

# Keep an eye on Shiveluch

OPSGROUP Team  
21 November, 2022



Shiveluch is a 70,000 year old volcano with quite a bad temper. We thought we might introduce you to this hot headed fellow because it might have an impact on aviation in the not too distant future.

It has been reported as 'extremely active' since November 20, and an eruption is expected imminently.

## **Say hello to Shiveluch.**

Or **Шивелуч** to give him his Russian name since he is, after all, Russian.

Shiveluch lives on the **Kamchatka Peninsula** (the far east bit of Russia that sticks out into the Pacific Ocean, and the Sea of Okhotsk). Shiveluch and Karymsky are the most active volcanoes on this bit of land.

## **What's the eruption history?**

He's been blowing his top for about 10,000 years, but the **current eruption period started in 1999** and he's kept it up with a fair few explosions, **frequent ash cloud spitting** along with 'incandescent block avalanches, and lava dome growth' since then.

In February 2015 the ash cloud (which is really the bit we're worried about in aviation) shot up to **30,000'** and **crossed the Bering Sea and into Alaska.**

In June 2022 it hocked up a dense ash plume which reached about **7 km in altitude.**



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The mega plume

### Where will a big ash cloud potentially affect?

Unfortunately this is dependant on how much ash he coughs up (historically quite a lot), and **which way the wind blows:**

- **UHPP/Yelizovo Airport** (Petropavlovsk-Kamchatsky)

This airport lies south of the volcano, on the peninsula, and is **popular fuel/tech stop for BizAv aircraft** but is currently not available anyway due prohibitions against operations into Russia airspace.

- **Alaska**

Alaskan airspace was affected back in 2015 and more recently in April 2022. Ash reached 32,000' and moved across the Pacific Ocean, **impacting traffic routing over the northeast region** and the Gulf of Alaska.

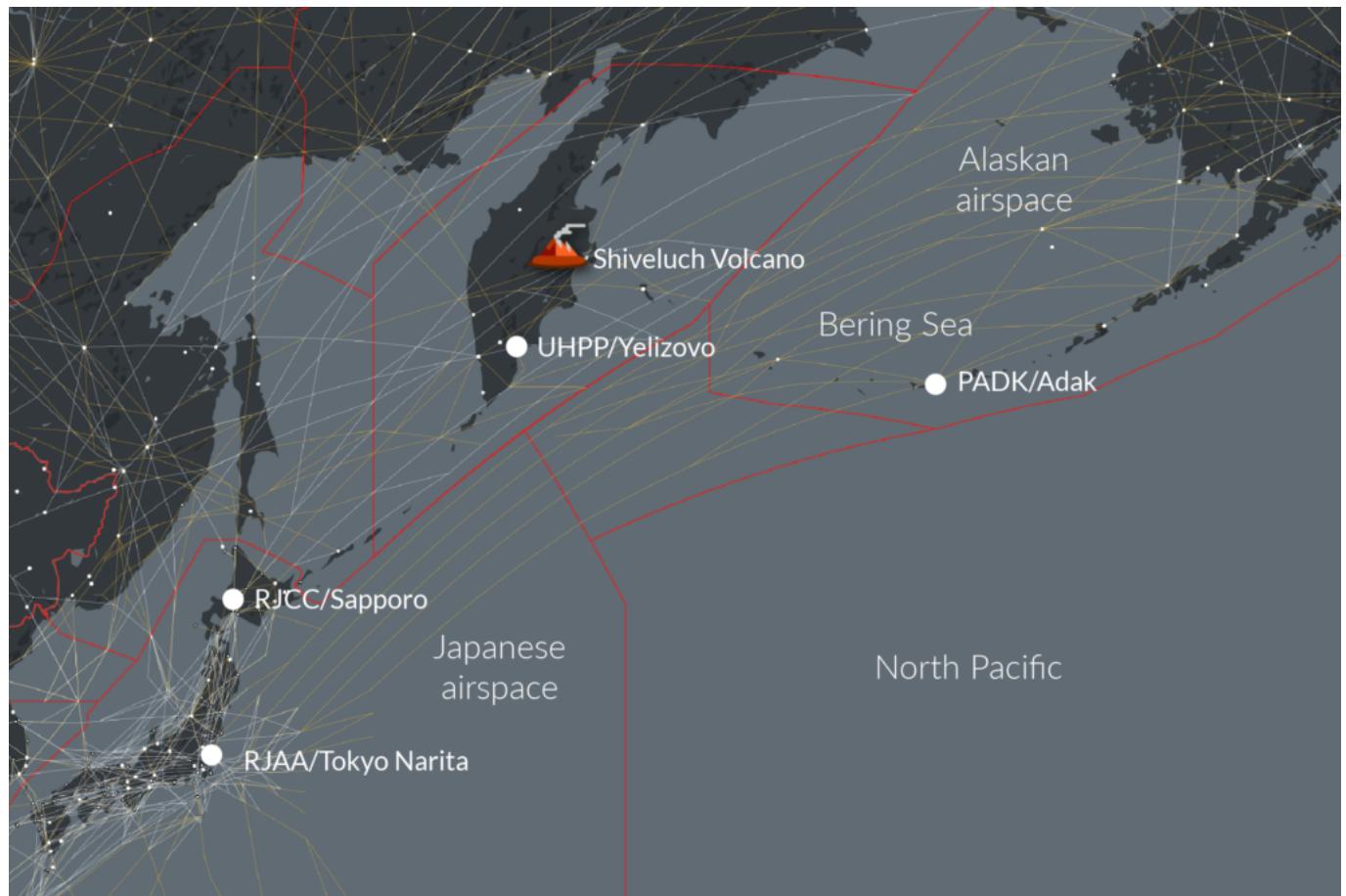
**PANC/Anchorage** could be affected, along with smaller airports such as **PADK/Adak** and airport along the Aleutian Islands currently used as fuel/tech stops while Russian airports are unavailable.

