



ICAO

## AFI VOLCANIC ASH EXERCISE

(AFI VOLCEX 23/01))

*(7 December 2023)*

## FINAL REPORT

# AFI VOLCANIC ASH EXERCISE 2023



**Official name of the volcano:** NYIRAGONGO

**Location:** Lat: 1° 31' 07" S; Long: 29° 15' 14" E

**Volcano number:** 223030

**The highest elevation:** 3470 M

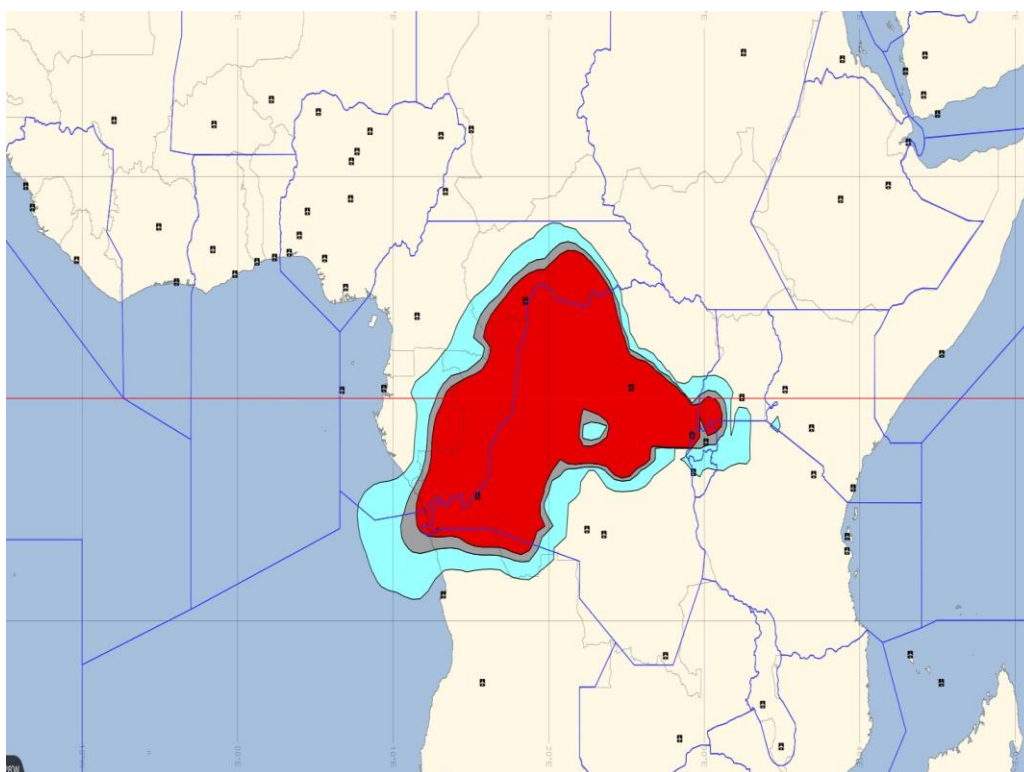
**Area:** Goma, Democratic Republic of the Congo (DRC),  
Central Africa Region.

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## 1. INTRODUCTION

- 1.1. The ICAO AFI volcanic ash exercise conducted in 2023, named AFI VOLCEX 23/01, simulated the eruption of Nyiragongo volcano (volcano number: 223030, position Lat: 1° 31' S; Long: 29° 15' E) located in Goma, Democratic Republic of the Congo (DRC), Central Africa Region.
- 1.2. The simulated ash affects ATS routes and airspace over the following FIRs/States: Kinshasa (DR Congo); Brazzaville (Republic of Congo); Libreville (Gabon); Yaoundé (Cameroon); Bangui (Central African Republic); Dar ES Salam (Tanzania); Entebbe (Uganda); Kigali (Rwanda); Luanda (Angola); Bujumbura (Burundi) and Nairobi (Kenya).
- 1.3. The exercise was conducted on a regional basis, from 09:30 UTC to 15:00 on 7 December 2023. All exercise participants took their respective actions, some of them from their own office locations.



**Figure 1:** Depiction of the flow of the volcanic ash

Ash Concentration Chart – From FL200 to FL350

7 December 2023, 09:00 UTC.

Figure 1 depicts the flow of the volcanic ash.

## **2. AIMS AND OBJECTIVES**

- 2.1. Demonstrate coordination procedures between all participating parties (ANSPs ; ATM ; Centres ; AIS ; VO ; VAACs ; MWOs ; SAR ; Military ; Users).
- 2.2. Timely distribution of messages including AIS and MET VONA; VAA/VAG; SIGMET ; NOTAM ; AIREP messages.
- 2.3. Ensure the operational status of telecommunications networks.
- 2.4. Evaluate the effectiveness of the team in managing a contingency related to volcanic ash
- 2.5. Check the effectiveness of agreements between neighboring States that may face issues related to volcanic ash when relevant regarding the provision of information on the volcanic eruption.
- 2.6. Demonstrate information timely sharing via telecommunications network and internet-based services.
- 2.7. Demonstrate transmission of air-reports on volcanic ash in accordance with Annex 3 (Aircraft -> ACC -> MWO ->VAAC).
- 2.8. Provide, recommendations for amendment of the procedures on the basis of lessons learned and conclusions formulated.

## **3. EXERCISE DURATION**

- 3.1. The exercise will be conducted on 7 December 2023. It will take 5 hours commencing at 09:30 UTC.
- 3.2. The first VONA is expected to be issued at 09:40 UTC. The second VONA, is to be issued at 12:00 UTC.

## **4. EXERCISE VOLCANO**

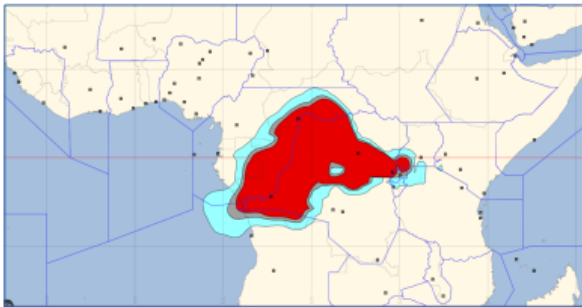
- Official name of the volcano: NYIRAGONGO
- Location: Lat: 1° 3 31' 07" S; Long: 29° 15' 14" E
- Volcano number: 223030
- The highest elevation: 3470 M
- Area: Goma, DRC, Democratic Republic of the Congo (DRC), Central Africa Region .

## 5. EXERCISE SCENARIO

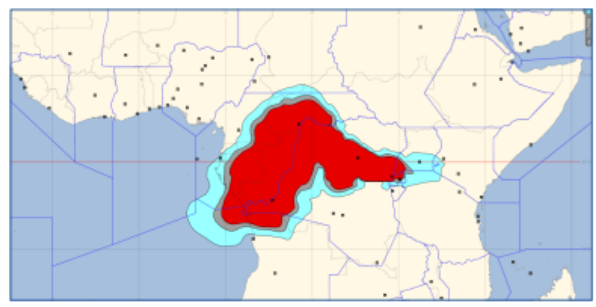
- 5.1. The scenario as described in Section 1 of this document is illustrated in the graph below. The vertical extension is between flight level FL200 and FL350 and horizontally, it covers eleven (11) countries with a wind of 37 km/hr moving from east to west.

Ash Concentration Chart - **from FL200 to FL350**

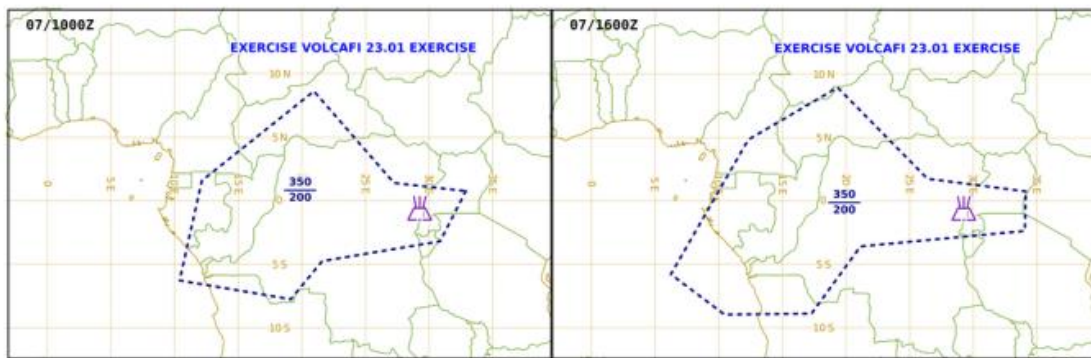
7 December 2023, 09UTC



7 December 2023, 15UTC



VOLCAFI 2023 : VAG to be sent 07 December at 10utc



## 6. REFERENCE MATERIAL

- ICAO Annex 3 – Meteorological Service for International Air Navigation.
- ICAO Annex 11 – Air Traffic Services.
- ICAO Annex 15 – Aeronautical Information Services.
- ICAO Doc 4444-ATM/501 – Procedures for Air Navigation Services.
- ICAO Doc 9691-AN/954 – Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds.
- ICAO Doc 9766-AN/968 – Handbook on the International Airways Volcano Watch.

