



Agenda Item 4: Implementation of SIGMET

(Presented by the Secretariat)

Summary

This working paper presents the results of the First Meeting of the Meteorological Warning Study Group (METWSG/1) and information on the implementation status of SIGMET in the CAR/SAM States/Territories.

References:

- Report of the First Meeting of the Meteorological Warning Study Group (METWSG/1, Montreal, Canada, 20 to 22 November 2007).

1. Introduction

1.1 As the meeting may recall, the study groups, authorized by the Air Navigation Commission (ANC), are small groups of experts made available by States and organizations for assisting the ICAO Secretariat, in a consultative capacity, in advancing progress on technical tasks of ICAO. The experts work in a close but informal manner with the Secretariat.

1.2 The results of the work accomplished with the help of a study group are submitted to the Air Navigation Commission for further processing as necessary. The work of a study group may involve the development of initial proposals for the amendment of ICAO Annexes and Procedures for Air Navigation Services (PANS) for consideration by the Air Navigation Commission before their submission to States for comments. The study groups are disbanded as soon as their tasks are completed.

2. Discussion

a) review of the outcome of the METWSG/1 Meeting

2.1 The Air Navigation Commission tasked the Secretariat to develop the following issues with the assistance of the Meteorological Warning Study Group (METWSG):

- 1) development of a draft Annex 3 provisions in view of resolving the persistent implementation problems with the availability of SIGMET by considering the consolidation of their issuance to a limited number of regional centres;
- 2) address the issues listed in the Air Navigation Integrated Programmes (ANIP) under: “Improvement of the content and issuance of SIGMET to meet evolving needs of flight operations”; and
- 3) address residual issues listed in the ANIP under “Enhancements of wind shear warnings and alerts”.

2.2 The First Meeting of the Meteorological Warning Study Group (METWSG/1) was carried out from 20 to 22 November 2007 in Montreal, Canada. The group recalled that the MET Divisional Meeting (Montreal 2002), approved Recommendations 1/11, 1/12 and 1/13 to encourage the organization of Special Implementation Projects (SIP), assess the level of implementation through regional surveys, update regional SIGMET Guides and upgrade volcanic ash advisories and tropical cyclones to “warnings”. The group also reviewed the actions taken for their implementation, and noted that in spite of the above efforts, problems persisted, as informed by the International Air Transport Association (IATA) in March 2006.

2.3 In this regard, the group agreed short term solutions that include amendments to Annex 3 provisions, in order to improve the implementation of SIGMET and agreed, among others, that the establishment of the MWOs (FASID Tables MET 1B) was subject to regional air navigation agreements, which will be reflected in Annex 3 to ensure that the possible delegation of the provision of MWO functions by States to MWOs in other States was appropriately reflected in the FASID Table MET 1B. The meeting agreed Action 1/1, proposing amendment to the SIGMET template of Annex 3, in order to include the time of forecasts, as an optional field to clarify the time of occurrence or commencement of the phenomenon and the identification of each phenomenon occurring or expected to occur in one FIR or CTA with a separate letter.

2.4 The group also agreed that to improve the implementation of provisions for the issuance of SIGMET in longer term, a thorough assessment of the current system based on meteorological watch offices (MWO) was necessary. In this regard, regional and operations groups had proposed approaches that include:

- the possibility of the volcanic ash and tropical cyclone advisory centres, rather than MWOs, issuing volcanic ash and tropical cyclone SIGMETs for multiple FIRs or for their area of responsibility; or
- that the VAAC and TCAC prepare the corresponding SIGMET and pass them to the MWO for their formal issue.

2.5 In this respect, the group agreed that this issue should be addressed by a worldwide conjoint ICAO/WMO MET Divisional Meeting.

2.6 The group also agreed Actions 1/2 and 1/3 so that ad-hoc working groups develop the following tasks and present the results in the METWSG/2 Meeting (May 2009):

- advance a feasibility study to rationalize and consolidate SIGMET issuance to selected regional centres designated by regional air navigation agreements;
- consolidate proposals to improve training related to SIGMET, regular testing and real-time monitoring of SIGMET and extend successful measures to all ICAO regions;
- develop quantitative criteria for “sandstorms” and “duststorms” to be used for SIGMET issuance; and
- assess the need of change the method to describe the area of the phenomena in a SIGMET/AIRMET.

