



*International Civil Aviation Organization*

**EIGHTEENTH MEETING OF THE METEOROLOGY  
SUB-GROUP (MET SG/18) OF APANPIRG**

ICAO Regional Sub-Office, Beijing, China  
18 – 21 August 2014

---

**Agenda Item 7.4: Research, development and implementation issues in the MET field**

**7.4 Advisories and warnings**

**VAAC DARWIN MANAGEMENT REPORT**

(Presented by Australia)

**SUMMARY**

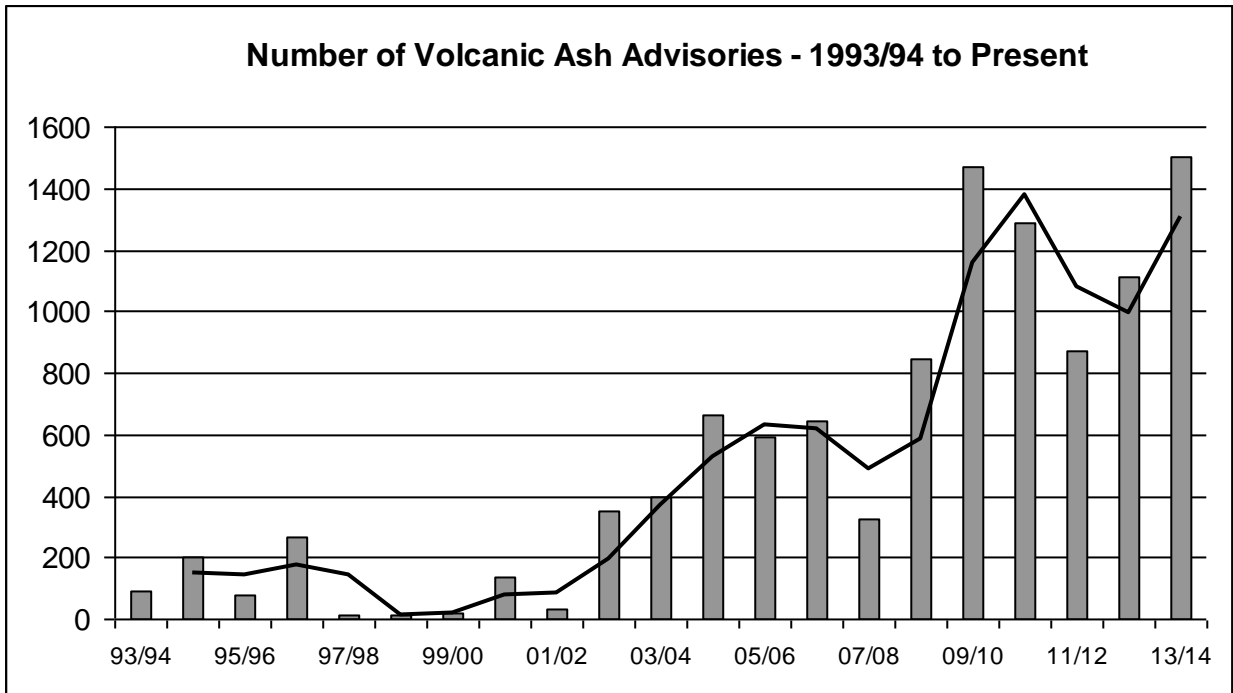
This paper presents the VAAC Darwin Management Report which addresses the main features of the IAVW operations, highlighting any recent developments and difficulties and future planned developments.