- AFI – Volcanic Ash Contingency Plan.
- AFI Volcanic Ash Operational Instructions

## 7. EXERCISE SCHEDULE

07 - 11 November 2022		
PLAYERS	EVENT / ACTION	RESP.
APIRG	Twenty-Fifth Meeting of AFI Planning and Implementation Regional Group (APIRG/25) approving the Conduct of the AFI VOLCEX 23/01 exercise in the region through Decision 25/33	ICAO WACAF and ESAF States

19 July 2023		
PLAYERS	EVENT / ACTION	RESP.
AFI VOLCEX Steering Group Members	Second Meeting of the AFI VOLCEX Steering Group to prepare the 2023 exercise	ICAO WACAF and ESAF Offices

05 September 2023		
PLAYERS	EVENT / ACTION	RESP.
DRC, ESAF and WACAF Offices	Designation of the AFI VOLCEX 23/01 Leader	DRC CAA

15 September – 4 December 2023		
PLAYERS	EVENT / ACTION	RESP.
Exercise Leader, ICAO Secretariat & DISTAFF.	Development of the draft VOLCEX 23/01 Directive.	Exercise Leader.

4 December 2023		
PLAYERS	EVENT / ACTION	RESP.
Exercise Leader	Send the final version of the exercise directive for publication by ICAO.	Exercise Leader

5 December 2023		
PLAYERS	EVENT / ACTION	RESP.
Directing Staff Members  Participating Agencies	Presentation of the final version of the AFI Volcanic Exercise Directive.	Exercise Leader



5 December 2023		
PLAYERS	EVENT / ACTION	RESP.
DRC NOF	Issue preparatory NOTAM to inform the aviation community of the exercise.	Exercise Leader

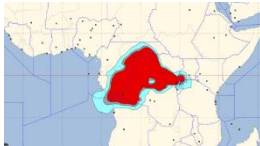
5 December 2023		
PLAYERS	EVENT / ACTION	RESP.
ICAO ESAF and WACAF Offices, all stakeholders, DStaff, Participating Agencies	Pre-Exercise Meeting to brief all stakeholders on the exercise directive.	Exercise Leader

5 December 2023		
PLAYERS	EVENT / ACTION	RESP.
NOFs of participating States	Issue a general aeronautical information to inform the aviation community of the exercise.	Exercise Leader  APIRG IIM MET Project 2.

05 December 2023		
PLAYERS	EVENT / ACTION	RESP.
ACCs of participating States	Issue to their NOFs a request NOTAM message to inform the aviation community of the exercise based on the preparatory NOTAM issued by the NOF DRC.	Exercise Leader, APIRG IIM MET Project 2.

06 December 2023		
PLAYERS	EVENT / ACTION	RESP.
NOFs of participating States	Issue consequential NOTAMs to inform the aviation community of the exercise based on the preparatory NOTAM issued by the NOF DRC.	Exercise Leader  APIRG IIM MET Project 2.

07 December 2023			
TIME (UTC)	PLAYERS	EVENT / ACTION	RESP.
09:00	Moderator.	Opening Ceremony (ICAO ESAF and WACAF; CAA/DRC; IATA, VAAC Toulouse, Exercise Leader).	Exercise Leader Secretariat
09:35	Exercise Leader.	Exercise Leader announce the start of the exercise.	Exercise Leader.
		START EXERCISE VOLCEX 23	

		Activities	
			

## 8. EXECUTION OF SEQUENTIAL ACTIONS BY THE EXERCISE TEAM

Time (UTC)	Timely completed	Completed late	Not completed	Action Lead	Action	Responsible	Comments
09:40				VO. OVG.	Issued <b>1<sup>st</sup> VONA</b> (details of the initial eruption).  <i>Phone call and e-mail to KIN ACC and Toulouse VAAC warning about eruption and giving first known data – (6 Dec.)</i>	DR Congo	
09:45				VAAC Toulouse.	Issued <b>1<sup>st</sup> exercise VAA/VAG</b> based on the 1 <sup>st</sup> VONA to the associated MWOs.	France	
09:50				MWO Kinshasa	Issued <b>1<sup>st</sup> exercise SIGMET</b> based on VAA/VAG for respective areas.	DR Congo.	
09:55				NOF Kinshasa	Issued <b>1<sup>st</sup> exercise NOTAM</b> based on SIGMET.	DR Congo.	
10:00				ACC Kinshasa	<i>Apply ATC measures based on SIGMET and NOTAM (Apply re-route)</i>	DR Congo.	

Time (UTC)	Timely completed	Completed late	Not completed	Action Lead	Action	Responsible	Comments
10:05				AO Busy Bee DR Congo	Report aircraft observation [volcanic ash/no volcanic ash] as special air-report by Busy Bee Congo Airlines to KINSHASA ACC	Busy Bee DR Congo	
10:10				ACC Kinshasa	Relay and record special air-report from Busy Bee DR Congo Airlines to all aircrafts in the routes affects by volcanic ash cloud	DR Congo.	National VA Contingency Plan activated
10:15				MWO Brazzaville	Issued 2 <sup>nd</sup> exercise <b>SIGMET</b> based on VAA/VAG for respective areas.	Congo.	
10:20				NOF Brazzaville	Issued 2 <sup>nd</sup> exercise <b>NOTAM</b> based on SIGMET.	Congo.	
10:25				ACC Brazzaville	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	Congo.	VACP established and shared - Agreement between DRC & Congo included in the VACP

Time (UTC)	Timely completed	Completed late	Not completed	Action Lead	Action	Responsible	Comments
10:30				AMO Libreville	invited to present the situation in their area through teleconference	Gabon	
1040				AMO Douala	invited to present the situation in their area through teleconference	Cameroon	
10:50				MWO Kigali	Issued 3 <sup>rd</sup> exercise <b>SIGMET</b> based on VAA/VAG for respective areas.	Rwanda.	
10:55				NOF Kigali	Issued 3 <sup>rd</sup> exercise <b>NOTAM</b> based on SIGMET.	Rwanda.	
11:00				ACC Kigali	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	Rwanda	
11:05				MWO Entebbe	Issued 4 <sup>th</sup> exercise <b>SIGMET</b> based on VAA/VAG for respective areas.	Uganda.	
11:10				NOF Entebbe	Issued 4 <sup>th</sup> exercise <b>NOTAM</b> based on SIGMET.	Uganda.	
11:15				ACC Entebbe	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	Uganda	
11:20				AO	Report aircraft observation [volcanic ash/no volcanic ash] as	Ethiopian Airlines	

Time (UTC)	Timely completed	Completed late	Not completed	Action Lead	Action	Responsible	Comments
				<i>Ethiopian Airlines</i>	<i>special air-report by Ethiopian Airlines to Entebbe ACC</i>		
11:25				ACC Entebbe	<i>Relay and record special air-report from Ethiopian Airlines to all aircrafts in the routes affects by volcanic ash cloud</i>	Uganda	<i>Internet connexion issues was raised</i>
11:30				MWO Luanda	Issued 5 <sup>th</sup> <b>exercise SIGMET</b> based on VAA/VAG for respective areas.	Angola.	
11:35				NOF Luanda	Issued 5 <sup>th</sup> <b>exercise NOTAM</b> based on SIGMET.	Angola.	
11:40				ACC Luanda	<i>Apply ATC measures based on SIGMET and NOTAM (Apply re-route)</i>	Angola	
11:40 – 11:59				<b>Exercise Leader and Participants</b>	<b>First Exercise web conference to discuss the exercise.</b>	<b>Speakers</b> <ul style="list-style-type: none"> <li>• <b>RODB Senegal</b></li> <li>• <b>Congo Chief RCC</b></li> <li>• <b>AMO Cameroon</b></li> <li>• <b>AMO Central African Republic</b></li> </ul>	<i>RODB Senegal didn't participated in the conference.</i>  <i>Cameroon informed that SIGMETs were not sent to the AMO Forecast Unit but to</i>

Time (UTC )	Timely completed	Completed late	Not completed	Action Lead	Action	Responsible	Comments
						• <b>AMO Gabon</b>	<i>Aerodrome Watch Section</i>  <i>A very good coordination was reported.</i>  <i><b>Rec.:</b>To use phraseology related to VA exercise.</i>
12:00				VO. OVG.	Issued <b>2<sup>nd</sup> exercise VONA</b> (updated eruption details).  <i>Phone call and e-mail to KIN ACC and Toulouse VAAC warning about eruption and giving first known data</i>	DR Congo.	
12:05				VAAC Toulouse.	Issued <b>2<sup>nd</sup> exercise VAA/VAG</b> based on observations/reports.	France	
12:10				MWO Kinshasa	Issued <b>6<sup>th</sup> exercise SIGMET</b> based on VAA/VAG for respective areas.	DR Congo.	

Time (UTC)	Timely completed	Completed late	Not completed	Action Lead	Action	Responsible	Comments
12:15				NOF Kinshasa	Issued 6 <sup>th</sup> exercise NOTAM based on SIGMET.	DR Congo.	
12:20				ACC Kinshasa	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	DR Congo.	SIGMET/NOTAM received and transmitted to aircraft - VACP activated
12:25				AMO Bangui	invited to present the situation in their area through teleconference	Central African Republic	
12:30				MWO Brazzaville	Issued 7 <sup>th</sup> exercise SIGMET based on VAA/VAG for respective areas.	Congo.	
12:35				NOF Brazzaville	Issued 7 <sup>th</sup> exercise NOTAM based on SIGMET.	Congo.	
12:40				ACC Brazzaville	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	Congo.	
12:45				MWO Entebbe	Issued 8 <sup>th</sup> exercise SIGMET based on VAA/VAG for respective areas.	Uganda.	