2.7 The meeting could find complete information on the meeting of the Meteorological Warning Study Group (METWSG) at the following website: <http://www.icao.int/anb/sg/metwsg>.

b) Implementation issues

2.8 The subgroup may recall that in the CAR/SAM Regions MWO implementation problems had been detected, and that the temporary delegation of functions from one MWO to another has been a complicated issue, since it requires an assessment and a consultation to the States in order to assume these functions and also the handling of the related cost recovery. Also, taking into account that if an MWO is temporarily out of service, another should assume its functions in the shortest possible time, the meeting could agree that in order to ensure the provision of the service without further delays, a contingency plan with the purpose of designating the MWO(s) that would assume the functions of each MWO shown in FASID Table MET 2B should be established, including in the Table the corresponding information. Therefore, the following draft conclusion may be formulated:

DRAFT
CONCLUSION 09/XX - CONTINGENCY PLAN FOR AN MWO TO ASSUME THE FUNCTIONS OF ANOTHER MWO IN CASE OF LACK OF IMPLEMENTATION OR BEING OUT OF SERVICE

That, in order to reduce at the least the lack of information of an MWO, in case it is out of service or due to the lack of implementation, the Meteorological Warnings Study Group (METWSG) studies the possibility of establishing a contingency plan to designate the MWO that would assume the functions of another MWO including in FASID Table MET 1B, the corresponding information.

2.9 Following Recommendations of the MET Divisional Meeting, in order to assist States/Members of the CAR/SAM Regions to implement SIGMET provisions of Annex 3/Technical Standards [C3.1], the following actions have been taken:

- SIGMET Special Implementation Projects (SIP) have been carried out for the CAR/Sam Regions during 2002 and 2005;
- the corresponding updates to the Guide for the preparation, dissemination and use of SIGMET messages in the CAR/SAM Regions have been made;

Note.- the latest update is the Eighth Edition which includes amendment 74 to Annex 3 and amendments to ANP Basic and FASID, regarding SIGMET information, which is available at ICAO South American Office website: <http://www.lima.icao.int/> under e-Documents.

- SIGMET tests have been developed in February 2007 and 2008, and the results will be presented to the meeting by the Task Force on volcanic ash.

2.10 The meeting could take note that during the update of the SIGMET Guide, it was observed that the States are not informing, in due course, the changes in the contact information of the ACC, MWO and NOTAM international offices under the responsibility of VAAC Buenos Aires and Washington, which is also included in Part 5 of *Doc 9766-AN969 – Handbook on the International Airways Volcano Watch (IAVW) — Operational Procedures and Contact List*. In this regard, it is expected that the relevant information, shown in Appendices K and L of the referred Guide, and included as **Appendices A and B** to this working paper, is revised and updated, as necessary, during the meeting.

2.11 Considering the above, the meeting could agree on the requirement that meteorological authorities should review their procedures, in particular those regarding meteorological watch offices, so that when changes in the contact information of the area control centres (ACC), NOTAM international offices (NOF), vulcanological observatories or in meteorological watch offices occur, these changes are informed in due course to the Lima and Mexico Offices, in order to update the information of the Regional SIGMET Guide and to inform the Secretary of the International Airways Volcano Watch Operations Group (IAVWOPSG), to update the pertinent contact list.

2.12 With the purpose of reducing the problems that persist in the issuance, dissemination and formatting of SIGMET messages, as per information provided by IATA, the meeting might concur in convening a seminar that could assist in the elimination of this deficiency in the CAR/SAM States, and formulate the following draft conclusion:

DRAFT
CONCLUSION 09/XX - SEMINAR ON SIGMET INFORMATION

That ICAO, in coordination with the VAAC Provider States, organizes a seminar on the preparation, use and issuance of SIGMET information.

3. **Action required**

3.1 The subgroup is invited to:

- a) consider the information presented in this working paper;
- b) review and, if necessary, update the information presented in Appendices A and B;
and
- c) based on the discussions, consider the approval of the draft conclusions presented in paragraphs 2.8 and 2.12.

APPENDIX A

(Appendix K of CAR/SAM SIGMET Guide, Eighth Edition)

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

VAAC BUENOS AIRES:**AFTN: SAZZMAMX** Tel. (5411) 5167 6767 Ext. 18238/18233**Telefax: (5411) 5167 6705 / 5167 6709****Fax Opcional/Optional fax: (5411) 5167 6709****Website: <http://www.ssd.noaa.gov/VAAC/OTH/AG/messages.html>****E-mail: sovaacbue@smn.gov.ar (Mr. Carlos Severo Iglesias, VAAC Supervisor)****E-mail Opcional: metaer@smn.gov.ar / cbenitez@smn.gov.ar**

