</sub>A<sub>2</sub>ii** of WMO abbreviated header should be used, respectively, as follows:
    - **T<sub>1</sub>T<sub>2</sub>** should always be **WV** for SIGMET on volcanic ash;
    - **T<sub>1</sub>T<sub>2</sub>** should always be **WC** for SIGMET on tropical cyclones;
    - **A<sub>1</sub> A<sub>2</sub>** 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 The validity period of SIGMET messages (WV and WC) should be 6 hours, including the position foreseen at the end of the validity period of volcanic ash clouds or of the centre of the tropical cyclone, 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 AT 1600Z]; a latitude central point (L<sub>a</sub>) followed by 4 characters and one for longitude (L<sub>o</sub>) 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 forecast position, at the end of the validity period, of the centre of the cyclone in latitude and longitude points [FCST 2200Z TC CENTRE N2740 W07345];

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=
NNNN
```

*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 25<sup>th</sup> 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.*

##### 4.3.4.2 Description of a message with information about a volcanic 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. This information could be included in subsequent SIGMET as the corresponding volcano observatory provides additional information or the associated VAAC provides advisory information.

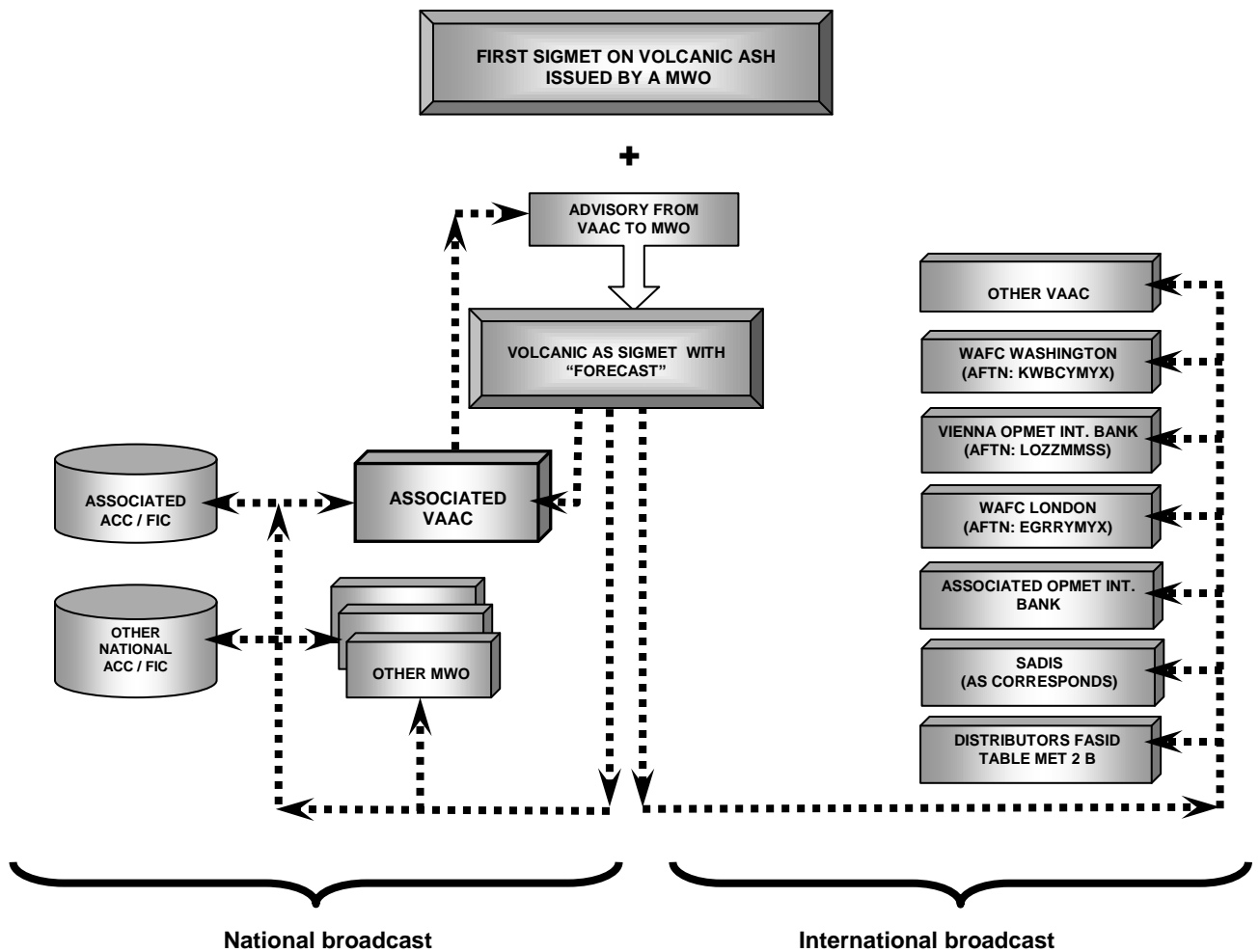


Diagram of information feedback between the associated VAAC and the MWO for the issuance of SIGMET on volcanic ash “with outlook”

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 position in geographical coordinates [**VA ERUPTION MT ASHVAL POC 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 [**MOV SE 65KMH**] and finally the position foreseen at the end of the validity period 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**].



## PART 5 DISTRIBUTION OF SIGMET INFORMATION

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 7.1.5 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, in the CAR/SAM Regions, should be based on the *Table of Appendix L to this Guide*, 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, SIGMET messages and special air-reports for the whole route foreseen should be made available at the departure aerodrome.

5.7 Notwithstanding the above, SIGMET messages 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 warnings, aerodrome and storm warnings, to make sure that said information will be duly and timely available for ground-air transmissions.

5.9 **Appendix M** contains a Table with the requirements for the transmission of SIGMET messages (WS, WC, WV) and special air-reports (UA), including AFTN addresses to which the required information should be sent, based on the Table of Appendix L to this Guide.



## 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/](http://www.icao.int/anb/iavwopsg/).

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

#### TTAAiiii CCCC MMYYGg (BBB)

<b>TT</b>	ASHTAM data designator		
<b>AA</b>	State designator		
<b>iiii</b>	ASHTAM serial number expressed by a group of four characters		
<b>CCCC</b>	Four letter location indicator corresponding to the flight information region concerned		
<b>MMYYGg</b>	Date, time of the report	<b>MM</b>	Month
		<b>YY</b>	Date
		<b>Gg</b>	Hours (GG) and minutes (gg) UTC
<b>(BBB)</b>	Group capable to correct an ASHTAM message disseminated previously with the same serial number	<b>COR</b>	

Example: ASHTAM abbreviated header corresponding to Auckland Oceanic FIR, report of 7 November at 0620 UTC:

**VANZ0001 NZZO 11070620**

### 6.2 Contact list

6.2.1 In order to facilitate the use of the contact list, **Appendix N** includes updated information of Doc 9766-AN/968 – Second edition 2004, of the IAVW Contact List for the ACCs, MWOs, NOFs and volcanic observatories of SAM States under the responsibility of the VAAC Buenos Aires, and **Appendix O** contains contact information for the ACCs, MWOs, NOFs and volcanic observatories of CAR/SAM States under the responsibility of the VAAC Washington.

6.2.2 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.

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



VI-MET1B-1

**FASID Table MET 1B — Tableau MET 1B — Tabla MET 1B DEL FASID****METEOROLOGICAL WATCH OFFICES  
CENTRES DE VEILLE MÉTÉOROLOGIQUE  
OFICINAS DE VIGILANCIA METEOROLÓGICA**

## EXPLANATION OF THE TABLE

*Column*

- |   |  |
|---|--|
| 1 | Location of the meteorological watch office (MWO)                                |
| 2 | ICAO location indicator, assigned to the MWO                                     |
| 3 | Name of the FIR, UIR and/or Search and Rescue Region (SRR) served by the MWO     |
| 4 | ICAO location indicator assigned to the ATS unit serving the FIR, UIR and/or SRR |
| 5 | Remarks  |

*Note. — Unless otherwise stated in Column 5, the MWO listed in Column 1 is the designated collecting centre for the air-reports received within the corresponding FIR/UIR listed in Column 3.*

## EXPLICATION DU TABLEAU

*Colonne*

- |   |  |
|---|--|
| 1 | Emplacement du centre de veille météorologique (MWO)   |
| 2 | Indicateur d'emplacement OACI du MWO   |
| 3 | Nom de la FIR, de l'UIR et/ou de la région de recherches et de sauvetage (SRR) desservie(s) par le MWO |
| 4 | Indicateur d'emplacement OACI des organismes ATS desservant la FIR, l'UIR et/ou les SRR                |
| 5 | Remarques  |

*Note.— Sauf indication contraire dans la colonne 5, le MWO indiqué dans la colonne 1 est le centre collecteur désigné des comptes rendus en vol reçus dans la FIR/UIR figurant dans la colonne 3.*

## EXPLICACIÓN DE LA TABLA

*Columna*

- 1 Lugar de la oficina de vigilancia meteorológica (MWO)
- 2 Indicador de lugar de la OACI asignado a la MWO
- 3 Nombre de las FIR, UIR o región de búsqueda y salvamento (SRR) a las que presta servicio la MWO
- 4 Nombre del indicador de lugar asignado a la dependencia ATS que presta servicio a las FIR, UIR o SRR
- 5 Observaciones

*Nota.— Salvo indicación distinta en la Columna 5, la MWO que figura en la Columna 1 es el centro colector designado para las aeronotificaciones recibidas en las FIR/UIR correspondientes reseñadas en la Columna 3.*

MWO location Emplacement du MWO Lugar de la MWO	ICAO loc.ind. Ind. d'empl. OACI Ind. lugar OACI	Area served/Région desservie/Zona atendida		Remarks Remarques Observaciones
		Name Nom Nombre	ICAO loc. ind. Ind. d'empl. OACI Ind. lugar OACI	
1	2	3	4	5
<b>ARGENTINA</b>				
BUENOS AIRES/Aeroparque, Jorge Newbery	SABE	Ezeiza FIR/SRR Ezeiza ACC/UIR	SAEF SAEU	
COMODORO RIVADAVIA/General Mosconi	SAVC	Comodoro Rivadavia FIR/SRR Comodoro Rivadavia ACC/UIR	SAVF SAVU	
CORDOBA/Ing. Aer. A.L. Taravela	SACO	Córdoba FIR/SRR Córdoba ACC/UIR	SACF SACU	
MENDOZA/EI Plumerillo	SAME	Mendoza FIR/SRR Mendoza ACC/UIR	SAMF SAMV	
RESISTENCIA/Resistencia	SARE	Resistencia FIR/SRR Resistencia ACC/UIR	SARR SARU	
<b>BOLIVIA</b>				
LA PAZ/EI Alto Intl	SLLP	La Paz FIR/SRR	SLLP	
<b>BRAZIL</b>				
BRASILIA/CINDACTA I	SBBS	Brasilia FIR/UIR/SRR	SBBS	
CURITIBA/CINDACTA II	SBCW	Curitiba FIR/UIR/UTA/SRR	SBCW	
MANAUS/CINDACTA IV	SBAZ	Amazónica FIR/UIR/SRR	SBAZ	
RECIFE/CINDACTA III	SBRE	Recife FIR/UIR/SRR Atlántico FIR/UIR/SRR	SBRE SBAO	
<b>CHILE</b>				
ANTOFAGASTA/Cerro Moreno	SCFA	Antofagasta FIR/SRR	SCFZ	During the night SCEL assumes functions of Meteorological Watch Office for SCFZ FIR / En horario nocturno SCEL asume las funciones de oficina de vigilancia meteorológica para la FIR SCFZ
SANTIAGO/Arturo Merino Benítez	SCEL			
PUERTO MONTT/EI Tepual	SCTE	Puerto Montt FIR/SRR	SCTZ	
PUNTA ARENAS/Pdte. C. Ibañez del Campo	SCCI	Punta Arenas FIR/SRR	SCCZ	
SANTIAGO/Arturo Merino Benitez	SCEL	Santiago FIR/SRR	SCEZ	
<b>COLOMBIA</b>				
BOGOTÁ/Eldorado	SKBO	Bogotá FIR/UIR/SRR Barranquilla FIR below/por debajo de FL200 (cf. Bogotá UIR)	SKED SKEC	
<b>CUBA</b>				
HABANA/José Martí Intl	MUHA	Habana FIR/SRR	MUFH	
<b>DOMINICAN REPUBLIC</b>				
SANTO DOMINGO/De Las Américas Intl	MDSO	Santo Domingo FIR/SRR	MDCS	
<b>ECUADOR</b>				
GUAYAQUIL/José Joaquín de Olmedo	SEGU	Guayaquil FIR/SRR	SEGU	

MWO location Emplacement du MWO Lugar de la MWO	ICAO loc.ind. Ind. d'empl. OACI Ind. lugar OACI	Area served/Région desservie/Zona atendida		Remarks Remarques Observaciones
		Name Nom Nombre	ICAO loc. ind. Ind. d'empl. OACI Ind. lugar OACI	
1	2	3	4	5
<b>FRENCH GUIANA (France)</b>				
CAYENNE/Rochambeau	SOCA	Rochambeau FIR Cayenne SRR	S000	
<b>GUYANA</b>				
TIMEHRI/Cheddi Jagan Intl	SYCJ	Georgetown FIR/SRR	SYGC	
<b>HAITI</b>				
PORT-AU-PRINCE/Port-au-Prince Intl	MTPP	Port-au-Prince FIR/SRR	MTEG	
<b>HONDURAS</b>				
TEGUCIGALPA/Toncontin Intl	MHTG	Central American FIR/SRR FIR/SRR Centroamericana	MHTG MHCC <sup>1</sup>	The Tegucigalpa MWO serves Central American FIR/SSR, which is under the Corporación Centroamericana para los Servicios de Navegación Aérea (COCESNA)'s responsibility, comprising Belize, Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua / La MWO de Tegucigalpa presta servicios a la FIR/SSR de Centroamérica, que está a cargo de la Corporación Centroamericana para los Servicios de Navegación Aérea (COCESNA) conformada por Belice, Costa Rica, El Salvador, Guatemala, Honduras y Nicaragua.
<b>JAMAICA</b>				
KINGSTON/Norman al Manley Intl	MKJP	Kingston FIR/SRR	MKJK	
<b>MÉXICO</b>				
MEXICO/Lic. Benito Juárez Intl	MMMX	Mazatlán Oceanic FIR/UIR México FIR/UIR/SRR	MMFO MMFR	
<b>NETHERLANDS ANTILLES (Netherlands)</b>				
WILLEMSTAD/Hato, Curaçao I.	TNCC	Curaçao FIR/SRR	TNCF	
<b>PANAMA</b>				
PANAMA/Tocumen Intl	MPTO	Panamá FIR/SRR	MPZL	
<b>PARAGUAY</b>				
ASUNCION/Silvio Pettirossi	SGAS	Asunción FIR/UIR/SRR	SGFA	
<b>PERU</b>				
LIMA-CALLAO/Jorge Chávez Intl	SPIM	Lima FIR/UIR/SRR	SPIM	
<b>SURINAME</b>				
ZANDERY/Johan Adolf Pengel Intl	SMJP	Paramaribo FIR/UIR	SMPM	
<b>TRINIDAD AND TOBAGO</b>				
PORT OF SPAIN/Piarco Intl, Trinidad I.	TTPP	Piarco FIR/SRR	TTZP	

<sup>1</sup> Will be included in the next proposal for amendment to this Table.

MWO location Emplacement du MWO Lugar de la MWO	ICAO loc.ind. Ind. d'empl. OACI Ind. lugar OACI	Area served/Région desservie/Zona atendida		Remarks Remarques Observaciones
		Name Nom Nombre	ICAO loc. ind. Ind. d'empl. OACI Ind. lugar OACI	
1	2	3	4	5
<b>UNITED STATES</b>				
Kansas City Aviation Weather Center	KKCI	Houston Oceanic FIR Miami Oceanic FIR/SRR San Juan FIR/SRR	KZHU KZMA TJZS	
<b>URUGUAY</b>				
MONTEVIDEO/Carrasco Intl Gral. Cesáreo L. Berisso	SUMU	Montevideo FIR/SRR	SUEO	
<b>VENEZUELA</b>				
CARACAS/Simon Bolivar Intl, Maiquetia	SVMI	Maiquetia FIR/UIR/SRR	SVZM	

## BACK-UP METEOROLOGICAL WATCH OFFICES (MWO)

Oficina de vigilancia meteorológica	Ind. lugar OACI	Oficina de vigilancia meteorológica de respaldo	Ind. lugar OACI
<b>ARGENTINA</b>		<b>ARGENTINA</b>	
BUENOS AIRES/Aeroparque, Jorge Newbery	SABE	COMODORO RIVADAVIA/General Mosconi	SAVC
COMODORO RIVADAVIA/General Mosconi	SAVC	BUENOS AIRES/Aeroparque, Jorge Newbery	SABE
CORDOBA/Ing. Aer. A.L. Taravela	SACO	RESISTENCIA/Resistencia	SARE
MENDOZA/El Plumerillo	SAME	BUENOS AIRES/Aeroparque, Jorge Newbery	SABE
RESISTENCIA/Resistencia	SARE	CORDOBA/Ing. Aer. A.L. Taravela	SACO
<b>BOLIVIA</b>		<b>PERÚ</b>	
LA PAZ/El Alto Intl	SLLP	LIMA-CALLAO/Jorge Chávez Intl	SPIM
<b>BRASIL</b>		<b>BRASIL</b>	
BRASILIA/CINDACTA I	SBBS	MANAUS/CINDACTA IV	SBAZ
CURITIBA/CINDACTA II	SBCW	RECIFE/CINDACTA III	SBRE
RECIFE/CINDACTA III	SBRE	CURITIBA/CINDACTA II	SBCW
MANAUS/CINDACTA IV	SBAZ	BRASILIA/CINDACTA I	SBBS
<b>CHILE</b>		<b>CHILE</b>	
ANTOFAGASTA/Cerro Moreno	SCFA	SANTIAGO/Arturo Merino Benítez	SCEL
PUERTO MONTT/El Tepual	SCTE	SANTIAGO/Arturo Merino Benítez	SCEL
PUNTA ARENAS/Pdte. C. Ibáñez del Campo	SCCI	SANTIAGO/Arturo Merino Benítez	SCEL
SANTIAGO/Arturo Merino Benítez	SCEL	PUERTO MONTT/El Tepual	SCTE
<b>COLOMBIA</b>		<b>PANAMÁ</b>	
BOGOTÁ/Eldorado	SKBO	PANAMA/Tocumen Intl	MPTO
<b>CUBA</b>		<b>UNITED STATES</b>	
HABANA/José Martí Intl	MUHA	Kansas City Aviation Weather Center	KKCI
<b>DOMINICAN REPUBLIC</b>		<b>UNITED STATES</b>	
SANTO DOMINGO/De Las Américas Intl	MDSD	Kansas City Aviation Weather Center	KKCI
<b>ECUADOR</b>		<b>BOLIVIA</b>	
GUAYAQUIL/José Joaquín de Olmedo	SEGU	LA PAZ/El Alto Intl	SLLP
<b>FRENCH GUIANA (France)</b>		<b>FRENCH GUIANA (France)</b>	
CAYENNE/Rochambeau	SOCA	PORT OF SPAIN/Piarco Intl, Trinidad I.	TTPP
<b>GUYANA</b>		<b>TRINIDAD AND TOBAGO</b>	
TIMEHRI/Cheddi Jagan Intl	SYCJ	PORT OF SPAIN/Piarco Intl, Trinidad I.	TTPP
<b>HAITI</b>		<b>JAMAICA</b>	
PORT-AU-PRINCE/Port-au-Prince Intl	MTPT	KINGSTON/Norman al Manley Intl	MKJP
<b>HONDURAS</b>		<b>PANAMA</b>	
TEGUCIGALPA/Toncontin Intl	MHTG	PANAMA/Tocumen Intl	MPTO
<b>JAMAICA</b>		<b>UNITED STATES</b>	
KINGSTON/Norman al Manley Intl	MKJP	Kansas City Aviation Weather Center	KKCI
<b>MEXICO</b>		<b>UNITED STATES</b>	
MEXICO/Lic. Benito Juárez Intl	MMMX	Kansas City Aviation Weather Center	KKCI
<b>NETHERLANDS ANTILLES (Netherlands)</b>		<b>JAMAICA</b>	
WILLEMSTAD/Hato, Curaçao I.	TNCC	KINGSTON/Norman al Manley Intl	MKJP
<b>PANAMA</b>		<b>COLOMBIA</b>	
PANAMA/Tocumen Intl	MPTO	BOGOTÁ/Eldorado	SKBO
<b>PARAGUAY</b>		<b>ARGENTINA</b>	
ASUNCION/Silvio Pettrossi	SGAS	RESISTENCIA/Resistencia	SARE
<b>PERU</b>		<b>BOLIVIA</b>	
LIMA-CALLAO/Jorge Chávez Intl	SPIM	Viru-Viru	SLVR
<b>SURINAME</b>		<b>TRINIDAD AND TOBAGO</b>	
ZANDERY/Johan Adolf Pengel Intl	SMJP	PORT OF SPAIN/Piarco Intl, Trinidad I.	TTPP

<b>Oficina de vigilancia meteorológica</b>	<b>Ind. lugar OACI</b>	<b>Oficina de vigilancia meteorológica de respaldo</b>	<b>Ind. lugar OACI</b>
<b>TRINIDAD AND TOBAGO</b>		<b>UNITED STATES</b>	
PORT OF SPAIN/Piarco Intl, Trinidad I.	TTPP	Kansas City Aviation Weather Center	KKCI
<b>UNITED STATES</b>			
Kansas City Aviation Weather Center	KKCI		
<b>URUGUAY</b>		<b>ARGENTINA</b>	
MONTEVIDEO/Carrasco Intl Gral. Cesáreo L. Berisso	SUMU	BUENOS AIRES/Aeroparque, Jorge Newbery	SABE
<b>VENEZUELA</b>		<b>BRASIL</b>	
CARACAS/Simon Bolivar Intl, Maiquetia	SVMI	MANAUS/CINDACTA IV	SBAZ

VI-MET 3A-1

## FASID Table MET 3A — Tabla MET 3A del FASID

### TROPICAL CYCLONE ADVISORY CENTRE CENTRO DE AVISOS DE CICLONES TROPICALES

#### EXPLANATION OF THE TABLE

- 1 Location of the tropical cyclone advisory centre (TCAC).
- 2 ICAO location indicator of TCAC (for use in the WMO header of advisory bulletin).
- 3 Area of responsibility for the preparation of advisory information on tropical cyclones by the TCAC in Column 1.
- 4 Period of operation of the TCAC.
- 5 MWO to which the advisory information on tropical cyclones should be sent.
- 6 Location indicator assigned to the MWO in Column 4.