**1. Introduction**

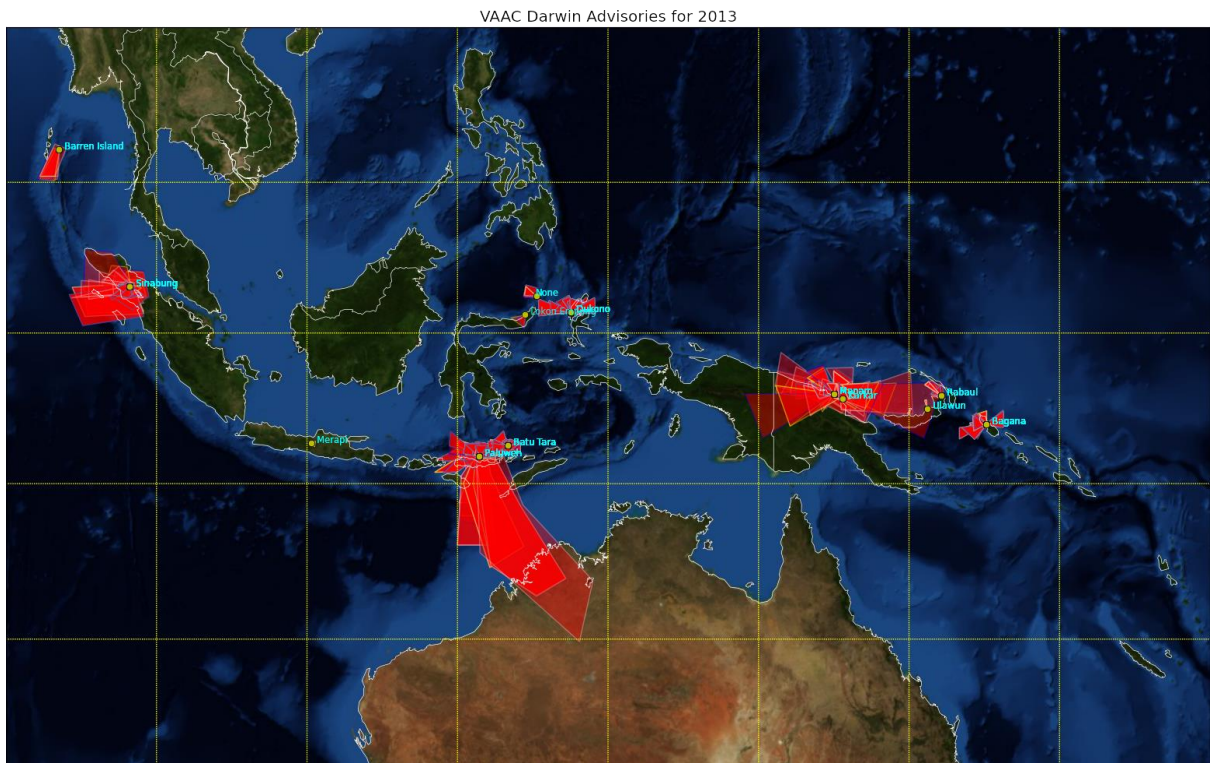
1.1 The Volcanic Ash Advisory Centre (VAAC) Darwin is responsible for monitoring the area from the Andaman Islands (India) eastwards to the Solomon Islands including the volcanically active Indonesian archipelago, Papua New Guinea and the southern Philippines. More than 150 active volcanoes lie within the area, some of which have given rise to the largest eruptions in human history. Areas within 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. Discussion**

2.1 A total of 1511 Volcanic Ash Advisories (VAA) were issued by VAAC Darwin from the 1st of July 2013 to the 30th of June 2014 (see Figure 1). During this period the most significant ash events within the VAAC Darwin area were the high level eruptions of the volcanoes Sinabung in February 2014, Kelut in February 2014 and Sangeang Api in May 2014 (see Figures 2 and 3).

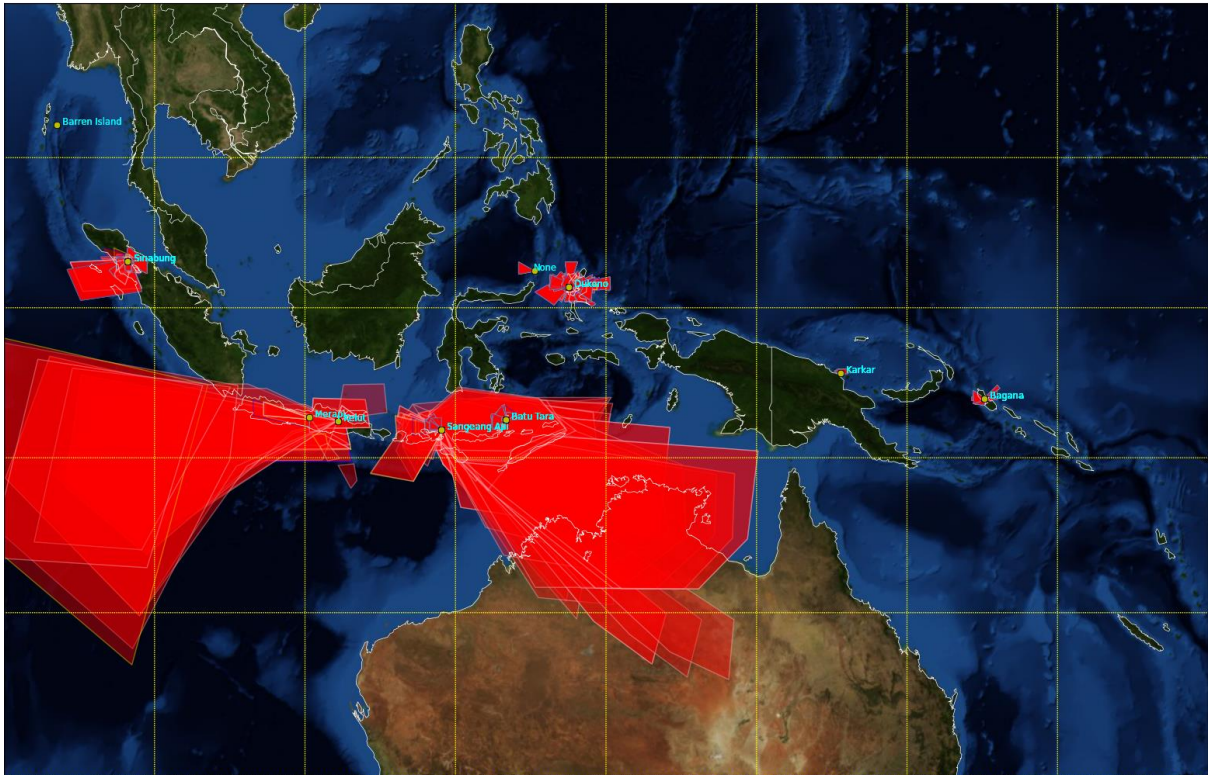


**Figure 1** - Total Volcanic Ash Advisories by fiscal year issued by Darwin VAAC. The solid line is the two-year moving average.