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
ARGENTINA						
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
FIR EZEIZA						
ACC	Ezeiza	SAEF	SAEZZRZX	(5411) 4480 - 2203	(54 11) 4480 - 2203	
MWO	Aeroparque	SABE	SABEYMYX SAZZMAMX	(5411) 4514 - 1612	(54 11) 4514 - 1612	omaaer@meteofa.mil.ar
FIR CORDOBA						
ACC	Córdoba	SACF	SACOZRZX	(54351) 4335 - 350	(54351) 4335 - 350	accba@hotmail.com
MWO	Córdoba	SACO	SACOYMYX SAZZMAMX	(54351) 4341 - 479	(54 351) 4756 - 427	omacba@meteofa.mil.ar
FIR MENDOZA						
ACC	Mendoza	SAMF	SAMEZRZX	(54261) 4487 - 486	(54261) 4487 - 486	apelplumerillo@ciudad.com.ar
MWO	Mendoza	SAME	SAMEYMYX SAZZMAMX	(54261) 4487 - 468	(54 261) 4487 - 468	omadoz@meteofa.mil.ar
FIR COMODORO RIVADAVIA						
ACC	Comodoro Rivadavia	SAVF	SAVCZRZX	(54297) 4548 - 375		
MWO	Comodoro Rivadavia	SAVC	SAVCYMYX SAZZMAMX	(54297) 4548 - 018	(54297) 4548 - 018	omacriv@meteofa.mil.ar
FIR RESISTENCIA						
ACC	Resistencia	SARR	SAREZRZX	(54372) 2440 - 939	(54372) 2440 - 939	
MWO	Resistencia	SARE	SAREYMYX SAZZMAMX	(54372) 2436 - 278	(54372) 2436 - 285	omasis@meteofa.mil.ar
NOF	Ezeiza	SAEZ	SAEZYNYX	(5411) 4480 - 2260	(54 11) 4480 - 2260	notamezeiza@yahoo.com.ar

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
BOLIVIA						
FIR LA PAZ						
ACC	La Paz	SLLP	SLLPZRZX	(5912) 2810 - 203	(5912) 2810 - 203	
MWO	La Paz	SLLP	SLLPYMYX	(5912) 2114 - 232 (5912) 2124 - 129		ovmbolivia@yahoo.es rimortchavez@asana.bo
NOF	La Paz	SLLP	SLLPYNYX	(5912) 2351 - 305 int. 152	(5912) 2370 – 341	aisbolivia@yahoo.es
BRASIL/BRAZIL						
FIR AMAZONICA						
ACC	Amazónico	SBAZ	SBAZZRZX	(5592) 3652 - 5318	(5592) 3625 - 5425	
MWO	Amazónico	SBAZ	SBMUYFTH	(5592) 3652 - 5375		cmvmanaus@bol.com.br
FIR BRASILIA						
ACC	Brasilia	SBBS	SBBRZRZX	(5561) 3364 - 8404	(55 61) 3365-4432	
MWO	Brasilia	SBBR	SBBSYMYX	(5561) 3364 - 8358		cmvbrasil@ig.com.br
FIR RECIFE						
ACC	Recife	SBRE	SBRFZRZX	(55 81) 3462 - 2742	(55 81) 3462 - 4927	
MWO	Recife	SBRF	SBREYMYX	(55 81) 2129 - 8093 (55 81) 2129 - 8094		cmvre@ig.com.br
FIR ATLANTICO						
ACC	Atlántico	SBAO	SBAOZRZX	(55 81) 3322- 4107		
MWO	Recife	SBRE	SBREYMYX	(55 81) 2129 - 8093 (55 81) 2129 - 8094		cmvre@ig.com.br
FIR CURITIBA						
ACC	Curitiba	SBCW	SBCWZRZX	(55 41) 3356 – 3475 (5541) 3356 - 5509	(5541) 3251 - 5484	
MWO	Curitiba	SBCW	SBCWYMYX	(55 41) 3356 - 6216 (5541) 3356 - 5367		cmvct@softone.com.br
NOF	Brasilia	SBBR	SBBRYNYX	(55 61) 3364 - 8353		nofbrazil@cindacta1.aer.mil.br
CHILE						
Observatorio u Organismo de Vulcanología	Southern Andes Volcano Observatory (SAVO)	N/A	N/A	(5645) 270 - 700 Cel.: (5645) 09 6430 - 245	(5592) 6250 - 371	dvasualto@sernageomin.cl hmoreno@sernageomin.cl
	SERNAGEOMIN, Santiago	N/A	N/A	(562) 737 - 5050 Cel.: (56 45) 09 6495 - 377	(562) 737 - 9253	jnaranzo@sernageomin.cl josénaranzo@manquehue.net
FIR ANTOFAGASTA						
ACC	Antofagasta	SCFA	SCFAZRZX	(5655) 227 944 Anexo 1425	N/A	appantofagasta@dgac.cl
MWO	Antofagasta	SCFA	SCFAYMYX SCZZMAMX	(5655) 227 - 944 Anexos 1421, 1460, 1466	(5655) 225 - 022	cmrnorte@dgac.cl jaravena@dgac.cl Página Web: www.dimetchi.cl
FIR SANTIAGO						
ACC	Santiago	SCEL	SCELZRZX	(252) 7672 - 001 (562) 4363 - 004	(562) 7671 - 636	cta.accu@dgac.cl cta_acol@dgac.cl
MWO	Santiago	SCEL	SCELYMYX SCZZMAMX	(562) 6019 - 214 (562) 4363 - 224	(562) 6019 - 214	metaer@meteo Chile.cl bcoopmet@meteo Chile.cl