#### EXPLICACIÓN DE LA TABLA

*Columna*

- 1 Lugar del centro de avisos de ciclones tropicales (TCAC).
- 2 Indicador de lugar del TCAC (para usar en el encabezamiento de la OMM del boletín de asesoramiento).
- 3 Zona de responsabilidad para la preparación de la información de asesoramiento sobre ciclones tropicales por el TCAC en la Columna 1.
- 4 Período de operación del TCAC.
- 5 MWO a la que debe enviarse la información de asesoramiento sobre ciclones tropicales.
- 6 Indicador de lugar de la OACI asignado a la MWO de la Columna 4.

**FASID Table MET 3A - Tabla MET 3A del FASID**

Tropical cyclone advisory centre/Centro de avisos de ciclones tropicales	ICAO Loc. Ind. / Ind. De Lugar OACI	Area of responsibility/ Zona de responsabilidad	Period of operation/ Período de operación	MWO to which advisory information is to be sent/ MWO a la que debe enviarse información de asesoramiento	
				Name/ Nombre	ICAO Loc. Ind./ Ind. de Lugar OACI
1	2	3	4	5	6
<b>Miami</b> (United States) (Estados Unidos)	KWBC	Tropical Atlantic, Caribbean Sea, Gulf of Mexico Relevant parts of the Pacific East of E140°  Atlántico Tropical, Mar del Caribe, Golfo de México Partes pertinentes del Pacífico al este de los 140° E	1 June – 30 November 1 de junio – 30 noviembre	Amazónico/CINDACTA IV Bogotá Brasilia/CINDACTA I Caracas Cayenne Curitiba/CINDACTA II Timehri Habana Kingston México Kansas City Panama Port of Spain Port-au-Prince Recife/CINDACTA III Santo Domingo Tegucigalpa Willemstad Zandery	SBAZ SKBO SBBS SVMJ SOCA SBCW SYCJ MUHA MKJP MMMX KKCI MPTO TTPP MTPP SBRE MDSD MHTG TNCC SMJP

## VI-MET 3B-1

**FASID Table MET 3B — Tableau MET 3B — Tabla MET 3B DEL FASID****VOLCANIC ASH ADVISORY CENTRE  
CENTRO DE AVISOS DE CENIZAS VOLCÁNICAS**

## EXPLANATION OF THE TABLE

*Column*

- 1 Name of the volcanic ash advisory centre (VAAC).
- 2 ICAO location indicator of VAAC (for use in the WMO heading of advisory bulletin).
- 3 Area of responsibility for the preparation of advisory information on volcanic ash by the VAAC in Column 1.
- 4 ICAO Contracting State where the MWOs and ACCs/FICs are located.
- 5 ICAO region where the VAAC, WMOs and ACCs/FICs are located.
- 6 MWOs to which the advisory information on volcanic ash should be sent.
- 7 ICAO location indicator of the MWOs in Column 6.
- 8 ACCs/FICs to which the advisory information on volcanic ash should be sent.
- 9 ICAO location indicator of the ACCs/FICs in Column 8.

## EXPLICACIÓN DE LA TABLA

*Columna*

- 1 Nombre del centro de aviso de cenizas volcánicas (VAAC)
- 2 Indicador de lugar de la OACI del VAAC (para uso en el encabezamiento abreviado de la OMM de los boletines de los avisos).
- 3 Zona de responsabilidad para la preparación de la información de asesoramiento sobre cenizas volcánicas por el VAAC de la Columna 1.
- 4 Estado Contratante de la OACI donde las MWO y los ACC/FIC están localizados.
- 5 Región de la OACI donde el VAAC, la MWO y el ACC/FIC están localizados.
- 6 MWO a las que debe enviarse la información de asesoramiento sobre cenizas volcánicas.
- 7 Indicador de lugar de la OACI de la MWO de la Columna 6.
- 8 ACC a las que debe enviarse la información de asesoramiento sobre cenizas volcánicas.
- 9 Indicador de lugar de la OACI de los ACC/FIC de la Columna 8.

**FASID Table MET 3B — Tableau MET 3B — Tabla MET 3B DEL FASID**

Volcanic ash advisory centre/Centro de aviso de ceniza volcánica		Area of responsibility/ Zona de responsabilidad	State/ Estado	ICAO Region/ Región de la OACI	MWO to which the information is to be sent/MWO a la que se enviará la información		ACC/FIC to which the information is to be sent/ACC/FIC a la que se enviará la información			
Name/ Nombre	ICAO Loc. Ind. de Lugar OACI				Name/ Nombre	ICAO Loc. Ind. de Lugar OACI	Name/ Nombre	ICAO Loc. Ind. de Lugar OACI		
1	2	3	4	5	6	7	8	9		
Buenos Aires (Argentina)	SABM	South of S10° between W10° and W90° Al sur de los 10°S entre 10°W y 90°W	Argentina	SAM	Buenos Aires (Aeroparque)	SABE	Ezeiza	SAEF/ SAEU		
					Comodoro Rivadavia	SAVC	Comodoro Rivadavia	SAVF/ SAVU		
					Córdoba	SACO	Córdoba	SACF/ SACU		
					Mendoza	SAME	Mendoza	SAMF/ SAMV		
					Resistencia	SARE	Resistencia	SARR/ SARU		
					Bolivia	La Paz	SLLP	La Paz	SLLF	
					Brazil	Amazónico/CINDACTA IV	SBAZ	Amazónica	SBAZ	
						Brasilia/CINDACTA I	SBBS	Brasilia	SBBS	
						Curitiba/CINDACTA II	SBCW	Curitiba	SBCW	
						Recife/CINDACTA III	SBRE	Recife	SBRE	
						Recife/CINDACTA III	SBRE	Atlántico	SBAO	
						Chile	Antofagasta	SCFA	Antofagasta	SCFZ
							Puerto Montt	SCTE	Puerto Montt	SCTZ
							Punta Arenas	SCCI	Punta Arenas	SCCZ
							Santiago	SCEL	Santiago	SCEZ
						Paraguay	Asunción	SGAS	Asunción	SGFA
						Peru	Lima-Callao	SPIM	Lima	SPIM
		Uruguay	Montevideo	SUMU	Montevideo	SUEO				
Washington (United States)	KNES	North of S10° 140°W Al norte de los 10°S 140°W New York Oceanic* Oakland Oceanic* United States Continental FIRs*	Brazil	SAM	Amazónico/CINDACTA IV	SBAZ	Amazónica	SBAZ		
					Recife/CINDACTA III	SBRE	Recife	SBRE		
					Recife/CINDACTA III	SBRE	Atlántico	SBAO		
				Colombia	SAM	Santa Fe de Bogotá	SKBO	Barranquilla	SKEC	
						Santa Fe de Bogotá	SKBO	Bogotá	SKED	
				Cuba	CAR	Habana	MUHA	Habana	MUFH	
				Dominican Republic	CAR	Santo Domingo	MDSO	Santo Domingo	MDCS	
				Ecuador	SAM	Guayaquil	SEGU	Guayaquil	SEGU	
				French Guiana (France)	SAM	Cayenne	SOCA	Rochambeau	SOOO	
				Guyana	SAM	Timehri	SYCJ	Georgetown	SYGC	
				Haiti	CAR	Port-au-Prince	MTTP	Port-au-Prince	MTEG	
				Honduras	CAR	Tegucigalpa	MHTG	Central American	MHTG	
				Jamaica	CAR	Kingston	MKJP	Kingston	MKJK	
				Mexico	CAR	México	MMMX	Mazatlán	MMZT	
						México	MMMX	México	MMEX	
						Netherlands antilles (Netherlands)	CAR	Willemstad	Curacao	TNCF
						Panama	SAM	Panamá	Panamá	MPZL
						Peru	SAM	Lima - Callao	Lima	SPIM
						Suriname	SAM	Zandery	Paramaribo	SMPM
						Trinidad and Tobago	CAR	Port of Spain	Piarco	TTZP
						United States	NAM	Kansas City	Houston Oceanic	KZHU
								Kansas City	Miami Oceanic	KZMA
								Kansas City	San Juan	TJZS
					Caracas	Maiquetía	SVZM			
			Venezuela	SAM						

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

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 A6-4 of this appendix.*

Element as specified in Chapter 5 and Appendix 6	Detailed content	Template(s)			Examples
		SIGMET	AIRMET	SPECIAL AIR-REPORT <sup>1</sup>	
Location indicator of FIR/CTA (M) <sup>2</sup>	ICAO location indicator of the ATS unit serving the FIR or CTA to which the SIGMET/AIRMET refers (M)	nnnn		—	YUCC <sup>3</sup> YUDD <sup>3</sup>
Identification (M)	Message identification and sequence number <sup>4</sup> (M)	SIGMET [nn]n	AIRMET [nn]n	ARS	SIGMET 5 SIGMET A3 AIRMET 2 ARS
Validity period (M)	Day-time groups indicating the period of validity in UTC (M)	VALID nnnnnn/nnnnnn			— <sup>5</sup> 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- <sup>3</sup> YUSO- <sup>3</sup>
Name of the FIR/CTA or aircraft identification (M)	Location indicator and name of the FIR/CTA <sup>6</sup> for which the SIGMET/AIRMET is issued or aircraft radiotelephony call sign (M)	nnnn nnnnnnnnnn FIR/[UIR] or nnnn nnnnnnnnnn CTA	nnnn nnnnnnnnnn FIR/[n]	nnnnnn	YUCC AMSWELL FIR <sup>3</sup> YUDD SHANLON FIR/UIR <sup>3</sup>  YUCC AMSWELL FIR/ <sup>23</sup> YUDD SHANLON FIR <sup>3</sup>  VA812
IF THE SIGMET IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.					
Phenomenon (M) <sup>7</sup>	Description of phenomenon causing the issuance of SIGMET/AIRMET (C)	OBSC <sup>8</sup> TS[GR] <sup>9</sup> EMBD <sup>10</sup> TS[GR] FRQ <sup>11</sup> TS[GR] SQL <sup>12</sup> TS[GR]  TC nnnnnnnnnn or NN <sup>13</sup>  SEV TURB <sup>14</sup> SEV ICE <sup>15</sup> SEV ICE (FZRA) <sup>15</sup> SEV MTW <sup>16</sup>  HVY DS HVY SS  [VA ERUPTION] [MT] [nnnnnnnnnn] [PSN Nnn[nn] or Snn[nn]	SFC WSPD nn[n]MPS (or SFC WSPD nn[n]KT)  SFC VIS nnnnM (nn) <sup>17</sup>  ISOL <sup>18</sup> TS[GR] <sup>9</sup> OCNL <sup>19</sup> TS[GR]  MT OBSC  BKN CLD nnn/[ABV]nnnnM (or BKN CLD nnn/[ABV]nnnnFT)  OVC CLD nnn/[ABV]nnnnM (or OVC CLD nnn/[ABV]nnnnFT)	TS TSGR  SEV TURB SEV ICE  SEV MTW  HVY SS  VA CLD [FL nnn/nnn] VA [MT nnnnnnnnnn]  MOD TURB MOD ICE	SEV TURB FRQ TS OBSC TSGR EMBD TSGR TC GLORIA TC NN  VA ERUPTION MT ASHVAL PSN S15 E073 VA CLD  MOD TURB MOD MTW ISOL CB  BKN CLD 120/900M (BKN CLD 400/3000FT)

Element as specified in Chapter 5 and Appendix 6	Detailed content	Template(s)			Examples
		SIGMET	AIRMET	SPECIAL AIR-REPORT <sup>1</sup>	
		Ennn[nn] or Wnnn[nn] VA CLD  RDOACT CLD	ISOL <sup>18</sup> CB <sup>20</sup> OCNL <sup>19</sup> CB FRQ <sup>11</sup> CB  ISOL <sup>18</sup> TCU <sup>20</sup> OCNL <sup>19</sup> TCU <sup>20</sup> FRQ <sup>11</sup> TCU  MOD TURB <sup>14</sup> MOD ICE <sup>15</sup> MOD MTW <sup>16</sup>		OVC CLD 270/ABV3000M (OVC CLD 900/ABV10000FT)  SEV ICE  RDOACT CLD
Observed or forecast phenomenon (M)	Indication whether the information is observed and expected to continue, or forecast (M)	OBS [AT nnnnZ] FCST [AT nnnnZ]		OBS AT nnnnZ	OBS AT 1210Z OBS FCST AT 1815Z
Location (C) <sup>21</sup>	Location (referring to latitude and longitude (in degrees and minutes) or locations or geographic features well known internationally)	Nnn[nn] Wnnn[nn] or Nnn[nn] Ennn[nn] or Snn[nn] Wnnn[nn] or Snn[nn] Ennn[nn] or N OF Nnn[nn] or S OF Nnn[nn] or N OF Snn[nn] or S OF Snn[nn] or [AND] W OF Wnnn[nn] or E OF Wnnn[nn] or W OF Ennn[nn] or E OF Ennn[nn] or [N OF, NE OF, E OF, SE OF, S OF, SW OF, W OF, NW OF] [LINE] Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] or [N OF, NE OF, E OF, SE OF, S OF, SW OF, W OF, NW OF, AT] nnnnnnnnnnn or WI Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – [Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]	NnnnnWnnnnn or NnnnnEnnnnn or SnnnnWnnnnn or SnnnnEnnnnn	S OF N54 N OF N50 N2020 W07005 AT YUSB <sup>3</sup> N2706 W07306  N48 E010  N OF N1515 AND W OF E13530  W OF E1554  N OF LINE S2520 W11510 – S2520 W12010  WI N6030 E02550 – N6055 E02500 – N6050 E02630	
Level (C) <sup>21</sup>	Flight level or altitude and extent (C) <sup>22</sup>	[SFC]/FLnnn or [SFC]/nnnnM (or [SFC]/nnnnFT) or FLnnn/nnn or TOP FLnnn or [TOP] ABV FLnnn  or <sup>23</sup> CB TOP [ABV] FLnnn WI nnnKM OF CENTRE (or CB TOP [ABV] FLnnn WI nnnNM OF CENTRE) or CB TOP [BLW] FLnnn WI nnnKM OF CENTRE (or CB TOP [BLW] FLnnn WI nnnNM OF CENTRE)  or <sup>24</sup>  FLnnn/nnn [APRX nnnKM BY nnnKM] [nnKM WID LINE <sup>25</sup> BTN (nnNM WID LINE BTN)] [Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]	FLnnn or nnnnM (or nnnnFT)	FL180 FL050/080 TOP FL390 SFC/FL070 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	

Element as specified in Chapter 5 and Appendix 6	Detailed content	Template(s)			Examples	
		SIGMET	AIRMET	SPECIAL AIR-REPORT <sup>1</sup>		
		– Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [ – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [ – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]] (or FLnnn/nnn [APRX nnnNM BY nnnNM] [Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [ – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [ – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]])				FL390
Movement or expected movement (C) <sup>21</sup>	Movement or expected movement (direction and speed) with reference to one of the sixteen points of compass, or stationary (C)	MOV N [nnKMH] or MOV NNE [nnKMH] or MOV NE [nnKMH] or MOV ENE [nnKMH] or MOV E [nnKMH] or MOV ESE [nnKMH] or MOV SE [nnKMH] or MOV SSE [nnKMH] or MOV S [nnKMH] or MOV SSW [nnKMH] or MOV SW [nnKMH] or MOV WSW [nnKMH] or MOV W [nnKMH] or MOV WNW [nnKMH] or MOV NW [nnKMH] or MOV NNW [nnKMH] (or MOV N [nnKT] or MOV NNE [nnKT] or MOV NE [nnKT] or MOV ENE [nnKT] or MOV E [nnKT] or MOV ESE [nnKT] or MOV SE [nnKT] or MOV SSE [nnKT] or MOV S [nnKT] or MOV SSW [nnKT] or MOV SW [nnKT] or MOV WSW [nnKT] or MOV W [nnKT] or MOV WNW [nnKT] or MOV NW [nnKT] or MOV NNW [nnKT]) or STNR			—	MOV E 40KMH (MOV E 20KT)  MOV SE STNR
Changes in intensity (C) <sup>21</sup>	Expected changes in intensity (C)	INTSF or WKN or NC			—	WKN
Forecast position (C) <sup>21, 22</sup>	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] or Snn[nn] Wnnn[nn] or Ennn[nn] or FCST nnnnZ VA CLD APRX [nnKM WID LINE <sup>25</sup> BTN (nnNM WID LINE BTN)] Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [ – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [ – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [AND] <sup>26</sup>	—	—	FCST 2200Z TC CENTRE N2740 W07345  FCST 1700Z VA CLD APRX S15 E075 – S15 E081 – S17 E083 – S18 E079 – S15 E075	

OR

Cancellation of SIGMET/ AIRMET (C) <sup>27</sup>	Cancellation of SIGMET/AIRMET referring to its identification	CNL SIGMET [nn]n nnnnnn/nnnnnn or CNL SIGMET [nn]n nnnnnn/nnnnnn [VA MOV TO nnnn FIR] <sup>24</sup>	CNL AIRMET [nn]n nnnnnn/nnnnnn	—	CNL SIGMET 2 101200/101600 <sup>27</sup>  CNL SIGMET 3 251030/251430 VA MOV TO YUDO FIR <sup>27</sup>  CNL AIRMET 151520/151800 <sup>27</sup>
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## Notes.—

1. No wind and temperature to be uplinked to other aircraft in flight in accordance with 3.2.
2. See 4.1.
3. Fictitious location.
4. In accordance with 1.1.3 and 2.1.2.
5. See 3.1.
6. See 2.1.3.
7. In accordance with 1.1.4 and 2.1.4.
8. In accordance with 4.2.1 a).
9. In accordance with 4.2.4.
10. In accordance with 4.2.1 b).
11. In accordance with 4.2.2.
12. In accordance with 4.2.3.
13. Used for unnamed tropical cyclones.
14. In accordance with 4.2.5 and 4.2.6.
15. In accordance with 4.2.7.
16. In accordance with 4.2.8.
17. In accordance with 2.1.4.
18. In accordance with 4.2.1 c).
19. In accordance with 4.2.1 d).
20. The use of cumulonimbus, CB, and towering cumulus, TCU, is restricted to AIRMETs in accordance with 2.1.4.
21. In the case of the same phenomenon covering more than one area within the FIR, these elements can be repeated, as necessary.
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. A straight line between two points drawn on a map in the Mercator projection or a straight line between two points which crosses lines of longitude at a constant angle.
26. To be used for two volcanic ash clouds or two centres of tropical cyclones simultaneously affecting the FIR concerned..