Time (UTC)	Timely completed	Completed late	Not completed	Action Lead	Action	Responsible	Comments
12:50				NOF Entebbe	Issued 8 <sup>th</sup> <b>exercise NOTAM</b> based on SIGMET.	Uganda.	
12:55				ACC Entebbe	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	Uganda	
13:00				MWO Dar es Salam	Issued 9 <sup>th</sup> <b>exercise SIGMET</b> based on VAA/VAG for respective areas.	Tanzania.	
13:05				NOF Dar es Salam	Issued 9 <sup>th</sup> <b>exercise NOTAM</b> based on SIGMET.	Tanzania.	
13:10				ACC Dar es Salam	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	Tanzania	Measures applied for the re-routing
13:15				AO South African Airways	Report aircraft observation [volcanic ash/no volcanic ash] as special air-report by South African Airways to Dar es Salam ACC	South African Airways	
13:20				ACC Dar es Salam	Relay and record special air-report from South African Airways to all aircrafts in the routes affected by volcanic ash cloud	Tanzania	Reported NO ARS received from South African Airlines

Time (UTC)	Timely completed	Completed late	Not completed	Action Lead	Action	Responsible	Comments
13:25				MWO Luanda	Issued 10 <sup>th</sup> <b>exercise SIGMET</b> based on VAA/VAG for respective areas.	Angola.	
13:30				NOF Luanda	Issued 10 <sup>th</sup> <b>exercise NOTAM</b> based on SIGMET.	Angola.	
13:35				ACC Luanda	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	Angola	
13:40				VO. OVG.	<b>Cancel</b> exercise VONA.	DR Congo.	
13:45				VAAC Toulouse.	<b>Cancel</b> exercise VAA/VAG.	France	
13:50				MWO Kinshasa.	<b>Cancel</b> exercise SIGMET for respective areas.	DR Congo.	
13:50				NOF Kinshasa.	NOTAM <b>Canceling eruption.</b> <b>Cancel</b> exercise NOTAM.	DR Congo.	
13:50				MWO Brazzaville.	<b>Cancel</b> exercise SIGMET for respective areas.	Congo.	

Time (UTC)	Timely completed	Completed late	Not completed	Action Lead	Action	Responsible	Comments
13:50				NOF Brazzaville	NOTAM <b>Canceling eruption.</b> <b>Cancel</b> exercise NOTAM.	Congo	
13:50				MWO Kigali.	<b>Cancel</b> exercise SIGMET for respective areas.	Rwanda.	
13:50				NOF Kigali.	NOTAM <b>Canceling eruption.</b> <b>Cancel</b> exercise NOTAM.	Rwanda.	
13:50				MWO Entebbe.	<b>Cancel</b> exercise SIGMET for respective areas.	Uganda.	
13:50				NOF Entebbe.	NOTAM <b>Canceling eruption.</b> <b>Cancel</b> exercise NOTAM.	Uganda.	<i>Issued cancellation SIGMET, BUT no SIGMET received from Entebbe during the Exercise</i>
13:50				MWO Dar es Salam	<b>Cancel</b> exercise SIGMET for respective areas.	Tanzania.	
13:50				NOF Dar es Salam	NOTAM <b>Canceling eruption.</b> <b>Cancel</b> exercise NOTAM.	Tanzania.	

Time (UTC)	Timely completed	Completed late	Not completed	Action Lead	Action	Responsible	Comments
13:50				MWO Luanda	<b>Cancel</b> exercise SIGMET for respective areas.	Angola.	
13:50				NOF Luanda	NOTAM <b>Canceling eruption.</b> <b>Cancel</b> exercise NOTAM.	Angola.	
13:55				Exercise Leader	Announce <b>cessation</b> of the exercise.	RD Congo.	
14:00 15:00				Exercise Leader and Participants	Exercise web conference to discuss the exercise.	<b>Speakers:</b> <ul style="list-style-type: none"> <li>• Kenya (BCC)</li> <li>• South Africa (RODB)</li> <li>• Senegal (RODB)</li> <li>• Tanzania SAR Coordinator</li> <li>• Congo Chief RCC</li> <li>• Cameroon (AMO)</li> <li>• Central African Republic (AMO)</li> <li>• Gabon (AMO)</li> <li>• NOFs</li> <li>• MWOs</li> </ul>	

Time (UTC )	Timely complete d	Complete d late	Not complete d	Action Lead	Action	Responsible	Comments
						<ul style="list-style-type: none"> <li>• IATA</li> <li>• Airlines</li> </ul>	

## 9. DISCUSSIONS

### *Simulated ash and impacted regions/airspace*

- 9.1. The simulated high level volcanic ash cloud contaminated eleven FIRs ; affecting major air traffic routes in Kinshasa ; Brazzaville ; Libreville ; Douala ; Bangui ; Dar ES Salam ; Entebbe ; Kigali ; Luanda ; Bujumbura and Nairobi FIRS.
- 9.2. The exercise involved participants from some agencies in Democratic Republic of Congo; Republic of Congo; Gabon; Cameroon; Central African Republic; Tanzania; Uganda; Rwanda; Burundi and Kenya. The Bulletin Compiling Centre (Kenya); the Dakar and Pretoria Regional OPMET Data Bank (RODB Dakar and RODB Pretoria); Senegal; Cap Vert; IATA and the ICAO WACAF and ESAF Regional Offices participated in the exercise.
- 9.3. Volcanic ash information was disseminated, including VONA messages, Ground Observation reports, SIGMET, NOTAM, VAA/VAG, special air-report through the AFTN/AMHS network.
- 9.4. This second exercise of volcanic ash in the AFI Region was based on the simulation of message exchanges and coordination between the entities involved in the exercise.

### *Exercise preparation*

- 9.5. Preparation for the AFI VOLCEX23/01 was initiated by the Secretariat and the Democratic Republic of Congo as the Exercise Team Leader. This was in line with the scenario which had been determined in September 15, 2023.
- 9.6. The Directive was drafted and communicated to the exercise participants through e-mail. Prior to the exercise, several web-teleconference meetings were held to prepare and communicate the initial requirements and needs of the Exercise. Various virtual meetings to review the Directive were held and attended by the Participating Agencies with the support of the ICAO ESAF and WACAF Offices.
- 9.7. During the online preparation meetings, exercise messages templates and indicators were shared with the exercise players. The importance of the indicators was to distinguish the exercise messages from the real operational messages.

### *The following webinars and meetings were conducted:*

- 9.8. AFI Volcanic Ash Exercise- Preparatory workshop - 07 to 11 November 2022.

- 9.9. Designation of the AFI VOLCEX 23/01 Leader - 05 September 2023.
- 9.10. Development of the draft VOLCEX 23/01 Directives – 15 September to 04 December 2023.
- 9.11. Send the final version of the exercise directive for publication by ICAO – 04 December 2023.
- 9.12. Presentation of the final version of the AFI Volcanic Exercise Directive – 05 December 2023.
- 9.13. A NOTAM dated 05 December 2023 was sent to exercise and webinar participants.
- 9.14. Pre-Exercise Meeting – 06 December 2023.

*The exercise GO/NO (in full) decision:*

- 9.15. It was agreed that in case of unforeseen circumstances, such as a real volcanic eruption or other significant events affecting the air transport system, the Exercise Leader may decide to either postpone the exercise to a later date or to cancel it. A decision not to proceed, i.e., to postpone or cancel the exercise, shall be communicated to all participants and observers as early as possible before the exercise is due to commence.
- 9.16. A new provision of the GO/NO decision was later added following inputs from the participants: *In the case of real volcanic eruption or other unforeseen circumstances that occur within the exercise period, if the exercise is considered to potentially affect the operation of air navigation system, the Exercise Leader must consult all participating agencies and postpone or abort the exercise. - (According to ICAO Doc 9766 Handbook on the IAVW, Appendix F, paragraph 2.3).*

*Actions taken by participating agencies:*

- 9.17. **The Volcano Observatory (VO)** - (Goma VO) started the exercise by issuing a VONA at 09:40 UTC informing the participants of the eruption of Nyiragongo Volcano with Aviation Color Code reported as red, volcanic ash cloud height 34449 FT and ash moving to West.
- 9.18. The VONA was disseminated through e-mail and integrated in the VAAC system. A second VONA was issued at 12:00 UTC to update the evolution of the volcanic eruption. Finally, another VONA was issued at 13:40 UTC informing that the volcanic activity had ceased, which then triggered the cessation of Exercise.
- 9.19. **VAAC Toulouse** issued the first volcanic ash advisories (VAA) and volcanic ash charts (VAG) at 09:45 UTC. VAAC issued the normal volcanic ash advisories sequentially. Additional quantitative products (concentration graphs) were provided before the exercise and published on the VAAC Toulouse web portal. The second advisory was issued at 12:05 UTC in response to the second VONA and the final advisory was issued at 13:45 UTC in response to the VONA ceasing the exercise.
- 9.20. **MWO Kinshasa** issued 2 SIGMETs including appropriate information from the VA Advisories. A cancellation SIGMET was issued at 13:50 UTC.
- 9.21. **NOF Kinshasa** issued 2 NOTAMs and 1 cancellation NOTAM for volcanic ash in compliance with SIGMETs issued by MWO Kinshasa.