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
				(562) 4363 - 435		
FIR PUERTO MONTT						
ACC	Puerto Montt	SCTE	SCTEZRZX	(5665) 4862 - 34 (5665) 4862 - 36	(5665) 486 - 298	mcofre@dgac.cl
MWO	Puerto Montt	SCTE	SCTEYMYX SCZZMAMX	(5665) 486 - 225 (5665) 486 - 226	(56 65) 486 - 226	tiempodelsur@tiempodelsur.cl
FIR PUNTA ARENAS						
ACC	Punta Arenas	SCCI	SCCIZRZX	(5661) 219 - 131 Anexo 5414		fortiz@dgac.cl
MWO	Punta Arenas	SCCI	SCCIYMYX SCZZMAMX	(5661) 219 - 131 Anexos 5464 y 5423	(5661) 219 - 131 Anexo 5464	meteoparenas@dgac.cl
NOF	Santiago	SCEL	SCELZPZX	(562) 436 - 3227	(562) 601 - 9366	operaciones_amb@dgac.cl
PARAGUAY						
FIR ASUNCION						
ACC	Asunción	SGFA	SGASZRZX SGZZMAMX	(59521) 646 - 082	(59521) 646 - 081	acc_sgasa@dinac.gov.py
MWO	Asunción	SGAS	SGASYMYX SGZZMAMX	(59521) 646 - 095	(59521) 646 - 095	aeronautica_dmh@dinac.gov.py
NOF	Asunción	SGAS	SGASYNYX SGZZMAMX	(59521) 646 - 952	(59521) 2299 - 49	
PERU						
Observatorio u Organismo de Vulcanología	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
FIR LIMA-CALLAO						
ACC	Lima-Callao	SPIM	SPIMZQZX	(511) 708 1157 (511) 708 1158 (511) 575 0886 (511) 575 1995		acclima@corpac.gob.pe jmontalvo@corpac.gob.pe
MWO	Lima-Callao	SPIM	SPIMYMYX SPZZMAMX	(511) 708 1181 (511) 708 1180	(511) 708 - 180	pronostico@corpac.gob.pe
NOF	Lima-Callao	SPIM	SPIMYNYX SPIMYOYX	(511) 708 1173 (511) 708 1172 (511) 414 1435	(511) 4141 - 435	aisaro@corpac.gob.pe
URUGUAY						
FIR MONTEVIDEO						
ACC	Montevideo	SUEO	SUEOZQZX	(5982) 6040 - 295	(5982) 6040 - 298	jopdta@adinet.com.uy
MWO	Montevideo	SUMU	SUMUYMYX	(5982) 2001 - 807	(5982) 6040 - 242	dame@adinet.com.uy sballesteros@adinet.com.uy
NOF	Montevideo	SUMU	SUMUYNYX	(5982) 6040 - 067	(5982) 6040 - 067	ais@adinet.com.uy

APPENDIX B

(Appendix K of CAR/SAM SIGMET Guide, Eighth Edition)

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

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

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
ANTIGUA Y BARBUDA						
FIR PIARCO						
ACC	Porto f Spain	TTZP	TTZPZQZX	(1 868) 6694 - 852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 6694 - 392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 6694 - 128 (1 868) 6259 - 843	(1 868) 6691 - 716	
ANTILLAS FRANCESAS						
Observatorio u Organismo de Vulcanología	GADELOUPE Observatoire volcanologique de la Soufriere	N/A	N/A	(590) 9911 - 33	(590) 991 - 134	komorow@ipgp.jussieu.fr
	MARTINIQUE Observatoire volcanologique de la Montagne Pelée	N/A	N/A	(596) 7841 - 41	(596) 558 - 080	viode@ipgp.jussieu.fr
FIR PIARCO						
ACC	Port of Spain	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 - 716	
BRASIL						
FIR AMAZONICA						
ACC	Amazónico	SBAZ	SBAZZRZX	(5592) 3652 - 5318	(5592) 3652 - 5425	
MWO	Amazónico	SBAZ	SBMUYFTH	(5592) 3652 - 5375 (5592) 3652 - 5384		cmvmanaus@bol.com.br