- **North Pacific/Bering Sea**

Aircraft heading between the USA and Asia utilise routings here which may be impacted by large ash clouds.

- **Japan**

Winds don't predominantly blow this way, but ash could potentially still disrupt airports and airspace in this direction.



Shiveluch ash impact areas

**Keep an eye on him.**

You can read his full history here. They post **regular bulletins and reports** on the ongoing action.

The **Tokyo and Anchorage VAACs** monitor this volcano. You can find links to their sites here.

Volcano Discovery also provides some handy info on volcanoes and their current action.

Look out for **ASHTAMs and SigWx information** for the North Pacific and Alaska region.

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# Volcanoes - No lavaing matter

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One of the rowdy Icelandic volcanoes is at it again. Earlier this month, the Icelandic Met Office changed the aptly named Grímsvötn to a 'Code Yellow' after it started showing high levels of activity.. There has also been a fair amount of action in the Pacific Rim, and even Mount Etna has been rumbling...

## Why is volcanic ash so dangerous?

For starters, it is not the same thing as smoke.

Volcanoes are on the ground, airplanes are in the air, but unfortunately volcanoes spit out loads of hot, nasty stuff and they tend to spit it rather high. That hot, nasty stuff is a mixture of glass, rock and mineral particles, and it is really fine – the diameter of a particle measuring less than 2mm. It is also very porous meaning it weighs next to nothing and is easily carried along on the wind.

Once the ash cloud starts to spread it, it can be very hard to spot – **even a fairly dense ash cloud is unlikely to show up on your weather radar because the particles are just too small.**

If it is ingested into a jet engine, it will erode the compressor blades before forming a substance similar to molten glass inside the combustion chamber, and this then re-solidifies on the turbine blades. The end result can be stalling and engine failure – and you might not be able to get them going again. And if that wasn't enough, it can also damage the flight deck windows, block pitot static systems, and get into the cabin air and damage ventilation and pressurisation systems.

So volcanic ash is to airplanes, like sand is to picnic on a beach – it gets everywhere, and pretty much

ruins it.

## Take British Airways Flight 9 for example...

In 1982 a British Airways 747 was en-route from London Heathrow to Auckland (with a few stops along the way). While overflying Indonesia, late into the night, their windshield began to glow an eerie shade of blue. They had unwittingly entered an ash cloud from the recently erupted Mount Galunggung. Within three minutes, all four engines had stopped. They descended over 25,000' and were making some pretty close-up eye contact with fish before they finally managed to get the engines running again.

In December 1989, a KLM 747 had a similar incident when en-route from Amsterdam to Tokyo, Narita. This time it was an ash cloud from the Redoubt Volcano that caused all four engines to fail. They also eventually managed to re-start and landed safely into Anchorage with no injuries, but with around 80 million dollars worth of damage to the airplane...