- 9.22. **ACC Kinshasa** applied measures based on SIGMETs and NOTAMs in accordance with the AFI Volcanic Ash Contingency Plan.
- 9.23. **AO Busy Bee DR Congo** broadcast a special air report (ARS) to ACC Kinshasa at 10:05 UTC. The ARS reported the pilot's observations, confirming the presence of ash in the area. The ARS was transmitted vocally to the ACC, then transmitted to the MWO Kinshasa.
- 9.24. The exercise was a valuable opportunity to simulate the ARS transmission which could be effectively implemented in the real operational, as the simulated method has been discussed among the teleconferences. The airlines simulated the risk assessment and flights planning were conducted in the teleconference by the exercise leader on behalf of airlines participating in the exercise.
- 9.25. **ACC Kinshasa** as planned, coordinated with the relevant entities, and managed the airspace, informing the aircraft of the presence of volcanic ash on the different routes and altitudes.
- 9.26. **MWO Brazzaville** issued 2 SIGMETs and a cancelation SIGMET in coordination with informations from the VA Advisories.
- 9.27. **NOF Brazzaville** issued 2 NOTAMs and 1 cancelation NOTAM for volcanic ash in compliance with SIGMETs issued by MWO Brazzaville.
- 9.28. **ACC Brazzaville** applied measures based on SIGMETs and NOTAMs in accordance with the AFI Volcanic Ash Contingency Plan.
- 9.29. **AMO Libreville** presented the situation in their area through teleconference at 10:30 UTC.
- 9.30. **AMO Douala** presented the situation in their area through teleconference at 10:40 UTC.
- 9.31. **MWO Kigali** issued a SIGMET at 10:50 UTC and a cancelation SIGMET in coordination with informations from the VA Advisories.
- 9.32. **NOF Kigali** issued a NOTAM and 1 cancelation NOTAM for volcanic ash in compliance with SIGMET issued by MWO Kigali.
- 9.33. **ACC Kigali** applied measures based on SIGMETs and NOTAMs in accordance with the AFI Volcanic Ash Contingency Plan.
- 9.34. **MWO Entebbe** issued a SIGMET at 11:05 UTC in coordination with informations from the VA Advisories and, a cancelation SIGMET.
- 9.35. **MWO Dar es Salam** issued a SIGMET at 13:00 UTC and a cancelation SIGMET in coordination with information from the VA Advisories.
- 9.36. **NOF Dar es Salam** issued a NOTAM and 1 cancelation NOTAM for volcanic ash in compliance with SIGMET issued by MWO Dar es salam.
- 9.37. **ACC Dar es Salam** applied measures based on SIGMETs and NOTAMs in accordance with the AFI Volcanic Ash Contingency Plan.

9.38. **Web Conferences:** The First Exercise web conference to discuss the exercise took place from 11:40 to 11:59 UTC while the second took place at the end of the Exercise, i.e. from 2:00 p.m. to 3:00 p.m. UTC.

## 10. LESSONS LEARNT

10.1 The exercise was conducted on a regional basis, from 09:30 to 15:00 UTC on 7 December 2023. The followings were achieved:

- Representatives from five (5) Volcano Observatory States, MET Watch Offices of four (4) impacted States, Notam Offices from for (4) impacted States, ACCs from four (4) impacted States, representatives from ANSP (ASECNA), Two airlines, IATA and representatives from Civil Aviation Authorities of five (5) impacted States participated in the exercise.
- Satisfactory coordination procedures between participating parties (ANSPs; ATM ; Centres ; AIS ; VO ; VAACs ; MWOs ; SAR).
- Satisfactory distribution of volcanic ash related messages including VONA; VAA/VAG; SIGMET; NOTAM and AIREPs.
- Activation of volcanic ash contingency plans in impacted States and good interaction of Rescue Coordination Centres Search and Rescue Centres.

10.2 Aspects that need to be improved include:

- Need to improve the formats of the NOTAM messages;
- Challenges related to the missing of the ARS from South African /Ethiopian airlines. Need to ensure that airlines are onboard;
- System of some MWOs States is set for SIGMET related to Thunderstorm and doesn't allow SIGMET WV;
- Exercise should focus on the phraseology to ensure the effective application;
- Need to have official notices to have key stakeholders involved in the exercise;
- Need to provide clarity on the role of all key stakeholders, including SAR entities;
- Delay in receiving some messages, including SIGMET was experienced;
- List of distribution should be extended to cover all the relevant recipients;
- Failure of some key stakeholders, including RODBs to participate in the exercise/Teleconference.



## 11. SUMMARY OF ISSUES /REMARKS RAISED AND PROPOSED ACTIONS

ISSUES / REMARKS	REFERENCE	CORRECTIVE MEASURES	RESPONSIBILITY	DEADLINE
Testing COM/Network links	Volcex 23-A1	Include in the next edition of the exercise, the verification of COM/Network links	Responsible for the exercise	March 2025
Improve the formats of the NOTAM messages	Volcex 23-A2	Prepare and issue NOTAM messages in right formats	Responsible for the exercise	When preparing the messages templates
Missing of the ARS from airlines	Volcex 23-A3	Ensure there is a mechanism in place to receive and disseminate ARS to identified recipients	Responsible for the exercise	2025
Local Contingency Committee not activated	Volcex 23-A4	Enable local contingency Committee during the exercise	Participating States (under exercise coordination Chief	During exercise
System of some MWOs States is set for SIGMET related to Thunderstorm and doesn't allow SIGMET WV	Volcex 23-A5	Verify MWOs States telecommunications systems to enable reception and dissemination of SIGMET WV messages	Participating MWO States	Prior to the 2025 exercise
Phraseology to ensure the effective application	Volcex 23-A6	Train ATCO on the application of phraseology rules/procedures	Participating States /ANSPs	2025

ISSUES / REMARKS	REFERENCE	CORRECTIVE MEASURES	RESPONSIBILITY	DEADLINE
Need to provide clarity on the role of all key stakeholders, including SAR entities	Volcex 23-A6	Explain the role of all key stakeholders, including SAR entities	Exercise Lead	2025
Delay in receiving some messages, including SIGMET was experienced	Volcex 23-A7	Train involved staff in the criteria of dissemination of the SIGMET information	States MET Offices /Telecommunication Offices	2025
Insufficient involvement at the highest level	Volcex 23-A8	Formally request the participation of stakeholders, specifying the key individuals	Secretariat	2025
Lack of agreements between stakeholders	Volcex 23-A9	Sign agreements with neighboring States	All Volcano Observatory States	2025
Contact details of the of Volcano Observatory States Point of Contact	Volcex 23-A10	Request Volcano Observatory States that have not yet provided/updated the contact details of their focal points	Secretariat	2025
Low participation of airlines in the Exercise	Volcex 23-A11	Raise awareness among airlines, in collaboration with IATA, to actively participate in the next Exercise	Secretariat	2025
Failure of some key stakeholders, including	Volcex 23-A12	Encourage participation in the VA exercise	Participating States	2025

ISSUES / REMARKS	REFERENCE	CORRECTIVE MEASURES	RESPONSIBILITY	DEADLINE
RODBs to participate in the exercise/Teleconference.				

## 12. CONCLUSION

- 12.1. The AFI VOLCEX 23/01 was extremely useful for all participating agencies, exercise players and observers. It enhanced close coordination, rate of response and improved systems to maintain safety, regularity, and efficiency of aviation. As indicated in this Report, some significant aspects worked well, and these include use of appropriate exercise messages indicators and proper simulation of applicable procedures. In addition, there was huge enthusiasm and cooperation among participants.
- 12.2. The Exercise managed to achieve its main objective, which was the coordination between the different agencies and services.
- 12.3. In conclusion, the Exercise was also a useful way to capture what needs to be improved in the volcanic ash handling, including the need to review the messages distribution lists, special air report transmission mechanism, further discussion on SIGMET/NOTAM procedure, as well as the importance of user-engagements.

