



VOLCANIC ASH AND FLIGHT OPERATIONS ESAF WORKSHOP – 14 JULY 2026

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Overview

- ❑ Introduction;
- ❑ Volcanic ash exercises;
- ❑ Volcanoes within the region;
- ❑ Roles of various agencies during a Volcanic eruption;
- ❑ Conclusion

Introduction

- ❑ Volcanic Ash – Tiny, abrasive particles of pulverized rock, glass particles, and corrosive gases ejected into the atmosphere during explosive volcanic eruptions.
- ❑ Impacts;
 - Engine ingestion – replacement/overhaul
 - Melting and clogging in engine
 - Engine malfunction – surges, flameout, failure
 - System contamination
 - Airframe degradation – Airframe refurbishing
 - Window scratches – window repolishing and/or replacement
 - Fuel contamination
 - Degraded sensor performance – pitot static system repair
 - Hydraulic systems impacts – Maneuverability

Introduction ctd...

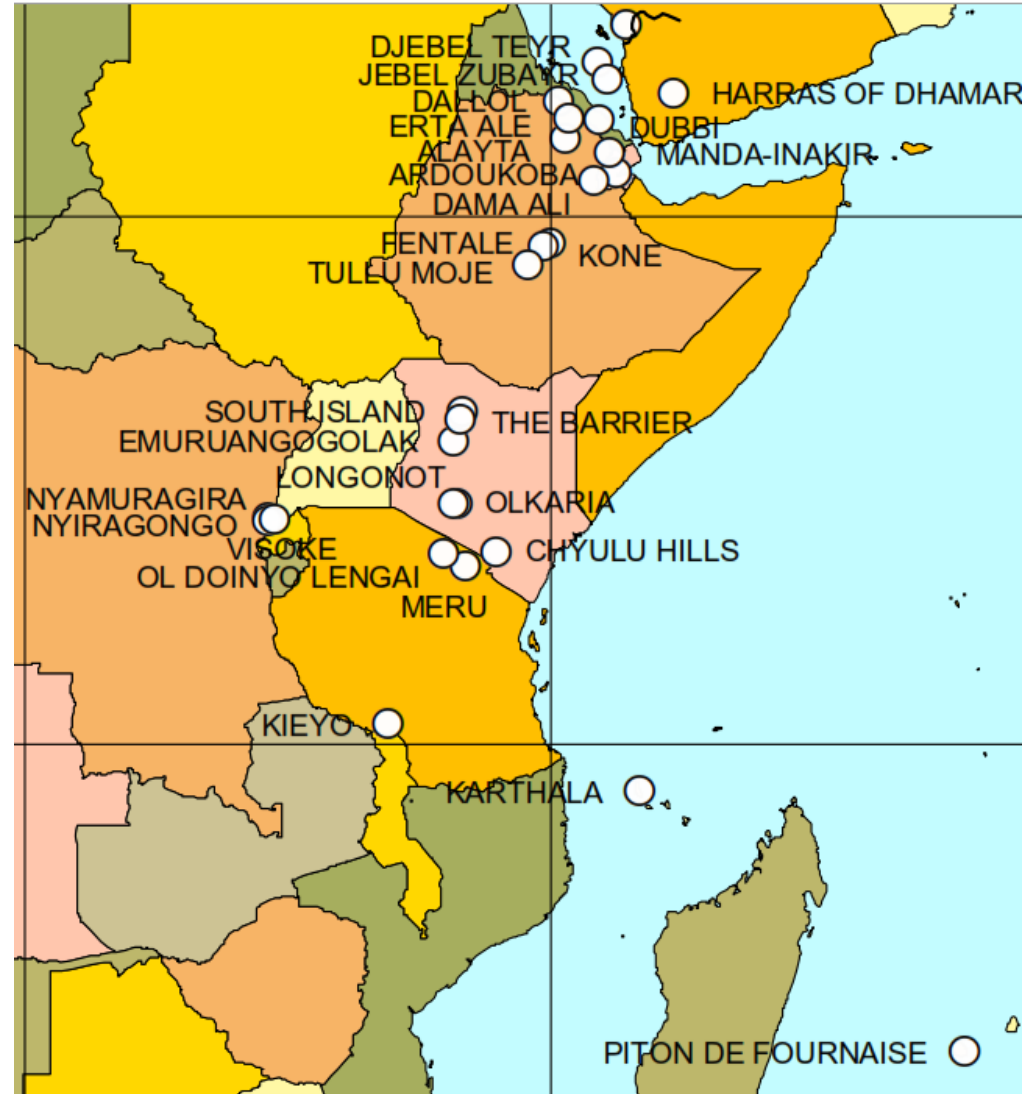
- ❑ Aircraft encounters with Volcanic Ash;
 - British Airways Flight 9, B747 (Indonesia 1982) – all 4 engines failed
 - Singapore Airlines Flight 268, B747 (Indonesia 1982) - engine damage
 - KLM Flight 867, B747 (Alaska 1989) – all 4 engines flamed out
 - Mt. Pinatubo eruption (Philippines 1991) – engine damage, windscreen abrasion, contaminated systems, massive disruption regional aviation.
 - Eyjafjallajökull Eruption (Iceland 2010) – widespread airspace closures in Europe, flight cancellation.
 - Hayli Gubbi (Ethiopia 23 Nov 2025) – Airspace closure