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
FIR BRASILIA						
ACC	Brasilia	SBBS	SBBRZRZX	(5561) 3364 - 8404	(5561) 3654 - 4432	
MWO	Brasilia	SBBR	SBBSYMYX	(5561) 3364 - 8358		cmvbrasil@ig.com.br
FIR RECIFE						
ACC	Recife	SBRE	SBRFZRZX	(55 81) 3462 - 2742	(55 81) 3462 - 4927	
MWO	Recife	SBRF	SBREYMYX	(55 81) 2129 - 8093 (55 81) 2129 - 8094		cmvre@ig.com.br
FIR ATLANTICO						
ACC	Atlántico	SBAO	SBAOZRZX	(55 81) 3322 - 4107		
MWO	Recife	SBRE	SBREYMYX	(55 81) 2129 - 8093 (55 81) 2129 - 8094		cmvre@ig.com.br
FIR CURITIBA						
ACC	Curitiba	SBCW	SBCWZRZX	(5541) 3356 - 3475	(5541) 3251 - 5484	
MWO	Curitiba	SBCW	SBCWYMYX	(5541) 3356 - 6216 (5541) 3356 - 5367		cmvct@softone.com.br
NOF	Brasilia	SBBR	SBBRYNYX	(55 61) 3468 - 8353		nofbrazil@cindacta1.aer.mil.br
COLOMBIA						
Observatorio u Organismo de Vulcanología	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	
FIR BARRANQUILLA						
ACC	Barranquilla	SKBQ	SKBQZQZX	(575) 3348 - 075 (575) 3348 - 503	(575) 3348 - 503	Maritza.lopez@aerocivil.gov.co
MWO	Bogotá	SKBQ	SKBQYMYX	(571) 4138 - 792 (571) 2662 - 481	(571) 4138 - 440	
FIR BOGOTA						
ACC	Bogotá	SKBO	SKBOZQZX	(571) 4139 - 998 (571) 2663 - 460 (571) 4135 - 445	(571) 4135 - 376	jgaviria@aerocivil.gov.co
MWO	Bogotá	SKBO	SKBOYMYX	(571) 4138 - 792 (571) 2662 - 481	(571) 4138 - 440	
NOF	Bogotá	SKBO	SKBOYNYX	(571) 2662 - 552	(517) 4138 - 631	ais@aerocivil.gov.co
COSTA RICA (Ver pie de página 3)						
Observatorio u Organismo de Vulcanología	Observatorio Vulcanológico y	N/A	N/A	(506) 2610 - 781 (506) 2610 - 611	(506) 2610 - 303	ovsicori@una.ac.cr

¹ La Tabla MET 3C del FASID CAR/SAM será enmendada en los términos que aparece resaltado