## Appendix A – EXERCISE PLAYERS AND OBSERVERS

### EXERCISE PLAYERS

AREA OF RESPONSIBILITY	AGENCY	COUNTRY	UNIT/DIVISION
Volcano activity alerting	OVG	DR of CONGO	Volcano Observatory
Volcanic ash advisory information	VAAC Toulouse	France	Met Services for Aviation Operations Head
SIGMET	MWO Kinshasa	DR of CONGO	Meteorological Watch Office
	MWO Brazzaville	CONGO	Meteorological Watch Office
	MWO Kigali	RWANDA	Meteorological Watch Office
	MWO Entebbe	UGANDA	Meteorological Watch Office
	MWO Dar es Salam	TANZANIA	Meteorological Watch Office
NOTAM	NOF Kinshasa	DR of CONGO	NOF

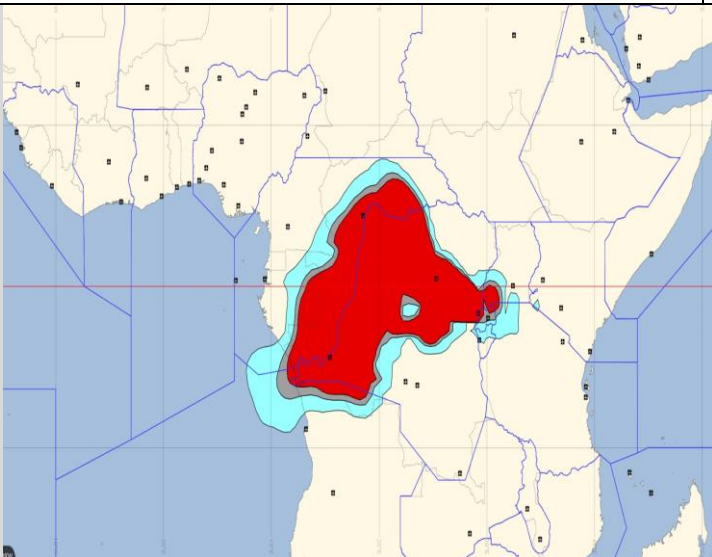
AREA OF RESPONSIBILITY	AGENCY	COUNTRY	UNIT/DIVISION
	NOF Brazzaville	CONGO	NOF
	NOF Kigali	RWANDA	NOF
	NOF Dar es Salam	TANZANIA	NOF
ATM	ACC Kinshasa	DR of CONGO	ACC
	ACC Brazzaville	CONGO	ACC
	ACC Kigali	RWANDA	ACC
	ACC Dar es Salam	TANZANIA	ACC
Airlines	Busy Bee	DR of CONGO	OPS
Regulatory	CAA	DR of CONGO	Exercise Leader

**EXERCISE OBSERVERS**

AREA OF RESPONSIBILITY	AGENCY	UNIT/DIVISION
International and inter-regional coordination	ICAO	ICAO WACAF Office
		ICAO ESAF Office
Airlines	IATA	Representantative
APIRG	ICAO	APIRG IIM/SG
MET Project		MET Project 2
RODB	ICAO	RODB Dakar
RODB	ICAO	RODB Pretoria
Volcanic Ash Focal Point	Kenya	Kenya Volcanic Ash Focal Point

## Appendix B – SEQUENTIAL ACTIONS TAKEN BY THE EXERCISE PLAYERS

December 7, 2023

Players	Event /Action	Resp.
Moderator	Opening Ceremony (ICAO, RVA, CAA, IATA , Exercise Leader)	
Exercise leader	Exercise leader announce the commencement of the exercise  START EXERCISE VOLCEX23/01 Activities	Exercise Leader
		
	<p><u><b>Volcano location</b></u> Lat: 1° 31' S ; Long: 29° 15' E</p> <p>Nyiragongo <u><a href="#">volcano eruption movie.</a></u></p>	

Players	Event /Action	Resp.
VO - OVG	<p><b><u>Issue 1<sup>st</sup> VONA (initial eruption details)</u></b></p> <p><b><u>Phone call and e-mail to Sal ACC and Toulouse VAAC warning about eruption and giving first known data.</u></b></p> <p><b><u>Also available on <a href="http://vaac.meteo.fr/">http://vaac.meteo.fr/</a></u></b></p> <p>EXERCISE EXERCISE EXERCISE</p> <p>VONA</p> <p>AFI VOLCEX 23/01</p> <p>(1) VOLCANO OBSERVATORY NOTICE FOR AVIATION (VONA)</p> <p>(2) Issued: 20231207/0940Z</p> <p>(3) Volcano: NYIRAGONGO 223030</p> <p>(4) Current Aviation Colour Code: RED</p> <p>(5) Previous Aviation Colour Code: Yellow</p> <p>(6) Source: GOMA VOLCANO OBSERVATORY</p> <p>(7) Notice/Number: 2023/01</p> <p>(8) Volcano Location: 1°31'07"S 29°15'14"E</p> <p>(9) Area: CENTRAL AFRICA REGION</p> <p>(10) Summit elevation: 11,385 feet (3,470 m)</p> <p>(11) Volcanic Activity Summary: Eruption in progress since 0900Z</p> <p>(12) Volcanic Ash Height: 34,449 FT (10,500 m) AMSL, ground observer</p> <p>(13) Other Volcanic Cloud Information: Dark ash cloud moving from east to west at a speed of 21 KT Presence of sulfur dioxide</p> <p>(14) Remarks: NIL</p> <p>(15) Contacts:</p>	DR CONGO



Players	Event /Action	Resp.
	<p>1) SAMBA VIKANDI Christian, +243 (0) 997790361, E-mail : kevikandi2@gmail.com</p> <p>2) MUKAMBILWA KIBUYE Pierre, +243 (0) 998749658, E-mail : kmuka1@yahoo.fr</p> <p>(16) Next Notice: 20231207/1200ZEXERCISE EXERCISE EXERCISE</p>	
VAAC Toulouse	<p><b><u>Issue 1<sup>st</sup> exercise VAA[/VAG] based on VONA</u></b></p> <p><b><u>Messages\VAA 1.docxand information by satellite and start running Dispersal Models</u></b></p> <p>VA ADVISORY</p> <p>STATUS : EXER</p> <p>DTG : 20231207/0946Z</p> <p>VAAC : TOULOUSE</p> <p>VOLCANO : NYIRAGONGO 223030</p> <p>PSN : S0131 E02915</p> <p>AREA : AFRICA (CENTRAL)</p> <p>SUMMIT ELEV : 3470M</p> <p>ADVISORY NR : 2023/2</p> <p>INFO SOURCE : EXERCISE AFI VOLCEX23/01 EXERCIS</p> <p>AVIATION COLOUR CODE : RED</p> <p>ERUPTION DETAILS : ERUPTION AT 20231207/0900Z EXERCISE AFI VOLCEX23/01 EXERCISE</p> <p>OBS VA DTG : 07/1000Z</p> <p>OBS VA CLD : FL200/350 N0045 E03251 - S0312 E03051 - S0448 E02136 - S0748</p> <p>E01906 - S0618 E01024 - N0136 E01209 - N0839 E02057 - N0124 E02715 - N0045</p>	FRANCE

Players	Event /Action	Resp.
	<p>E03251 MOV 20KT</p> <p>FCST VA CLD + 6 HR : 07/1600Z FL200/350 N0045 E03406 - S0224 E03403 - S0336</p> <p>E02109 - S0854 E01718 - S0900 - E01027 - S0548 E00615 - N0451 E01218 - N0857</p> <p>E0921 - N0145 E02624 - N0045 E03406</p> <p>FCST VA +12 HR : 07/2200Z FL200/350 N0039 E03335 - S0212 E03334 - S0357</p> <p>E01824 - S0818 E01545 - S0839 - E00815 - S0445 E00421 - N0712 E01233 - N0918</p> <p>E01711 - N0127 E02506 - N0039 E03353</p> <p>FCST VA CLD + 18 HR: 08/0400Z FL200/350 N0100 E03433 - S0330 E03142 - S0421</p> <p>E01611 - S0803 E01524 - S1003 E00848 - S0603 E00148 - N0539 E00712 -N1042</p> <p>E01506 - N0221 E02321 - N0100 E03433</p> <p>RMK: EXERCISE AFI VOLCEX23/01 PLEASE DISREGARD. EXERCISE EXERCISE EXERCISE</p> <p>NXT ADVISORY : NO LATER THAN 20231207/1200Z</p>	
MWO Kinshasa	<p><b><u>Issue 1<sup>st</sup> exercise SIGMET based on VAA/VAG for respective areas.</u></b></p> <p>071520 FZAAYMYX</p> <p>WVZR31 FZAA 070950Z</p> <p>FZZA SIGMET D1 VALID 071000/071600 FZAA</p> <p>FZAA KINSHASA FIR/UIR VA EXERSICE VOLCAFI 23/01</p> <p>VA ERUPTION MT NYIRAGONGO LOC S0131 E02915 VA CLD OBS AT 0930Z FL 200/350 APRIX 554 NM</p>	DR Congo.