## Okay, so what can we do about it?

For starters, understand the alerts you see in your pre-flight briefings.

To help operators plan against potential ash encounters, ICAO have helped develop a universal alerting system for aviation that uses a simple but informative colour coding to give a heads up of the activity level of volcanoes.

ICAO COLOUR CODE	STATUS OF ACTIVITY OF VOLCANO
GREEN	Volcano is in normal, non-eruptive state. or, <i>after a change from a higher level</i> : Volcanic activity considered to have ceased, and volcano reverted to its normal, non-eruptive state.
YELLOW	Volcano is experiencing signs of elevated unrest above known background levels. or, <i>after a change from higher alert level</i> : Volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.
ORANGE	Volcano is exhibiting heightened unrest with increased likelihood of eruption. or, Volcanic eruption is underway with no or minor ash emission. <i>[specify ash-plume height if possible]</i> .
RED	Eruption is forecasted to be imminent with significant emission of ash into the atmosphere likely. or, Eruption is underway with significant emission of ash into the atmosphere. <i>[specify ash-plume height if possible]</i> .

ICAO also coordinate several Volcanic Ash Advisor Centers (VAACs) around the world that operate under the International Airways Volcano Watch. They use a network of met stations, satellites and even reports from pilots to provide forecasts, SIGMETS and advisories to the aviation community regarding ash clouds and eruptions. In other words, they try to tell you where it is, how bad it is and if it will get worse.

So, you can plan your flights to avoid affected areas both laterally and vertically.

## Know the signs...

We have made you a handy infographic explaining what happens, and what you should do about it, but the general gist is:

**Watch out for the signs that you might be entering an ash cloud** - a strange colored cloud (in the vicinity of a known volcano), sulphuric or acrid smells in the cabin that can't be blamed on the co-pilot, increased static charge around the flightdeck windows, garbled radio, or a picture of it on your sigmet chart (that you missed in the pre-flight briefing) are usually a good giveaway;

**If you think you've flown into ash, get out fast.** A 180 degree turn is usually best. Follow the actions or volcanic ash checklist for your aircraft type, and consider getting yourself on oxygen;

**Look after your engines.** Monitor your engine closely - you might see surging, stalling or high EGTs. If they are, reduce power and turn the auto throttle off. **Do not try** to climb out of it;

**Watch your speed.** If you're getting erroneous speed indications, go back to basics using pitch and power until you can confirm your speed is safe;

**Report it** - Chances are if you've flown into it, so will another aircraft behind you, so make sure you put a radio call out to warn them, and to let ATC know why you just did a massive wheelie in the sky.

## The Bigger Issue for Aviation

In 2010 the unpronounceable Eyjafjallajökull erupted and caused enormous disruption to air travel across Europe. The disruption lasted for over a week, and that was just one volcano!

A previously published report established that over one hundred airports in twenty-six different countries were affected by the eruptions of just forty-six volcanoes within a three period. Unfortunately for aviation, there are about 1500 active volcanoes in the world (not counting the ones that line the ocean floor.) 75% of these fire breathing mountains live in the Ring of Fire, in the Pacific, but there are some seriously cranky calderas on all continents bar Australia.

### Which ones should we keep an eye on?

Volcano-watching organizations and aviation authorities have established a ranking system for volcanoes using an overall threat score, and a threat to aviation score which take into account 24 factors.

In the US, Kīlauea in Hawaii ranks numero uno worst with an overall threat score of 263, and an aviation threat score of 48. Mount St. Helens, Washington poses the greatest threat to aviation with a score of 59.

### So what other resources are there to help avoid serious aviation disruptions from eruptions?

Unfortunately, volcanic eruptions can be a little hard to forecast, but generally how much they are rumbling, GPS data that monitors seismic activity, and historic eruption data are used to predict if and when they might pop.

Ash clouds are relatively hard to track as well - normally data is plugged into ash cloud modeling programs that consider the density and plume size, and the wind conditions for the day to model how it might disperse. Satellite sensing to detect radiation absorption levels, and thermal infrared wavelength levels also help, but there is no one sensor for observing everything.

Aviation authorities determine ash zones based on the concentration of ash. These are either a No Fly Zone, or an Enhanced Procedure Zone, and are based off tolerance levels agreed with aircraft and engine manufacturers. Generally enhanced procedures require training for the pilots (on identifying effects) and additional maintenance checks for the engines and aircraft.

