



International Civil Aviation Organization

**SEVENTEENTH MEETING OF THE METEOROLOGY
SUB-GROUP (MET SG/17) OF APANPIRG**

Bangkok, Thailand, 13 – 16 May 2013

Agenda Item 5: Regional Implementation of International Airways Volcano Watch (IAVW)

VAAC DARWIN MANAGEMENT REPORT

(Presented by Australia)

SUMMARY

This paper presents the VAAC Darwin Management Report which addresses the main features of the IAVW operations, highlighting any recent developments and difficulties and future planned developments.

1. Introduction

1.1 The VAAC Darwin covers the area from the Andaman Islands (India) eastwards to the Solomon Islands which includes the volcanically active Indonesian archipelago, Papua New Guinea and the southern Philippines. Overall, more than 150 volcanoes are active within the area. Parts of the region have poor communications and general infrastructure, incomplete volcanic monitoring and are characterised by moist tropical convection that makes remote sensing difficult for much of the year.

2. VAAC Darwin Operations

2.1 **Volcanic Ash Advisories.** A total of 1382 Volcanic Ash Advisories (VAA) were issued by VAAC Darwin for the 18 month period from 1 July 2011 to 31 December 2012. This is a 27% reduction from the previous reporting period. Low level eruptive activity continued to dominate, with the greatest number of advisories being issued for the volcanoes Batu Tara (629), Dukono (271) and Paluweh (142) in Indonesia. Total advisory numbers by volcano are shown in Figure 1 and the number of advisories issued in each financial year (1 July to 30 June) is given in Figure 2.

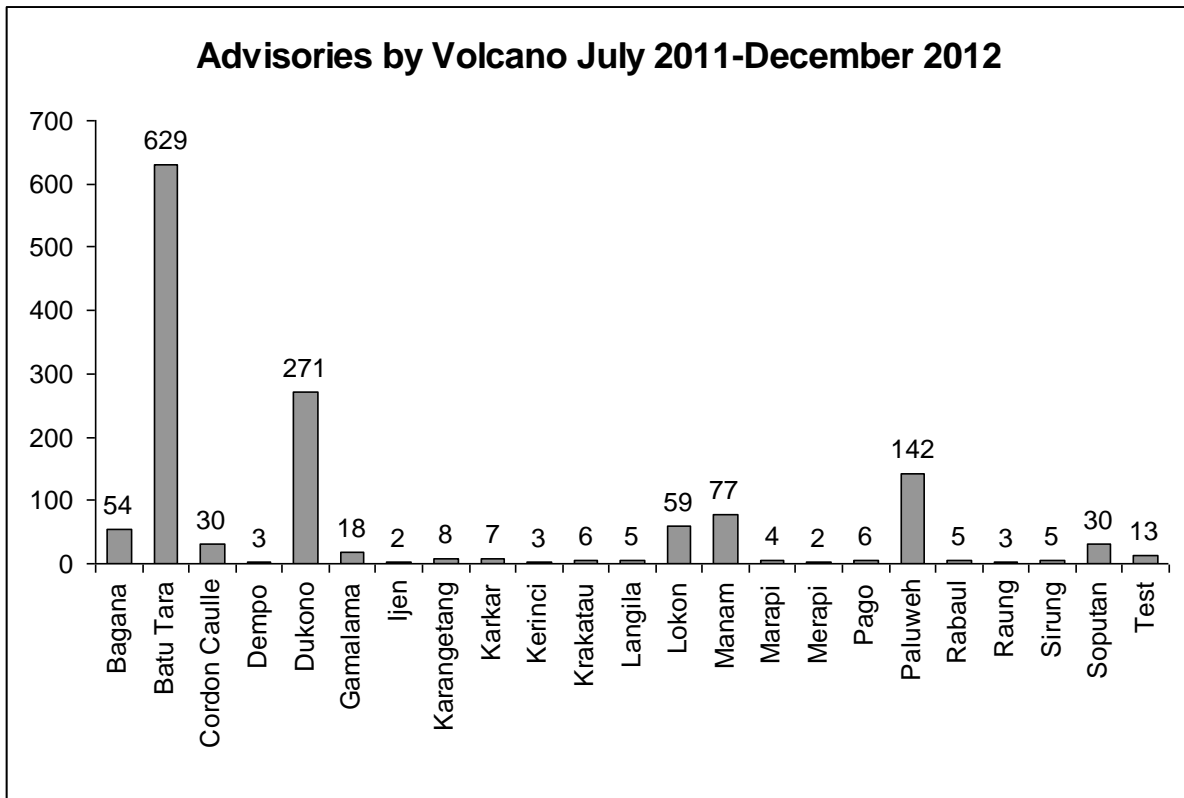


Figure 1. Number of VAA issued per volcano from 1 July 2011 to 31 December 2012.