27. End of the message (as the SIGMET/AIRMET message is being cancelled).

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

## APPENDIX F

**WMO ABBREVIATED HEADER GROUP T<sub>1</sub> T<sub>2</sub> A<sub>1</sub><sup>1</sup> A<sub>2</sub>ii FOR SIGMET(S) AND ICAO  
LOCATION INDICATOR(S) OF THE FIR(S)  
(CAR/SAM FASID Table MET 1B)**

State	Meteorological Watch Office(s)	WMO Header First Group	Name and ICAO location indicator(s) of the FIR(s)	
		<u>T<sub>1</sub> T<sub>2</sub> A<sub>1</sub><sup>2</sup> A<sub>2</sub>ii</u>		
<b>CAR/SAM REGIONS</b>				
ARGENTINA	BUENOS AIRES/Aeroparque	WVSA31	Ezeiza FIR	SAEF
	COMODORO RIVADAVIA		Comodoro Rivadavia FIR	SAVF
	CORDOBA		Córdoba FIR	SACF
	CORDOBA		Mendoza FIR	SAMF
	RESISTENCIA		Resistencia FIR	SARR
BOLIVIA	LA PAZ/El Alto Intl	WSBO31	La Paz FIR	SLLP
BRASIL	BRASILIA/CINDACTA I	WSBZ31	Brasilia FIR	SBBS
	CURITIBA/CINDACTA II		Curitiba FIR	SBCW
	MANAUS/CINDACTA IV		Amazónica FIR	SBAZ
	RECIFE/CINDACTA III		Recife FIR	SBRE
CHILE	ANTOFAGASTA/SANTIAGO	WSCH31	Antofagasta FIR	SCFZ
	PUERTO MONTT		Puerto Montt FIR	SCTZ
	PUNTA ARENAS		Punta Arenas FIR	SCCZ
	SANTIAGO		Santiago FIR	SCEZ
COLOMBIA	BOGOTÁ	WVCO31	Bogotá FIR	SKED
			Barranquilla FIR	SKEC
CUBA	HABANA	ECSU31	Habana FIR	MUFH
DOMINICAN REPUBLIC	SANTO DOMINGO	WSDR31	Santo Domingo FIR	MDCS
ECUADOR	GUAYAQUIL	WSEQ31	Guayaquil FIR	SEGU
FRENCH GUIANA (France)	CAYENE	WSFG20	Rochambeau	SOOO
GUYANA	TIMEHRI	WSGY31	Georgetown FIR	SYGC
HAITI	POR-AU-PRINCE	WSHA31	Port-au-Prince FIR	MTEG
HONDURAS	TEGUCIGALPA	WVHO31	Central American FIR	MHTG
JAMAICA	KINGSTON	WSJM31	Kingston FIR	MKJK
MEXICO	MEXICO	WSMX31	Mazatlan Oceanic México FIR	MMFO MMFR

<sup>1</sup> WS/WV/WC<sup>2</sup> WS/WV/WC

State	Meteorological Watch Office(s)	WMO Header First Group	Name and ICAO location indicator(s) of the FIR(s)	
		T <sub>1</sub> T <sub>2</sub> A <sub>1</sub> <sup>2</sup> A <sub>2</sub> ii		
NETHERLANDS ANTILLES (Netherlands)	WILEMSTAD	WSNU31	Curaçao FIR	TNCF
PANAMA	PANAMÁ	WSPM31	Panamá FIR	MPZL
PARAGUAY	ASUNCIÓN	WSPY31	Asunción FIR	SGFA
PERU	LIMA	WSPR31	Lima FIR	SPIM
SURINAME	ZANDERY	WSSM31	Paramaribo FIR	SMPM
TRINIDAD AND TOBAGO	PORT OF SPAIN	WVCA31	Piarco FIR	TTZP
UNITED STATES	KANSAS CITY WEATHER CENTER	WCUS31	Houston Oceanic fir Miami Oceanic FIR San Juan FIR	KZHU KZMA TJZS
URUGUAY	MOPNTEVIDEO	WSUY31	Montevideo FIR	SUEO
VENEZUELA	CARACAS	WSVN31	Maiquetía FIR	SVZM

*Abstract of Doc 8400/5 – PANS/ABS-ICAO Abbreviations and Codes***Common abbreviations in meteorological messages****A**

<b>ABT</b>	About
<b>ABV</b>	Above
<b>AC</b>	Alto cumulus
<b>ACT</b>	Active <i>or</i> activated <i>or</i> activity
<b>AD</b>	Aerodrome
<b>ADS</b>	The address ( <i>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)</i>
<b>ADZ</b>	Advise
<b>AFT</b>	After . . . ( <i>time or place</i> )
<b>AFTN</b>	Aeronautical fixed telecommunication network
<b>AIREP</b>	Air-report
<b>AIRMET</b>	Information concerning en-route weather phenomena which may affect the safety of low-level aircraft operations
<b>ALT</b>	Altitude
<b>AMD</b>	Amend <i>or</i> amended ( <i>used to indicate amended meteorological message; message type designator</i> )
<b>APCH</b>	Approach
<b>APRX</b>	Approximate <i>or</i> approximately
<b>AS</b>	Altostratus
<b>AT . . .</b>	At ( <i>followed by time at which weather change is forecast to occur</i> )
<b>ATS</b>	Air traffic services

**B**

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

**C**

<b>C</b>	Degrees Celsius ( <i>Centigrade</i> )
<b>CAT</b>	Clear air turbulence
<b>CAVOK</b>	( <i>to be pronounced "KAV-OH-KAY"</i> ) Visibility, cloud and present weather better than prescribed values or conditions
<b>CB</b>	( <i>to be pronounced "CEE BEE"</i> ) Cumulonimbus

<b>CC</b>	Cirrocumulus
<b>CI</b>	Cirrus
<b>CLD</b>	Cloud
<b>CONT</b>	Continue(s) <i>or</i> continued
<b>COV</b>	Cover <i>or</i> covered <i>or</i> covering
<b>CS</b>	Cirrostratus
<b>CTA</b>	Control area
<b>CU</b>	Cumulus

**D**

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

**E**

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

**F**

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

<b>M</b>	Metres (preceded by figures)
<b>MAX</b>	Maximum
<b>MBST</b>	Microburst
<b>MET</b>	Meteorological <i>or</i> meteorology
<b>METAR</b>	Aviation routine weather report ( <i>in aeronautical meteorological code</i> )
<b>MID</b>	Mid-point (related to RVR)
<b>MIFG</b>	Shallow fog
<b>MNM</b>	Minimum
<b>MOD</b>	Moderate ( <i>used to indicate the intensity of weather phenomena, interference or static reports, e.g. MOD RA = moderate rain</i> )
<b>MON</b>	Above mountains
<b>MOV</b>	Move <i>or</i> moving <i>or</i> movement
<b>MS</b>	Minus
<b>MSL</b>	Mean sea level
<b>MT</b>	Mountain
<b>MTW</b>	Mountain waves
<b>MWO</b>	Meteorological watch office

**N**

<b>N</b>	No distinct tendency ( <i>in RVR during previous 10 minutes</i> )
<b>N</b>	North <i>or</i> northern latitude
<b>NC</b>	No change
<b>NE</b>	North-east
<b>NIL</b>	None <i>or</i> I have nothing to send to you
<b>NM</b>	Nautical miles
<b>NOSIG</b>	No significant change ( <i>used in trend-type landing forecasts</i> )
<b>NOTAM</b>	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
<b>NS</b>	Nimbostratus
<b>NSC</b>	Nil significant cloud
<b>NSW</b>	Nil significant weather
<b>NW</b>	North-west

**O**

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

## P

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

## Q

<b>QFE</b>	Atmospheric pressure at aerodrome elevation ( <i>or at runway threshold</i> )
<b>QNH</b>	Altimeter sub-scale setting to obtain elevation when on the ground

## R

<b>RA</b>	Rain
<b>RAFC</b>	Regional area forecast centre
<b>RDOACT</b>	Radioactive
<b>RE</b>	Recent ( <i>used to qualify weather phenomena, e.g. RERA = recent rain</i> )
<b>RNAV</b>	( <i>to be pronounced "AR-NAV"</i> ) Area navigation
<b>ROBEX</b>	Regional OPMET bulletin exchange ( <i>scheme</i> )
<b>ROFOR</b>	Route forecast ( <i>in aeronautical meteorological code</i> )
<b>RTD</b>	Delayed ( <i>used to indicate delayed meteorological message; message type designator</i> )
<b>RVR</b>	Runway visual range
<b>RWY</b>	Runway

## S

<b>S</b>	South <i>or</i> southern latitude
<b>SA</b>	Sand
<b>SARPS</b>	Standards and Recommended Practices [ICAO]
<b>SC</b>	Stratocumulus
<b>SCT</b>	Scattered
<b>SEV</b>	Severe ( <i>used e.g. to qualify icing and turbulence reports</i> )
<b>SFC</b>	Surface
<b>SH</b>	Showers ( <i>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</i> )
<b>SIGMET</b>	Information concerning en-route weather phenomena which may affect the safety of aircraft operations
<b>SKC</b>	Sky clear
<b>SN</b>	Snow
<b>SPECI</b>	Aviation selected special weather report ( <i>in aeronautical meteorological code</i> )
<b>SPOT</b>	Spot wind
<b>SQ</b>	Squall
<b>SS</b>	Sandstorm
<b>SST</b>	Supersonic transport
<b>ST</b>	Stratus
<b>STNR</b>	Stationary
<b>SW</b>	South west

**T**

<b>T</b>	Temperature
<b>TAF</b>	Aerodrome forecast
<b>TC</b>	Tropical cyclone
<b>TCU</b>	Towering cumulus
<b>TDO</b>	Tornado
<b>TEMPO</b>	Temporary <i>or</i> temporarily
<b>TL</b>	Till ( <i>followed by time by which weather change is forecast to end</i> )
<b>TO</b>	To . . . (place)
<b>TOP</b>	Cloud top
<b>TS</b>	Thunderstorm ( <i>in aerodrome reports and forecasts, TS used alone means thunder heard but no precipitation at the aerodrome</i> )
<b>TS . . .</b>	Thunderstorm ( <i>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</i> )
<b>TURB</b>	Turbulence

**U**

<b>U</b>	Upward ( <i>tendency in RVR during previous 10 minutes</i> )
<b>UIR</b>	Upper flight information region
<b>UTC</b>	Coordinated Universal Time

**V**

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

**W**

<b>W</b>	West <i>or</i> western longitude
<b>WAFC</b>	World area forecast centre
<b>WDSPR</b>	Widespread
<b>WI</b>	Within
<b>WID</b>	Width; wide
<b>WINTEM</b>	Forecast upper wind and temperature for aviation
<b>WKN</b>	Weaken <i>or</i> weakening
<b>WRNG</b>	Warning
<b>WS</b>	Wind shear
<b>WX</b>	Weather

**Z**

<b>Z</b>	Coordinated Universal Time ( <i>in meteorological messages</i> )
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**Table A6-4. Ranges and resolutions for the numerical elements included in volcanic ash and tropical cyclone advisory messages, SIGMET/AIRMET messages and aerodrome and wind shear warnings**

<i>Element as specified in Appendices 2 and 6</i>	<i>Range</i>	<i>Resolution</i>
Summit elevation: M FT	000 – 8 100 000 – 27 000	1 1
Advisory number: for VA (index)* for TC (index)*	000 – 2 000 00 – 99	1 1
Maximum surface wind: MPS KT	00 – 99 00 – 199	1 1
Central pressure: hPa	850 – 1 050	1
Surface wind speed: MPS KT	15 – 49 30 – 99	1 1
Surface visibility: M M	0000 – 0750 0800 – 5 000	50 100
Cloud: height of base: M FT	000 – 300 000 – 1 000	30 100
Cloud: height of top: M M FT FT	000 – 2 970 3 000 – 20 000 000 – 9 900 10 000 – 60 000	30 300 100 1 000
Latitudes: ° (degrees) ' (minutes)	00 – 90 00 – 60	1 1
Longitudes: ° (degrees) ' (minutes)	000 – 180 00 – 60	1 1
Flight levels:	000 – 650	10
Movement: KMH KT	0 – 300 0 – 150	10 5
* Non-dimensional		

## VI-MET 3C-1

**FASID Table MET 3C**  
**TABLA MET 3C DEL FASID**

**SELECTED STATE VOLCANO OBSERVATORIES**  
**OBSERVATORIOS DE VOLCANES DE ESTADOS SELECCIONADOS**

EXPLANATION OF THE TABLE

*Column*

- 1 Name of the Provider State of the volcano observatory designated for direct notification of volcanic activity.
- 2 Name of the volcano observatory.
- 3 VAAC to which the information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.
- 4 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 of the ACC in Column 4.
6. 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 Nombre del Estado Proveedor del observatorio de volcanes designado para la notificación directa de actividad volcánica.
- 2 Nombre del observatorio de volcanes.
- 3 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 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 del ACC de la Columna 4.
- 6 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 de volcanes	Volcano observatory Observatorio de volcanes	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
<b>Argentina</b>	Servicio Geológico y Minero Argentino (SEGEMAR)	Buenos Aires	Ezeiza	SAEF/ SAEU	Buenos Aires (Aeroparque)	SABE
			Comodoro Rivadavia	SAVF/ SAVU	Comodoro Rivadavia	SAVC
			Córdoba	SACF/ SACU	Córdoba	SACO
			Mendoza	SAMF/ SAMV	Mendoza	SAME
			Resistencia	SARR/ SARU	Resistencia	SARE
<b>Chile</b>	Southern Andes Volcano Observatory (SAVO) Departamento de Ciencias Físicas, Temuco Servicio Nacional de Geología y Minería (SERNAGEOMIN), Santiago	Buenos Aires	Antofagasta	SCFZ	Antofagasta	SCFA
			Puerto Montt	SCTZ	Puerto Montt	SCTE
			Punta Arenas	SCCZ	Punta Arenas	SCCI
			Santiago	SCEZ	Santiago	SCEL
<b>Colombia</b>	INGEOMINAS - Observatorio de volcanes de Colombia, Manizales	Washington	Barranquilla	SKEC	Santa Fe de Bogotá	SKBO
			Bogotá	SKED	Santa Fe de Bogotá	SKBO
<b>Costa Rica</b>	Observatorio de volcanes y Sismológico de Costa Rica, (OVSICORI-UNA), Heredia	Washington	Central American	MHTG	Tegucigalpa	MHTG
<b>Ecuador</b>	Instituto Geofísico, Quito	Washington	Guayaquil	SEGU	Guayaquil	SEGU
<b>El Salvador</b>	Servicio Nacional de Estudios Territoriales (SNET), Ministerio de Medio Ambiente y Recursos Naturales, (MARN), El Salvador	Washington	Central American	MHTG	Tegucigalpa	MHTG
<b>French Antilles (France)</b>	GAUDELouPE, Observatoire volcanologique de la Soufriere	Washington	Piarco	TTZP	Port of Spain	TTPP
	MARTINIQUE, Observatoire volcanologique de la Pelée	Washington				
<b>Guatemala</b>	INSIVUMEH Sección Vulcanología, Ciudad de Guatemala	Washington	Central American	MHTG	Tegucigalpa	MHTG
<b>Guyana</b>	Guyana Geology and Mines Commission	Washington	Georgetown	SYGC	Timheri	SYCJ
<b>México</b>	Centro Nacional de Prevención de Desastres (CENAPRED) Centro Universitario de Investigaciones en Ciencias del Ambiente, Universidad de Colima Instituto de Geofísica, UNAM Observatorio de volcanes, Universidad de Colima	Washington	Mazatlán México	MMZT MMEX	México México	MMM MMM

Provider State of volcano observatory Estado Proveedor del observatorio de volcanes	Volcano observatory Observatorio de volcanes	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
<b>Montserrat (U.K.)</b>	Montserrat Volcano Observatory	Washington	Piarco	TTZP	Port of Spain Port of Spain Port of Spain Port of Spain	TTPP TTPP TTPP TTPP
<b>Nicaragua</b>	Dirección General del Inst. Nicaragüense de Estudios Territoriales (INETER), Managua Dirección de Vulcanología	Washington	Central American	MHTG	Tegucigalpa	MHTG
<b>Panamá</b>	Instituto de Geociencias	Washington	Panamá/Tocumen	MPZL	Panamá	MPTO
<b>Perú</b>	Instituto Geofísico del Perú (IGP), Arequipa	Buenos Aires and/y Washington	Lima	SPIM	Lima	SPIM
<b>Trinidad y Tabago</b>	Seismic Research Unit, University of Indies St. Augustine	Washington	Piarco	TTZP	Port of Spain	TTPP

*Note.- AFTN is not available at all selected volcano observatories and therefore it is the responsibility of each State to make appropriate communications arrangements.*

*Nota.- El AFTN no está disponible en todos los observatorios de volcanes seleccionados y por lo tanto es responsabilidad de cada Estado efectuar los arreglos de comunicaciones correspondientes.*

**AFTN ADDRESSES TO WHICH THE MIAMI TCAC SHOULD TRANSMIT  
TROPICAL CYCLONE ADVISORIES IN THE CAR/SAM REGIONS**

<b>Tropical Cyclone Advisory Centre (TCAC)</b>	<b>Addressee</b>	<b>AFTN Address</b>
Miami (United States)	Bogota	SKBOYMYX/SKZZMAMX
	Caracas	SVMIIYMYX/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	MDSYMYX
	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 IN THE CAR/SAM REGIONS**

<b>VAAC BUENOS AIRES</b>			
<b>Addressee:</b>			
<b>MWO(s) Name</b>	<b>MWO(s) AFTN</b>	<b>FIR(s) Name</b>	<b>ACC AFTN Address</b>
<b>Argentina</b>			
Buenos Aires (Aeroparque)	SABEYMYX / SAZZMAMX	Ezeiza	SAEFZRZX
Comodoro Rivadavia	SAVCYMYX / SAZZMAMX	Comodoro Rivadavia	SAVFZRZX
Cordoba	SACOYMYX / SAZZMAMX	Cordoba UIR	SACUZRZX
Mendoza	SAMEYMYX / SAZZMAMX	Mendoza	SAMFZRZX
Resistencia	SAREYMYX / SAZZMAMX	Resistencia	SARRZRZX
<b>Bolivia</b>			
La Paz	SLLPYMYX / SLZZMAMX	La Paz	SLLFZRZX
<b>Brazil</b>			
Brasilia	SBBSYMYX	Brasilia	SBBRZRZX
Curitiba	SBCWYMYX	Curitiba	SBCWZRZX
Manaus	SBAZYMYX	Amazonica	SBAZZRZX
Recife	SBREYMYX	Recife	SBREZRZX
		Atlantico	SBAOZRZX
<b>Chile</b>			
Antofagasta/Santiago	SCFAYMYX / SCZZMAMX	Antofagasta	SCFZZRZX
Puerto Montt	SCTEYMYX / SCZZMAMX	Puerto Montt	SCTZZRZX
Punta Arenas	SCCIYMYX / SCZZMAMX	Punta Arenas	SCCZZRZX
Santiago	SCZZMAMX / SCELZYMYX	Santiago	SCEZZRZX
<b>Paraguay</b>			
Asuncion	SGASYMYX / SGZZMAMX	Asunción	SGFAZRZX
<b>Peru</b>			
Lima-Callao	SPIMYMYX / SPZZMAMX	Lima	SPIMZQZX
<b>Uruguay</b>			
Montevideo	SUMUYMYX / SUZZMAMX	Montevideo	SUEOZQZX
<b>Brasilia OPMET Databank: SBBRYZYX</b>			
<b>ISCS: KWBCYMYX</b>			
<b>SADIS: EGZZMSAM</b>			

<b>VAAC WASHINGTON</b>			
<b>Addressee:</b>			
<b>MWO(s) Name</b>	<b>MWO(s) AFTN</b>	<b>FIR(s) Name</b>	<b>ACC AFTN Address</b>
<b>Brazil</b>			
Recife	SBREYMYX	Recife	SBREZRZX
		Atlantico	SBAOZRZX
<b>Colombia</b>			
Santa Fe de Bogotá	SKBOYMYX / SKZZMAMX	Barranquilla	SKECZQZX
		Bogota	SKEDZQZX
<b>Cuba</b>			
Habana	MUHAYMYX	Habana	MUFHZQZX
<b>Dominican Republic</b>			
Santo Domingo	Santo Domingo	Santo Domingo	Santo Domingo
<b>Ecuador</b>			
Guayaquil	SEGUYMYX / SEGUZXB	Guayaquil	SEGUZQZX
<b>French Guiana (France)</b>			
Cayenne	SOCAYMYX / SOZZMAMX	Cayenne	SOOOZQZX
<b>Guyana</b>			
Timehri	SYCJYMYX / SYZZMAMX	Georgetown	SYCJZQZX
<b>Haiti</b>			
Port-au-Prince	MTPPYMYX	Port-au-Prince	MTEG
<b>Honduras</b>			
Tegucigalpa	MHTGYMYX	Central America	MHTGZQZX
<b>Jamaica</b>			
Kingston	MKJPYMYX		
<b>Mexico</b>			
Mexico	MMMXYMYX	Mazatlan Oceanic	MMFO
		Mexico	MMFR
<b>Netherland Antilles (Netherlands)</b>			
Willemstad	TNCCYMYX		
<b>Panama</b>			
Panama	MPTOYMYX / MPZZMAMX	Panama	MPZLZQZX
<b>Peru</b>			
Lima-Callao	SPIMYMYX / PZZMAMX	Lima	SPIMZQZX
<b>Suriname</b>			
Zandery	SMJPYMYX / SMZZMAMX	Paramaribo	SMPM
<b>Trinidad y Tobago</b>			
Port of Spain	TTPPYMYX	Piarco	TTZPZQZX
<b>United States</b>			
Kansas City	KKCI	Houston Oceanic	KZHU
		Miami Oceanic	KZMA
		San Juan	TJZS
<b>Venezuela</b>			
Caracas	SVMYMYX / SVZZMAMX	Maiquetia	SVZMZQZX / SVZMZFZX SVZMZRZX
<b>Brasilia OPMET Databank: SBBRYZYX</b>			
<b>ISCS: KWBCYMYX</b>			
<b>SADIS: EGZMSAM</b>			







**INTERNATIONAL TRANSMISSION OF SIGMET MESSAGES (WS/WC/WV) AND SPECIAL AIR-REPORTS (UA) IN THE STATES OF THE CAR/SAM REGIONS**

Note: According to the explanation of the Table of Appendix F to this Guide, "S" means that the exchange of SIGMET WS, WC, WV and special AIREPs (UA) (column 5) is required, and "s" that only SIGMET related with volcanic ash are required (WV).

STATE MWO	ICAO Location Ind.	FIR, UIR and/or SRR	ICAO Location Ind.	WS, WV, WC, UA	AFTN Addresses (based on CAR/SAM FASID Table MET 1B and the Table of Appendix F)
1	2	3	4	5	6
<b>ARGENTINA</b>					
Buenos Aires/ Aeroparque	SABE	Ezeiza FIR/SRR Ezeiza ACC/UIR	SAEF SAEU	WS, WV, UA	SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX MDSYMYX SEZZMAMX MKJPYMYX MMMXYMYX TNCCYMYX SGZZMAMX SPZZMAMX TTPPYMYX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b> and <b>SAZZMAMX</b>
Comodoro Rivadavia	SAVC	Comodoro Rivadavia FIR/SRR Comodoro Rivadavia ACC/UIR	SAVF SAVU	WS, WV, UA	SCZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b> and <b>SAZZMAMX</b>
Córdoba	SACO	Córdoba FIR/SRR Córdoba ACC/UIR	SACF SACU	WS, WV, UA	SLZZMAMX SCZZMAM X MDSYMYX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b> and <b>SAZZMAMX</b>
Mendoza	SAME	Mendoza FIR/SRR Mendoza ACC/UIR	SAMF SAMV	WS, WV, UA	SCZZMAMX SGZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b> and <b>SAZZMAMX</b>
Resistencia	SARE	Resistencia FIR/SRR Resistencia ACC/UIR	SARR SARU	WS, WV, UA	SLZZMAMX SCZZMAMX SGZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b> and <b>SAZZMAMX</b>
<b>BOLIVIA</b>					
La Paz	SLLP	La Paz FIR/SRR	SLLF	WS, WV, UA	TNCAYMYX SCZZMAMX SKZZMAMX MROCYMYX MPZZMAMX SGZZMAMX SPZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b> and <b>SAZZMAMX</b>
<b>BRAZIL</b>					
Brasilia/CINDACTA I	SBBS	Brasilia FIR/UIR/SRR	SBBS	WS, WC, WV,UA	SAZZMAMX SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX MDSYMYX SEZZMAMX SOZZMAMX SYZZMAMX MTPPYMYX MKJKYMYX TNCCYMYX MPZZMAMX SGZZMAMX SPZZMAMX TJSJYMYX SMZZMAMX TTPPYMYX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WC y WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> / Only SIGMETS <b>WC and WV</b> shall be sent additionally to <b>LOZZMMSS</b>

STATE MWO	ICAO Location Ind.	FIR, UIR and/or SRR	ICAO Location Ind.	WS, WV, WC, UA	AFTN Addresses (based on CAR/SAM FASID Table MET 1B and the Table of Appendix F)
Curitiba/CINDACTA II	SBCW	Curitiba FIR/UIR/SRR	SBCW	WS, WC, WV, UA	SAZZMAMX SLZZMAMX SCZZMAMX SKZZMAMX MDSYMYX SEZZMAMX SGZZMAMX SPZZMAMX TJSJYMYX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZMSAM  Solamente los SIGMET <b>WC y WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> / Only SIGMETS <b>WC and WV</b> shall be sent additionally to <b>LOZZMMSS</b>
Manaus/CINDACTA IV	SBAZ	Amazonica FIR/UIR/ SRR	SBAZ	WS, WC, WV, UA	SAZZMAMX SLZZMAMX SCZZMAMX SKZZMAMX MDSYMYX SEZZMAMX SGZZMAMX SPZZMAMX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZMSAM  Solamente los SIGMET <b>WC y WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> / Only SIGMETS <b>WC and WV</b> shall be sent additionally to <b>LOZZMMSS</b>
Recife/CINDACTA III	SBRE	Recife FIR/UIR/SRR  Atlántico FIR/UIR/SRR	SBRE  SBAO	WS, WC, WV, UA  WS, WC, WV, UA	SOZZMAMX SGZZMAMX SMZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZMSAM  SAZZMAMX SLZZMAMX SCZZMAMX SKZZMAMX MROCYMYX MUHAYMYX MDSYMYX SEZZMAMX SOZZMAMX SYZZMAMX MTPPYMYX MKJKYMYX TNCCYMYX MPZZMAMX SGZZMAMX SPZZMAMX TJSJYMYX SMZZMAMX TTPPYMYX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZMSAM  Solamente los SIGMET <b>WC</b> se enviarán adicionalmente a <b>LOZZMMSS</b> / Only SIGMETS <b>WC</b> shall be sent additionally to <b>LOZZMMSS</b>  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b> and <b>SAZZMAMX</b>
<b>CHILE</b>					
Antofagasta Santiago <sup>1</sup>	SCFA SCEL	Antofagasta FIR/SRR	SCFZ	WS, WV, UA	SAZZMAMX SLZZMAMX SKZZMAMX SEZZMAMX MPZZMAMX SGZZMAMX SPZZMAMX SBBRYZYX KWBCYMYX EGZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b> and <b>SAZZMAMX</b>
Puerto Montt	SCTE	Puerto Montt FIR/SRR	SCTZ	WS, WV, UA	SBBRYZYX KWBCYMYX EGZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b> and <b>SAZZMAMX</b>
Punta Arenas	SCCI	Punta Arenas FIR/SRR	SCEZ	WS, WV, UA	SAZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b> and <b>SAZZMAMX</b>
Santiago	SCEL	Santiago FIR/SRR	SCCZ	WS, WV, UA	SAZZMAMX SLZZMAMX SKZZMAMX MUHAYMYX MDSYMYX SEZZMAMX MKJPYMYX MPZZMAMX SGZZMAMX SPZZMAMX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b> and <b>SAZZMAMX</b>

<sup>1</sup> SCEL assumes MWO SCFA functions during the night shift.

