



WORKING PAPER

**INTERNATIONAL AIRWAYS VOLCANO WATCH OPERATIONS GROUP
(IAVWOPSG)**

EIGHTH MEETING

Melbourne, Australia, 17 to 20 February 2014

Agenda Item 5: Operation of the IAVW (Deliverables 01, 03, 04 and 05)

**5.1: Implementation of the IAVW, including the IAVW management reports
(Deliverable 01)**

**VAAC WELLINGTON MANAGEMENT REPORT
DECEMBER 2012 – NOVEMBER 2013**

(Presented by New Zealand)

SUMMARY

This report covers the operations of the Wellington VAAC for the period of December 2012 to November 2013.

1. EXECUTIVE SUMMARY

1.1 Volcanic ash advisory centre (VAAC) Wellington, operated by the Meteorological Service of New Zealand Limited (MetService), has remained operational for the reporting period with no outages.

1.2 Volcanic ash advisories (VAAs) were issued for an eruption of the Gaua volcano (Vanuatu) in April 2013. The White Island volcano (New Zealand) displayed on-going unrest throughout this period with a minor eruption in August 2013. Significant seismic activity lead to a period of heightened monitoring by the VAAC for the Tinakula (Solomon Islands) and Traitor's Head (Vanuatu) volcanoes.

1.3 Closer collaboration between Wellington VAAC, the Vanuatu Meteorology and Geo-Hazards Department (VMGD) and GNS Science (GNS) has resulted in greater information sharing regarding the likelihood of eruptions at the Gaua, Yasur and Ambae volcanoes.

2. INTRODUCTION

2.1 Pursuant to Conclusion 1/2 of the IAVWOPSG/1 Meeting, VAAC Provider States were invited to provide a concise IAVW management report to be presented at every IAVWOPSG meeting covering the period elapsed since the previous meeting and addressing the main features of the international airways volcano watch (IAVW) operations, highlighting any recent developments and difficulties and future planned developments.

2.2 MetService has operated the Wellington VAAC since the inception of the Volcanic Ash Advisory Centres as part of the IAVW system. The Wellington VAAC works closely with GNS, who are responsible for volcano monitoring in New Zealand. Wellington VAAC also works closely with the VMGD who are responsible for monitoring volcanoes across the Vanuatu region.

2.3 The VAAC also communicates with other meteorological and air traffic service organizations across the Pacific region when seeking confirmation of volcanic activity.

3. OPERATIONS OF THE VAAC

3.1 Issuance of Volcanic Ash Advisories in the VAAC Area

VAA and VAG messages were issued by the Wellington VAAC covering the Gaua eruption. In summary:

Volcano	Country	Date	VAA Issued
Gaua	Vanuatu	29 – 30 April 2013	7

3.2 Gaua

A volcanic ash report (VAR) citing a possible eruption in the region of the Gaua volcano was received by VAAC Wellington at approximately 0400Z on 29 April 2013. Advice was also sought from GNS, who after contacting VMGD, confirmed that an eruption had occurred and an ash plume extending from the volcano had been sighted. This visual confirmation, corroborated with evidence of an ash plume on satellite imagery, prompted the issue of VAAs. The last advisory was issued at 1746Z on 30 April 2013.

3.3 White Island

Although no advisories were issued for White Island during the reporting period, the volcano displayed periods of unrest, resulting in GNS raising the volcano's alert level and aviation colour code at times. Minor eruptions occurred on 21 August 2013 and 4 and 11 October 2013. The localized nature and type of each eruption (as confirmed by GNS) did not warrant the issuance of advisories. New Zealand's Civil Aviation Authority (CAA) was consulted shortly after Wellington VAAC had been notified of each eruption.

3.4 Mt Tongariro

Wellington VAAC received pilot reports of possible volcanic ash about Mt. Tongariro in December 2012 and January 2013. In both instances GNS confirmed that no eruption had occurred and Wellington VAAC did not issue any advisories. Apart from these instances, Mt. Tongariro has experienced a quiet period following its heightened activity in 2012.

3.5 VONA

Through the period, the Geological and Nuclear Sciences (GNS) organization ensured the provision of volcano observatory notices to aviation (VONA). The VONA issued reflected all aspects of the relevant International Civil Aviation Organization (ICAO) guidance material. VONA are now also distributed routinely to the area control centre (ACC) and main airline operations offices in Australia and New Zealand.

3.6 Other activity of interest

3.6.1 Yasur and Ambae volcanoes in the Pacific showed signs of unrest during this reporting period. However, the localized nature of each period of activity (as confirmed by VMGD) did not warrant the issuance of advisories. VAAC Wellington was also aware of a series of significant earthquakes beneath Traitor's Head volcano in February 2013, which was thought to be indicative of magma movement beneath the volcano.

3.6.2 In February 2013, a report from the United States Geological Survey (USGS) suggested that seismicity about the Santa Cruz Islands resembled characteristics of eruption precursors rather than typical tectonic activity. VAAC Wellington discussed the situation with the Solomon Islands Meteorological Office (SIMS); SIMS reported that there were loud explosions in the vicinity of the volcano but no evidence of an eruption.