## Too Long; Didn't Read

1. **Keep an eye on our alerts.** Opsgroup will send out alerts on any volcanic eruptions that look like they will significantly impact flight operations;
2. **Familiarise yourself** with the signs of ash clouds, and the actions to take in case you ever do end up in one.

## Other resources

- <http://www.bom.gov.au/aviation/warnings/volcanic-ash/> - shows the Volcanic Ash SIGMETs received in the last 24 hours for all regions around the world.
- <https://www.ssd.noaa.gov/VAAC/vaac.html> - links to the individual websites of all the different Volcanic Ash Advisory Centers.

- <http://icelandicvolcanos.is> – shows a nice clear map of the volcanoes in Iceland, color-coded to show varying levels of activity.
- How to make your own volcano at home!

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## Ongoing Bali volcanic threat - update

OPSGROUP Team  
21 November, 2022



### **Update June 29, 2018:**

Following the volcanic eruption on Jun 28 at Bali's Mount Agung, the airport has been closed all morning today, Jun 29, and only just reopened at 1430 local time (0630z). Over 500 flights have already been cancelled as a result. Big delays expected all day and into the weekend. Further closures due to volcanic ash are still possible.

Per latest report from Darwin VAAC, there is a volcanic ash cloud observed up to FL160 in the area, but they predict winds will carry the ash southwest toward Java, Indonesia's most densely populated island.

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**In Short:** Continued vigilance required for operations to Bali; The alert level for Mt Agung eruption remains at 3 (on a scale of 1-4). Last ash plume on 26 March rose to at least an altitude of 11,650 ft.



When **Mount Agung** erupted in November 2017, airlines faced travel chaos as flights were cancelled due to the lingering ash cloud. Since then, visitor arrivals have dropped by more than 70 percent. Facing \$1bn in lost tourist revenue, the Indonesian government is trying to lure tourists back to the holiday island.

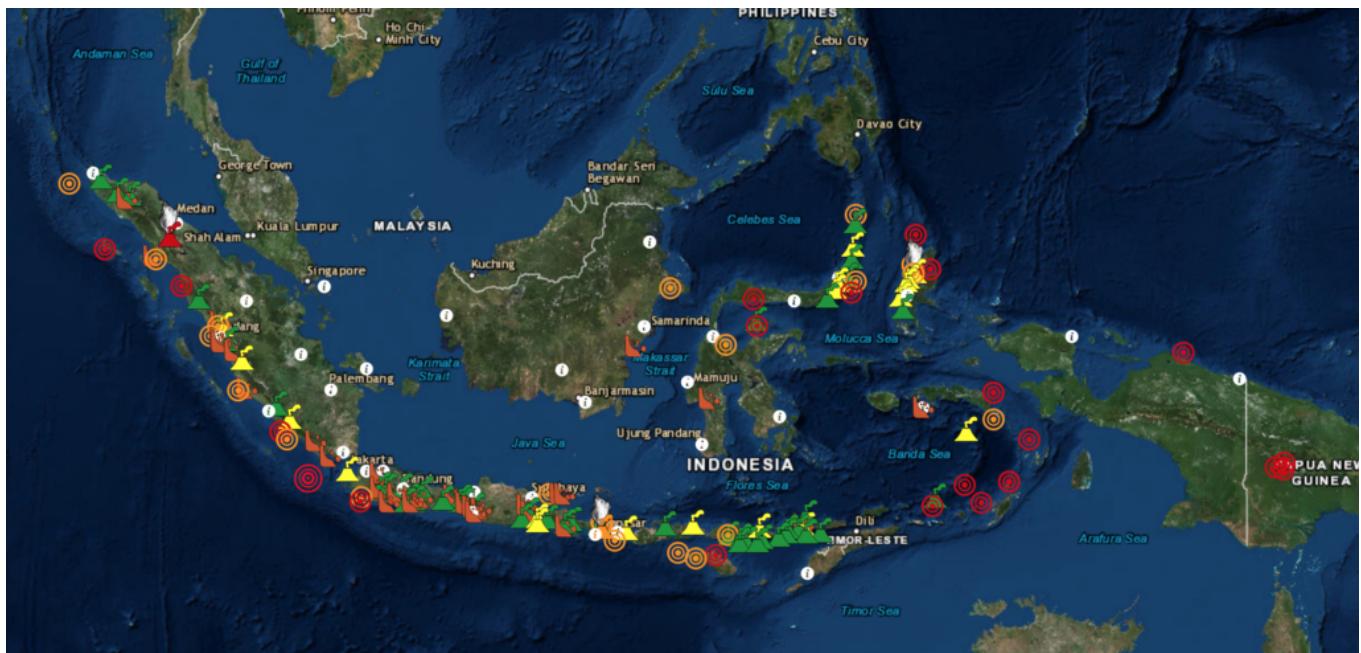
The 3,000metre high volcano sits roughly **70 kilometres** away from the tropical paradise's main airport and popular tourist areas.