STATE MWO	ICAO Location Ind.	FIR, UIR and/or SRR	ICAO Location Ind.	WS, WV, WC, UA	AFTN Addresses (based on CAR/SAM FASID Table MET 1B and the Table of Appendix F)
<b>COLOMBIA</b>					
Bogotá	SKBO	Bogotá FIR/UIR/SRR Barranquilla FIR por debajo de FL200 (Bogotá UIR)	SKED SKEC	WS, WV, UA	SAZZMZX SLZZMAMX SCZZMAMX MUHAYMYX MDSYMYX SEZZMAMX SOZZMAMX SYZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX MPZZMAMX SPZZMAMX TJSJYMYX TTPPYMYX SVZZMAMX TUPJYMYX SBBRYZYX KWBCYMYX EGZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>
<b>CUBA</b>					
Habana	MUHA	Habana FIR/SRR	MUFH	WS, WV, WC, UA	SAZZMAMX MYNNYMYX SLZZMAMX SCZZMAMX SKZZMAMX MDSYMYX SEZZMAMX SYZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX MPZZMAMX SGZZMAMX SPZZMAMX TJSJYMYX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZMCMAR  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>
<b>DOMINICAN REPUBLIC</b>					
Santo Domingo	MDSB	Santo Domingo FIR/SRR	MDCS	WS, WC, WV, UA	MYNNYMYX SKZZMAMX MUHAYMYX TFFYMYX TFFRYMYX SOZZMAMX SYZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX MPZZMAMX TJSJYMYX TTPPYMYX SVZZMAMX TUPJYMYX SBBRYZYX KWBCYMYX EGZMCMAR  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>
<b>ECUADOR</b>					
Guayaquil	SEGU	Guayaquil FIR/SRR	SEGU	WS, WV, UA	SAZZMAMX SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX MHTGYMYX MMMXYMYX TNCCYMYX MPZZMAMX SPZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>
<b>FRENCH GUIANA (FRANCE)</b>					
Cayenne	SOCA	Rochambeau FIR Cayenne SRR	SOOO	WS, WV, WC, UA	MYNNYMYX MUHAYMYX TFFYMYX TFFRYMYX SYZZMAMX MMMXYMYX TNCCYMYX SMZZMAMX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>
<b>GUYANA</b>					
Timehri	SYCJ	Georgetown FIR/SRR	SYGC	WS, WV, WC, UA	SAZZMAMX MUHAYMYX MDSYMYX SOZZMAMX MKJPYMYX TNCCYMYX SPZZMAMX TJSJYMYX SMZZMAMX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>
<b>HAITI</b>					
Port-Au-Prince	MTPP	Port-Au-Prince FIR/SRR	MTEG	WS, WV, WC, UA	MYNNYMYX SKZZMAMX MUHAYMYX MDSYMYX TFFYMYX TFFRYMYX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX PZZMAMX TJSJYMYX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>

STATE MWO	ICAO Location Ind.	FIR, UIR and/or SRR	ICAO Location Ind.	WS, WV, WC, UA	AFTN Addresses (based on CAR/SAM FASID Table MET 1B and the Table of Appendix F)
<b>HONDURAS</b>					
Tegucigalpa <sup>2</sup>	MHTG	Central American FIR/SRR FIR/SRR Centroamericana	MHTG	WS, WC, WV, UA	SKZZMAMX MROCYMYX MUHAYMYX MDSYMYX SEZZMAMX MSLPYMYX MGGTYMYX MTPPYMYX MKJPYMYX MMMXYMYX TNCCYMYX MNMGYMYX MPZZMAMX SGZZMAMX SPZZMAMX TJSJYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>
<b>JAMAICA</b>					
Kingston	MKJP	Kingston FIR/SRR	MKJK	WS, WC, WV, UA	SAZZMAMX MYNNYMYX SCZZMAMX SKZZMAMX MUHAYMYX MDSYMYX SEZZMAMX SOZZMAMX SYZZMAMX MTPPYMYX MHTGYMYX MMMXYMYX TNCCYMYX MPZZMAMX SPZZMAMX TJSJYMYX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>
<b>MÉXICO</b>					
México	MMMX	Mazatlán Oceanic FIR/UIR México FIR/UIR/SRR	MMFO MMFR	WS, WC, WV, UA	SAZZMAMX TNCAYMYX MYNNYMYX TBPBYMYX SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX MDSYMYX SEZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX TNCCYMYX MPZZMAMX SGZZMAMX SPZZMAMX TJSJYMYX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>
<b>NETHERLANDS ANTILLES (NETHERLANDS)</b>					
Willemstad	TNCC	Curacao	TNCF	WS, WC, WV, UA	SAZZMAMX MYNNYMYX TBPBYMYX SKZZMAMX MUHAYMYX MDSYMYX SEZZMAMX TFFYMYX TFFRYMYX SOZZMAMX SYZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX MMMXYMYX MPZZMAMX SPZZMAMX TJSJYMYX SMZZMAMX TTPPYMYX SVZZMAMX  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>
<b>PANAMA</b>					
Panamá	MPTO	Panamá FIR/SRR	MPZL	WS, WC, WV, UA	SAZZMAMX MYNNYMYX TBPBYMYX SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX MDSYMYX SEZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX SPZZMAMX TJSJYMYX TTPPYMYX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>
<b>PARAGUAY</b>					
Asunción	SGAS	Asunción FIR/UIR/SRR	SGFA	WS, WV, UA	SLZZMAMX SCZZMAMX SPZZMAMX SUZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMSS</b> y <b>SAZZMAMX</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMSS</b> and <b>SAZZMAMX</b>

<sup>2</sup> Tegucigalpa MWO provides services to Central America FIR/SRR, which is in charge of the Corporación Centroamericana para los Servicios de Navegación aérea (COCESNA), integrated by Belize, Costa Rica, El Salvador, Honduras and Nicaragua.

STATE MWO	ICAO Location Ind.	FIR, UIR and/or SRR	ICAO Location Ind.	WS, WV, WC, UA	AFTN Addresses (based on CAR/SAM FASID Table MET 1B and the Table of Appendix F)
<b>PERU</b>					
Lima - Callao	SPIM	Lima FIR/UIR/SRR	SPIM	WS, WV, UA	SAZZMAMX SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX MDSYMYX SEZZMAMX TFFFYMYX TFFRYMYX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX MPZZMAMX SGZZMAMX TTPPYMYX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b>
<b>SURINAME</b>					
Zandery	SMJP	Paramaribo FIR/UIR	SMPM	WS, WC, WV, UA	MDSYMYX SOZZMAMX SYZZMAMX MTPPYMYX MKJPYMYX TNCCYMYX MPZZMAMX SPZZMAMX TJSJYMYX TTPPYMYX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b>
<b>TRINIDAD Y TABAGO</b>					
Port of Spain	TTPP	Piarco FIR/SRR	TTZP	WS, WC, WV, UA	SAZZMAMX TNCAYMYX MYNNYMYX SKZZMAMX MROCYMYX MDSYMYX TFFFYMYX TFFRYMYX SOZZMAMX SYZZMAMX MTPPYMYX MKJPYMYX MMMXYMYX TNCCYMYX MPZZMAMX SPZZMAMX TJSJYMYX SMZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMCAR  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b>
<b>UNITED STATES</b>					
Kansas City	KKCI	Houston Oceanic FIR Miami Oceanic FIR/SRR San Juan FIR/SRR	KZHU KZMA TJZS	WS, WC, WV, UA	SAZZMAMX TAPAYMYX TQPFYMYX TNCCYMYX MYNNYMYX TBPBYMYX MZBZYMYX MWCRYMYX SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX MDSYMYX TFFFYMYX TFFRYMYX SOZZMAMX SYZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX MPZZMAMX SGZZMAMX SPZZMAMX SMZZMAMX TTPPYMYX SUZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMNAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b>
<b>URUGUAY</b>					
Montevideo	SUMU	Montevideo FIR/SRR	SUEO	WS, WV, UA	SAZZMAMX SLZZMAMX SCZZMAMX SKZZMAMX SGZZMAMX SPZZMAMX SVZZMAMX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b>
<b>VENEZUELA</b>					
Caracas	SVMI	Maiquetia FIR/UIR/SRR	SVZM	WS, WV, UA	SAZZMAMX MYNNYMYX SLZZMAMX SCZZMAMX SKZZMAMX MUHAYMYX MDSYMYX SEZZMAMX TFFFYMYX TFFRYMYX SOZZMAMX SYZZMAMX MTPPYMYX MHTGYMYX MKJPYMYX MMMXYMYX TNCCYMYX MPZZMAMX SGZZMAMX SPZZMAMX TJSJYMYX SMZZMAMX SUZZMAMX TTPPYMYX SBBRYZYX KWBCYMYX EGZZMSAM  Solamente los SIGMET <b>WV</b> se enviarán adicionalmente a <b>LOZZMMSS</b> / Only SIGMETS <b>WV</b> shall be sent additionally to <b>LOZZMMSS</b>

**Contact information of the ACC, MWO, NOF and Volcano Observatories of CAR/SAM States  
under the responsibility of VAAC Buenos Aires**

**VAAC BUENOS AIRES:**

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Website: <http://www.smn.gov.ar/?mod=vaac&id=1>E-mail Operational: [vmsr@smn.gov.ar](mailto:vmsr@smn.gov.ar) / [bue.vacc@smn.gov.ar](mailto:bue.vacc@smn.gov.ar) / [sovaachue@smn.gov.ar](mailto:sovaachue@smn.gov.ar) (Mr. Gabriel Oscar Damiani, VAAC Supervisor)E-mail Optional: [metaer@smn.gov.ar](mailto:metaer@smn.gov.ar) / [cbenitez@smn.gov.ar](mailto:cbenitez@smn.gov.ar) (Lic. Carlos Manuel Benítez, VAAC Director)

STATE	Name	ICAO Loc. Indicator	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
<b>ARGENTINA</b>						
Observatorio u Organismo de Vulcanología	Servicio Geológico y Minero Argentino (SEGEMAR)	N/A	N/A	(5411) 4349 3176	(5411) 4349 3176	olapid@secind.mecon.gov.ar
<b>FIR EZEIZA</b>						
ACC	Ezeiza	SAEF	SAEZZRZX	(5411) 4480 2203	(54 11) 4480 2203	
MWO	Aeroparque	SABE	SABEYMYX SAZZMAMX	(5411) 4514 1612	(54 11) 4514 1612	omaaer@smn.gov.ar
<b>FIR CORDOBA</b>						
ACC	Córdoba	SACF	SACOZRZX	(54351) 4335 350	(54351) 4335 350	accba@hotmail.com
MWO	Córdoba	SACO	SACOYMYX SAZZMAMX	(54351) 4341 479	(54 351) 4756 427	omacba@smn.gov.ar
<b>FIR MENDOZA</b>						
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@smn.gov.ar
<b>FIR COMODORO RIVADAVIA</b>						
ACC	Comodoro Rivadavia	SAVF	SAVCZRZX	(54297) 4548 375		
MWO	Comodoro Rivadavia	SAVC	SAVCYMYX SAZZMAMX	(54297) 4548 018	(54297) 4548 018	omacriv@smn.gov.ar
<b>FIR RESISTENCIA</b>						
ACC	Resistencia	SARR	SAREZRZX	(54372) 2440 939	(54372) 2440 939	
MWO	Resistencia	SARE	SAREYMYX SAZZMAMX	(54372) 2436 278	(54372) 2436 285	omasis@smn.gov.ar
NOF	Ezeiza	SAEZ	SAEZYNYX	(5411) 4480 2260	(54 11) 4480 2260	notamezeiza@yahoo.com.ar
<b>BOLIVIA</b>						
<b>FIR LA PAZ</b>						
ACC	La Paz	SLLP	SLLPZRZX	(5912) 2810 203	(5912) 2810 203	
MWO	La Paz	SLLP	SLLPYMYX	(5912) 2114 232	(5912) 2810 217	ovmbolivia@yahoo.es
MWO con VAAC Bs As.	La Paz	SLLP	SLLPYNYX	(5912) 2124 129		
NOF	La Paz	SLLP	SLLPYNYX	(5912) 2316 686	(5912) 2316 686	aisbolivia@yahoo.es

STATE	Name	ICAO Loc. Indicator	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
<b>BRASIL/BRAZIL</b>						
<b>FIR AMAZONICA</b>						
ACC	Amazónica	SBAZ	SBAZZRZX SBAZZQZX	(5592) 3652 5318	(5592) 3625 5371	
MWO	Manaus/CINDACTA IV	SBAZ	SBMUYFTH	(5592) 3652 5375 (5592) 3652 5384		cmv-az@cindacta4.decea.gov.br
<b>FIR BRASILIA</b>						
ACC	Brasilia	SBBS	SBBRZRZX	(5561) 3364 8404 (5561) 3364 7032	(5561) 3365 8321	
MWO	Brasilia/CINDACTA I	SBBS	SBBSYMYX	(5561) 3364 8358		cmv-bs@cindacta1.aer.mil.br
<b>FIR RECIFE</b>						
ACC	Recife	SBRE	SBRFZRZX	(5581) 3462 2742	(55 81) 3462 4927	
MWO	Recife/CINDACTA III	SBRE	SBREYMYX	(5581) 2129 8093 (5581) 2129 8094		cmv-re@cindacta3.aer.mil.br
<b>FIR ATLANTICO</b>						
ACC	Atlántico	SBAO	SBAOZRZX	(5581) 3343 6215	(5581) 3462 4927	
MWO	Recife/CINDACTA III	SBRE	SBREYMYX	(5581) 2129 8093 (5581) 2129 8094		cmv-re@cindacta3.aer.mil.br
<b>FIR CURITIBA</b>						
ACC	Curitiba	SBCW	SBCWZRZX	(5541) 3356 3475 (5541) 3356 5342	(5541) 3251 5484	
MWO	Curitiba/CINDACTA II	SBCW	SBCWYMYX	(55 41) 3356 6216 (5541) 3356 5357		cmv-cw@cindacta2.aer.mil.br
NOF	Brasilia	SBBR	SBBRYNYX	(55 61) 3364 8353	(5561) 3364 8354	nofbrazil@cindacta1.aer.mil.br
<b>CHILE</b>						
Observatorio u Organismo de Vulcanología	Southern Andes Volcano Observatory (SAVO)	N/A	N/A	(5645) 270 700 Cel.: (5645) 09 643 0245	(5592) 625 0371	dvasualto@sernageomin.cl hmoreno@sernageomin.cl
	SERNAGEOMIN, Santiago	N/A	N/A	(562) 737 5050 Cel.: (56 45) 09 649 5377	(562) 737 9253	jnaranjo@sernageomin.cl josénaranjo@manquehue.net
<b>FIR ANTOFAGASTA</b>						
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 Página Web: www.dimetchi.cl
<b>FIR SANTIAGO</b>						
ACC	Santiago	SCEL	SCELZRZX	(252) 767 2001 (562) 436 3004	(562) 7671 636	cta.accu@dgac.cl cta_acol@dgac.cl
MWO	Santiago	SCEL	SCELYMYX SCZZMAMX	(562) 601 9214 (562) 436 3224 (562) 436 3435	(562) 6019 214	metaer@meteoehile.cl bcoopmet@meteoehile.cl
NOF	Santiago	SCEL	SCELPZX	(562) 436 3227	(562) 601 9366	operaciones_amb@dgac.cl

STATE	Name	ICAO Loc. Indicator	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
<b>FIR PUERTO MONTT</b>						
ACC	Puerto Montt	SCTE	SCTEZRX	(5665) 486 234 (5665) 486 236	(5665) 486 298	evasquez@dgac.cl
MWO	Puerto Montt	SCTE	SCTEYMYX SCZZMAMX	(5665) 486 225 (5665) 486 226	(5665) 486 226	meteozonasur@dgac.cl
<b>FIR PUNTA ARENAS</b>						
ACC	Punta Arenas	SCCI	SCCIZRX	(5661) 219 131 Anexo 5414, 5474	(5661) 219 131	fortiz@dgac.cl
MWO	Punta Arenas	SCCI	SCCIYMYX SCZZMAMX	(5661) 219 131 Anexos 5464 y 5423	(5661) 219 131 Anexo 5464	meteoparenas@dgac.cl
<b>PARAGUAY</b>						
<b>FIR ASUNCION</b>						
ACC	Asunción	SGFA	SGASZRZX	(59521) 646 082	(59521) 646 082	acc_sgaz@dinac.gov.py
MWO	Asunción	SGAS	SGASYMYX SGZZMAMX	(59521) 646 095	(59521) 646 095	aeronautica_dmh@dinac.gov.py
NOF	Asunción	SGAS	SGASYNYX	(59521) 646 952	(59521) 646 952	ais.ad_nof@hotmail.com
<b>PERU</b>						
<b>Observatorio u Organismo de Vulcanología</b>	Instituto Geofísico del Perú Arequipa	N/A	N/A	(5154) 251 373	(5154) 251 373	Orlando Macedo omacedo@geo.igp.gob.pe
	Instituto Geofísico del Perú Lima	N/A	N/A	(511) 317 2325	(511) 317 2321	Edmundo Norabuena enorab@nazca.igp.gob.pe
<b>FIR LIMA-CALLAO</b>						
ACC	Lima-Callao	SPIM	SPIMZQZX	(511) 630 1157 (511) 630 1158 (511) 575 0886 (511) 575 1995		acclima@corpac.gob.pe hcasachahua@corpac.gob.pe
MWO	Lima-Callao	SPIM	SPIMYMYX SPZZMAMX	(511) 630 1181 (511) 630 1180	(511) 630 1180	pronostico@corpac.gob.pe
NOF	Lima-Callao	SPIM	SPIMYNYX SPIMYOYX	(511) 630 1173 (511) 630 1172 (511) 414 1435 (511) 414 1288	(511) 414 1435	aisaro@corpac.gob.pe
<b>URUGUAY</b>						
<b>FIR MONTEVIDEO</b>						
ACC	Montevideo	SUEO	SUEOZQZX	(5982) 6040 295	(5982) 6040 298	jopdta@adinet.com.uy
MWO	Montevideo	SUMU	SUMUYMYX	(5982) 2001 807	(5982) 6040 242	dmae@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 VAAC Washington**

**VAAC WASHINGTON:****AFTN: KWBCYMYX****Tel.: 1 301 763 8444/8298 Fax: 1 301 763 8333/8592****Sitio web: <http://www.ssd.noaa.gov/VAAC/washington.html>****E-mail: [w-vaac@noaa.gov](mailto:w-vaac@noaa.gov) [Grace.Swanson@noaa.gov](mailto:Grace.Swanson@noaa.gov)**

STATE	Name	ICAO Loc. Indicator	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
<b>BRAZIL</b>						
<b>FIR AMAZONICA</b>						
ACC	Amazónica	SBAZ	SBAZZRZX SBAZZQZX	(5592) 3652 5318	(5592) 3625 5371	
MWO	Manaus/CINDACTA IV	SBAZ	SBMUYFTH	(5592) 3652 5375 (5592) 3652 5384		cmv-az@cindacta4.decea.gov.br
<b>FIR BRASILIA</b>						
ACC	Brasilia	SBBS	SBBRZRZX	(5561) 3364 8404 (5561) 3364 7032	(5561) 3365 8321	
MWO	Brasilia/CINDACTA I	SBBS	SBBSYMYX	(5561) 3364 8358		cmv-bs@cindacta1.aer.mil.br
<b>FIR RECIFE</b>						
ACC	Recife	SBRE	SBRFZRZX	(5581) 3462 2742	(55 81) 3462 4927	
MWO	Recife/CINDACTA III	SBRE	SBREYMYX	(5581) 2129 8093 (5581) 2129 8094		cmv-re@cindacta3.aer.mil.br
<b>FIR ATLANTICO</b>						
ACC	Atlántico	SBAO	SBAOZRZX	(5581) 3343 6215	(5581) 3462 4927	
MWO	Recife/CINDACTA III	SBRE	SBREYMYX	(5581) 2129 8093 (5581) 2129 8094		cmv-re@cindacta3.aer.mil.br