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
	Sismológico de Costa Rica (OVSI-CORI-UNA) Heredia ¹			(506) 2773 - 304 (506) 2773 - 306		
FIR CENTROAMERICANA						
ACC	Tegucigalpa	MHTG	MHTGZQZX	(504) 2331 - 503	(504) 2331 - 219	
FIC	Alajuela	MROC		(506) 4438 - 965	(506) 4438 - 961	rfic@dgac.go.cr
OMA	Alajuela	MROC	MROCYMYX	(506) 4412 - 398	(506) 4427 - 036	
MWO*	Tegucigalpa	MHTG	MHTGYMYX	(504) 2349 - 499 (504) 2331 - 111 (504) 2337 - 114	(504) 2338 - 075 (504) 2349 - 500	
*Via National ATS/MET units of Alajuela/Intl. Juan Santamaría Airport	Meteorological Office	MROC	MROCYMYX	(506) 4412 - 398	(506) 4427 - 036	
	AIS	MROC	MROCYOYX	(506) 4433 - 170	(506) 4414 - 781	
NOF	Tegucigalpa	MHTG	MHTGYNYX	(504) 2331 - 141/42 /43 (504) 2331 - 349 (504) 2342 - 407	(504) 2331 - 141 (504) 2331 - 349	
ECUADOR						
Observatorio u Organismo de Vulcanología	Instituto Geofísico, Quito	N/A	N/A	(5932) 2225 - 655 (5932) 2225 - 627	(5932) 2567 - 847	geofisico@igepe.edu.ec geofisico@accessinter.net http://www.igepe.edu.ec
FIR GUAYAQUIL						
ACC	Guayaquil	SEGU	SEGUZQZX	(5934) 2282 - 851	(5934) 2396 - 073	accgye@dgac.gov.ec
MWO	Guayaquil	SEGU	SEGUYMYX	(5934) 2392 - 712	(5934) 2283 - 748	meteorologia@dgac.gov.ec financero@dgac.gov.ec
NOF	Guayaquil	SEGU	SEGUYNXX	(5934) 2285 - 661	(5934) 2285 - 661	notam_intl_gye@hotmail.com
EL SALVADOR (Ver pie de página 3)						
Observatorio u Organismo de Vulcanología	Servicio Nacional de Estudios Territoriales (SNST)/Servicio Geológico Ministerio de Medio Ambiente y Recursos Naturales (MARN)	N/A	N/A	(503) 2267-9566	(503) 2267-9537 -	descobar@snet.gob.sv www.snet.gob.sv
FIR CENTROAMERICANA						
ACC	Tegucigalpa	MHTG	MHTGZQZX	(504) 2331 - 503	(504) 2331 - 219	
FIC	El Salvador	MSLP	MSLPZTZX	(503) 2366-2491	(503) 2366-2451	usuario.radar@cepa.gob.sv
OMA	El Salvador	MSLP	MSLPYMYX	(503) 2366-2291	(503) 2366-2287	meteorologia.aeropuerto@cepa.gob.sv www.aeropuertoelsalvador.gob.sv/meteorologia.php
MWO*	Tegucigalpa	MHTG	MHTGYMYX	(504) 2349 - 499 (504) 2331 - 111 (504) 2337 - 114	(504) 2338 - 075 (504) 2349 - 500	

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
*Via national ATS/MET units of San Salvador/Ilopango Intl.	OMA	MSSS	MSLPYMYX	(503) 2295-4327	(503) 2295-4322	meteorologia.aeropuerto@cepa.gob.sv
	AIS	MSSS	MSSSZPZX	(503) 2296-6662	(503) 2296-6662	ais.ilopango@cepa.gob.sv
San Salvador/El Salvador Intl.	OMA	MSLP	MSLPYMYX	(503) 2366-2291 (503) 2366-2551	(503) 2366-2287	meteorología.aeropuerto@cepa.gob.sv danilo.ramirez@cepa.gob.sv
	AIS	MSLP	MSLPZPZX	(503) 2366-2290 (503) 2366-2281	(503) 2366-2464	oficiales.ais@cepa.gob.sv
NOF	Tegucigalpa	MHTG	MHTGYNYX	(504) 2331 - 141/42/43 (504) 2331 - 349 (504) 2342 - 407	(504) 2331 - 141 (504) 2331 - 349	
GUATEMALA (Ver pie de página 3)						
Observatorio u Organismo de Vulcanología	INSIVUMEH Sección Vulcanología Ciudad de Guatemala			(502) 3314 - 967 (502) 3319 - 183 (502) 3324 - 741	(502) 3315 - 005	
FIR CENTROAMERICANA						
ACC	Tegucigalpa	MHTG	MHTGZQZX	(504) 2331 - 503	(504) 2331 - 219	
FIC						
OMA						
MWO*	Tegucigalpa	MHTG	MHTGYMYX	(504) 2349 - 499 (504) 2331 - 111 (504) 2337 - 114	(504) 2338 - 075 (504) 2349 - 500	
*Via national ATS/MET units of Guatemala/La Aurora Intl.	AIS			(502) 3315 - 484		
	OMA			(502) 3314 - 897		
NOF	Tegucigalpa	MHTG	MHTGYNYX	(504) 2331 - 141/42 /43 (504) 2331 - 349 (504) 2342 - 407	(504) 2331 - 141 (504) 2331 - 349	
GUYANA						
Observatorio u Organismo de Vulcanología	Guyana Geology and Mines Comisión			(5922) 53047	(5922) 53047	ggmc@sdpn.org.gy
FIR GEORGETOWN						
ACC	Georgetown	SYCJ	SYCJZQZX	(592) 2612 - 245	(592) 2612 - 279	
MWO	Timehri	SYCJ	SYCJYMYX	(592) 2612 - 216	(592) 2612 - 284	s.h.williams@hydromet-gv
NOF	Timehri	SYCJ	SYCJYNYX	(592) 2612 - 269	(592) 2612 - 279	ais@gcaa-gy.org
GUYANA FRANCESA						
FIR ROCHAMBEAU						
ACC	Rochambeau	SOCA	SOOOZQZX	(594) 359 - 3 06	(594) 359 - 3 98	yves-j.mattei@aviation-civile.gouv.fr
MWO	CVM Rochambeau	SOCA	SOCAYMYX	(594) 353 - 5 35	(594) 356 - 0 89	philippe.livenais@meteo.fr
NOF	Rochambeau	SOCA	SOOYNYX	(594) 359 - 3 08	(594) 304 - 124	gerard.clavaret@aviation/civile.gov