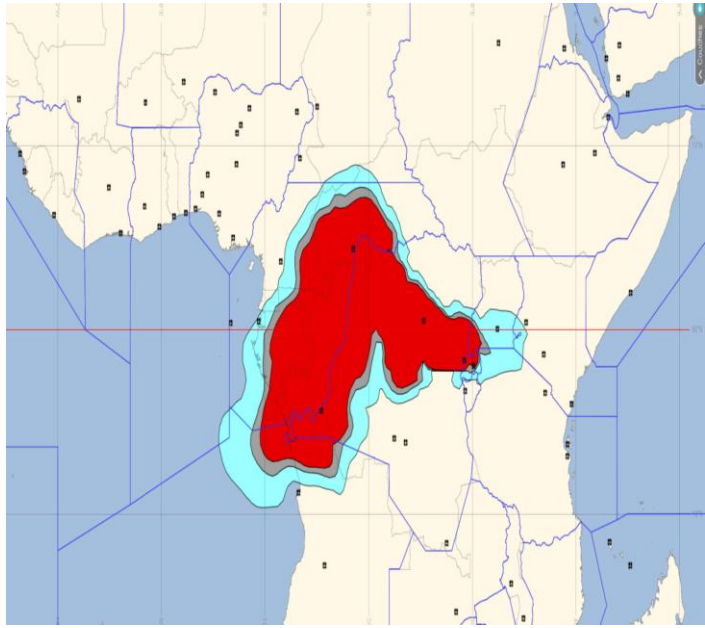
Players	Event /Action	Resp.
	<p>ROUND N0050 E03000 - S0350 E02930 - S0450 E02145 - S0750 E01930 - N04000 E02450</p> <p>NO110 E02720 -N0050 E03000 MOV NW 20KT INTSF</p> <p>FCST VA CLD FL 250/350 N0050 E03000- S0350 - E02930 - S0336 E02109 - S0750 E01920 - S0340 E01620 - N0400 E02450 - N0110 E02720 - NOO50 - E03000 EXERCISE EXERCISE EXERCISE</p>	
NOF  Kinshasa	<p><b><u>Issue 1<sup>st</sup> exercise NOTAM based on SIGMET.</u></b></p> <p>070959 FZAZNYX</p> <p>(A01128/23 NOTAMN</p> <p>Q) FZZA/QAFXX/IV/NBO/E/000/999/0137S 02915E /025</p> <p>A) FZZA</p> <p>B) 2312071000</p> <p>C) NYAGONGO 223030</p> <p>D) S0131 E02915</p> <p>E) VA AFI VOLCEX 23 / 01 NYRAGONGO</p> <p>FZZA SIGMET D1 VALID 071000 / 071600 FZAA</p> <p>FZZA KINSHASA FIR/UIR VA EXERCISE VOLCAFI 23/ 01 VA ERRUPTION MT</p> <p>NYRAGONGO LOC S0131 E0131 E02915 VA CLD OBS AT 0930Z FL200/ 350 APRX 554 NM</p> <p>ROUND N0050 E03000 - N0050 E02930 - S0450 E02145 - S0750 E01920 - S0340</p> <p>E01620 - N0500 E01930 - N04000 E2450 - N0110 E02720 - N0050 E003000 MVO NW</p> <p>20KT INSTF FCST VA CLD FL200/ 350 N0050 B03000 - S0350 E02930 - S336</p>	DR Congo.

Players	Event /Action	Resp.
	E02720 - N0050 E03000 EXERCISE EXERCISE EXERCISE)	
ACC Kinshasa	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	DR Congo.
AO Busy Bee DR Congo	Report aircraft observation [volcanic ash/no volcanic ash] as special air-report by Busy Bee Congo Airlines to KINSHASA ACC	Busy Bee DR Congo
ACC Kinshasa	Relay and record special air-report from Busy Bee DR Congo Airlines to all aircrafts in the routes affects by volcanic ash cloud	DR Congo.
MWO Brazzaville	<p><b><u>Issue 2<sup>nd</sup> exercise SIGMET based on VAA/VAG for respective areas.</u></b></p> <p>WVCG31 FCBB 071015</p> <p>FCCC SIGMET V1 VALID 071000/071600 FCBB-</p> <p>FCCC BRAZZAVILLE FIR/UIR VA EXERCISE VOLCAFI 23/01 VA ERUPTION MT NYIRAGONGO LOC S0131 E02915 VA CLD OBS AT 0930Z FL200/350 APRX 554</p> <p>NM ROUND N0050 E03000 - S0350 E02930 - S0450 E02145 - S0750 E01920 - S0340 E01620 - N0500 E01930 - N0400 E02450 - N0110 E02720 - N0050</p> <p>E03000 MOV NW 20KT INTSF FCST VA CLD FL200/350 N0050 E03000 - S0350</p> <p>E02930 - S0336 E02109 - S0750 E01920 - S0340 E01620 - N0500 E01930 - N0400 E02450 - N0110 E02720 - N0050 E03000 EXERCISE EXERCISE</p> <p>EXERCISE=</p>	Congo.

Players	Event /Action	Resp.
NOF  Brazzaville	<p><b><u>Issue 2<sup>nd</sup> exercise NOTAM based on SIGMET.</u></b></p> <p>(A1296/23 NOTAMN</p> <p>Q)FCCC/QAFXX/IV/NBO/E/000/999/0137S 02915E/025</p> <p>A)FCCC B)2312071023 C)2312071600</p> <p>D)S 0131 E 02915</p> <p>E)WVCG31 FCBB 071015</p> <p>FCCC SIGMET V1 VALID 071000/071600 FCBB FCCC BRAZZAVILLE FIR/UIR VA EXERCISE VOLCAFI 23/01 VA ERUPTION MT</p> <p>NYIRAGONGO LOC S0131 E02915 VA CLD OBS AT 0930Z FL200/350 APRX 554</p> <p>NM ROUND N0050 E03000 - S0350 E02930 - S0450 E02145 - S0750 E01920 -</p> <p>S0340 E01620 - N0500 E01930 - N0400 E02450 - N0110 E02720 - N0050</p> <p>E03000 MOV NW 20KT INTSF FCST VA CLD FL200/350 N0050 E03000 - S0350</p> <p>E02930 - S0336 E02109 - S0750 E01920 - S0340 E01620 - N0500 E01930 -</p> <p>N0400 E02450 - N0110 E02720 - N0050 E03000 EXERCISE EXERCISE</p> <p>EXERCISE= )</p>	Congo.
ACC  Brazzaville	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	Congo.
AMO  Libreville	Invited to present the situation in their area through teleconference	Gabon

Players	Event /Action	Resp.
AMO Douala	Invited to present the situation in their area through teleconference	Cameroon
MWO Kigali	<p><b><u>Issue 3<sup>rd</sup> exercise SIGMET based on VAA/VAG for respective areas.</u></b></p> <p>WVRW31 HRYR 071045Z</p> <p>HRYP SIGMET 01 VALID 071100/071700 HRYR-</p> <p>HRYP KIGALI FIR VA EXERCISE VOLCAFI 23/01 VA ERUPTION MT NYIRAGONGO LOC S0131 E02915 VA CLD</p> <p>OBS AT 1000Z FL200/350 N0045 E03251 - S0312 E03051 - S0448 E02136 - S0748 E01906 - S0618 E01024 -</p> <p>N0136 E01209 - N0839 E02057 - N0124 E02715 - N0045 E03251 MOV NW 20KT INTSF FCST AT 1600Z WI</p> <p>N0045 E03406 - S0224 E03403 - S0336 E02109 - S0854 E01718 - S0900 E01027 - S0548 E00615 - N0451 E01218</p> <p>- N0857 E01921 - N0145 E02624 - N0045 E03406 – N0050 EXCERCISE EXERCISE EXERCISE=</p>	Rwanda.
NOF Kigali	<p><b><u>Issue 3<sup>rd</sup> exercise NOTAM based on SIGMET.</u></b></p> <p>(A0090/23 NOTAMN</p> <p>Q)HRYR/QWWXX/IV/NBO/W/200/350/0156S02948E025</p> <p>A)HRYR</p> <p>B)2312071055 C)23120715 EST</p> <p>E)HRYR KIGALI FIR VA EXERCISE VOLCAFI 23/01 VA ERUPTION MT NYIRAGONGO LOC S0131 E02915 VA CLD OBS AT 1000Z FL200/350</p> <p>E)N0045 E03251 S0312 E03051 S0448 E02136 S0748 E01906 S0618 E01024 N0136 E01209 N0839 E02057 N0124 E02715 N0045 E03251 MOV NW 20KT</p>	Rwanda.

Players	Event /Action	Resp.
	INTSF FCST AT 1600Z WI N0045 E03406 S0224 E03403 S0336 E02109 S0854 E01718 S0900 E01027 S0548 E00615 N0451 E01218 N0857 E01921 N0145 E02624 N0045 E03406  F)200 G)350AMSL  EXCERCISE EXERCISE EXERCISE)	
MWO Entebbe	<b><u>Issued 4th exercise SIGMET based on VAA/VAG for respective areas.</u></b>  WVUG31 HUEN 071110Z  HUEC SIGMET A1 VALID 071100/071700 HUEN-  HUEC ENTEBBE FIR/UIR VA EXERCISE VOLCAFI 23/01 VA ERUPTION MT NYIRAGONGO LOC S0131 E02915 VA CLD OBS AT 0930Z FL200/350 ROUND S0033 E02970 – S0143 E02955 – S0185 E03141 – S0008 E03038 – N0001 E02955 – S0003 E02970 MOV  W 20KT INSTF FCST VA CLD FL200/350 N0047 E02992 – N00323 E03130 – N0063 E03170 – S0101 E03152 – S0112 E03061 – S0147 E02957 – N0047 E02992 EXCERCISE EXERCISE EXERCISE=	Uganda.
ACC Kigali	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	Rwanda
<b>Exercise Leader and Participants</b>	<b>First Exercise web conference to discuss the exercise.</b>	<b>All participants</b>

Players	Event /Action	Resp.
		