In a **Volcano Observatory Notice for Aviation** (VONA), Volcanological Survey of Indonesia (PVMBG) reported that at 1009 on 26 March an event at Agung generated an ash plume that rose at least to an altitude of 3.6 km (11,650 ft) a.s.l. and drifted NW. The **Alert Level remained at 3** (on a scale of 1-4) and the exclusion zone continued at a 4-km radius.

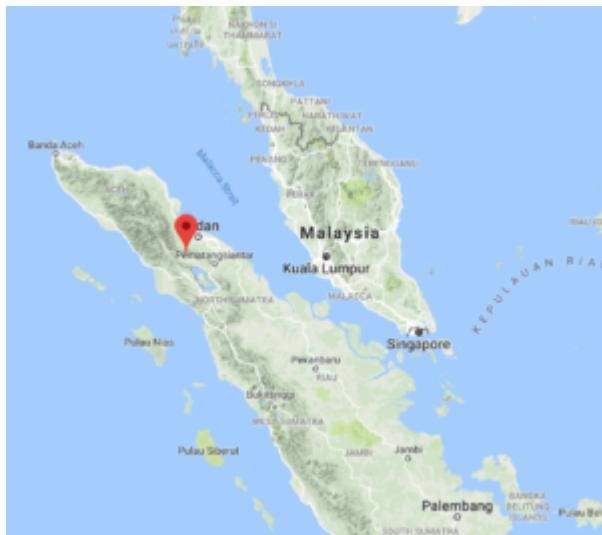


**Best up-to-date information:**

- Darwin Volcanic Ash Advisory Centre
- MAGMA Indonesia – VONA stands for Volcano Observatory Notice for Aviation. It issues reports for changes, both increases and decreases, in volcanic activities, providing a description on the nature of the unrest or eruption, potential or current hazards as well as likely outcomes.
- Global Volcanism Program – Agung



### The current one to watch:



**Mount Sinabung** – located in Medan, Indonesia is also very active at the moment (last spewing ash on Friday April 6) and may disrupt air operations to Malaysia and Singapore.

**“Current Aviation Color Code: RED, Eruption with volcanic ash cloud at 09:07 UTC (16:07 local). Eruption and ash emission is continuing. Ash-cloud moving to west – south. Best estimate of ash-cloud top is around 23872 FT (7460 M) above sea level, may be higher than what can be observed clearly. Source of height data: ground observer.”**

We will keep an eye on this one.

Mount Sinabung roared back to life in 2010 for the first time in 400 years. After another period of inactivity it erupted once more in 2013, and has remained highly active since.

*If you have travelled through the region lately and can provide members with more of an update, please get in touch.*