Volcanic Ash Exercises

- ❑ Exercises are necessary to ensure effective response.
- ❑ Aim - to practice and develop inter-agency response to volcanic activity, in order to maintain safety, regularity and efficiency of aviation in the event of a volcanic eruption.
- ❑ Conducted by ICAO on a regional basis.
- ❑ Spearheaded by the AFI Volcanic Ash exercise Steering Group (AFI VOLCEX/SG).
- ❑ AFI VOLCEX/SG has coordinated three volcanic ash exercises (2021, 2023 and 2025*)
- ❑ Early preparations is key

Volcanoes in the Region

- ❑ Volcanoes within ESAF region – Holocene period (less than 11,700yrs)



Roles of various agencies during Volcanic eruption

□ Important players include;

- State Volcano Observatories
- Volcanic Ash Advisory Centres (VAAC Toulouse)
- Area Control Centres / Flight Information Centres (ACCs/FICs)
- Meteorological Watch Offices (MWOs)
- NOTAM Offices (NOFs)
- Aircraft operators
- Rescue Coordination Centres (RCCs)
- National OPMET Centres (NOCs, formally BCCs)

State Volcano Observatories (SVO)

- ❑ SVO - A volcano observatory, designated by regional air navigation agreement, to monitor active or potentially active volcanoes within a State and to provide information on volcanic activity and/or volcanic ash in the atmosphere.
- ❑ SVO, when observing Significant pre-eruption volcanic activity, Volcanic eruption or a significant change in eruptive activity; and/or volcanic ash in the atmosphere.
 - Immediately forward available information to ACCs/FICs, MWOs, and VAACs by telephone or other agreed means.
 - Follow up with issuance of a Volcano Observatory Notice to Aviation (**VONA**) by email, AMHS, public website;
- ❑ VONA - Summary of volcanic activity and observations about ash emission (or lack thereof).

Volcanic Ash Advisory Centre (VAAC)

❑ VAAC - A meteorological centre designated by regional air navigation agreement to provide advisory information to meteorological watch offices, area control centres, flight information centres, world area forecast centres and international OPMET databanks regarding the lateral and vertical extent and forecast movement of volcanic ash in the atmosphere.

❑ Responsibilities

- monitoring relevant geostationary and polar-orbiting satellite data and, where available, relevant ground-based and airborne data, to detect the existence and extent of volcanic ash in the atmosphere in the area concerned.

Volcanic Ash Advisory Centre (VAAC)

❑ Responsibilities ctd...

- activate the volcanic ash numerical trajectory/dispersion model in order to forecast the movement of any ash “cloud” which has been detected or reported.
- issuing advisory information regarding the extent and forecast movement of the volcanic ash “cloud” to;
 - MWOs, ACCs and FICs serving FIRs in its area of responsibility which may be affected;
 - other VAACs whose areas of responsibility may be affected;
 - WAFCs, international OPMET databanks, international NOTAM offices, and centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services; and
 - operators requiring the advisory information through the AMHS/AFTN address provided specifically for this purpose.