<b>FIR CURITIBA</b>						
ACC	Curitiba	SBCW	SBCWZRZX	(5541) 3356 3475 (5541) 3356 5342	(5541) 3251 5484	
MWO	Curitiba/CINDACTA II	SBCW	SBCWYMYX	(55 41) 3356 6216 (5541) 3356 5357		cmv-cw@cindacta2.aer.mil.br
NOF	Brasilia	SBBR	SBBRYNYX	(55 61) 3364 8353	(5561) 3364 8354	nofbrazil@cindacta1.aer.mil.br
<b>COLOMBIA</b>						
Volcano Observatory or Organization	Manizales	N/A	N/A	(5768) 843 020	(5768) 843 018	ovsm@ingeminas.gov.co
	Pasto	N/A	N/A	(5727) 314 752 (5727) 310 514 (5727) 312 595	(5727) 310 514	ovt@ingeminas.gov.co
	Popayan	N/A	N/A	(5728) 242 341 (5728) 242 057 (5728) 240 210	(5728) 241 255	

STATE	Name	ICAO Loc. Indicator	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
<b>FIR BARRANQUILLA</b>						
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	fhidalgo@ideam.gov.co
<b>FIR BOGOTA</b>						
ACC	Bogotá	SKBO	SKBOZQZX	(571) 4139 998 (571) 2663 460 (571) 4135 445	(571) 4135 376	jcramirez@aerocivil.gov.co
MWO	Bogotá	SKBO	SKBOYMYX	(571) 4138 792 (571) 2662 481	(571) 4138 440	fhidalgo@ideam.gov.co
NOF	Bogotá	SKBO	SKBOYNYX	(571) 2662 552	(517) 4138 631	ais@aerocivil.gov.co
<b>CUBA</b>						
<b>FIR HAVANA</b>						
ACC	La Habana	MUHA	MUFHZQZX	(537) 642 1185	(537) 642 1185	superacc@aeronav.ecasa.avianet.cu
MWO	La Habana	MUHA	MUHAYMYX	(537) 642 6168	(537) 642 6168	meteof@aeronav.ecasa.avianet.cu aduran@aeronav.ecasa.avianet.cu
NOF	La Habana	MUHA	MUHAYNYX	(537) 266 4497	(537) 266 4497	notam@aeronav.ecasa.avianet.cu
<b>DOMINICAN REPUBLIC</b>						
<b>FIR SANTO DOMINGO</b>						
ACC	Santo Domingo	MDCS	MDCSZQZX	8095490692	8095490692	dgta@idac.gov.do
MWO	OVM	MDSO	MDSYMYX	8095491291	8095490256	onametaila85@yahoo.com
NOF	Ofic. NOTAM Intl.	MCSC	MDSYNYX	8095490095	8095490095	ais@idac.gov.do
<b>ECUADOR</b>						
Volcano Observatory or Organization	Instituto Geofísico, Quito	N/A	N/A	(5932) 2225 655 (5932) 2225 627	(5932) 2567 847	geofisico@igepn.edu.ec geofisico@accessinter.net <a href="http://www.igepn.edu.ec">http://www.igepn.edu.ec</a>
<b>FIR GUAYAQUIL</b>						
ACC	Guayaquil	SEGU	SEGUZQZX	(5934) 2282 851	(5934) 2396 073	accgye@dgac.gov.ec
MWO	Guayaquil	SEGU	SEGUYMYX	(5934) 2392 712	(5934) 2283 748	meteorologiagy@dgac.gov.ec mortiz@dgac.gov.ec
NOF	Guayaquil	SEGU	SEGUYNYX	(5934) 2285 661	(5934) 2285 661	notam_intl_gye@hotmail.com
<b>FRENCH GUIANA</b>						
<b>FIR ROCHAMBEAU</b>						
ACC	Rochambeau	SOCA	SOOZQZX	(594) 359 306	(594) 359 398	gilles.esser@aviation-civile.gouv.fr
MWO	CVM Rochambeau	SOCA	SOCAYMYX	(594) 353 535	(594) 356 089	philippe.livenais@meteo.fr
NOF	Rochambeau	SOCA	SOOYNYX	(594) 359 3 08	(594) 304 124	gilles.esser@aviation/civile.gouv.fr
<b>GUYANA</b>						
Volcano Observatory or Organization	Guyana Geology and Mines Commission			(5922) 53047	(5922) 53047	ggmc@sdpn.org.gy

STATE	Name	ICAO Loc. Indicator	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
<b>FIR GEORGETOWN</b>						
ACC	Georgetown	SYCJ	SYCJZQZX	(592) 2612 245	(592) 2612 279	
MWO	Timehri	SYCJ	SYCJYMYX	(592) 2613 065	(592) 2612 284	
NOF	Timehri	SYCJ	SYCJYNYX	(592) 2612 269	(592) 2612 279	ais@gcaa-gy.org
<b>HAITI</b>						
<b>FIR PORT AU PRINCE</b>						
ACC	Port au Prince		MTEGZQZX			
MWO	Port au Prince	MTPP	MTPPYMYX	(509) 3406 0258		cnmhaiti@yahoo.fr
NOF			MTPPYNYX			
<b>HONDURAS</b>						
<b>FIR CENTRAL AMERICAN</b>						
ACC	Tegucigalpa	MHTG	MHCCZQZX	(504) 234 3358 (504) 234 3360 Ext. 1310/1314	(504) 234 2507	
MWO <sup>1</sup>	Tegucigalpa	MHTG	MHTGYMYX	(504) 234 9499 (504) 233 1111 (504) 233 1114	(504) 233 8075 (504) 234 9500	smn.honduras@gmail.com met_honduras@smn.gob.hn jefatura@smn.gob.hn
NOF	Tegucigalpa	MHTG	MHTGYNYX	(504) 234 3360 Ext. 1271/1359	(504) 233 1141 (504) 233 1349	notam@cocesna.org
<b>JAMAICA</b>						
<b>FIR KINGSTON</b>						
ACC	Kingston		MKJKZQZX			
MWO	Kingston	MKJP	MKJPYMYX	(876) 924 8055	(876)924 8670	metoffice@cwjamaica.com
NOF			MKJPYNYX			
<b>MEXICO</b>						
MEXICO Volcano Observatory or Organization FIR	Centro Nacional de Prevención de Desastres (CENAPRED)			(5255) 56068837 (5255) 5424 6100	(5255) 5606 1608	rqw@cenapred.unam.mx <a href="http://www.cenapred.unam.mx">http://www.cenapred.unam.mx</a>
	Centro Universitario de Investigación en Ciencias del Ambiente, Universidad de Colima			(52312) 3161 137 Ext. 51151	(52312) 3161 137 Ext. 31152	galindo@ucol.mx <a href="http://www.ucol.mx/volcan">http://www.ucol.mx/volcan</a>
	Instituto de Geofísica, UNAM Observatorio de volcanes, Universidad de Colima			(52312) 3161 134 Ext. 47208	(52312) 3161 134 Ext. 47208	tonatiuh@cgic.ucol.mx
<b>FIR MAZATLÁN OCEANIC</b>						
FIC	Radio Mexico	MMID	MMIDZQZX	(52999) 9461 347	(52999) 9461 237	centromerida@hotmail.com
MWO	México	MMMXX	MMMXYMYT	(5255) 5716 6678	(5255) 5802 8519	hvargast@sct.gob.mx capma@sct.gob.mx

STATE	Name	ICAO Loc. Indicator	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
<b>FIR MEXICO</b>						
ACC	Centro Mexico Centro Merida Centro Mazatlan Centro Monterrey	MMEX MMID MMZT MMTY	MMEXZQZX MMIDZQZX MMZTZQZX MMTYZQZX	(5255) 5716 6655 (52999) 9461 347 (52669) 9181 092 (5281) 8369 0846	(5255) 5716 4199 (52999) 9461 237 (52669) 9822 820 (5281) 8369 0884	centro_mexico@yahoo.com centromerida@hotmail.com josegalindo@hotmail.com felipe1822@yahoo.com.mx
MWO	Centro de Análisis y Pronósticos Meteorológicos Aeronáuticos (CAPMA), SENEAM, SCT.	MMMXX	MMMXYMYT	(5255) 5716-6678	(5255) 5802 8519	hvargast@sct.gob.mx capma@sct.gob.mx
NOF	México	MMMXX	MMMXYNYX	(5255) 5786 5519	(5255) 5786 5519	ais_pcr@sct.gob.mx
<b>NETHERLANDS ANTILLES</b>						
<b>FIR CURACAO</b>						
ACC	Curacao		TNCFZQZX			
MWO	Curacao	TNCC	TNCCYMYX	(599) 9839 3360	(599) 9869 2699	cur-met@meteo.an
NOF			TNCCYNYX			
<b>PANAMA</b>						
Volcano Observatory or Organization	Instituto de Geociencia			(507) 523 2071 (507) 523 2072 (507) 269 5744	(507) 2637671	igc2@ancon.up.ac.pa
<b>FIR PANAMA</b>						
ACC	Panamá	MPZL	MPZLZQZX MPPCICPX	(507) 5019807	(507) 5019849 (507) 63930964	mailto@aeronautica.gob.pa edgarcia@aeronautica.gob.pa
MWO	Panamá	MPTO	MPTOYMYX	(507) 2382611 (507) 2382650	(507) 2384678	meteortoc@aeronautica.gob.pa
NOF	Panamá	MPTO	MPTOYNYX	(507) 2382615 (507) 2382616	(507) 2382617	aisnof@aeronautica.gob.pa
<b>PERU</b>						
Volcano Observatory or Organization	Instituto Geofísico del Perú Arequipa	N/A	N/A	(5154) 251 373	(5154) 251 373	Orlando Macedo omacedo@geo.igp.gob.pe
	Instituto Geofísico del Perú Lima	N/A	N/A	(511) 317 2325	(511) 317 2321	Edmundo Norabuena enorab@nazca.igp.gob.pe
<b>FIR LIMA-CALLAO</b>						
ACC	Lima-Callao	SPIM	SPIMZQZX	(511) 630 1157 (511) 630 1158 (511) 575 0886 (511) 575 1995		acclima@corpac.gob.pe hcasachahua@corpac.gob.pe
MWO	Lima-Callao	SPIM	SPIMYMYX SPZZMAMX	(511) 630 1181 (511) 630 1180	(511) 630 1180	pronostico@corpac.gob.pe

STATE	Name	ICAO Loc. Indicator	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
NOF	Lima-Callao	SPIM	SPIMYNYX SPIMYOYX	(511) 630 1173 (511) 630 1172 (511) 414 1435 (511) 414 1288	(511) 414 1435	aisaro@corpac.gob.pe
<b>SURINAME</b>						
<b>FIR PARAMARIBO</b>						
ACC	Paramaribo	SMPM	SMPMZRZX	(597) 325 203	(597) 325 453	atssur@sr.net
MWO	Zandery	SMJP	SMZZMAMX	(597) 325 206	(597) 325 206	metezan@yahoo.com
NOF	Zandery	SMJP	SMJPYFYX	(597) 325 270	(597) 325 270	aislvd@surimail.sr
<b>TRINIDAD AND TABAGO</b>						
<b>FIR PIARCO</b>						
ACC	Piarco	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 259	
MWO	Piarco	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 727	synop@tstt.net.tt
NOF	Piarco	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 716	
<b>UNITED STATES</b>						
<b>FIR SAN JUAN</b>						
ACC	San Juan	TJZS	TJZSZQZX	(787) 2538665	(787) 253 8685	NA
MWO <sup>2</sup>	Kansas City AWC	KWBC	KWBCYMYX	816 584 7269		
NOF	San Juan		TJZSYNYX	(305) 233 2600		
<b>FIR NASSAU (LOWER AIR SPACE) AND MIAMI OCEANIC (UPPER AIR SPACE)</b>						
ACC	Nassau	MYNA	MYNAZQZX	(242) 377 7108	(242) 377 2375	NA
ACC	Miami	KZMA	KZMAZQZX	(305) 716 1588	(305) 716 1511	NA
MWO <sup>2</sup>	Kansas City AWC	KWBC	KWBCYMYX	816 584 7269		
NOF	Nassau		MYNAYNYX	(242) 377 7116		
<b>VENEZUELA</b>						
<b>FIR MAIQUETIA</b>						
ACC	Maiquetía	SVZM	SVZMZRZX	(58212) 355 - 2216	(58212) 355 2216	acc@inac.gob.ve
MWO	Maiquetía	SVMI	SVMIYMYX	(58212) 303 - 1522	(58212) 303 1522	oficinamet-miq@yahoo.es
NOF	Maiquetía	SVMI	SVMIYNYX SVMIYNYN	(58212) 355 - 1325 (58416) 624 - 7625	(58212) 355 - 1325 (58212) 355 - 1680	nofmaiquetia@inac.gob.ve notam.maiquetia@inac.gob.ve

<sup>1</sup> MWO Tegucigalpa should coordinate the preparation of SIGMET(s) (WS, WV y WC) with the Aerodrome Meteorological Offices of all the Central American States and Belize and send them to the corresponding Aerodrome Meteorological Office.

<sup>2</sup> In accordance with CAR/SAM FASID Table MET 1B (page 1B-5).

**Extracted from Appendix F of Manual on Volcanic Ash, Radioactive Material and  
Toxic Chemical Clouds, Doc 9691-AN/954**

## Appendix F

### CROSS-REFERENCE LIST OF VOLCANOES AND NAVIGATION AIDS

(6.8.1 refers)

Volcano Name	Country/State Region	Volcano number	Volcano lat-long	Radial (MAG BRG) and distance from reference Navigation Aid		
<b>EUROPE-AFRICA-MIDDLE EAST-INDIAN OCEAN</b>						
ALAYTA	ETHIOPIA	201-112	N12 52.5	E040 33.4	297°/168NM	DJIBOUTI (DTI) VOR/DME
ARDOUKOBA	DJIBOUTI	201-126	N11 36.4	E042 27.4	274°/37NM	DJIBOUTI (DTI) VOR/DME
CAMPI FLEGREI	ITALY	101-01	N40 49.4	E014 08.2	327°/17NM	SORRENTO (SOR) VOR/DME
CAMPI FLEGREI MAR SICILY	ITALY	101-07	N37 06.0	E012 42.0	064°/39NM	PANTELLERIA (PAN) VOR/DME
CHYULU HILLS	AFRICA-E	202-13	S02 40.5	E037 52.5	269°/17NM	MTITO ANDEI (MTA) VOR/DME
DALLOL	ETHIOPIA	201-041	N14 14.3	E040 18.0	124°/102NM	ASMARA (ASM) VOR/DME
DAMA ALI	ETHIOPIA	201-141	N11 16.3	E041 37.3	258°/88NM	DJIBOUTI (DTI) VOR/DME
DJEBEL TEYR	RED SEA	201-01	N15 42.0	E041 44.3	212°/86NM	JAZAN (GIZ) VORTAC
DUBBI	ETHIOPIA	201-10	N13 34.5	E041 48.3	222°/99NM	HODEIDAH (HDH) VOR/DME
EMURUANGOGOLAK	AFRICA-E	202-051	N01 30.0	E036 19.5	155°/105NM	LODWAR (LOV) VOR/DME
ERTA ALE	ETHIOPIA	201-08	N13 36.0	E040 40.1	131°/144NM	ASMARA (ASM) VOR/DME
ES SAFA	SYRIA	300-05	N33 04.5	E037 09.0	113°/38NM	DAMASCUS (DAM) VOR/DME
ETNA	ITALY	101-06	N37 44.0	E015 00.1	004°/16NM	CATANIA (CAT) VOR/DME
FENTALE	ETHIOPIA	201-19	N08 58.3	E039 55.5	087°/67NM	ADDIS (ADS) VOR/DME
HARRAS OF DHAMAR	ARABIA-S	302-06	N14 34.1	E044 40.1	029°/60NM	TAIZ (TAZ) VOR/DME
HEARD VOLCANO	INDIAN OCEAN-S	304-01	S53 06.2	E073 30.4	181°/2091NM	PLAISANCE (MAURITIUS) (PLS) VOR/DME
JABAL YAR	ARABIA-S	302-01	N17 03.0	E042 49.5	058°/16NM	JAZAN (GIZ) VORTAC
JEBEL ZUBAYR	RED SEA	201-02	N15 04.5	E042 09.4	289°/51NM	HODEIDAH (HDH) VOR/DME
KARTHALA	INDIAN OCEAN-W	303-01	S11 45.0	E043 22.5	161°/15NM	MORONI (HAI) VOR
KIEYO	AFRICA-E	202-17	S09 13.5	E033 46.5	355°/43NM	KARONGA (VKA) VOR/DME
KONE	ETHIOPIA	201-20	N08 48.0	E039 41.3	099°/54NM	ADDIS (ADS) VOR/DME
LONGONOT	AFRICA-E	202-10	S00 55.1	E036 27.0	308°/37NM	NAIROBI (NV) VOR/DME
MANDA-INAKIR	ETHIOPIA	201-122	N12 22.5	E042 12.0	313°/72NM	DJIBOUTI (DTI) VOR/DME
MARION ISLAND	INDIAN OCEANS	304-08	S46 54.0	E037 45.0	177°/947NM	EAST LONDON (ELV) VOR/DME
MERU	AFRICA-E	202-16	S03 15.0	E036 45.0	297°/23NM	KILIMANJARO (KV) VOR/DME
METHANA	GREECE	102-02	N37 36.5	E023 20.1	033°/9NM	DIDIMON (DDM) VOR/DME
MOUNT CAMEROON	AFRICA-W	204-01	N04 12.1	E009 10.1	293°/36NM	DOUALA (DLA) VOR/DME
NISYROS	GREECE	102-05	N36 34.5	E027 10.5	200°/45NM	MILAS (BODRUM) (GML) VOR/DME
NYAMURAGIRA	AFRICA-C	203-02	S01 24.3	E029 12.0	354°/16NM	GOMA (GOM) VOR/DME
NYIRAGONGO	AFRICA-C	203-03	S01 31.1	E029 15.0	006°/9NM	GOMA (GOM) VOR/DME
OKU VOLCANO FIELD	AFRICA-W	204-003	N06 15.0	E010 30.0	065°/25NM	BAMENDA (BND) VOR/DME
OL DOINYO LENGAI	AFRICA-E	202-12	S02 45.0	E035 54.1	300°/82NM	KILIMANJARO (KV) VOR/DME
OLKARIA	AFRICA-E	202-09	S00 54.1	E036 17.3	302°/46NM	NAIROBI (NV) VOR/DME
PANTELLERIA	ITALY	101-071	N36 45.4	E012 00.4	147°/3NM	PANTELLERIA (PAN) VOR/DME
PITON DE FOURNAISE	INDIAN OCEAN-W	303-02	S21 13.4	E055 42.5	171°/24NM	ST DENIS (SDG) VOR/DME
SANTA ISABEL	AFRICA-W	204-02	N03 34.3	E008 45.0	175°/11NM	MALABO (MBO) VOR/DME
SANTORINI	GREECE	102-04	N36 24.1	E025 23.5	113°/47NM	MILOS (MIL) VOR/DME
SOUTH ISLAND	AFRICA-E	202-02	N02 37.3	E036 36.0	115°/66NM	LODWAR (LOV) VOR/DME
ST PAUL	INDIAN OCEAN-S	304-03	S38 42.4	E077 31.5	159°/1502NM	PLAISANCE (MAURITIUS) (PLS) VOR/DME
STROMBOLI	ITALY	101-04	N38 47.2	E015 12.5	271°/54NM	CARAFFA (CDC) VORTAC
THE BARRIER	AFRICA-E	202-03	N02 19.1	E036 34.1	129°/74NM	LODWAR (LOV) VOR/DME
TULLU MOJE	ETHIOPIA	201-25	N08 09.3	E039 07.5	155°/52NM	ADDIS (ADS) VOR/DME
VESUVIO	ITALY	101-02	N40 49.2	E014 25.3	015°/14NM	SORRENTO (SOR) VOR/DME
VISOKE	AFRICA-C	203-05	S01 28.1	E029 29.3	051°/20NM	GOMA (GOM) VOR/DME
VULCANO	ITALY	101-05	N38 24.1	E014 57.4	358°/56NM	CATANIA (CAT) VOR/DME

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Volcano Name	Country/State Region	Volcano number	Volcano lat-long		Radial (MAG BRG) and distance from reference Navigation Aid	
<b>NEW ZEALAND-SOUTHWEST PACIFIC</b>						
AMBRYM	VANUATU-SW PACIFIC	507-04	S16 15.0	E168 07.1	343°/84NM	PORT VILA (VLI) VOR/DME
AOBA	VANUATU-SW PACIFIC	507-03	S15 24.0	E167 49.5	338°/137NM	PORT VILA (VLI) VOR/DME
AUCKLAND FIELD	NEW ZEALAND	401-02	S36 54.0	E174 52.1	003°/6NM	AUCKLAND (AA) VOR/DME
BAGANA	BOUGAINVILLE-SW PACIFIC	505-02	S06 08.2	E155 11.4	114°/198NM	TOKUA (TOK) VOR/DME
BAM	NEW GUINEA-NE OF	501-01	S03 36.0	E144 51.0	085°/70NM	WEWAK (WK) VOR/DME
BAMUS	NEW BRITAIN-SW PACIFIC	502-11	S05 12.0	E151 13.5	225°/86NM	TOKUA (TOK) VOR/DME
BILLY MITCHELL	BOUGAINVILLE-SW PACIFIC	505-011	S06 05.3	E155 13.3	113°/198NM	TOKUA (TOK) VOR/DME
BRIMSTONE ISLAND	KERMADEC IS	402-02	S30 13.5	W178 54.4	022°/508NM	WHENUAPAI (AUCKLAND) (WP) VORTAC
CURACOA	TONGA-SW PACIFIC	403-101	S15 36.4	W173 39.4	210°/143NM	FALEOLO (UPOLU I.) (FA) VOR/DME
DAKATAUA	NEW BRITAIN-SW PACIFIC	502-04	S05 03.2	E150 06.3	244°/143NM	TOKUA (TOK) VOR/DME