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STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
HONDURAS (Ver pie de página 3)						
FIR CENTROAMERICANA						
ACC	Tegucigalpa	MHTG	MHTGZQZX	(504) 2331 - 503	(504) 2331 - 219	
MWO* ²	Tegucigalpa	MHTG	MHTGYMYX	(504) 2349 - 499 (504) 2331 - 111 (504) 2337 - 114	(504) 2338 - 075 (504) 2349 - 500	
NOF	Tegucigalpa	MHTG	MHTGYNYX	(504) 2331 - 141/42 /43 (504) 2331 - 349 (504) 2342 - 407	(504) 2331 - 141 (504) 2331 - 349	
MEXICO						
MÉXICO Observatorio u Organismo de Vulcanología FIR	Centro Nacional de Prevención de Desastres (CENAPRED)			+52 (55) 5606-8837 +52 (55) 5424-6100	+52 (55) 5606-1608	rqw@cenapred.unam.mx http://www.cenapred.unam.mx
	Centro Universitario de Investigación en Ciencias del Ambiente, Universidad de Colima			+52 (312) 3161-137 Ext. 51151	+52 (312) 3161-137 Ext. 31152	galindo@ucol.mx http://www.ucol.mx/volcan
	Instituto de Geofísica, UNAM Observatorio de volcanes, Universidad de Colima			+52 (312) 3161-134 Ext. 47208	+52 (312) 3161-134 Ext. 47208	tonatiuh@cgic.ucol.mx
FIR MAZATLÁN OCEANIC						
FIC	Radio Mexico	MMID	MMIDZQZX	+52 (999) 9461-347	+52 (999) 9461-237	centromerida@hotmail.com
MWO	México	MMMXX	MMMXYMYT	+52 (55) 5716-6678	+52 (55) 5802-8519	hvargast@sct.gob.mx
FIR MEXICO						
ACC	Centro Mexico Centro Merida Centro Mazatlan Centro Monterrey	MMEX MMID MMZT MMTY	MMEXZQZX MMIDZQZX MMZTZQZX MMTYZQZX	+52 (55) 5716 - 6655 +52 (999) 9461-347 +52 (669) 9181-092 +52 (81) 8369 - 0846	+52 (55) 5716-4199 +52 (999) 9461-237 +52 (669) 9822-820 +52 (81) 8369- 0884	centro_mexico@yahoo.com centromerida@hotmail.com josegalindo@hotmail.com felipe1822@yahoo.com.mx
MWO	Centro de Análisis y Pronósticos Meteorológicos Aeronáuticos (CAPMA), SENEAM, SCT.	MMMXX	MMMXYMYT	+52 (55) 5716-6678	+52 (55) 5802-8519	hvargast@sct.gob.mx
NOF	México	MMMXX	MMMXYNYX	+52 (55) 5716-6615	+52 (55) 5716-6615	javillanu@sct.gob.mx
MONTSERRAT (U.K)						
Observatorio u Organismo de Vulcanología	Montserrat Volcano Observatory	N/A	N/A	1* 664** 491 5647 1 664 491 0002	1 664 491 2423	mvo@candw.ag

² La MWO de Tegucigalpa deberá coordinar con las Oficinas Meteorológicas de Aeródromo de todos los Estados Centroamericano y Belice la elaboración de SIGMET(s) (WS, WV y WC) y enviarlos a las respectivas Oficinas Meteorológicas de Aeródromo.