Volcanic Ash Advisory Centre (VAAC)

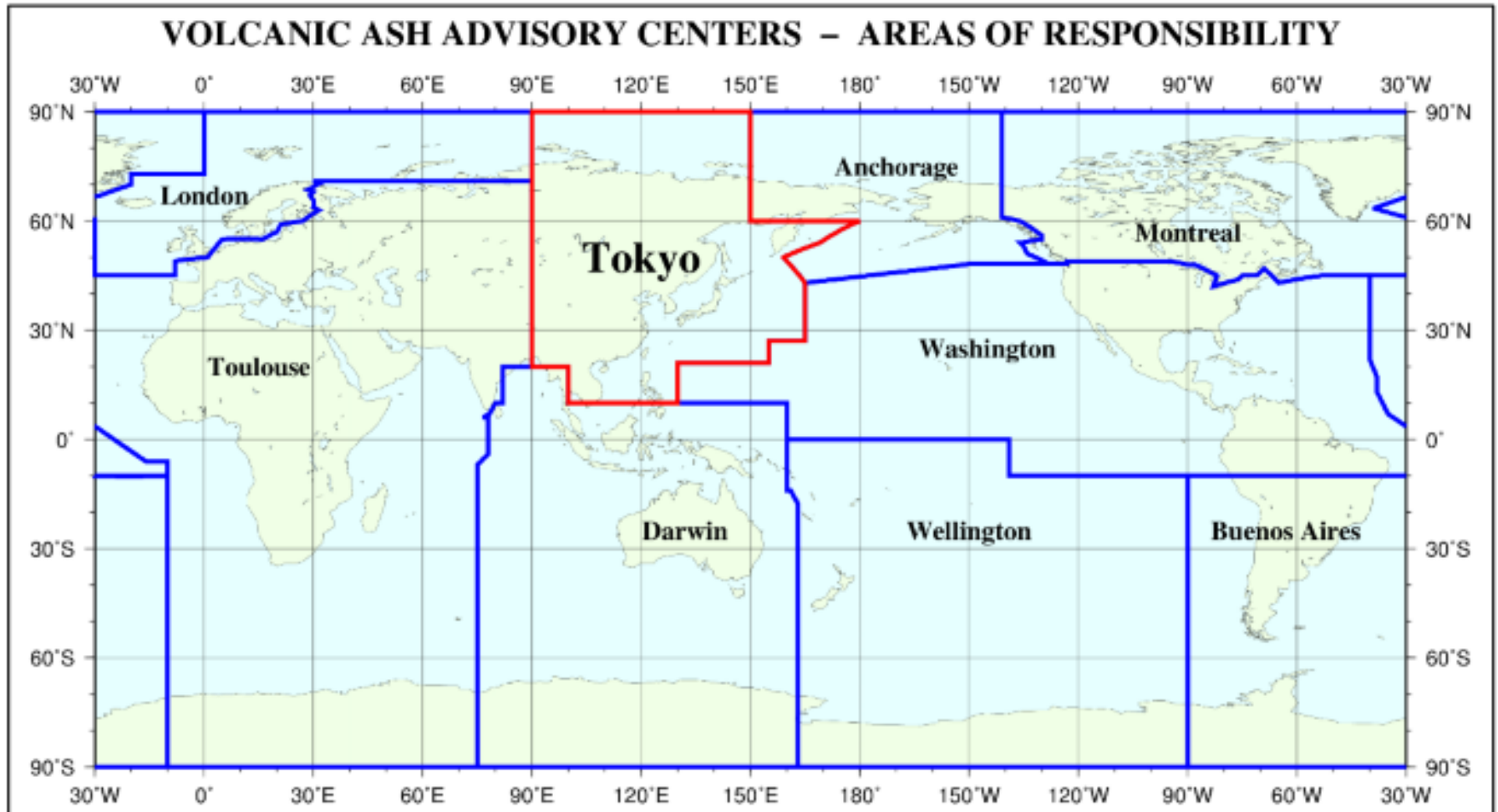
❑ Responsibilities ctd..