EAST EPI	VANUATU-SW PACIFIC	507-06	S16 40.5	E168 22.1	355°/59NM	PORT VILA (VLI) VOR/DME
FALCON ISLAND	TONGA-SW PACIFIC	403-05	S20 18.4	W175 24.4	331°/57NM	FUA'AMOTU (TBU) VOR/DME
FONUALEI	TONGA-SW PACIFIC	403-10	S18 00.4	W174 19.3	359°/198NM	FUA'AMOTU (TBU) VOR/DME
GAUA	VANUATU-SW PACIFIC	507-02	S14 16.1	E167 30.0	336°/207NM	PORT VILA (VLI) VOR/DME
HOME REEF	TONGA-SW PACIFIC	403-08	S18 59.3	W174 46.3	354°/136NM	FUA'AMOTU (TBU) VOR/DME
HUNTER ISLAND	SW PACIFIC	508-02	S22 24.0	E172 03.0	099°/285NM	LIFOU (LFU) VOR
KARKAR	NEW GUINEA-NE OF	501-03	S04 38.6	E145 57.5	011°/34NM	MADANG (MD) VOR/DME
KAVACHI	SOLOMON IS-SW PACIFIC	505-06	S09 01.1	E157 57.0	272°/125NM	HONIARA (HN) VOR/DME
KUWAE	VANUATU-SW PACIFIC	507-07	S16 49.4	E168 32.1	007°/52NM	PORT VILA (VLI) VOR/DME
LAMINGTON	NEW GUINEA	503-01	S08 57.0	E148 09.0	055°/63NM	PORT MORESBY (PY) VOR/DME
LANGILA	NEW BRITAIN-SW PACIFIC	502-01	S05 31.3	E148 25.1	052°/119NM	NADZAB (NZ) VOR/DME
LATE	TONGA-SW PACIFIC	403-09	S18 48.2	W174 39.0	357°/148NM	FUA'AMOTU (TBU) VOR/DME
LOLOBAU	NEW BRITAIN-SW PACIFIC	502-13	S04 55.1	E151 09.3	237°/81NM	TOKUA (TOK) VOR/DME
LONG ISLAND	NEW GUINEA-NE OF	501-05	S05 21.3	E147 07.1	012°/76NM	NADZAB (NZ) VOR/DME
LOPEVI	VANUATU-SW PACIFIC	507-05	S16 30.3	E168 20.5	353°/69NM	PORT VILA (VLI) VOR/DME
MANAM	NEW GUINEA-NE OF	501-02	S04 06.0	E145 03.4	321°/79NM	MADANG (MD) VOR/DME
MATTHEW ISLAND	SW PACIFIC	508-01	S22 19.5	E171 19.1	100°/246NM	LIFOU (LFU) VOR
METIS SHOAL	TONGA-SW PACIFIC	403-07	S19 10.5	W174 51.4	353°/124NM	FUA'AMOTU (TBU) VOR/DME
MONOWAI SEAMOUNT	KERMADEC IS	402-05	S25 53.2	W177 11.2	187°/299NM	FUA'AMOTU (TBU) VOR/DME
MOUNT EGMONT	NEW ZEALAND	401-03	S39 18.0	E174 03.4	176°/18NM	NEW PLYMOUTH (NP) VOR/DME
NIUAFO'OU	TONGA-SW PACIFIC	403-11	S15 36.0	W175 37.5	154°/144NM	HIHIFO (UVEA I., WALLIS IS.) (HOI) VOR/DME
OFU-OLOSEGA	SAMOA-SW PACIFIC	404-01	S14 10.3	W169 37.1	069°/64NM	PAGO PAGO (TUT) VORTAC
PAGO WITORI	NEW BRITAIN-SW PACIFIC	502-08	S05 34.5	E150 31.1	228°/134NM	TOKUA (TOK) VOR/DME
RABAUL	NEW BRITAIN-SW PACIFIC	502-14	S04 16.2	E152 12.1	283°/12NM	TOKUA (TOK) VOR/DME
RAOUL ISLAND	KERMADEC IS	402-03	S29 15.4	W177 54.4	182°/502NM	FUA'AMOTU (TBU) VOR/DME
RITTER ISLAND	NEW GUINEA-NE OF	501-07	S05 31.1	E148 07.2	047°/105NM	NADZAN (NZ) VOR/DME
RUAPEHU	NEW ZEALAND	401-10	S39 16.5	E175 34.1	027°/42NM	MAXWELL (MX) VOR/DME
RUMBLE III	NEW ZEALAND	401-13	S35 44.4	E178 28.4	017°/175NM	ROTORUA (RO) VOR/DME
SAVA'I	SAMOA-SW PACIFIC	404-04	S13 36.4	W172 31.3	280°/33NM	FALEOLO (UPOLU I.) (FA) VOR/DME
SAVO	SOLOMON IS-SW PACIFIC	505-07	S09 07.5	E159 49.1	318°/22NM	HONIARA (HN) VOR/DME
SORETIMEAT	VANUATU-SW PACIFIC	507-01	S13 48.0	E167 28.1	337°/235NM	PORT VILA (VLI) VOR/DME
ST ANDREW STRAIT	ADMIRALTY IS-SW PACIFIC	500-01	S02 22.5	E147 21.0	024°/192NM	MADANG (MD) VOR/DME
TARAWERA	NEW ZEALAND	401-06	S38 13.4	E176 30.3	108°/11NM	ROTORUA (RO) VOR/DME
TINAKULA	SANTA CRUZ IS-SW PACIFIC	506-01	S10 22.5	E165 48.0	090°/346NM	HONIARA (HN) VOR/DME
TOFUA	TONGA-SW PACIFIC	403-06	S19 45.0	W176 04.5	315°/103NM	FUA'AMOTU (TBU) VOR/DME
TONGARIRO	NEW ZEALAND	401-08	S39 07.5	E175 38.3	095°/43NM	OHURA (OR) VOR/DME
TRAITOR'S HEAD	VANUATU-SW PACIFIC	507-09	S18 45.0	E169 13.5	126°/86NM	PORT VILA (VLI) VOR/DME
ULAWUN	NEW BRITAIN-SW PACIFIC	502-12	S05 03.0	E151 19.5	228°/76NM	TOKUA (TOK) VOR/DME
UNNAMED	TONGA-SW PACIFIC	403-01	S21 27.3	W175 46.1	235°/37NM	FUA'AMOTU (TBU) VOR/DME
UNNAMED	TONGA-SW PACIFIC	403-03	S20 51.0	W175 31.5	303°/32NM	FUA'AMOTU (TBU) VOR/DME

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## Appendix F. Cross-reference list of volcanoes and navigation aids

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Volcano Name	Country/State Region	Volcano number	Volcano lat-long		Radial (MAG BRG) and distance from reference Navigation Aid	
UNNAMED	TONGA-SW PACIFIC	403-04	S20 33.4	W175 22.5	328°/42NM	FUA'AMOTU (TBU) VOR/DME
UNNAMED	SW PACIFIC	508-03	S25 46.5	E168 37.5	356°/199NM	NORFOLK I. (NF) VOR/DME
UNNAMED	ADMIRALTY IS-SW PACIFIC	500-03	S03 01.5	E147 46.5	037°/176NM	MADANG (MD) VOR/DME
UNNAMED	KERMADEC IS	402-04	S29 10.5	W177 52.1	182°/497NM	FUA'AMOTU (TBU) VOR/DME
VICTORY	NEW GUINEA	503-03	S09 12.0	E149 04.1	304°/101M	GURNEY (GNY) VOR/DME
WAIOWA	NEW GUINEA	503-04	S09 34.1	E149 04.3	293°/88NM	GURNEY (GNY) VOR/DME
WHITE ISLAND	NEW ZEALAND	401-04	S37 31.1	E177 10.5	029°/54NM	ROTORUA (RO) VOR/DME
YASUR	VANUATU-SW PACIFIC	507-10	S19 31.1	E169 25.3	136°/129NM	PORT VILA (VLI) VOR/DME
<b>INDONESIA</b>						
AGUNG	LESSER SUNDA IS	604-02	S08 20.3	E115 30.3	039°/31NM	BALI (DEN PASAR) (BLI) VOR/DME
AMBANG	SULAWESI-INDONESIA	606-02	N00 45.0	E124 25.1	218°/45NM	MANADO (TDO) VOR/DME
API SIAU	SANGIHE IS- INDONESIA	607-02	N02 46.5	E125 28.5	022°/80NM	MANADO (MNO) VOR/DME
ARJUNO-WELIRANG	JAVA	603-29	S07 43.3	E112 34.5	210°/24NM	SURABAYA (SBY) VOR/DME
AWU	SANGIHE IS- INDONESIA	607-04	N03 40.1	E125 30.0	013°/130NM	MANADO (MNO) VOR/DME
BANDA API	BANDA SEA	605-09	S04 31.3	E129 52.2	116°/114NM	AMBON (AMN) VOR/DME
BANUA WUHU	SANGIHE IS- INDONESIA	607-03	N03 08.2	E125 29.3	017°/100NM	MANADO (MNO) VOR/DME
BARREN ISLAND	ANDAMAN IS-IND	600-01	N12 15.0	E093 49.5	061°/73NM	PORT BLAIR (PPB) VOR/DME
BATU TARA	LESSER SUNDA IS	604-26	S07 47.3	E123 34.4	288°/124NM	DILI (DIL) VOR/DME
BATUR	LESSER SUNDA IS	604-01	S08 14.3	E115 22.3	021°/32NM	BALI (DEN PASAR) (BLI) VOR/DME
BUR NI TELONG	SUMATRA	601-05	N04 45.4	E096 48.3	233°/33NM	LHOK SUKON (LSN) VOR
CEREME	JAVA	603-17	S06 53.3	E108 24.0	174°/35NM	INDRAMAYU (IMU) VOR/DME
COLO UNA UNA	SULAWESI-INDONESIA	606-01	S00 10.1	E121 36.3	066°/111NM	PALU (PAL) VOR/DME
DEMPO	SUMATRA	601-23	S04 01.5	E103 07.5	232°/114NM	PALEMBANG (PLB) VOR/DME
DIENG VOLCANO COMPLEX	JAVA	603-20	S07 12.0	E109 55.1	242°/30NM	ACHMAD YANI (SEMARANG) (ANY) VOR/ DME
DUKONO	HALMAHERA-INDONESIA	608-01	N01 42.0	E127 52.1	085°/177NM	MANADO (MNO) VOR/DME
EBULOBO	LESSER SUNDA IS	604-10	S08 48.3	E121 10.5	296°/168NM	KUPANG (KPG) VOR/DME
EGON	LESSER SUNDA IS	604-16	S08 39.4	E122 27.0	319°/115NM	KUPANG (KPG) VOR/DME
GALUNGGUNG	JAVA	603-14	S07 15.0	E108 03.0	123°/38NM	BANDUNG (BND) VOR/DME
GAMALAMA	HALMAHERA-INDONESIA	608-06	N00 48.0	E127 19.3	101°/148NM	MANADO (TDO) VOR/DME
GAMKONORA	HALMAHERA-INDONESIA	608-04	N01 22.3	E127 31.1	091°/156NM	MANADO (MNO) VOR/DME
GEDE	JAVA	603-06	S06 46.5	E106 58.5	169°/30NM	HALIM (JAKARTA) (HLM) VOR/DME
GUNTUR	JAVA	603-13	S07 07.5	E107 49.5	127°/24NM	BANDUNG (BND) VOR/DME
GUNUNG BESAR	SUMATRA	601-25	S04 25.5	E103 39.4	298°/104NM	BANDAR LAMPUNG (TKG) VOR/DME
GUNUNG RANAKAH	LESSER SUNDA IS	604-071	S08 37.1	E120 31.1	294°/207NM	KUPANG (KPG) VOR/DME
GUNUNGAPI WETAR	BANDA SEA	605-03	S06 38.3	E126 39.0	027°/131NM	DILI (DIL) VOR/DME
IBU	HALMAHERA-INDONESIA	608-03	N01 28.5	E127 37.5	089°/162NM	MANADO (MNO) VOR/DME
IJEN	JAVA	603-35	S08 03.3	E114 14.3	306°/68NM	BALI (DEN PASAR) (BLI) VOR/DME
ILIBOLENG	LESSER SUNDA IS	604-22	S08 20.3	E123 15.3	345°/111NM	KUPANG (KPG) VOR/DME
ILIWERUNG	LESSER SUNDA IS	604-25	S08 32.2	E123 35.2	355°/97NM	KUPANG (KPG) VOR/DME
INIELIKA	LESSER SUNDA IS	604-09	S08 43.5	E120 58.5	296°/180NM	KUPANG (KPG) VOR/DME
IYA	LESSER SUNDA IS	604-11	S08 52.5	E121 37.5	300°/142NM	KUPANG (KPG) VOR/DME
KABA	SUMATRA	601-22	S03 30.4	E102 36.4	209°/128NM	JAMBI (JMB) VOR/DME
KELIMUTU	LESSER SUNDA IS	604-14	S08 45.3	E121 49.5	305°/137NM	KUPANG (KPG) VOR/DME
KELUT	JAVA	603-28	S07 55.5	E112 18.3	220°/43NM	SURABAYA (SBY) VOR/DME
KERINCI	SUMATRA	601-17	S01 41.3	E101 15.4	132°/73NM	PADANG (PDG) VOR/DME
KIARABERES-GAGAK	JAVA	603-03	S06 43.5	E106 39.0	168°/26NM	BUDIARTO (TANGERANG) (BTO) VOR/ DME
KRAKATAU	INDONESIA	602-00	S06 06.1	E105 25.2	164°/52NM	BANDAR LAMPUNG (TKG) VOR/DME
LAMONGAN	JAVA	603-32	S08 00.0	E113 20.3	137°/49NM	SURABAYA (SBY) VOR/DME
LEREBOLENG	LESSER SUNDA IS	604-20	S08 21.3	E122 50.3	333°/118NM	KUPANG (KPG) VOR/DME
LEWOTOBI	LESSER SUNDA IS	604-18	S08 31.5	E122 46.3	329°/110NM	KUPANG (KPG) VOR/DME
LEWOTOLO	LESSER SUNDA IS	604-23	S08 16.2	E123 30.2	353°/113NM	KUPANG (KPG) VOR/DME
LOKON-EMPUNG	SULAWESI-INDONESIA	606-10	N01 21.3	E124 47.3	283°/7NM	MANADO (TDO) VOR/DME
MAHAWU	SULAWESI-INDONESIA	606-11	N01 21.3	E124 51.3	297°/3NM	MANADO (TDO) VOR/DME

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Volcano Name	Country/State Region	Volcano number	Volcano lat-long		Radial (MAG BRG) and distance from reference Navigation Aid	
MAKIAN	HALMAHERA-INDONESIA	608-07	N00 19.1	E127 24.0	110°/161NM	MANADO (TDO) VOR/DME
MARAPI	SUMATRA	601-14	S00 22.5	E100 28.2	013°/30NM	PADANG (PDG) VOR/DME
MERAPI	JAVA	603-25	S07 32.3	E110 26.3	026°/17NM	YOGYAKARTA (JOG) VOR/DME
MERBABU	JAVA	603-24	S07 27.0	E110 25.5	279°/22NM	SOLO (SLO) VOR/DME
NILA	BANDA SEA	605-06	S06 43.5	E129 30.0	152°/198NM	AMBON (PMA) VOR/DME
PALUWEH	LESSER SUNDA IS	604-15	S08 19.1	E121 42.3	311°/159NM	KUPANG (KPG) VOR/DME
PAPANDAYAN	JAVA	603-10	S07 18.4	E107 43.5	152°/28NM	BANDUNG (BND) VOR/DME
PEUET SAGUE	SUMATRA	601-03	N04 55.3	E096 19.5	260°/56NM	LHOK SUKON (LSN) VOR
RAUNG	JAVA	603-34	S08 07.3	E114 02.3	298°/76NM	BALI (DEN PASAR) (BLI) VOR/DME
RINJANI	LESSER SUNDA IS	604-03	S08 24.4	E116 27.4	067°/24NM	MATARAM (MTM) VOR/DME
RUANG	SANGIHE IS- INDONESIA	607-01	N02 16.5	E125 25.3	032°/52NM	MANADO (MNO) VOR/DME
SALAK	JAVA	603-05	S06 42.4	E106 43.5	157°/26NM	BUDIARTO (TANGERANG) (BTO) VOR/ DME
SANGEANG API	LESSER SUNDA IS	604-05	S08 10.5	E119 03.3	081°/178NM	MATARAM (MTM) VOR/DME
SEMERU	JAVA	603-30	S08 06.3	E112 55.1	169°/44NM	SURABAYA (SBY) VOR/DME
SERUA	BANDA SEA	605-07	S06 18.0	E130 00.0	141°/192NM	AMBON (PMA) VOR/DME
SIBAYAK	SUMATRA	601-07	N03 12.3	E098 28.1	207°/19NM	MEDAN (MDN) VOR/DME
SIRUNG	LESSER SUNDA IS	604-27	S08 30.4	E124 08.5	268°/82NM	DILI (DIL) VOR/DME
SLAMET	JAVA	603-18	S07 14.3	E109 12.3	023°/26NM	CILACAP (CLP) VOR/DME
SOPUTAN	SULAWESI-INDONESIA	606-03	N01 06.3	E124 43.3	219°/17NM	MANADO (TDO) VOR/DME
SORIKMARAPI	SUMATRA	601-12	N00 41.1	E099 32.1	026°/112NM	ESMERALDAS (TACHINA) (ESV) VOR/DME
SUMBING	SUMATRA	601-18	S02 24.4	E101 43.5	138°/123NM	PADANG (PDG) VOR/DME
SUMBING	JAVA	603-22	S07 22.5	E110 03.3	328°/29NM	YOGYAKARTA (JOG) VOR/DME
SUNDORO	JAVA	603-21	S07 18.0	E109 59.3	228°/30NM	ACHMAD YANI (SEMARANG) (ANY) VOR/ DME
SUOH	SUMATRA	601-27	S05 15.0	E104 15.4	270°/55NM	BANDAR LAMPUNG (TKG) VOR/DME
TALANG	SUMATRA	601-16	S00 58.4	E100 40.4	161°/142NM	AMBATO (AMB) VOR/DME
TAMBORA	LESSER SUNDA IS	604-04	S08 15.0	E118 00.0	079°/116NM	MATARAM (MTM) VOR/DME
TANDIKAT	SUMATRA	601-15	S00 25.6	E100 19.0	355°/26NM	PADANG (POG) VOR/DME
TANGKUBANPARAHU	JAVA	603-09	S06 46.1	E107 36.0	037°/8NM	BANDUNG (BND) VOR/DME
TENGER CALDERA	JAVA	603-31	S07 56.3	E112 57.0	163°/34NM	SURABAYA (SBY) VOR/DME
TEON	BANDA SEA	605-05	S06 54.4	E129 07.3	160°/200NM	AMBON (PMA) VOR/DME
TONGKOKO	SULAWESI-INDONESIA	606-13	N01 31.1	E125 12.0	095°/16NM	MANADO (MNO) VOR/DME
WURLALI	BANDA SEA	605-04	S07 07.3	E128 40.3	062°/205NM	DILI (DIL) VOR/DME

**PHILIPPINES-JAPAN-MARIANAS-SOUTHEAST ASIA**

ADATARA	HONSHU-JAPAN	803-17	N37 37.1	E140 16.5	349°/24NM	FUKUSHIMA (FKE) VOR/DME
AGRIGAN	MARIANA IS-C PACIFIC	804-16	N18 46.1	E145 40.1	007°/322NM	NIMITZ (UNZ) VORTAC
AKAGI	HONSHU-JAPAN	803-13	N36 31.5	E139 10.5	256°/44NM	NASU (NZE) VOR/DME
AKAN	HOKKAIDO-JAPAN	805-07	N43 22.5	E144 01.1	347°/22NM	KUSHIRO (KSE) VOR/DME
AKITA-KOMAGA-TAKE	HONSHU-JAPAN	803-23	N39 45.0	E140 48.0	328°/24NM	HANAMAKI (HPE) VOR/DME
AKITA-YAKE-YAMA	HONSHU-JAPAN	803-26	N39 58.1	E140 46.1	134°/23NM	ODATE-NOSHIRO (ODE) VOR/DME
ALAMAGAN	MARIANA IS-C PACIFIC	804-18	N17 36.0	E145 49.5	012°/255NM	NIMITZ (UNZ) VORTAC
AOGA-SHIMA	IZU IS-JAPAN	804-06	N32 27.0	E139 46.1	187°/39NM	HACHIJO JIMA (HCE) VOR/DME
ASAMA	HONSHU-JAPAN	803-11	N36 24.0	E138 31.5	070°/33NM	MATSUMOTO (MBE) VOR/DME
ASO	KYUSHU-JAPAN	802-11	N32 52.5	E131 06.0	084°/13NM	KUMAMOTO (KUE) VOR/DME
ASUNCION	MARIANA IS-C PACIFIC	804-15	N19 39.4	E145 24.0	004°/372NM	NIMITZ (UNZ) VORTAC
AZUMA	HONSHU-JAPAN	803-18	N37 43.5	E140 15.0	196°/27NM	ZAO-YAMADA (ZMO) VOR
BABUYAN CLARO	LUZON IS-N OF	704-03	N19 31.2	E121 56.2	044°/113NM	LAOAG (LAO) VOR/DME
BANDAI	HONSHU-JAPAN	803-16	N37 36.0	E140 04.5	329°/28NM	FUKUSHIMA (FKE) VOR/DME
BAYONNAISE ROCKS	IZU IS-JAPAN	804-07	N31 55.1	E139 55.1	180°/71NM	HACHIJO JIMA (HCE) VOR/DME
BILIRAN	PHILIPPINES-C	702-08	N11 31.2	E124 32.0	133°/73NM	MASBATE (MBT) VOR
BUD DAJO	SULU IS-PHILIPPINES	700-01	N05 57.0	E121 04.1	224°/82NM	ZAMBOANGA (ZAM) VOR/DME
BULUSAN	LUZON-PHILIPPINES	703-01	N12 46.1	E124 03.0	140°/29NM	LEGAZPI (LP) VOR/DME
CALAYO	MINDANAO-PHILIPPINES	701-07	N07 52.4	E125 04.1	139°/42NM	CAGAYAN DE ORO (CGO) VOR/DME
CAMIGUIN DE BABUYANE	LUZON IS-N OF	704-01	N18 49.5	E121 51.4	006°/71NM	TUGUEGARAO (TUG) VOR
CANLAON	PHILIPPINES-C	702-02	N10 24.4	E123 07.6	116°/39NM	ILOILO (IOO) VOR/DME
CHOKAI	HONSHU-JAPAN	803-22	N39 04.5	E140 01.5	041°/19NM	SHONAI (YSE) VOR/DME
DIDICAS	LUZON IS-N OF	704-02	N19 04.3	E122 12.0	018°/90NM	TUGUEGARAO (TUG) VOR
E-SAN	HOKKAIDO-JAPAN	805-012	N41 48.0	E141 09.4	091°/14NM	HAKODATE (HWE) VOR/DME

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No. 1

## Appendix F. Cross-reference list of volcanoes and navigation aids

App F-5

Volcano Name	Country/State Region	Volcano number	Volcano lat-long	Radial (MAG BRG) and distance from reference Navigation Aid
FARALLON DE PAJAROS	MARIANA IS-C PACIFIC	804-14	N20 31.5 E144 54.0	359°/422NM NIMITZ (UNZ) VORTAC
FUJI	HONSHU-JAPAN	803-03	N35 21.0 E138 43.5	283°/42NM YOKOSUKA (HYE) VOR/DME
FUKUJIN	VOLCANO IS-JAPAN	804-133	N21 55.3 E143 26.3	350°/511NM NIMITZ (UNZ) VORTAC
GUGUAN	MARIANA IS-C PACIFIC	804-19	N17 18.4 E145 51.0	013°/239NM NIMITZ (UNZ) VORTAC
HACHIJO-JIMA	IZU IS-JAPAN	804-05	N33 07.5 E139 46.1	321°/1NM HACHIJO JIMA (HCE) VOR/DME
HAKU-SAN	HONSHU-JAPAN	803-05	N36 09.0 E136 46.5	135°/23NM KOMATSU (KMC) VORTAC
HIBOK-HIBOK	MINDANAO-PHILIPPINES	701-08	N09 12.1 E124 40.2	003°/46NM CAGAYAN DE ORO (CGO) VOR/DME