<p>VO.</p> <p>OVG.</p>	<p><b><u>Issue 2<sup>nd</sup> exercise VONA (updated eruption details).</u></b></p> <p><b><u>Phone call and e-mail to KIN ACC and Toulouse VAAC warning about eruption and giving first known data</u></b></p> <p>EXERCISE EXERCISE EXERCISE</p> <p>VONA</p> <p>AFI VOLCEX 23/01</p> <p>(1) VOLCANO OBSERVATORY NOTICE FOR AVIATION (VONA)</p> <p>(2) Issued: 20231207/1200Z</p> <p>(3) Volcano: NYIRAGONGO 223030</p> <p>(4) Current Aviation Colour Code: RED</p> <p>(5) Previous Aviation Colour Code: Yellow</p> <p>(6) Source: GOMA VOLCANO OBSERVATORY</p> <p>(7) Notice/Number: 2023/02</p> <p>(8) Volcano Location: 1°31'07"S 29°15'14"E</p>	<p>DR Congo.</p>



Players	Event /Action	Resp.
	<p>(9) Area: CENTRAL AFRICA REGION</p> <p>(10) Summit elevation: 11,385 feet (3,470 m)</p> <p>(11) Volcanic Activity Summary: Eruption activity is decreasing since 1100Z</p> <p>(12) Volcanic Ash Height: 18,045 feet (5,500 m) AMSL, ground observer</p> <p>(13) Other Volcanic Cloud Information: the emission of volcanic ash has greatly decreased and its speed. However, the dominant direction remains east to west</p> <p>(14) Remarks: NIL</p> <p>(15) Contacts:</p> <p>1) SAMBA VIKANDI Christian, +243 (0) 997790361 E-mail : kcvikandi2@gmail.com</p> <p>2) MUKAMBILWA KIBUYE Pierre, +243 (0) 998749658 E-mail : kmuka1@yahoo.fr</p> <p>(16) Next Notice: 20231207/1340Z</p> <p>EXERCISE EXERCISE EXERCISE</p>	
VAAC Toulouse.	<p><b><u>Issue 2<sup>nd</sup> exercise VAA/VAG based on observations/reports.</u></b></p> <p>VA ADVISORY</p> <p>STATUS : EXER</p> <p>DTG : 20231207/1200Z</p> <p>VAAC : TOULOUSE</p> <p>VOLCANO : NYIRAGONGO 223030</p> <p>PSN : S0131 E02915</p> <p>AREA : AFRICA (CENTRAL)</p>	France

Players	Event /Action	Resp.
	<p>SUMMIT ELEV : 3470M</p> <p>ADVISORY NR : 2023/2</p> <p>INFO SOURCE : EXERCISE AFI VOLCEX23/01 EXERCISE</p> <p>AVIATION COLOUR CODE : RED</p> <p>ERUPTION DETAILS : ERUPTION AT 20231207/0900Z EXERCISE AFI VOLCEX23/01 EXERCIS</p> <p>OBS VA DTG : 07/1200Z</p> <p>OBS VA CLD : FL200/350 N0048 E03408 - S0221 E03403 - S0221 E03403 - S0221</p> <p>E03403 - S0345 E02109 - S0857 E01718 - S0900 E01015 - S0539 E00627 - N0457</p> <p>E01233 - N0857 E01924 - N0142 E02630 - N0048 E03408 MOV W 20 KT</p> <p>FCST VA CLD + 6 HR : 07/1800Z FL200/350 N0039 N0039 E03353 - S0212 E03348 - S0357</p> <p>E01824 - S0818 E01545 - S0839 - E00815 - S0445 E00421 - N0712 E01233 - N0918</p> <p>E01711 - N0127 E02505 - N0039 E03353</p> <p>FCST VA +12 HR : 08/0000Z FL200/350 N0100 E03433 - S0330 E03142 - S0421</p> <p>E01611 - S0803 E01524 - S1003 - E00848 - S0603 E00148 - N0539 E00712 - N1042</p> <p>E01506 - 0221 E02321 - N0100 E03433</p> <p>FCST VA CLD + 18 HR: 08/0600Z FL200/350 N0339 E03154 - N0054 E03545 - S0354</p> <p>E03212 - S0427 E01626 - S1027 E01018 - S0350 W00224 - N0845 E00524 -N1057</p> <p>E01418 - N0245 E02118 - N0339 E03154</p>	

Players	Event /Action	Resp.
	<p>RMK: EXERCISE AFI VOLCEX23/01 PLEASE DISREGARD. EXERCISE EXERCISE EXERCISE</p> <p>NXT ADVISORY : NO LATER THAN 20231207/1500Z</p>	
MWO Kinshasa	<p><b><u>Issue 5<sup>th</sup> exercise SIGMET based on VAA/VAG for respective areas.</u></b></p> <p>GG FZNAYMYX</p> <p>071520 FZAAYMYX</p> <p>WVZR31 FZAA 071210Z</p> <p>FZZA SIGMET D2 VALID 071200/071800 FZAA- FZZA KINSHASA FIR/UIR VA EXERCISE VOLCAFI 23/01 VA ERUPTION MT NYIRAGONGO LOC S0131 E02915 VA CLD OBS AT 1200Z FL 250/350 APRIX 551 NM ROUND N0050 E03000 - S0350 E02930 - S0336 E02109 - S0750 E01920 - S0340 E01620 - N0500 E01930 - N0400 E02450 - N0110 E02720 - N0050 E03000 - MOV E 20KT WKN</p> <p>EXERCISE EXERCISE EXERCISE=</p>	DR Congo.
NOF Kinshasa	<p><b><u>Issue 4<sup>th</sup> exercise NOTAM based on SIGMET.</u></b></p> <p>071001 FZAZYNYX</p> <p>(A0129/23 NOTAMN</p> <p>Q) FZZA/QAFXX/IV/NBO/E/000/999/0137S 02915E /025</p> <p>A) FZZA</p> <p>B) 2312071200</p> <p>C) NYAGONGO 223030</p> <p>D) S0131 E02915</p> <p>E) VA AFI VOLCEX 23 / 02 NYRAGONGO</p> <p>FZZA SIGMET D2 VALID 071200 / 071800 FZAA</p>	DR Congo.

Players	Event /Action	Resp.
	<p>FZZA KINSHASA FIR/UIR VA EXERCISE VOLCAFI 23/ 02 VA ERRUPTION MT NYRAGONGO LOC S0131 E0131 E02915 VA CLD OBS AT 1230Z FL200/ 350 APRX 554 NM</p> <p>ROUND N0050 E03000 - S0350 E02930 - S0336 E02109 - S0750 E01920 - S0340</p> <p>E01620 - N0500 E01930 - N04000 E2450 - N0110 E02720 - N0050 E003000 MVO NW E</p> <p>20KT WKN EXERCISE EXERCISE EXERCISE)</p>	
ACC Kinshasa	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	DR Congo.
MWO Brazzaville	<p><b><u>Issue 6<sup>th</sup> exercise SIGMET based on VAA/VAG for respective areas.</u></b></p> <p>WVCG31 FCBB 071240</p> <p>FCCC SIGMET V2 VALID 071300/071900 FCBB-</p> <p>FCCC BRAZZAVILLE FIR/UIR VA EXERCISE VOLCAFI 23/01 VA ERUPTION MT NYIRAGONGO LOC S0131 E02915 VA CLD OBS AT 1200Z FL200/350 APRX 554</p> <p>NM ROUND N0050 E03000 - S0350 E02930 - S0336 E02109 - S0750 E01920 - S0340 E01620 - N0500 E01930 - N0400 E02450 - N0110 E02720 - N0050</p> <p>E03000 MOV E 20KT WKN EXERCISE EXERCISE EXERCISE=</p>	Congo.
NOF Brazzaville	<p><b><u>Issue 5<sup>th</sup> exercise NOTAM based on SIGMET.</u></b></p> <p>(A1297/23 NOTAMN</p> <p>Q)FCCC/QAFXX/IV/NBO/E/000/999/0137S02915E025 A)FCCC B)2312071235 C)2312071600</p> <p>D)S 0131 E 02915</p>	Congo.

Players	Event /Action	Resp.
	<p>E)WVCG31 FCBB 071240</p> <p>FCCC SIGMET V2 VALID 071300/071900 FCBB FCCC BRAZZAVILLE FIR/UIR VA EXERCISE VOLCAFI 23/01 VA ERUPTION MT NYIRAGONGO LOC S0131 E02915 VA CLD OBS AT 1200Z FL200/350 APRX 554</p> <p>NM ROUND N0050 E03000 - S0350 E02930 - S0336 E02109 - S0750 E01920 -</p> <p>S0340 E01620 - N0500 E01930 - N0400 E02450 - N0110 E02720 - N0050</p> <p>E03000 MOV E 20KT WKN EXERCISE EXERCISE EXERCISE=)</p>	
ACC Brazzaville	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	Congo.
MWO Dar es Salam	<p><b><u>Issue 7<sup>th</sup> exercise SIGMET based on VAA/VAG for respective areas.</u></b></p> <p>071300 HTDAYMYX</p> <p>WVTN31 HTDA 071300</p> <p>HTDC SIGMET 01 VALID 071300/071900 HTDA - 11/11/1</p> <p>HTDC DAR ES SALAAM FIR VA EXERCISE VOLCAFI 23/01 VA ERUPTION MT NYIRAGONGO PSN S0131 E02915 OBS VA CLD AT 1200Z FL200/350 PSN S0221 E03403 - S0221 E03403 - S0221 E03403 MOV NOT IDENTIFIED INTENSITY_NOT IDENTIFIED FCST VA CLD +6HR 07/1900Z FL200/350 S0212 E03348 PLEASE DISREGARD. EXERCISE EXERCISE EXERCISE=</p>	Tanzania.
NOF Dar es Salam	<p><b><u>Issue 6<sup>th</sup> exercise NOTAM based on SIGMET.</u></b></p> <p>Q)HTDC/QWELW/IV/BO/W/000/350/06225/03640E/500</p> <p>A) HTDC</p> <p>B) 2312071300</p>	Tanzania.