- issuing updated advisory information to the MWOs, ACCs, FICs and affected VAACs, as necessary, but at least every six hours until such time as:
 - the volcanic ash “cloud” is no longer identifiable from satellite data and, where available, ground-based and airborne data;
 - no further reports of volcanic ash are received from the area; and
 - no further eruptions of the volcano are reported.

❑ Note: VAACs are to maintain contact with State Volcano agencies in order to obtain expert and timely information.

Volcanic Ash Advisory Centre (VAAC)

ICAO
Designated
VAACs



Area Control Centre/Flight Information Centre (ACC/FIC)

On receipt of information about pre-volcanic activity, volcanic eruption or presence of volcanic ash in the atmosphere, ACC/FIC should;

- ☐ Pass information to aircraft in flight which could be affected;
- ☐ Advise ACCs/FICs in relevant adjacent FIRs;
- ☐ Coordinate with NOF for issue of ASHTAM/NOTAM;
- ☐ Activate contingency arrangements (ATM Contingency plan);
- ☐ Advise associated MWO(s) and VAAC of the volcanic eruption and/or the existence of volcanic ash cloud;
- ☐ Forward all special air-reports received to the MWO;

Area Control Centre/Flight Information Centre (ACC/FIC) Ctd...

- ❑ Maintain continuous coordination with the MWO to ensure consistency in issuance of ASHTAM/NOTAM and SIGMETs.
 - ❑ Initiate cancellation of ASHTAM or NOTAM as soon as it is considered that the volcano has reverted to its normal state and the airspace is not contaminated by volcanic ash
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- Note: ATS to undertake a Safety Risk Assessment

Meteorological Watch Offices (MWOs)

- ❑ Maintain close liaison with ACC/FIC
- ❑ Issue VA SIGMET (WV) with priority FF to relevant recipients.
 - Initial SIGMET based on VONA
 - SIGMET based on VAAC Toulouse VAA/VAG received
- ❑ Update SIGMET every 6 hours
- ❑ Transmit using AMHS/AFTN addresses, special Air Reports received from ACC to
 - VAAC Toulouse;
 - Regional OPMET databanks (Pretoria and Dakar);
 - WAFC London SADIS;
 - WAFC Washington;
- ❑ Cancel SIGMET as appropriate

NOTAM Office

- ❑ Issue an ASHTAM (or a NOTAM for volcanic activity – NOTAM Series V) based on information provided.
- ❑ Cancel the ASHTAM or NOTAM as soon as it is considered that the airspace is not contaminated by volcanic ash.