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
				* For Canada, USA and the Caribbean only ** Or 868		
	British Geological Survey	N/A	N/A	44 115 936 3100 44 115 936 3200		u.name@bgs.sc.uk
FIR PIARCO						
ACC	Porto f Spain	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 - 716	
NICARAGUA (Ver pie de página 3)						
Observatorio u Organismo de Vulcanología	Dirección General del Instituto Nicaragüense de Estudios Territoriales (INETER), Managua	N/A	N/A	505 2 492 757 505 2 492 759 505 2 496 986	505 2 491 890	ineter.disup@netport.com.ni
	Dirección de Meteorología	N/A	N/A	505 2 492 755	505 2 492 755	metineter@ibw.com.ni
	Dirección de Vulcanología	N/A	N/A	505 2 492 761 505 2 496 987	505 2 491082	
FIR CENTROAMERICANA						
ACC	Tegucigalpa	MHTG	MHTGZQZX	(504) 2331 - 503	(504) 2331 - 219	
FIC						
OMA						
MWO*	Tegucigalpa	MHTG	MHTGYMYX	(504) 2349 - 499 (504) 2331 - 111 (504) 2337 - 114	(504) 2338 - 075 (504) 2349 - 500	
*Via national ATS/MET units of Managua/OMA				505 233 1925 505 233 1321	505 233 1610	
AIS (airport)					505 233 1765	
NOF	Tegucigalpa	MHTG	MHTGYNYX	(504) 2331 - 141/42 /43 (504) 2331 - 349 (504) 2342 - 407	(504) 2331 - 141 (504) 2331 - 349	
PANAMA						
Observatorio u Organismo de Vulcanología	Instituto de Geociencia			(507) 523 2071 (507) 523 2072 (507) 269 5744	(507) 2637671	igc2@ancon.up.ac.pa
FIR PANAMA						
ACC	Panamá	MPZL	MPZLZQZX MPPCICPX	(507) 5019807	(507) 5019849	mailto@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

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
PERU						
Observatorio u Organismo de Vulcanología	Instituto Geofísico del Perú Arequipa	N/A	N/A	(5154) 251 - 373	(5154) 251 - 373	Orlando Macedo omacedo@geo.ig.gob.pe
	Instituto Geofísico del Perú Lima	N/A	N/A	(511) 317 - 2325	(511) 317 - 2321	Edmundo Norabuena enorab@nazca.igp.gob.pe
FIR LIMA-CALLAO						
ACC	Lima-Callao	SPIM	SPIMZQZX	(511) 626 1157 (511) 575 0886 (511) 575 1995 (511) 626 1158		acclima@corpac.gob.pe jmontalvo@corpac.gob.pe
MWO	Lima-Callao	SPIM	SPIMYMYX SPZZMAMX	(511) 626 1181 (511) 626 1180	(511) 6261 - 180	pronostico@corpac.gob.pe
NOF	Lima-Callao	SPIM	SPIMYNYX SPIMYOYX	(511) 626 1173 (511) 626 1172 (511) 414 1435	(511) 4141 - 435	aisaro@corpac.gob.pe
SAINT KITTS Y NEVIS						
Observatorio u Organismo de Vulcanología						
FIR PIARCO						
ACC	Porto f Spain	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 - 716	
SANTA LUCIA						
Observatorio u Organismo de Vulcanología						
FIR PIARCO						
ACC	Porto f Spain	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 - 716	
SAN VICENTE Y LAS GRANADINAS						
Observatorio u Organismo de Vulcanología						
FIR PIARCO						
ACC	Porto f Spain	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 - 716	

STATE	Name	ICAO Location Ind.	AFTN	Telephone (24 hours)	Fax (24 hours)	E-mail
SURINAME						
FIR PARAMARIBO						
ACC	Paramaribo	SMPM	SMPMZRX	(597) 325 203	(597) 325 453	atssur@sr.net
MWO	Zanderij	SMJP	SMZZMAMX	(597) 325 206	(597) 325 206	meteoan@yahoo.com
NOF	Zanderij	SMJP	SMJPNYX	(597) 325 270	(597) 325 270	ais@cadsur.sr
TRINIDAD Y TABAGO						
FIR PIARCO						
ACC	Porto f Spain	TTZP	TTZPZQZX	(1 868) 669 4852	(1 868) 6694 - 259	
MWO	Port of Spain	TTPP	TTPPYMYX	(1 868) 669 4392	(1 868) 6694 - 727	
NOF	Port of Spain	TTPP	TTPPYNYX	(1 868) 669 4128 (1 868) 625 9843	(1 868) 6691 - 716	
VENEZUELA						
FIR MAIQUETIA						
ACC	Maiquetía	SVZM	SVZMZQZX	(58212) 355 - 2216	(58212) 355 - 2216	acc@inac.gov.ve
MWO	Maiquetía	SVMI	SVMIMYX	(58212) 303 - 1522	(58212) 303 - 1522	ovmmaiquetia@inac.gov.ve
NOF	Maiquetía	SVMI	SVMINYX	(58212) 355 - 1325	(58212) 355 - 1325	nofmaiquetia@inac.gov.ve notam.maiquetia@inac.gov.ve