IBUSUKI VOLCANO FIELD	KYUSHU-JAPAN	802-07	N31 13.1 E130 34.1	187°/28NM KAGOSHIMA (HKC) VORTAC
ILE DES CENDRES	SE ASIA	705-06	N10 09.3 E109 00.5	129°/72NM PHANTHET (PTH) VOR/DME
IRIGA	LUZON-PHILIPPINES	703-041	N13 27.3 E123 27.3	319°/24NM LEGAZPI (LP) VOR/DME
IRIOMOTE-JIMA	RYUKYU IS	802-01	N24 33.3 E124 00.0	326°/16NM ISHIGAKI (GKE) VOR/DME
IWAKI	HONSHU-JAPAN	803-27	N40 39.0 E140 18.0	262°/19NM AOMORI (MRE) VOR/DME
IWATE	HONSHU-JAPAN	803-24	N39 51.0 E141 00.0	353°/25NM HANAMAKI (HPE) VOR/DME
IZU-TO	VOLCANO IS-JAPAN	804-12	N24 45.0 E141 19.5	175°/507NM HACHIJO JIMA (HCE) VOR/DME
IZU-TOBU	HONSHU-JAPAN	803-01	N34 55.1 E139 07.1	316°/19NM OSHIMA (XAC) VORTAC
KAITOKU SEAMOUNT	VOLCANO IS-JAPAN	804-10	N26 03.2 E141 07.1	176°/428NM HACHIJO JIMA (HCE) VOR/DME
KIKAI	RYUKYU IS	802-06	N30 46.5 E130 16.5	325°/31NM YAKUSHIMA (YKE) VOR/DME
KIRISHIMA	KYUSHU-JAPAN	802-09	N31 55.5 E130 52.1	048°/10NM KAJIKI (KAGOSHIMA) (KGE) VOR/DME
KITA-IO-TO	VOLCANO IS-JAPAN	804-11	N25 25.5 E141 13.5	176°/466NM HACHIJO JIMA (HCE) VOR/DME
KOMAGA-TAKE	HOKKAIDO-JAPAN	805-02	N42 04.1 E140 40.5	347°/19NM HAKODATE (HWE) VOR/DME
KUCHINOERABU-JIMA	RYUKYU IS	802-05	N30 25.5 E130 13.1	282°/23NM YAKUSHIMA (YKE) VOR/DME
KUJU GROUP	KYUSHU-JAPAN	802-12	N33 04.5 E131 15.0	255°/24NM OITA (TAE) VOR/DME
KURIKOMA	HONSHU-JAPAN	803-21	N38 57.0 E140 46.5	218°/33NM HANAMAKI (HPE) VOR/DME
KUSATSU-SHIRANE	HONSHU-JAPAN	803-12	N36 37.1 E138 33.0	054°/41NM MATSUMOTO (MBE) VOR/DME
KUTTARA	HOKKAIDO-JAPAN	805-034	N42 30.0 E141 10.5	251°/25NM CHITOSE (CHE) VOR/DME
MALINAO	LUZON-PHILIPPINES	703-04	N13 25.2 E123 35.5	334°/17NM LEGAZPI (LP) VOR/DME
MAYON	LUZON-PHILIPPINES	703-03	N13 15.3 E123 41.1	338°/6NM LEGAZPI (LP) VOR/DME
MINAMI-HIYOSHI	VOLCANO IS-JAPAN	804-131	N23 30.2 E141 54.2	174°/585NM HACHIJO JIMA (HCE) VOR/DME
MIYAKE-JIMA	IZU IS-JAPAN	804-04	N34 04.5 E139 31.5	152°/2NM MIYAKEJIMA (MJE) VOR/DME
MOUNT PAGAN	MARIANA IS-C PACIFIC	804-17	N18 07.5 E145 48.0	010°/286NM NIMITZ (UNZ) VORTAC
MOUNT PINATUBO	LUZON-PHILIPPINES	703-083	N15 07.5 E120 21.0	255°/12NM CLARK (ANGELES (CIA) VOR/DME
NAKANO-SHIMA	RYUKYU IS	802-04	N29 51.0 E129 52.1	237°/52NM YAKUSHIMA (YKE) VOR/DME
NASU	HONSHU-JAPAN	803-15	N37 07.1 E139 58.1	357°/20NM NASU (NZE) VOR/DME
NIIGATA-YAKE-YAMA	HONSHU-JAPAN	803-09	N36 55.1 E138 01.5	075°/43NM TOYAMA (TOE) VOR/DME
NIKKO-SHIRANE	HONSHU-JAPAN	803-14	N36 48.0 E139 22.5	278°/31NM NASU (NZE) VOR/DME
NIPESOTSU-UPEPESANKE	HOKKAIDO-JAPAN	805-051	N43 27.0 E143 01.5	126°/28NM ASAHIKAWA (AWE) VOR/DME
NISHINO-SHIMA	VOLCANO IS-JAPAN	804-092	N27 14.4 E140 52.4	176°/356NM HACHIJO JIMA (HCE) VOR/DME
OKINAWA-TORI-SHIMA	RYUKYU IS	802-02	N27 51.0 E128 15.0	279°/33NM TOKUNOSHIMA (TKE) VOR/DME
ON-TAKE	HONSHU-JAPAN	803-04	N35 54.0 E137 28.5	241°/26NM MATSUMOTO (MBE) VOR/DME
OSHIMA	IZU IS-JAPAN	804-01	N34 43.5 E139 22.5	308°/2NM OSHIMA (XAC) VORTAC
OSHIMA-OSHIMA	HOKKAIDO-JAPAN	805-01	N41 30.0 E139 22.1	194°/34NM OKUSHIRI (ORE) VOR/DME
OSORE-YAMA	HONSHU-JAPAN	803-29	N41 19.1 E141 04.5	165°/29NM HAKODATE (HWE) VOR/DME
RAGANG	MINDANAO-PHILIPPINES	701-06	N07 40.1 E124 30.0	029°/34NM COTABATO (DINAIG) (COT) VOR/DME
RUBY	MARIANA IS-C PACIFIC	804-201	N15 36.4 E145 33.4	018°/137NM NIMITZ (UNZ) VORTAC
SAKURA-JIMA	KYUSHU-JAPAN	802-08	N31 34.5 E130 40.1	153°/8NM KAGOSHIMA (HKC) VORTAC
SHIN-IO-TO	VOLCANO IS-JAPAN	804-13	N24 16.5 E141 31.1	175°/536NM MIYAKEJIMA (MJE) VOR/DME
SHIRETOKO-IO-ZAN	HOKKAIDO-JAPAN	805-09	N44 07.5 E145 10.1	025°/34NM NAKASHIBETSU (NSE) VOR/DME
SMITH ROCK	IZU IS-JAPAN	804-08	N31 16.5 E139 46.1	186°/109NM HACHIJO JIMA (HCE) VOR/DME
SUPPLY REEF	MARIANA IS-C PACIFIC	804-142	N20 07.5 E145 06.0	001°/399NM NIMITZ (UNZ) VORTAC
SUWANOSE-JIMA	RYUKYU IS	802-03	N29 31.5 E129 43.1	011°/65NM AMAMI (ALC) VORTAC
TAAL	LUZON-PHILIPPINES	703-07	N14 00.1 E120 59.4	288°/8NM LIPA (LIP) VOR
TARUMAI	HOKKAIDO-JAPAN	805-04	N42 40.5 E141 22.5	274°/13NM CHITOSE (CHE) VOR/DME
TATE-YAMA	HONSHU-JAPAN	803-08	N36 34.1 E137 36.0	110°/20NM TOYAMA (TOE) VOR/DME
TENGCHONG	CHINA-S	705-11	N25 18.4 E098 27.4	292°/41NM BAOSHAN (BSD) VOR
TOKACHI	HOKKAIDO-JAPAN	805-05	N43 25.1 E142 40.5	155°/17NM ASAHIKAWA (AWE) VOR/DME
TORI-SHIMA	IZU IS-JAPAN	804-09	N30 28.5 E140 19.1	176°/160NM HACHIJO JIMA (HCE) VOR/DME
UNNAMED	LUZON IS-N OF	704-05	N20 19.5 E121 45.0	153°/108NM HENGCHUN (HCN) VORTAC
UNNAMED	TAIWAN-E OF	801-02	N21 49.5 E121 10.5	109°/19NM HENGCHUN (HCN) VORTAC
UNNAMED	TAIWAN-E OF	801-03	N24 00.0 E121 49.5	099°/10NM HUALIEN (HLN) VOR/DME
UNNAMED	TAIWAN-N OF	801-04	N25 24.4 E122 19.5	075°/46NM ANPU (TAIPEI) (APU) VOR/DME
UNZEN	KYUSHU-JAPAN	802-10	N32 45.0 E130 18.0	121°/21NM NAGASAKI (OLE) VOR/DME

*Manual on Volcanic Ash, Radioactive Material  
and Toxic Chemical Clouds*

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Volcano Name	Country/State Region	Volcano number	Volcano lat-long		Radial (MAG BRG) and distance from reference Navigation Aid	
USU	HOKKAIDO-JAPAN	805-03	N42 31.5	E140 49.5	264°/39NM	CHITOSE (CHE) VOR/DME
YAKE-DAKE	HONSHU-JAPAN	803-07	N36 13.1	E137 34.5	290°/16NM	MATSUMOTO (MBE) VOR/DME
ZAO	HONSHU-JAPAN	803-19	N38 09.0	E140 27.0	121°/5NM	ZAO-YAMADA (ZMO) VOR
ZENGYU	TAIWAN-N OF	801-05	N26 10.5	E122 27.3	043°/78NM	ANPU (TAIPEI) (APU) VOR/DME
<b>MAINLAND ASIA-KURILES-KAMCHATKA PENINSULA</b>						
ALAUD	KURIL IS	900-39	N50 48.0	E155 30.0	050°/610NM	NAKASHIBETSU (NSE) VOR/DME
ANJUISKY	RUSSIA	1001-02	N67 10.1	E165 12.0	286°/639NM	KUKULIAK (SAVOONGA) (ULL) VOR/DME
ATSONUPURI	KURIL IS	900-05	N44 49.1	E147 07.3	059°/119NM	NAKASHIBETSU (NSE) VOR/DME
AVACHINSKY	KAMCHATKA PENINSULA	1000-10	N53 15.0	E158 51.0	276°/551NM	SHEMYA (SYA) VORTAC
BAITOUSHAN	CHINA-E	1005-07	N41 58.5	E128 04.5	236°/83NM	YANJI (YNJ) VOR/DME
BALAGAN-TAS	RUSSIA	1001-03	N66 25.5	E143 43.5	048°/780NM	CHULMAN (NERUNGRI) (NRG) VOR/DME
BARANSKY	KURIL IS	900-08	N45 06.0	E148 01.5	063°/161NM	NAKASHIBETSU (NSE) VOR/DME
BEZYMIANNY	KAMCHATKA PENINSULA	1000-25	N55 58.1	E160 36.0	294°/510NM	SHEMYA (SYA) VORTAC
CHIKURACHKI-TATARINO	KURIL IS	900-36	N50 19.3	E155 27.3	052°/591NM	NAKASHIBETSU (NSE) VOR/DME
CHIRINKOTAN	KURIL IS	900-26	N48 58.5	E153 28.5	053°/480NM	NAKASHIBETSU (NSE) VOR/DME
CHIRIP PENINSULA GROUP	KURIL IS	900-09	N45 22.5	E147 55.1	057°/167NM	NAKASHIBETSU (NSE) VOR/DME
CHIRPOI	KURIL IS	900-15	N46 31.3	E150 52.3	061°/307NM	NAKASHIBETSU (NSE) VOR/DME
EBEKO	KURIL IS	900-38	N50 40.1	E155 55.5	051°/618NM	NAKASHIBETSU (NSE) VOR/DME
EKARMA	KURIL IS	900-27	N48 57.0	E153 56.3	055°/493NM	NAKASHIBETSU (NSE) VOR/DME
FUSS PEAK	KURIL IS	900-34	N50 13.1	E155 12.0	051°/579NM	NAKASHIBETSU (NSE) VOR/DME
GOLOVNIN	KURIL IS	900-01	N43 48.4	E145 33.0	070°/29NM	NAKASHIBETSU (NSE) VOR/DME
GORELY	KAMCHATKA PENINSULA	1000-07	N52 33.3	E158 01.5	272°/584NM	SHEMYA (SYA) VORTAC
GORIASCHAIA SOPKA	KURIL IS	900-17B	N46 49.5	E151 45.0	062°/348NM	NAKASHIBETSU (NSE) VOR/DME
GROZNY GROUP	KURIL IS	900-07	N45 01.1	E147 52.1	063°/152NM	NAKASHIBETSU (NSE) VOR/DME
HARIMKOTAN	KURIL IS	900-30	N49 03.0	E154 25.5	055°/512NM	NAKASHIBETSU (NSE) VOR/DME
ILYINSKY	KAMCHATKA PENINSULA	1000-03	N51 30.0	E157 12.0	267°/626NM	SHEMYA (SYA) VORTAC
KARPINSKY GROUP	KURIL IS	900-35	N50 09.0	E155 22.1	052°/581NM	NAKASHIBETSU (NSE) VOR/DME
KARYMSKY	KAMCHATKA PENINSULA	1000-13	N54 04.5	E159 25.5	281°/530NM	SHEMYA (SYA) VORTAC
KETOI	KURIL IS	900-20	N47 21.0	E152 28.3	060°/389NM	NAKASHIBETSU (NSE) VOR/DME
KIKHPINYCH	KAMCHATKA PENINSULA	1000-18	N54 28.5	E160 13.5	284°/504NM	SHEMYA (SYA) VORTAC
KIZIMEN	KAMCHATKA PENINSULA	1000-23	N55 09.4	E160 31.5	289°/500NM	SHEMYA (SYA) VORTAC
KLIUCHEVSKOI	KAMCHATKA PENINSULA	1000-26	N56 03.3	E160 38.2	295°/510NM	SHEMYA (SYA) VORTAC
KOLOKOL GROUP	KURIL IS	900-12	N46 03.0	E150 03.3	063°/263NM	NAKASHIBETSU (NSE) VOR/DME
KORYAKSKY	KAMCHATKA PENINSULA	1000-09	N53 18.4	E158 42.4	276°/556NM	SHEMYA (SYA) VORTAC
KOSHELEV	KAMCHATKA PENINSULA	1000-02	N51 21.0	E156 43.5	266°/645NM	SHEMYA (SYA) VORTAC
KRASHENINNIKOV	KAMCHATKA PENINSULA	1000-19	N54 36.0	E160 16.5	285°/503NM	SHEMYA (SYA) VORTAC
KRONOTSKY	KAMCHATKA PENINSULA	1000-20	N54 45.0	E160 31.5	286°/496NM	SHEMYA (SYA) VORTAC
KSUDACH	KAMCHATKA PENINSULA	1000-05	N51 48.0	E157 31.5	268°/610NM	SHEMYA (SYA) VORTAC
KUNLUN VOLCANO GROUP	CHINA-W	1004-03	N35 30.4	E080 12.0	167°/92NM	SHACHE (SCH) VOR/DME
LONGGANG GROUP	CHINA-E	1005-06	N42 19.5	E126 30.0	157°/110NM	CHANGCHUN (CGQ) VOR/DME
MALY SEMIACHIK	KAMCHATKA PENINSULA	1000-14	N54 07.5	E159 40.5	282°/522NM	SHEMYA (SYA) VORTAC
MEDVEZHIA	KURIL IS	900-10	N45 22.5	E148 48.0	064°/197NM	NAKASHIBETSU (NSE) VOR/DME
MENDELEEY	KURIL IS	900-02	N43 54.0	E145 42.0	068°/37NM	NAKASHIBETSU (NSE) VOR/DME
MUTNOVSKY	KAMCHATKA PENINSULA	1000-06	N52 27.0	E158 10.5	271°/580NM	SHEMYA (SYA) VORTAC
NEMO PEAK	KURIL IS	900-32	N49 33.4	E154 48.3	054°/542NM	NAKASHIBETSU (NSE) VOR/DME
OPALA	KAMCHATKA PENINSULA	1000-08	N52 32.4	E157 20.1	272°/610NM	SHEMYA (SYA) VORTAC

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## Appendix F. Cross-reference list of volcanoes and navigation aids

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Volcano Name	Country/State Region	Volcano number	Volcano lat-long		Radial (MAG BRG) and distance from reference Navigation Aid	
PREVO PEAK	KURIL IS	900-19	N47 00.4	E152 06.4	062°/366NM	NAKASHIBETSU (NSE) VOR/DME
RAIKOKE	KURIL IS	900-25	N48 15.0	E153 15.0	057°/446NM	NAKASHIBETSU (NSE) VOR/DME
RASSHUA	KURIL IS	900-22	N47 46.1	E153 01.1	059°/422NM	NAKASHIBETSU (NSE) VOR/DME
SARYCHEV PEAK	KURIL IS	900-24	N48 05.3	E153 12.0	058°/439NM	NAKASHIBETSU (NSE) VOR/DME
SHEVELUCH	KAMCHATKA PENINSULA	1000-27	N56 39.0	E161 21.0	300°/500NM	SHEMYA (SYA) VORTAC
SINARKA	KURIL IS	900-29	N48 52.3	E154 10.3	056°/498NM	NAKASHIBETSU (NSE) VOR/DME
TAO-RUSYR CALDERA	KURIL IS	900-31	N49 21.3	E154 42.3	054°/532NM	NAKASHIBETSU (NSE) VOR/DME
TIATIA	KURIL IS	900-03	N44 21.0	E146 15.0	059°/72NM	NAKASHIBETSU (NSE) VOR/DME
TOLBACHIK	KAMCHATKA PENINSULA	1000-24	N55 49.5	E160 19.5	293°/516NM	SHEMYA (SYA) VORTAC
UNNAMED	KURIL IS	900-23	N48 04.5	E153 19.5	058°/443NM	NAKASHIBETSU (NSE) VOR/DME
UNNAMED	KURIL IS	900-16	N46 30.0	E151 00.0	062°/311NM	NAKASHIBETSU (NSE) VOR/DME
USHISHIR CALDERA	KURIL IS	900-21	N47 30.4	E152 48.4	060°/406NM	NAKASHIBETSU (NSE) VOR/DME
USHKOVSKY	KAMCHATKA PENINSULA	1000-261	N56 06.4	E160 30.4	295°/515NM	SHEMYA (SYA) VORTAC
VEER	KAMCHATKA PENINSULA	1000-102	N53 37.5	E158 34.5	278°/560NM	SHEMYA (SYA) VORTAC
WUDALIANCHI	CHINA-E	1005-04	N48 42.4	E126 06.4	054°/124NM	QIQIHAER (NDG) VOR
XIANJINDAO	KOREA	1006-01	N41 19.5	E128 00.0	223°/116NM	PYONGYANG (SUNAN) (GK) VOR/DME
ZAVARITZKI CALDERA	KURIL IS	900-18	N46 55.3	E151 57.0	062°/358NM	NAKASHIBETSU (NSE) VOR/DME
ZHELTOVSKY	KAMCHATKA PENINSULA	1000-04	N51 34.1	E157 15.0	267°/623NM	SHEMYA (SYA) VORTAC
ZHUPANOVSKY	KAMCHATKA PENINSULA	1000-12	N53 35.2	E159 08.5	278°/540NM	SHEMYA (SYA) VORTAC

## ALEUTIANS-PACIFIC-NORTH AMERICA

AKUTAN	ALEUTIAN IS	1101-32	N54 07.5	W165 58.1	222°/130NM	COLD BAY (COB) VORTAC
AMAK	ALEUTIAN IS	1101-39	N55 24.4	W163 09.0	286°/15NM	COLD BAY (CDB) VORTAC
AMUKTA	ALEUTIAN IS	1101-19	N52 30.0	W171 15.0	227°/343NM	COLD BAY (COB) VORTAC
ANIACHAK	ALASKA PENINSULA	1102-09	N56 52.5	W158 09.0	086°/16NM	TURNBULL (PORT HEIDEN) (PTH) VOR/ DME
ATKA	ALEUTIAN IS	1101-16	N52 22.5	W174 09.0	085°/431NM	SHEMYA (SYA) VORTAC
AUGUSTINE	ALASKA-SW	1103-01	N59 21.4	W153 24.4	227°/63NM	HOMER (HOM) VORTAC
BOGOSLOF	ALEUTIAN IS	1101-30	N53 55.5	W168 01.5	231°/200NM	COLD BAY (CDB) VORTAC
CARLISLE	ALEUTIAN IS	1101-23	N52 54.0	W170 03.0	227°/293NM	COLD BAY (CDB) VORTAC
CHIGINAGAK	ALASKA PENINSULA	1102-11	N57 07.5	W157 00.0	060°/54NM	TURNBULL (PORT HEIDEN) (PTH) VOR/ DME
CLEVELAND	ALEUTIAN IS	1101-24	N52 48.4	W169 57.0	225°/293NM	COLD BAY (CDB) VORTAC
FISHER	ALEUTIAN IS	1101-35	N54 39.4	W164 21.0	219°/65NM	COLD BAY (CDB) VORTAC
GARELOI	ALEUTIAN IS	1101-07	N51 46.5	W178 48.0	096°/269NM	SHEMYA (SYA) VORTAC
GLACIER PEAK	USA-WASHINGTON	1201-02	N48 06.4	W121 06.4	027°/63NM	SEATTLE (SEA) VORTAC
GREAT SITKIN	ALEUTIAN IS	1101-12	N52 04.5	W176 07.5	089°/362NM	SHEMYA (SYA) VORTAC
HALEAKALA	HAWAIIAN IS	1302-06	N20 42.3	W156 15.0	127°/15NM	MAUI (KAHULUI) (OGG) VORTAC
HUALALAI	HAWAIIAN IS	1302-04	N19 41.3	W155 51.4	065°/9NM	KONA (KAILUA-KONA) (IAI) VORTAC
ILIAMNA	ALASKA-SW	1103-02	N60 01.5	W153 04.5	268°/52NM	HOMER (HOM) VORTAC
ISANOTSKI	ALEUTIAN IS	1101-37	N54 45.0	W163 43.5	210°/45NM	COLD BAY (CDB) VORTAC
ISKUT-UNUK RIVER GROUP	CANADA	1200-10	N56 34.5	W130 33.0	056°/84NM	LEVEL ISLAND (LVD) VOR/ DME
KAGAMIL	ALEUTIAN IS	1101-26	N52 57.4	W169 42.4	226°/281NM	COLD BAY (CDB) VORTAC
KANAGA	ALEUTIAN IS	1101-11	N51 54.4	W177 09.4	092°/326NM	SHEMYA (SYA) VORTAC
KASATOCHI	ALEUTIAN IS	1101-13	N52 10.5	W175 30.0	087°/384NM	SHEMYA (SYA) VORTAC
KATMAI	ALASKA PENINSULA	1102-17	N58 16.1	W154 58.5	094°/62NM	KING SALMON (AKN) VORTAC
KILAUEA	HAWAIIAN IS	1302-01	N19 25.3	W155 17.3	211°/23NM	HILO (ITO) VORTAC
KISKA	ALEUTIAN IS	1101-02	N52 06.0	E177 36.0	101°/135NM	SHEMYA (SYA) VORTAC
KUPREANOF	ALASKA PENINSULA	1102-06	N56 00.4	W159 48.0	196°/68NM	TURNBULL (PORT HEIDEN) (PTH) VOR/ DME
LASSEN	USA-CALIFORNIA	1203-07	N40 29.3	W121 30.3	036°/40NM	RED BLUFF (RBL) VORTAC
LITTLE SITKIN	ALEUTIAN IS	1101-05	N51 57.0	E178 31.5	100°/170NM	SHEMYA (SYA) VORTAC
MACDONALD	PACIFIC-C	1303-07	S28 58.5	W140 15.0	176°/436NM	MURUROA (MRA) VOR/DME
MAGEIK	ALASKA PENINSULA	1102-15	N58 12.0	W155 15.0	102°/56NM	KING SALMON (AKN) VORTAC
MAKUSHIN	ALEUTIAN IS	1101-31	N53 54.0	W166 55.5	225°/166NM	COLD BAY (CDB) VORTAC
MARTIN	ALASKA PENINSULA	1102-14	N58 09.4	W155 21.0	105°/55NM	KING SALMON (AKN) VORTAC
MAUNALOA	HAWAIIAN IS	1302-02	N19 28.3	W155 36.3	103°/25NM	KONA (KAILUA-KONA) (IAI) VORTAC
MEDICINE LAKE	USA-CALIFORNIA	1203-02	N41 31.5	W121 31.5	149°/38NM	KLAMATH FALLS (LMT) VORTAC
MONO LAKE VOLCANO FIELD	USA-CALIFORNIA	1203-11	N38 01.5	W119 00.4	218°/56NM	MINA (MVA) VORTAC

## App F-8

Manual on Volcanic Ash, Radioactive Material  
