SHARING YOUR VIEW OF THE WEATHER

Pilot reports are invaluable to meteorologists and other pilots – whether they're about the presence of volcanic ash, an encounter with severe turbulence, or aircraft icing.

// Satellite image taken by NOAA's polar orbiting Aqua satellite at 0220 UTC on 27 July 2018. Ash is seen spewing from the volcano Aoba on Ambae Island, Vanuatu, while ash from an eruption of Aoba earlier that day is moving across Fiji.

Pilot reports help meteorologists refine their current warnings and improve future ones. They also ensure other aircraft are aware of hazardous weather in the area.

Under *AIP New Zealand* GEN 3.5, all aircraft are required to provide air reports or pilot reports (known as AIREP Specials or PIREPs) whenever the following meteorological conditions are encountered or observed:

- moderate or severe turbulence;
- moderate or severe icing;
- severe mountain wave;
- thunderstorms, with or without hail, that are obscured, embedded, widespread, or in squall lines;
- heavy dust storm or heavy sandstorm;
- volcanic ash cloud;
- pre-eruption volcanic activity or a volcanic eruption.

It all goes towards improving the shared view of current and future weather phenomena both locally and globally.

Aoba eruption

On 26 July 2018, an eruption of Aoba, the volcano on the Vanuatu island of Ambae, sent ash over 6 km high into the atmosphere. A series of lightning storms were initiated by the eruption. These gave the meteorologists at the Wellington Volcanic Ash Advisory Centre (VAAC) the first clue that something out of the ordinary was happening.

Checking the satellite imagery over the region, the VAAC meteorologists were quickly aware this was a big eruption. Ash had reached the strong westerly winds high in the atmosphere and was heading towards Fiji airspace during peak tourism season.

Thankfully for the meteorologists, it was a relatively clear day over Vanuatu and across to Fiji. This meant a clear satellite view of the ash cloud horizontally and by comparing the satellite derived temperature of the ash with a nearby weather balloon sounding, they also had a good idea of the cloud top height. What they were missing, however, were observations of the ash cloud base as it moved towards Fiji.

If this eruption had occurred across Western Europe, a scattering of LIDARs[1] would have given local VAAC meteorologists a series of cloud base measurements. But across the South Pacific, meteorologists must rely on ash dispersion models, experience – and if they're lucky – pilot reports.

Around 12 hours after the initial eruption, the ash cloud was moving across Fiji. Meteorologists had estimated the base of the cloud to be around 10,000 ft, based on the balloon sounding and the direction the ash was moving. By working closely with the local international operator, Fiji Airways, VAAC was able to confirm their cloud base estimate using a range of observations provided by various Fiji Airways flights. This meant the meteorologists had higher confidence in their forecast and so did Fiji Airways, who managed to continue operations by flying under the ash cloud.

1 LIDAR stands for Light Detection and Ranging. It's a remote sensing method using a pulsed laser to measure distances of objects from Earth.