3.6.2.1 The Support to Aviation Control Service (SACS) sulphur dioxide emission monitoring service continues to provide valuable information to VAAC Wellington: on a number of occasions, notifications have prompted VAAC Wellington to contact VMGD when noting significant sulphur dioxide emissions from some Vanuatu volcanoes.

4. USER FEEDBACK

4.1 Meetings between MetService's Aviation Forecasting Team and Air New Zealand's Flight Dispatch Centre continued in April 2013, to ensure that the VAAC remains aware of the impacts that volcanic ash forecasts have on flight operations.

4.2 MetService attended the Australian Bureau of Meteorology's annual "Vulcan-Aus" meeting in Canberra on 25 August 2013. The purpose of this meeting is to discuss issues relating to the impact that volcanic ash has on aviation. MetService provided a presentation on VAAC activities since the previous meeting, and a summary of changes to VAAC forecasting operations. These changes are discussed in sections 4 and 8 of this report.

5. SIGNIFICANT OPERATIONAL CHANGES

5.1 The additional investment, by airlines, in the VAAC Wellington from 1 July 2012 is directed towards:

- a) additional forecasting resource during volcanic events, and
- b) development of new operational technical capability in volcanic ash monitoring and forecasting.

5.2 The new technical capability includes C-band Doppler weather radar detection of eruption plumes¹, enhanced ceilometer detection of ash cloud, and multi-spectral viewing of high resolution satellite imagery.

6. WELLINGTON VAAC BACK-UP ARRANGEMENTS

6.1 An updated memorandum of understanding (MoU) between the Australian Bureau of Meteorology (BoM) and the MetService is now in place and both organizations are working to ensure that all commitments agreed to in the MoU are implemented as soon as practicable. In particular, the MetService has agreed to provide a backup service to VAAC Darwin for the area south of 20° S and is currently introducing forecast production software which will provide this level of capability. This will ensure that VAAC Wellington can participate in future VAAC backup tests as per Appendices K and L of ICAO's Asia Pacific SIGMET Guide.

7. STATUS OF QMS

7.1 MetService maintains a quality management system (QMS) to the AS/NZS ISO9001:2008 Management System Standard, and covers the design, development and provision of weather and related information services. The QMS was reviewed for revalidation in October 2013 by Telarc SAI Limited, and a new certificate was issued that extends registration to 28 October 2016.

8. IAVW IMPLEMENTATION ISSUES

- a) Peter Kreft (Chief Forecaster, MetService) attended the WMO 6th International Workshop on Volcanic Ash (Citeko, 10 – 15 March 2013). Also attended by Peter Lechner of the civil aviation administration (CAA);
- b) Norm Henry (General Manager National Weather Services and Aviation, MetService) attended the 7th meeting of the International Airways Volcano Watch Operations Group (Bangkok, 18 – 22 March 2013);
- c) Marcel Roux (Manager Aviation Forecasting, MetService) attended the Australian Bureau of Meteorology Vulcan-Aus Group meeting (Canberra, 25 August 2013);

¹ Joint MetService – GNS – Massey University paper submitted to the Tongariro Eruption Special Issue of the Journal of Volcanology and Geothermal Research.

- d) the relationship between the VAAC Wellington and GNS remains robust with a programme of visits planned for early 2014;
- e) the VAAC continues to receive emailed alerts of SO₂ emissions from the SACS service (<http://www.sacs.aeronomie.be/>); and
- f) the VAAC Wellington website remains available at <http://vaac.metservice.com/>

9. FUTURE DEVELOPMENTS

9.1 Case work on C-band Doppler weather radar sensing of volcanic ash plumes observed in the 2012 Mount Tongariro and White Island eruptions has yielded a prototype radar-based eruption alerting tool. While this has not yet been tested on a live event, it is highly likely to produce early, and valuable, information about eruptions and source terms for ash models. User training (in VAAC Wellington) is planned for early 2014.

9.2 Twenty-one of MetService's automatic weather stations (AWS) are fitted with ceilometers capable of detecting volcanic ash, under suitable meteorological conditions, up to FL250. In the absence of any meteorological cloud, these data should provide valuable information on the location and height of the ash cloud at time H+0. Additional ceilometers are planned to be fitted to other MetService AWS sites. Wellington VAAC is able to view data from four sites at any given time.

9.3 In February 2013, MetService installed a new polar orbiting satellite receiver. This provides faster access to more satellites and higher-resolution data. Together with implementation of more algorithms designed to detect airborne volcanic ash (development currently under way), this significantly enhances satellite monitoring within at least part of the VAAC area of responsibility. User training on new algorithms, and updates to operational documentation, will occur during 2014.

9.4 The expansion of MetService's Doppler weather radar network will be completed in early 2014, with the ninth and final radar to be installed in the far north of the North Island.

10. ACTION BY THE IAVWOPSG

10.1 The IAVWOPSG is invited to:

- a) note the information contained in this paper; and
- b) exchange views on the various matters discussed in this paper.

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