Aircraft Operators

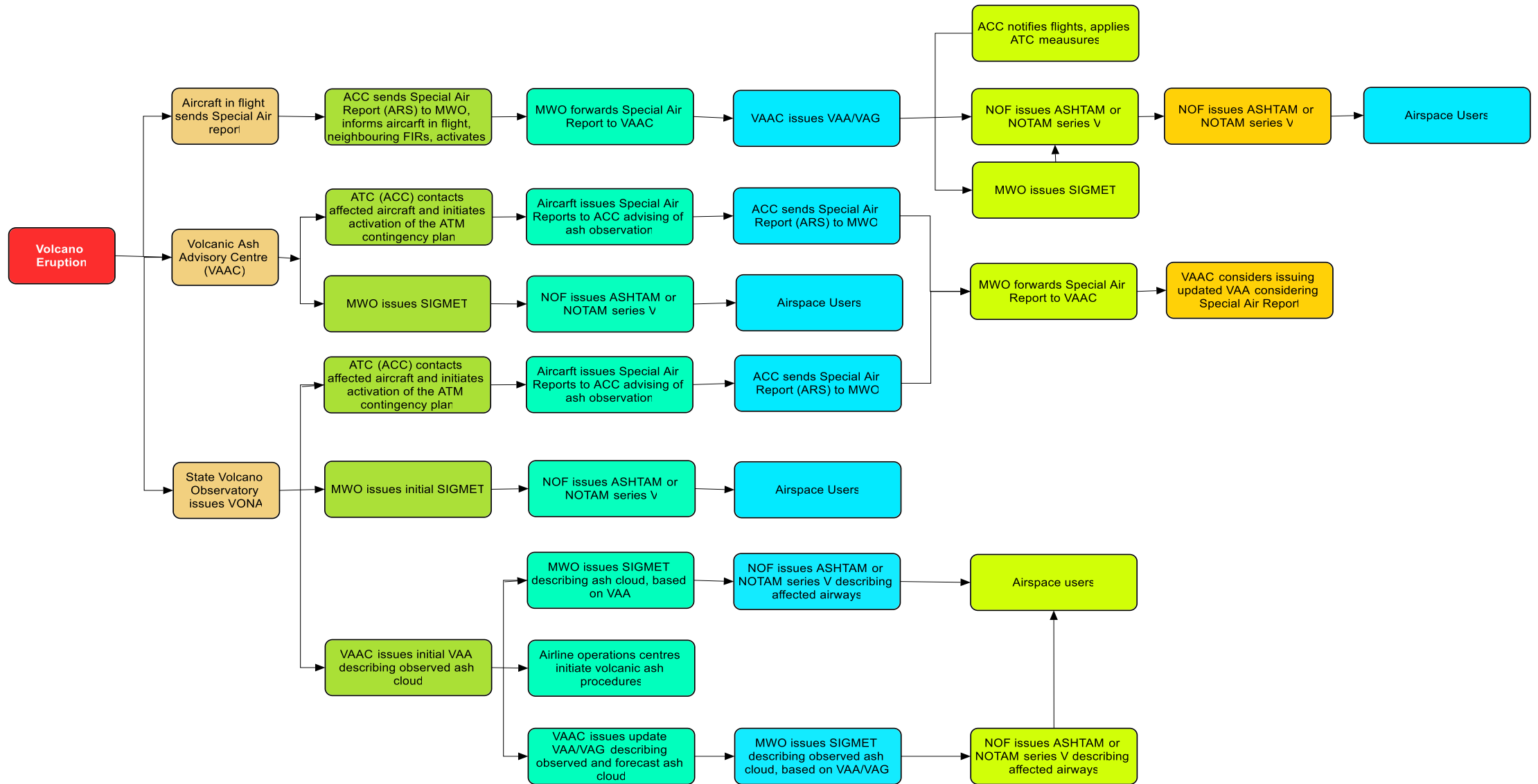
- ❑ In the event of an eruption, operators should;
 - request their pilots to report, when appropriate, any observation related to a volcanic ash cloud including the absence of visible ash and all other relevant information such as observational conditions.
- ❑ Undertake a safety risk assessment to identify potential hazards, evaluate associated risks, and implement appropriate mitigation measures to ensure continued safety.

Rescue Coordination Centres (RCC)

In the event of an eruption, pre-eruption volcanic activity or volcanic ash presence in the atmosphere, the RCC, on receipt of communication from the ACC/FIC,

- ❑ Utilize information received and activate internal Procedures.

Summary of Actions



Conclusion

- ❑ Volcanic ash poses a significant hazard to aviation
- ❑ Early detection, accurate forecasts, and timely advisories are essential.
- ❑ Effective coordination among meteorological services, VAACs, ANSPs, airlines, and regulators enhances flight safety.
- ❑ Continued preparedness, collaboration, and situational awareness are essential to ensuring the safety and efficiency of flight operations.

Reference Materials

- ❑ Annex 3 – Meteorological Service for Air Navigation
- ❑ ICAO Doc. 10157 - Procedures for Air Navigation Services – Meteorology (PANS-MET)
- ❑ ICAO Doc. 8896 – Manual of Aeronautical Meteorological Practice.
- ❑ ICAO Doc. 9691 – Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds
- ❑ ICAO Doc. 9766 – Handbook on the International Airways Volcano Watch (IAVW) – Operational Procedures and contact list.
- ❑ ICAO Doc. 9974 – Flight safety and Volcanic Ash

THANK
YOU

