Volcanic Ash
Fact Sheet

There are more than 500 active volcanoes in the world. On average 12 significant eruptions per year can be expected globally, in some instances lasting up to several weeks.

Volcanic ash is made up predominantly of silicates with a melting temperature of 1,100°C which is below the operating temperature of modern commercial jet engines of about 1,400 °C.

Examples of previous major volcanic eruptions that significantly impacted airline operations and resulted in airport closures:

- 1980 – Mt. St. Helens, USA
- 1982 - Galunggung, Indonesia
- 1989 – Mt. Redoubt, USA
- 1991 – Mt. Pinatubo, Philippines
- 1997 – Mt. Popocatepetl, Mexico
- 2010 – Mt. Eyjafjallajokull, Iceland
- 2011 – Mt. Grimsvotn, Iceland
- 2011 - Puyehue-Cordón Caulle, Chile
- 2013 – Mt. Etna, Sicily
- 2013 – Mt. Sinabung, Indonesia

In recent years numerous events within the Pacific Rim and South American regions have caused minor disruption to aviation

While there have been some serious incidents, there has been no aircraft accident, injury or loss of life as a result of a volcanic ash encounter. However, some eruptions have resulted in major negative financial impact to aviation, related (or ancillary) services, and passengers.

The International Airways Volcanic Watch was established by the International Civil Aviation Organization (ICAO) as a result of the serious encounters that occurred during the 1980s. ICAO set up nine Volcanic Ash Advisory Centers (VAAC) whose role is to monitor and advise of volcanic activity by promulgating volcano advisories and graphics to the regional meteorology offices for use by the airlines, air navigation service providers and governments.

Airlines use the information provided by the VAACs and other sources of information to plan their flights to avoid ash contaminated areas. The information provided is used in each airline’s regulatory approved Safety Risk Analysis procedures to mitigate the risk of flying in areas that may potentially be affected by volcanic ash. This is particularly so for flights under instrument flight rules and at night near areas of associated volcanic activity.

As demonstrated in 2010, the consequence of a major volcanic eruption is significant disruption to aviation with the associated financial and social impact to airlines, business and governments.

ICAO Document 9974 Flight Safety and Volcanic Ash was published in 2012. This document provides guidance for states in recommending practices to their operators and regulatory authorities where volcanic ash
contamination may be a hazard for flight operations. It was co-signed by seven industry bodies, including IATA and is in the process of undergoing a review.

Current Status and Activities

PANS ATM was revised to include the recommendations of the IVATF and took effect in November 2014.

IATA is actively involved with the ICAO MET Panel which undertake regular meetings. This includes progressing the outstanding work of the IAVW Ops Group and issues remaining from the closure of the IVATF.

Where appropriate, ICAO has tasked the Flight Operations Panel to undertake certain aspects of this work; IATA is a part of the panel and a contributor to the activities.

Summary:
- The immediate eruption period is acknowledged as being the most dangerous for aircraft with recommendations applicable to this phase included in Doc. 9974.
- Volcanic ash should be treated similarly to any other significant meteorological hazard.
- Airlines are able to operate near areas potentially affected by volcanic ash only by means of the use of an evidence-based risk assessment process.
- States are encouraged not to close their airspace, directly or by artificial means, except within the proximity of the volcanic crater where danger areas may be defined.
- The core business of the VAAC is to warn aviation of airspace where ‘visible’ ash may expect to be encountered.
- ICAO is now addressing the inconsistencies that have been noted between its documents and guidance materials to bring them into alignment; this also includes regional variations.

This will then provide airlines with better and consistent pre-flight and in-flight guidance, further enhancing the risk analysis process.

Other IATA priorities and initiatives include:

- With the cooperation of the VAACs, devise guidance to improve and standardize the information available from volcanic ash advisories with an emphasis on accurately indicating observed or discernible ash along with probabilities indicating the accuracy of the information provided.
- Reduce information overload and conflict by increasing the accuracy of the volcanic ash advisories.
- Improve the volcanic ash reports by improving the accuracy and determination of plume source parameters.
- Introduce a global air traffic management Contingency Plan template which can be merged into regional plans by the Planning and Implementation Regional Groups.
- VAAC Best Practices workshops. This initiative was first sponsored by IATA in response to airlines highlighting the significant inconsistencies in VAAC capability, practices and product information. These meetings have now been formalized by the WMO and continue on an annual basis. Progress has been made across many areas but the size and nature of the problem and the inefficiencies within the IAVW will always mean a sub optimal outcome for operators.

Ongoing work and Challenges

- Producing a guide to Best Practices for all VAACs to deliver harmonized output for all VAACs.
- Convincing the ICAO MET Panel and the ANC to conduct a review of the IAVW.
• Progressing the review by the ICAO FLTOPS Panel of ICAO Doc 9974
• Progressing the need for an ICAO global contingency plan which can be regionally adopted to remain primarily consistent with pilot and operator expectations
• Convening the IATA Flight Operations Support Task Force twice a year allows for the opportunity to discuss issues pertaining to Volcanic Ash and other significant meteorological factors affecting flight operations. Resulting working papers are written in cooperation with ICAO, the World Area Forecast Centers (WAFCs: located in the UK and the US), airlines and the World Meteorological Organization (WMO) to improve aviation meteorological standards and practices

Active monitoring of active volcanoes remains a concern in some parts of the world. Active watch will help to reduce the notification time from start of eruption and minimize the possibility of an accidental volcanic ash encounter. Although significant progress has been made by some Volcanic Observatories, more is required to ensure aviation is notified of pre-eruption activity. Not all States are harmonized in their approach with some still following a policy of airspace closures.