Players	Event /Action	Resp.
	<p>D)</p> <p>C)2312071900</p> <p>E) HTDC DAR FIR VA EXER VOLCAFI</p> <p>HTDC SIGMET 01 VALID 071300/071900 HTDA-</p> <p>HTDC DAR FIR VA EXER VOLCAFI 23/01 VA ERUPTION FM MT NYIRAGONGO</p> <p>COORD 0131s 02915E OBS VA CLD AT 1200 FL200/350</p> <p>COORD</p> <p>0221 03403E0221S 03403E 0221 03403E MOV NOT IDENTIFIED INTENSITY NOT IDENTIFIED FCST VA CLD +6HR 07/1900Z FL200/350</p> <p>0212S 03348E. PLEASE DISREGARD.</p> <p>EXERCISE EXERCISE EXERCISE=</p> <p>F) GND G)35000FT AMSL</p>	
ACC Dar es Salam	Apply ATC measures based on SIGMET and NOTAM (Apply re-route)	Tanzania
VO. OVG.	<p><b><u>Cancel exercise VONA.</u></b></p> <p>EXERCISE EXERCISE EXERCISE</p> <p>VONA</p> <p>AFI VOLCEX 23/01</p> <p>(1) VOLCANO OBSERVATORY NOTICE FOR AVIATION (VONA)</p> <p>(2) Issued: 20231207/1340Z</p> <p>(3) Volcano: NYIRAGONGO 223030</p> <p>(4) Current Aviation Colour Code: YELLOW</p> <p>(5) Previous Aviation Colour Code: Yellow</p>	DR Congo.

Players	Event /Action	Resp.
	<p>(6) Source: GOMA VOLCANO OBSERVATORY</p> <p>(7) Notice/Number: 2023/03</p> <p>(8) Volcano Location: 1°31'07"S 29°15'14"E</p> <p>(9) Area: CENTRAL AFRICA REGION</p> <p>(10) Summit elevation: 11,385 feet (3,470 m)</p> <p>(11) Volcanic Activity Summary: Volcanic activity has ceased since 1410Z</p> <p>(12) Volcanic Ash Height: 3,281 FT (1,000 m) AMSL, ground observer</p> <p>(13) Other Volcanic Cloud Information: There is no more emission of volcanic ash, except for a small plume of gases</p> <p>(14) Remarks: NO ASH PRODUCTION</p> <p>(15) Contacts:</p> <p>1) SAMBA VIKANDI Christian, +243 (0) 997790361, E-mail : kcvikandi2@gmail.com</p> <p>2) MUKAMBILWA KIBUYE Pierre, +243 (0) 998749658, E-mail : kmuka1@yahoo.fr</p> <p>(16) Next Notice: NIL</p> <p>EXERCISE VOLCEX TERMINATED.</p> <p>EXERCISE EXERCISE EXERCISE</p>	
VAAC Toulouse.	<p><b><u>Cancel exercise VAA/VAG.</u></b></p> <p>VA ADVISORY</p> <p>STATUS : EXER</p> <p>DTG : 20231207/1345Z</p> <p>VAAC : TOULOUSE</p> <p>VOLCANO : NYIRAGONGO 223030</p>	France

Players	Event /Action	Resp.
	PSN : S0131 E02915  AREA : AFRICA (CENTRAL)  SUMMIT ELEV : 3470M  ADVISORY NR : 2023/2  INFO SOURCE : EXERCISE AFI VOLCEX23/01 EXERCIS  AVIATION COLOUR CODE : YELLOW  ERUPTION DETAILS : ERUPTION AT 20231207/0900Z AND OF EXERCISE AFI VOLCEX 23/01 EXERCIS  OBS VA DTG : 07/1200Z  OBS VA CLD : NO VA EXP  FCST VA CLD + 6 HR : 07/2000Z NO VA EXP  FCST VA CLD + 12 HR : 08/0200Z NO VA EXP  FCST VA CLD + 18 HR : 08/0800Z NO VA EXP  RMK : EXERCISE AFIVOLCEX 23/01 PLAESE DISREGARD. EXERCISE EXERCISE EXERCISE  NXT ADVISORY : NO FURTHER ADVISORIES=	
MWO  Kinshasa.	<u><b>Cancel exercise SIGMET for respective areas.</b></u>  071520 FZAAYMYX  WVZR31 FZAA 071350Z  FZZA SIGMET D3 VALID 071400/072000 FZAA- FZZA KINSHASA FIR/UIR VA EXERCISE AFIVOLCEX 23/01 CNL SIGMET D2 071200/071800=	DR Congo.
NOF  Kinshasa.	<u><b>NOTAM Canceling eruption.</b></u>  <u><b>Cancel exercise NOTAM.</b></u>  071233 FZAZYNYX	DR Congo.



Players	Event /Action	Resp.
	<p>(A0130/23 NOTAMNC A0129/23</p> <p>Q) FZZA/QXXXX /XX /XXX/X/000/999/0137S 02915E /025</p> <p>A) FZZA</p> <p>B) 2312071420</p> <p>C) NYAGONGO 223030</p> <p>E) VA AFI VOLCEX 23 / 02 NYRAGONGO FINISHED</p> <p>CNL FZZA SIGMET 02 EXERCISE EXERCISE EXERCISE)</p>	
<p>MWO</p> <p>Brazzaville.</p>	<p><b><u>Cancel exercise SIGMET for respective areas.</u></b></p> <p>WVCG31 FCBB 071350</p> <p>FCCC SIGMET V3 VALID 071350/071900 FCBB-</p> <p>FCCC BRAZZAVILLE FIR/UIR VA EXERCISE VOLCAFI 23/01 CNL SIGMET V2 071300/071900=</p>	Congo.
<p>NOF</p> <p>Brazzaville</p>	<p><b><u>NOTAM Canceling eruption.</u></b></p> <p><b><u>Cancel exercise NOTAM.</u></b></p> <p>(A1298/23 NOTAMC A1296/23</p> <p>Q)FCCC/QAFXX/IV/NBO/E/000/999/0137S02915E025</p> <p>A)FCCC</p> <p>B)2312071350</p> <p>E)VA AFI VOLCEX 23/01 NYIRAGONGO FINISHED CNL)</p> <p>(A1299/23 NOTAMC A1297/23</p> <p>Q)FCCC/QAFXX/IV/NBO/E/000/999/0137S02915E025</p> <p>A)FCCC</p> <p>B)2312071352</p>	Congo

Players	Event /Action	Resp.
	E)VA AFI VOLCEX 23/01 NYIRAGONGO FINISHED CNL)	
MWO Kigali.	<p><b><u>Cancel exercise SIGMET for respective areas.</u></b></p> <p>WVRW31 HRYR 071350</p> <p>HRYP SIGMET 02 VALID 071350/071730 HRYR-</p> <p>HRYP SIGMET KIGALI FIR VA EXERCISE VOLCAFI 23/01 CNL SIGMET 01 071100/071700=</p>	Rwanda.
NOF Kigali.	<p><b><u>NOTAM Canceling eruption.</u></b></p> <p><b><u>Cancel exercise NOTAM.</u></b></p> <p>Originator: HRYRYNYX</p> <p>Primary Recipients: LFPWYMYX EGZZVANW HRYRZQZX FZAZYNYX</p> <p>PRI: GG</p> <p>FT: 071350</p> <p>(A0091/23 NOTAMC A0092/23</p> <p>Q)HRYR/QWWCN/IV/NBO/W/200/350/0156S02948E025</p> <p>A)HRYR</p> <p>B)2312071350</p> <p>E)VA AFI VOLCEX 23/01 NYIRAGONGO NOTAM CNL EXERCISE EXERCISE EXERCISE)</p>	Rwanda.
MWO Entebbe	<p><b><u>Cancel exercise SIGMET for respective areas.</u></b></p> <p>WVUG31 HUEN 071420Z</p> <p>HUEC SIGMET A2 VALID 071430/071820 HUEN-</p> <p>HUEC ENTEBBE FIR/UIR VA EXERCISE VOLCAFI 23/01 CNL SIGMET A1 071100/1700=</p>	UGANDA

Players	Event /Action	Resp.
MWO  Dar es Salam	<p><b><u>Cancel exercise SIGMET for respective areas.</u></b></p> <p>HKNAYMYX FAORYMYX GOOOYMYX</p> <p>071353 HTDAYMYX</p> <p>WVTN31 HTDA 071350</p> <p>HTDC SIGMET 02 VALID 071350/071900 HTDA-</p> <p>HTDC DAR ES SALAAM FIR VA EXERCISE VOCAFI 23/01 CNL SIGMET 01 VALID 071300/071900Z=</p>	Tanzania.
NOF  Dar es Salam	<p><b><u>NOTAM Canceling eruption.</u></b></p> <p><b><u>Cancel exercise NOTAM.</u></b></p> <p>HTDA-A0268/23</p> <p>NOTAMC</p> <p>C/R A0268/23</p> <p>Q)</p> <p>HTDC/QWECN/IV/NBO/WWW/000/350/0622S/03640E/500</p> <p>A) HTDC</p> <p>B) 2312071354</p> <p>C)</p> <p>D)</p> <p>E) VOCAFI 23/01 EXER CMPL.</p> <p>F) GND G)35000FT AMSL</p>	Tanzania.
Exercise Leader	Announce cessation of the exercise.	RD Congo.
Exercise Leader and Participants	Exercise web conference to discuss the exercise.	All participants.

### Appendix C – LIST OF PARTICIPANTS

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