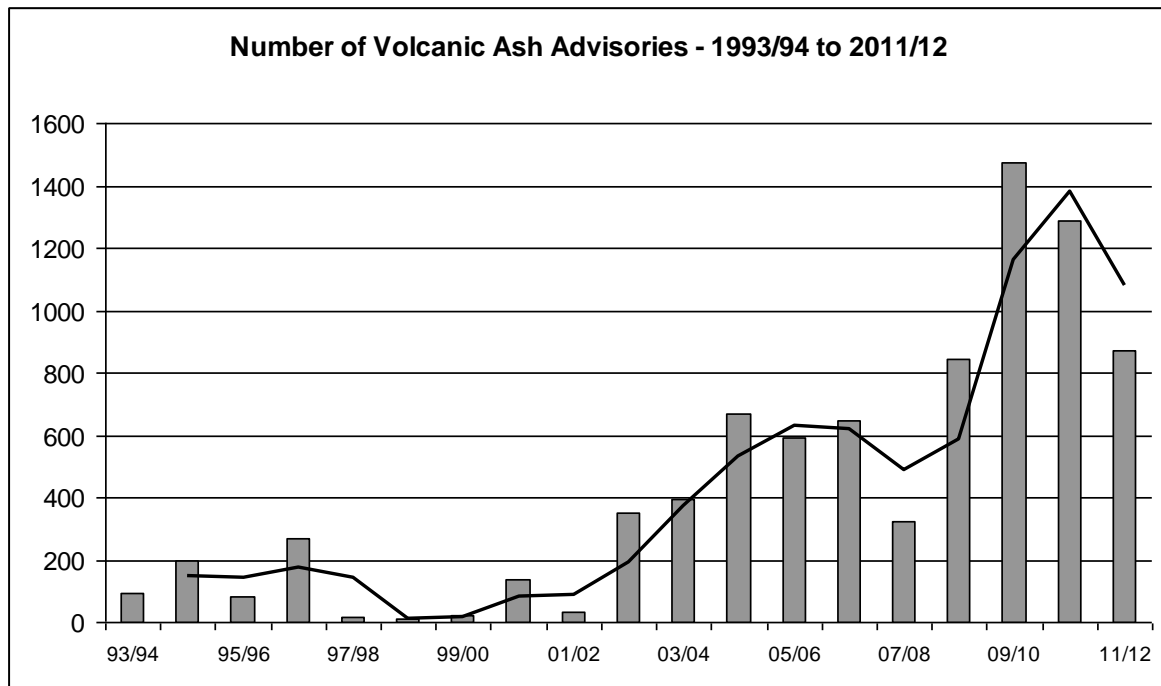


Figure 2. Number of VAA by Australian financial year (1 July – 30 June) since 1993.

2.2 Significant Eruptions

2.2.1 The eruption of Cordon Caulle in Chile, beginning in June 2011, produced an ash cloud that twice circumnavigated the southern hemisphere. Ash from this eruption moved over the Australian continent during the periods 11-15 June and 20-24 June, affecting flights to and from the major airports of Perth, Adelaide, Hobart, Melbourne, Sydney and Canberra. 133 volcanic ash advisories were issued by VAAC Darwin for this event between 8 June and 8 July, 2011.

2.2.2 Four high-level eruptions were produced from the volcano Sopotan in northeast Sulawesi, Indonesia. Eruptions affecting FL450 occurred on 4 July 2011, 14 August 2011 and 26 August 2012. A fourth eruption affecting FL200 occurred on 18 September 2012. During this period 30 VAA were issued for Sopotan, 19 of which were for flight levels above 15,000 ft.

2.3 Significant Operation or Technical Changes

2.3.1 In response to the significant increases in operational and administrative workload associated with VAAC operations in recent years, and following extensive stakeholder consultation, an extra 2.5 full time equivalent positions have been staffed and it is anticipated that further resourcing will be required in 2013-14. This will allow the VAAC to address relevant IVATF and IAVWOPSG outcomes.

2.3.2 New procedures regarding forecaster input into the remarks section of the VAA were implemented in October 2012. In the absence of a more operationally significant remark, a default remark that explains the method from which the ash height assignment was made is included. A web based software interface is used by forecasters to generate situation specific remarks, with greater continuity.

2.3.3 In regions with high levels of cloud obscuration and limited ground based observations, the decision to terminate a current advisory is often difficult. With reference to IAVWOPSG/4-REPORT Conclusion 4/20 — Recommended practice for “gradual” advisory cessation, a clear evidence based process for the cessation of advisories, which involves the gradual truncation of ash polygons from forecast time-steps, has now been formalised.