# Guatemala's Fuego volcano disrupts ops

David Mumford  
21 November, 2022

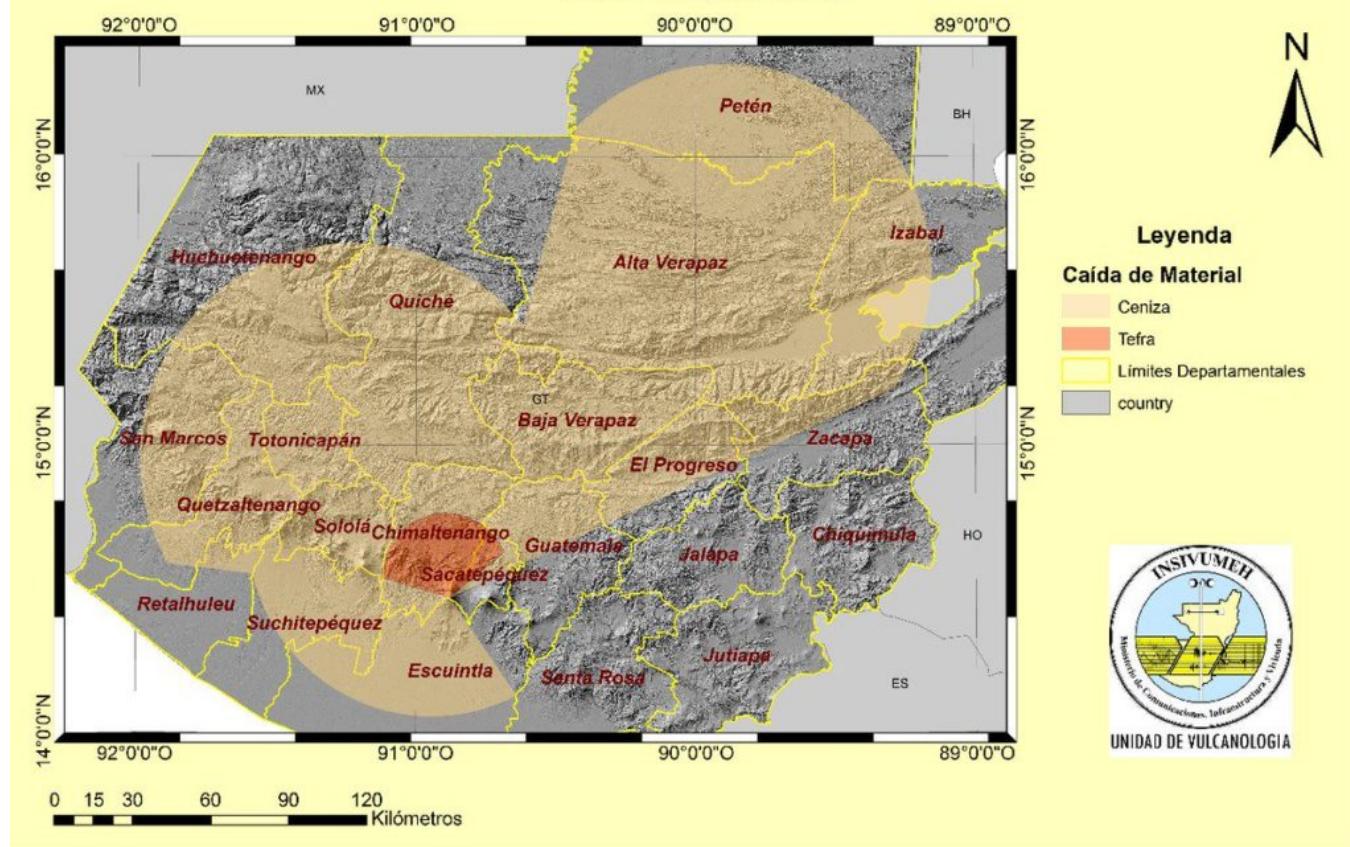


An eruption at Guatemala's Fuego volcano on 3rd June resulted in the deaths of 25 people, and forced the temporary closure of MGTT/Guatemala City Airport. After the military cleared ash from the runway, the airport re-opened on 4th June, with the warning of delays due to ongoing runway inspections.



On June 3, Guatemala's Institute for Vulcanology (INSIVUMEH) published a map showing the volcanic ash distribution (shown on the map as the area in orange, labelled 'Ceniza'):

Mapa de Caída de Ceniza Volcán de Fuego  
03 de junio de 2018  
18:00 horas (Hora Local)



#### Further reading:

- Guatemala's Fuego volcano erupts, killing 25 and injuring hundreds

## Bali - Airport Status

David Mumford  
21 November, 2022



Volcanic eruptions from Bali's Mount Agung earlier last week forced the closure of WADD/Denpasar and WADL/Lombok airports, as volcanic ash spread across both islands.

**Here's the current situation at the airports on Dec 4:**

- **WADD/Bali:** Re-opened on Nov 29. (Although the airport will be closed for runway repair from 18-23z daily [except Saturdays] until Dec 31).
- **WADL/Lombok:** Re-opened on Nov 30.
- **WARR/Juanda:** Open and operating. So far has not been affected at all by the volcanic ash. (Although the airport will be closed for runway repair from 16-22z daily until Jan 06).

Although Mount Agung has now stopped emitting ash, another large eruption is still likely. The local monitoring agency are registering powerful and continuous tremors, and authorities have ordered locals and journalists within 10km of the volcano to evacuate. Further intermittent airport closures are possible, depending on wind direction.

We will keep this page updated with the latest news as we get it.