and Toxic Chemical Clouds

Volcano Name	Country/State Region	Volcano number	Volcano lat-long		Radial (MAG BRG) and distance from reference Navigation Aid	
MOUNT BAKER	USA-WASHINGTON	1201-01	N48 47.1	W121 48.4	087°/31NM	BELLINGHAM (BLI) VORTAC
MOUNT HOOD	USA-OREGON	1202-01	N45 21.4	W121 42.0	209°/33NM	KLICKITAT (THE DALLES) (LTJ) VORTAC
MOUNT RAINIER	USA-WASHINGTON	1201-03	N46 51.4	W121 45.3	124°/41NM	SEATTLE (SEA) VORTAC
MOUNT SHASTA	USA-CALIFORNIA	1203-01	N41 24.0	W122 10.5	187°/49NM	KLAMATH FALLS (LMT) VORTAC
MOUNT ST HELENS	USA-WASHINGTON	1201-05	N46 12.0	W122 10.5	011°/32NM	BATTLE GROUND (BTG) VORTAC
MOUNT WRANGELL	ALASKA-E	1105-02	N62 00.0	W144 00.4	074°/41NM	GULKANA (GKN) VORTAC
NOVARUPTA KATMAI	ALASKA PENINSULA	1102-18	N58 16.1	W155 09.4	096°/57NM	KING SALMON (AKN) VORTAC
OKMOK	ALEUTIAN IS	1101-29	N53 24.4	W168 07.5	224°/218NM	COLD BAY (CDB) VORTAC
PAVLOF	ALASKA PENINSULA	1102-03	N55 25.1	W161 54.0	055°/31NM	COLD BAY (CDB) VORTAC
PAVLOF SISTER	ALASKA PENINSULA	1102-04	N55 27.0	W161 51.4	053°/33NM	COLD BAY (CDB) VORTAC
PROSPECT PEAK	USA-CALIFORNIA	1203-08	N40 33.0	W121 19.1	039°/50NM	RED BLUFF (RBL) VORTAC
REDOUBT	ALASKA-SW	1103-03	N60 28.5	W152 45.0	235°/46NM	KENAI (ENA) VOR/DME
SEGUAM	ALEUTIAN IS	1101-18	N52 18.4	W172 30.4	229°/388NM	COLD BAY (CDB) VORTAC
SEMISOPOCHNOI	ALEUTIAN IS	1101-06	N51 55.5	E179 36.0	097°/209NM	SHEMYA (SYA) VORTAC
SHISHALDIN	ALEUTIAN IS	1101-36	N54 45.0	W163 57.4	216°/51NM	COLD BAY (CDB) VORTAC
SOUTH SISTER	USA-OREGON	1202-08	N44 06.0	W121 45.4	227°/21NM	DESCHUTES (REDMOND) (DSD) VORTAC
SPURR	ALASKA-SW	1103-04	N61 18.0	W152 15.0	298°/51NM	KENAI (ENA) VOR/DME
TANAGA	ALEUTIAN IS	1101-08	N51 52.5	W178 07.5	093°/291NM	SHEMYA (SYA) VORTAC
TRIDENT	ALASKA PENINSULA	1102-16	N58 13.5	W155 04.5	097°/60NM	KING SALMON (AKN) VORTAC
TSEAX RIVER CONE	CANADA	1200-12	N55 06.4	W128 51.4	273°/86NM	HOUSTON (SMITHERS) (YYD) VOR/DME
UGASHIK-PEULIK	ALASKA PENINSULA	1102-13	N57 45.0	W156 21.4	146°/59NM	KING SALMON (AKN) VORTAC
UKINREK MAARS	ALASKA PENINSULA	1102-13	N57 49.5	W156 30.4	150°/54NM	KING SALMON (AKN) VORTAC
UNNAMED	PACIFIC-C	1303-01	N09 49.1	W104 18.0	198°/107NM	PHNOM PENH (PNH) VOR/DME
UNNAMED	PACIFIC-N	1301-02	N45 01.5	W130 12.0	259°/263NM	NEWPORT (ONP) VORTAC
UNNAMED	PACIFIC-N	1301-01	N46 33.0	W129 34.3	246°/225NM	HOQUIAM (HQM) VORTAC
UNNAMED	HAWAIIAN IS	1302-09	N23 34.5	W163 49.5	282°/258NM	SOUTH KAUAI (SOK) VORTAC
VENIAMINOF	ALASKA PENINSULA	1102-07	N56 09.4	W159 22.5	189°/53NM	TURNBULL (PORT HEIDEN) (PTH) VOR/ DME
VSEVIDOF	ALEUTIAN IS	1101-27	N53 07.5	W168 40.5	223°/244NM	COLD BAY (CDB) VORTAC
WESTDAHL	ALEUTIAN IS	1101-34	N54 30.0	W164 39.0	218°/79NM	COLD BAY (CDB) VORTAC
YUNASKA	ALEUTIAN IS	1101-21	N52 37.5	W170 37.5	226°/320NM	COLD BAY (CDB) VORTAC

## MEXICO-CENTRAL AMERICA

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 JOSE) (TIO) VOR/DME
ATITLAN	GUATEMALA	1402-06	N14 34.6	W091 11.1	265°/38NM	LA AURORA (GUAT. CITY) (AUR) VOR/ DME
BARCENA	MEXICO-IS	1401-02	N19 15.4	W110 48.0	185°/240NM	CABOS (SAN JOSE DEL CABO) (SJD) VOR/ DME
BARU	PANAMA	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 JOSE) (TIO) VOR/DME
CERRO NEGRO	NICARAGUA	1404-07	N12 30.2	W086 42.1	157°/96NM	TONCONTIN (TEGUCIGALPA) (TNT) VOR/ DME
COLIMA VOLCANO COMPLEX	MEXICO	1401-04	N19 30.5	W103 37.1	342°/14NM	COLIMA (COL) VOR/DME
CONCEPCION	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	TONCONTIN (TEGUCIGALPA) (TNT) VOR/ DME
COSIGUINA	NICARAGUA	1404-01	N12 58.5	W087 33.4	193°/65NM	TONCONTIN (TEGUCIGALPA) (TNT) VOR/ DME
EL CHICHON	MEXICO	1401-12	N17 21.4	W093 13.4	005°/36NM	TUXTLA (TUXTLA GUTIERREZ) (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
IRAZU	COSTA RICA	1405-06	N09 58.4	W083 51.1	089°/22NM	EL COCO (SAN JOSE) (TIO) VOR/DME
IZALCO	EL SALVADOR	1403-03	N13 48.4	W089 37.6	280°/31NM	ILOPANGO (SAN SALVADOR) (YSV) VOR/ DME
LA YEGUADA	PANAMA	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
MICHOACAN-GUANAJUATO	MEXICO	1401-06	N19 28.5	W102 15.0	285°/12NM	URUAPAN (UPN) VOR/DME

## Appendix F. Cross-reference list of volcanoes and navigation aids

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Volcano Name	Country/State Region	Volcano number	Volcano lat-long		Radial (MAG BRG) and distance from reference Navigation Aid	
MIRAVALLS	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	TONCONTIN (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	MEXICO	1401-10	N19 01.5	W097 16.1	256°/61NM	VERACRUZ (VER) VOR/DME
PINACATE PEAKS	MEXICO	1401-001	N31 46.2	W113 29.5	349°/25NM	PENASCO (PUNTA PENASCO) (PPE) VOR/ DME
POAS	COSTA RICA	1405-04	N10 12.0	W084 13.6	360°/12NM	EL COCO (SAN JOSE) (TIO) VOR/DME
POPOCATEPETL	MEXICO	1401-09	N19 01.2	W098 37.2	233°/16NM	PUEBLA (PBC) VOR/DME
RINCON DE LA VIEJA	COSTA RICA	1405-02	N10 49.5	W085 19.3	040°/19NM	LIBERIA (LIB) VOR/DME
SAN CRISTOBAL	NICARAGUA	1404-02	N12 42.1	W087 00.1	166°/80NM	TONCONTIN (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
SANTA ANA	EL SALVADOR	1403-02	N13 51.1	W089 37.5	284°/31NM	ILOPANGO (SAN SALVADOR) (YSV) VOR/ DME
SANTA MARIA	GUATEMALA	1402-03	N14 45.2	W091 33.1	087°/47NM	TAPACHULA (TAP) VOR/DME
SOCORRO	MEXICO-IS	1401-021	N18 45.0	W110 57.0	184°/271NM	CABOS (SAN JOSE DEL CABO) (SJD) VOR/ DME
TACANA	MEXICO	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 VIRGENES	MEXICO	1401-01	N27 28.1	W112 35.3	289°/19NM	ROSALIA (SANTA ROSALIA) (SRL) VOR/ DME
TURRIALBA	COSTA RICA	1405-07	N10 01.5	W083 46.1	083°/27NM	EL COCO (SAN JOSE) (TIO) VOR/DME
VOLCANO CEBORUCO	MEXICO	1401-03	N21 07.3	W104 30.0	124°/25NM	TEPIC (TNY) VOR/DME
VOLCANO DE SAN MARTIN	MEXICO	1401-11	N18 34.2	W095 10.1	304°/43NM	MINATITLAN (MTT) VOR/DME

## SOUTH AMERICA-CARIBBEAN

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 MARTIN DE LOS ANDES (CHP) VOR/ DME
CERRO QUIZAPU AZUL	CHILE-C	1507-06	S35 39.1	W070 45.4	144°/46NM	CURICO ((CO) VOR/DME
CERRO AZUL	GALAPAGOS	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 (MOU) 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
CORDON CAULLE	CHILE-C	1507-141	S40 30.4	W072 12.0	232°/57NM	SAN MARTIN 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) VOR/DME
DESCABEZADO GRANDE	CHILE-C	1507-05	S35 34.5	W070 45.0	141°/43NM	CURICO (ICO) VOR/DME
DONA JUANA	COLOMBIA	1501-07	N01 28.1	W076 55.1	085°/22NM	PASTO (PST) VOR/DME
EL MISTI	PERU	1504-01	S16 17.4	W071 24.3	079°/11NM	AREQUIPA (EQU) VOR/DME
FERNANDINA	GALAPAGOS	1503-01	S00 22.1	W091 33.0	266°/76NM	GALAPAGOS (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
GUALLATIRI	CHILE-N	1505-02	S18 25.1	W069 10.1	107°/67NM	TACNA (TCA) VOR/DME
HUAYNAPUTINA	PERU	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 INDIES	1600-16	N12 18.0	W061 37.5	040°/20NM	POINT SALINES (ST GEORGE'S) (GND) VOR/DME

*Manual on Volcanic Ash, Radioactive Material  
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Volcano Name	Country/State Region	Volcano number	Volcano lat-long		Radial (MAG BRG) and distance from reference Navigation Aid	
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	GALAPAGOS	1503-08	N00 19.5	W090 28.1	046°/497NM	BANDA ACEH (BAC) VOR/DME
MICOTRIN	W INDIES	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 MARTIN DE LOS ANDES (CHP) VOR/ DME
MONTAGNE PELEE	W INDIES	1600-12	N14 49.1	W061 10.1	341°/16NM	FORT DE PRANCE (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 INDIES	1600-11	N15 13.1	W061 22.1	344°/42NM	FORT DE FRANCE (FOF) VOR/DME
MOUNT LIAMUIGA	W INDIES	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 CHILLAN	CHILE-C	1507-07	S36 51.5	W071 22.3	110°/36NM	CHILLAN (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	GALAPAGOS	1503-07	N00 34.5	W090 45.0	328°/67NM	BANDA ACEH (BAC) VOR/DME
PLANCHON-PETEROA	CHILE-C	1507-04	S35 14.2	W070 34.1	110°/35NM	CURICO (ICO) VOR/DME
PUNTIQUIDO-CORDON CEN	CHILE-C	1507-16	S40 57.0	W072 15.4	042°/47NM	PUERTO MONTT (MON) VOR/DME
PURACE	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 INDIES	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	CONCEPCION (CAR) VOR/DME
RUIZ	COLOMBIA	1501-02	N04 53.4	W075 19.2	234°/30NM	MARIQUITA (MQU) VOR
SABA	W INDIES	1600-01	N17 37.5	W063 13.5	206°/25NM	SAINT MAARTEN (PJM) VOR/DME
SABANCAYA	PERU	1504-003	S15 46.5	W071 51.0	338°/36NM	AREQUIPA (EQU) VOR/DME
SAN JOSE	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	GALAPAGOS	1503-09	S00 13.1	W090 46.1	287°/31NM	GALAPAGOS (ISLA BALTRA) (GLV) VOR/ DME
SIERRA NEGRA	GALAPAGOS	1503-05	S00 49.5	W091 10.1	275°/617NM	SALINAS (SAV) VOR/DME
SOUFRIERE GUADELOUPE	W INDIES	1600-06	N16 03.0	W061 40.1	224°/15NM	POINTE A PITRE (PPR) VOR/DME
SOUFRIERE HILLS	W INDIES	1600-05	N16 43.1	W062 10.5	235°/32NM	V.C. BIRD (SAINT JOHNS) (ANU) VOR/DME
SOUFRIERE ST VINCENT	W INDIES	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	PERU	1504-04	S17 01.3	W070 21.3	359°/65NM	TACNA (TCA) VOR/DME
UBINAS	PERU	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
VOLCANO ALCEDO	GALAPAGOS	1503-04	S00 25.5	W091 07.1	264°/50NM	GALAPAGOS (ISLA BALTRA) (GLV) VOR/ DME
VOLCANO VIEDMA	CHILE-S	1508-061	S49 25.1	W073 16.5	131°/121NM	ISLOTE SAN PEDRO (ISP) VOR/DME
VOLCANO WOLF	GALAPAGOS	1503-02	N00 01.1	W091 21.0	052°/524NM	GALAPAGOS (ISLA BALTRA) (GLV) VOR/ DME
YUCAMANE	PERU	1504-05	S17 10.5	W070 12.0	007°/56NM	TACNA (TCA) VOR/DME

## Appendix F. Cross-reference list of volcanoes and navigation aids

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Volcano Name	Country/State Region	Volcano number	Volcano lat-long		Radial (MAG BRG) and distance from reference Navigation Aid	
<b>ICELAND-ATLANTIC-ANTARCTICA</b>						
AGUA DE PAU	AZORES	1802-09	N37 46.1	W025 28.1	120°/14NM	SAN MIGUEL (VMG) VORTAC
ASKJA	ICELAND-NE	1703-06	N65 01.5	W016 45.0	162°/54NM	AKUREYRI (AKI) VOR/DME
BARDARBUNGA	ICELAND-NE	1703-03	N64 37.5	W017 31.5	352°/55NM	INGO (ING) VOR/DME
BOUVET	ATLANTIC-S	1806-02	S54 24.4	E 003 21.0	227°/1385NM	CAPE TOWN (CTV) VOR/DME
BRISTOL ISLAND	ANTARCTICA	1900-08	S59 01.5	W026 34.5	072°/905NM	MARAMBIO (MBI) VOR/DME
BUCKLE ISLAND	ANTARCTICA	1900-01	S66 48.0	E163 15.0	160°/1236NM	INVERCARGILL (NV) VOR/DME
CANDLEMAS ISLAND	ANTARCTICA	1900-10	S57 04.5	W026 42.4	066°/970NM	MARAMBIO (MBI) VOR/DME
DECEPTION ISLAND	ANTARCTICA	1900-03	S62 58.1	W060 39.0	211°/65NM	ISLA REY JORGE (IRJ) VOR/DME
DON JOAO DE CASTRO BANK	AZORES	1802-07	N38 13.5	W026 37.5	159°/40NM	LAJES (LM) VOR
ESJUFJOLL	ICELAND-SE	1704-02	N64 16.1	W016 34.1	020°/28NM	INGO (ING) VOR/DME
EYJAFJOLL	ICELAND-S	1702-02	N63 37.5	W019 36.4	280°/80NM	INGO (ING) VOR/DME
FAYAL	AZORES	1802-01	N38 36.0	W028 43.5	326°/77NM	HORTA (VFL) VORTAC
FOGO	CAPE VERDE IS	1804-01	N14 57.0	W024 21.0	230°/134NM	SAL (CVS) VOR/DME
FREMFINAMUR	ICELAND-NE	1703-07	N65 25.3	W016 39.0	139°/39NM	AKUREYRI (AKI) VOR/DME
FURNAS	AZORES	1802-10	N37 46.1	W025 19.1	114°/21NM	SAN MIGUEL (VMG) VORTAC
GRIMSVOTN	ICELAND-NE	1703-01	N64 25.1	W017 19.5	351°/41NM	INGO (ING) VOR/DME
HEKLA	ICELAND-S	1702-07	N63 58.5	W019 42.0	110°/77NM	KEFLAVIK (KEF) VORTAC
HIERRO	CANARY IS	1803-02	N27 43.5	W018 00.0	265°/71NM	TENERIFE-SOUTH (TFS) VOR/DME
JAN MAYEN	ATLANTIC-N	1706-01	N71 04.5	W008 10.1	048°/386NM	AKUREYRI (AKI) VOR/DME
KATLA	ICELAND-S	1702-03	N63 37.5	W019 01.5	278°/64NM	INGO (ING) VOR/DME
KOLBEINSEY RIDGE	ICELAND-N OF	1705-01	N67 07.1	W018 36.0	009°/83NM	AKUREYRI (AKI) VOR/DME
KRAFLA	ICELAND-NE	1703-08	N65 43.5	W016 46.5	111°/30NM	AKUREYRI (AKI) VOR/DME
KRAKAGIGAR	ICELAND-S	1702-09	N64.00.4	W019 27.4	297°/75NM	INGO (ING) VOR/DME
KVERKFJOLL	ICELAND-NE	1703-05	N64 39.0	W016 43.1	014°/51NM	INGO (ING) VOR/DME
LA PALMA	CANARY IS	1803-01	N28 34.5	W017 49.5	308°/69NM	TENERIFE-SOUTH (TFS) VOR/DME
LANZAROTE	CANARY IS	1803-06	N29 01.5	W013 37.5	359°/5NM	LANZAROTE (LT) VOR/DME
LOKI-FOGRUFJOLL	ICELAND-NE	1703-02	N64 28.3	W017 48.0	340°/50NM	INGO (ING) VOR/DME
MONACO BANK	AZORES	1802-11	N37 36.0	W025 52.5	213°/15NM	SAN MIGUEL (VMG) VORTAC
MOUNT EREBUS	ANTARCTICA	1900-02	S77 31.5	E167 10.1	155°/1872NM	INVERCARGILL (NV) VOR/DME
MOUNT MELBOURNE	ANTARCTICA	1900-015	S74 21.0	E164 42.0	157°/1683NM	INVERCARGILL (NV) VOR/DME
MOUNT MICHAEL	ANTARCTICA	1900-09	S57 46.5	W026 27.0	069°/951NM	MARAMBIO (MBI) VOR/DME
MUNDAFELL	ICELAND-S	1702-08	N63 58.5	W019 33.0	296°/78NM	INGO (ING) VOR/DME
ORAEFAJOKULL	ICELAND-SE	1704-01	N64 00.0	W016 39.0	015°/11NM	INGO (ING) VOR/DME
PENGUIN	ANTARCTICA	1900-031	S62 06.0	W057 55.5	068°/30NM	ISLA REY JORGE (IRJ) VOR/DME
PICO	AZORES	1802-02	N38 27.4	W028 24.0	121°/11NM	HORTA (VFL) VORTAC
PROTECTOR SHOAL	ANTARCTICA	1900-14	S55 54.4	W028 04.5	061°/981NM	MARAMBIO (MBI) VOR/DME
REYKJANES	ICELAND-SW	1701-02	N63 52.3	W022 30.0	175°/77NM	KEFLAVIK (KEF) VORTAC
REYKJANESHRYGGUR	ICELAND-SW	1701-01	N63 40.1	W023 19.3	244°/26NM	KEFLAVIK (KEF) VORTAC
SAN JORGE	AZORES	1802-03	N38 39.0	W028 04.5	085°/26NM	HORTA (VFL) VORTAC
SEAL NUNATAKS GROUP	ANTARCTICA	1900-05	S65 01.5	W060 03.0	229°/100NM	MARAMBIO (MBI) VOR/DME
SETE CIDADES	AZORES	1802-08	N37 52.1	W025 46.5	336°/1NM	SANTA MARIA (VMG) VORTAC
TENERIFE	CANARY IS	1803-03	N28 16.2	W016 38.3	016°/16NM	TENERIFE-SOUTH (TFS) VOR/DME
TERCEIRA	AZORES	1802-05	N38 43.5	W027 18.4	266°/10NM	LAJES (LM) VOR
TJORNES FRACTURE ZONE	ICELAND-N OF	1703-10	N66 18.0	W017 06.0	052°/39NM	AKUREYRI (AKI) VOR/DME
TRISTAN DA CUNHA	ATLANTIC-S	1806-01	S37 05.3	W012 16.5	276°/1508NM	ROBBEN ISLAND (RIV) VOR/DME
UNNAMED	ARCTIC OCEAN	2001-01	N88.15.4	W065 36.0	066°/706NM	THULE (THT) VORTAC
UNNAMED	AZORES	1802-081	N37 46.5	W025 40.1	145°/5NM	SAN MIGUEL (VMG) VORTAC
UNNAMED	ATLANTIC-N	1801-02	N49 00.0	W034 30.0	001°/589NM	FLORES (FRS) VOR/DME
UNNAMED	ATLANTIC-N	1801-04	N38 45.0	W038 04.5	279°/323NM	FLORES (FRS) VOR/DME
UNNAMED	ATLANTIC-C	1805-03	S00 34.5	W015 49.5	007°/449NM	ASCENSION AUX (ASI) VORTAC
VESTMANNAEYJAR	ICELAND-S	1702-01	N63 27.4	W020 28.5	138°/6570NM	KEFLAVIK (KEF) VORTAC
ZAVODOVSKI	ANTARCTICA	1900-13	S56 18.0	W027 33.4	063°/978NM	MARAMBIO (MBI) VOR/DME