2.3.4 Existing quality management procedures have been strengthened by implementing a detailed framework for the post analysis of high level eruptions. A detection report detailing the event timeline, detection methods and any operational recommendations is now required for all eruptions above FL150. The report is produced as soon as possible after the event ensuring that operational and industry follow up is expedited.

2.3.5 VAAC Darwin was certified according to the AS/NZS ISO 9001:2008 Quality Management Standard in January 2008. An external audit was conducted by Lloyd’s Register of Quality Assurance (LRQA) in October 2011 and a subsequent internal audit in was completed in August 2012. The audit findings revealed no significant areas of non-conformance.

2.4 Regional Engagement

2.4.1 Liaison visits to Japan, Papua New Guinea and Indonesia were undertaken in 2012. The focus of these visits has been to improve communications between VAACs, MWOs and volcano observatories within the region. Progress in this regard has been encouraging and the flow of information between regional organisations involved in the IAVW has been significantly enhanced.

2.4.2 A working group involving representatives from VAAC Darwin, BMKG, CVGHM and the Directorate Air Navigation (DGAC) has been established to encourage effective volcanic ash information dissemination between Australian and Indonesian authorities.

2.4.3 The two way exchange of information between VAAC Darwin and regional volcano observatories was a particular focus during 2011-12. In addition to the established role of observatories as information providers to VAACs, forecasters at VAAC Darwin are now routinely providing satellite imagery to observatory staff. This two way exchange has been used recently to identify the source of ash falls on Bougainville Island in PNG where, due to the remoteness of the area, ground based techniques could not be applied.

2.5 **VAAC Backup.** Darwin, Tokyo and Wellington VAACs are continuing to cooperate to enhance existing back-up arrangements. A series of three backup tests were conducted between Darwin and Tokyo VAACs between January and September 2012. Operational testing of the backup arrangements proved to be extremely valuable as it revealed a number of communications issues that would not otherwise have been discovered. The most recent backup test conducted in September 2012 indicated that these communications issues have now been successfully resolved and the finalisation of the backup arrangement between Tokyo and Darwin VAACs is anticipated in 2013.

3. IAVW Implementation Issues

3.1 The main area of concern regarding the operation of the IAVW, within the VAAC Darwin area of responsibility, remains the risk of a significant eruption being undetected or unreported to the VAAC due to meteorological obscuration or the absence of ground based monitoring infrastructure.

3.2 In Papua New Guinea, only six of the country's 16 or so active volcanoes (50 volcanoes overall) are routinely monitored due to funding constraints. In addition, while the Rabaul Volcano Observatory (RVO) has been responsive with regard to alerting the VAAC to changes in volcanic activity, communications (telephone and email) outages have at times hampered timely exchange of information between the VAAC and the volcanological agency. VAAC Darwin has been assisting RVO with understanding the aviation cost-recovery mechanism; however RVO has so far been unsuccessful in this regard.

3.3 Around half of Indonesia's 129 active volcanoes are routinely monitored, although a number of international agencies are assisting CVGHM in this regard. During unfavorable satellite viewing situations, reports from the volcanological agency are critical for providing timely advice to the aviation industry. Discussions are continuing with CVGHM on these issues.

3.4 The development of a regional contingency plan for volcanic events that effectively involves the volcanological, meteorological and aviation stakeholders is seen by VAAC Darwin as being an area of particular importance.

3.5 The deficiency of the SIGMET service within the VAAC Darwin area of responsibility remains an area of concern. VAAC Darwin remains committed to addressing these issues by working with MWOs in the region and participating in further regional SIGMET testing. However, we are pleased to note there has been a significant progress with regards to the formatting and addressing of SIGMETs during 2012 and further progress is anticipated in 2013.

4. Future Developments

4.1 VAAC Darwin is pursuing alternative communication strategies for interactive information sharing between volcanological agencies, VAACs, air traffic coordinators and the aviation industry.

4.2 In an effort to improve forecast process transparency and provide flight planners with an indication of the strength of evidence upon which a volcanic ash forecast is based, confidence levels will be incorporated into trial VAAC products. The format of the resulting trial product will be determined through consultation with the aviation industry but is expected to include graphical indications of both altitudinal and areal confidence.

4.3 Back-up arrangements between Darwin and Tokyo VAACs are expected to be finalised and a back-up test between Wellington and Darwin VAACs is expected later in 2013.

4.4 A major research project is currently being undertaken by the Centre for Australian Weather and Climate Research to support the operations of VAAC Darwin. Expected outcomes of the project include an automated ash loading retrieval system, improved dispersion modelling capabilities and more efficient product generation software.

5. Action by the Meeting

5.1 The meeting is invited to note the information contained in this paper.