**Figure 2** – Areas covered by volcanic ash forecasts during 2013

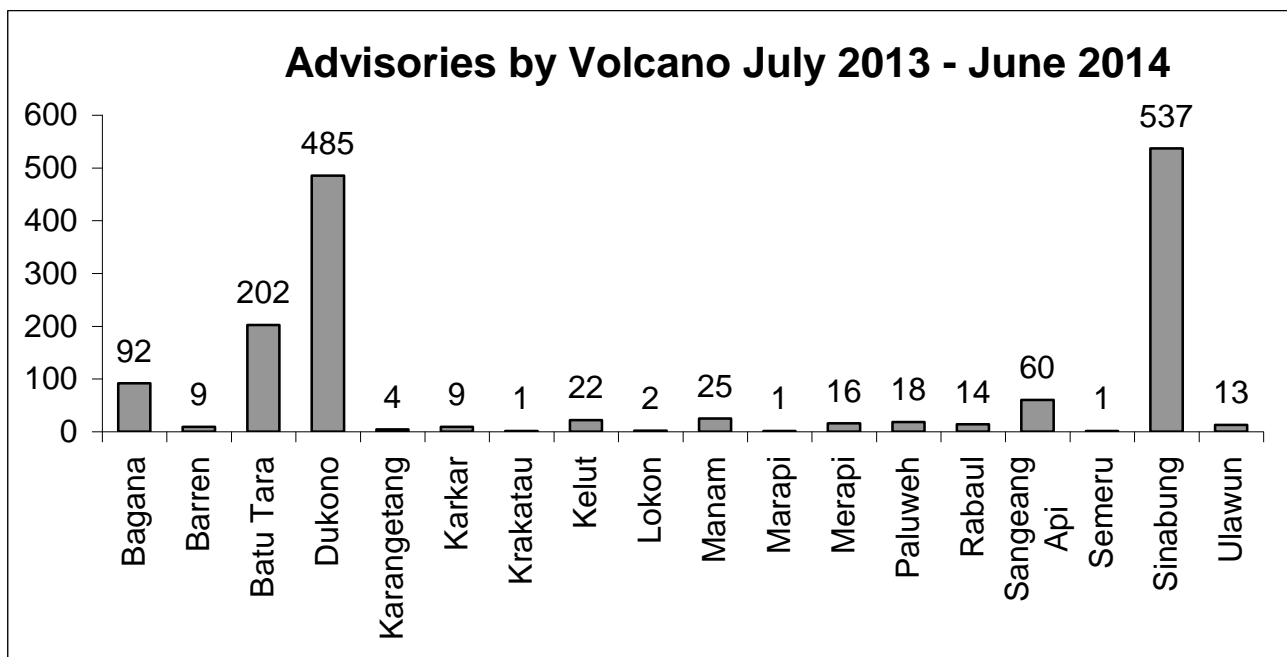
VAAC Darwin Advisories for 2014



**Figure 3** – Areas covered by volcanic ash forecasts during the period January – June 2014.

2.2 The number of VAA for the 2013/14 year indicate an approximately 26% increase in activity compared with 2012/13. Even though historically active volcanoes in the region such as Merapi and Rabaul were quiet, others such as Bagana, Batu Tara, Dukono, Sangeang Api and Sinabung became significantly more active.

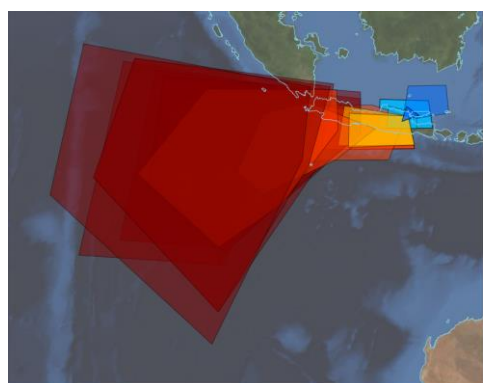
2.3 Activity within the region was dominated by low-level ash plumes detected on satellite imagery. The number of VAA issued by volcano for the year 2013/2014 is shown in Figure 4. Two highly active volcanoes, Dukono in Halmahera and Sinabung in the northern Sumatra were responsible for 68% of all the advisories issued. Sinabung remained at Alert Level IV for four and half months during this period, the highest alert level issued by Indonesia’s Centre for Volcanology and Geological Disaster Mitigation (CVGHM).



**Figure 4:** Number of advisories issued per volcano during the period July 2013 – June 2014.

2.4 A major eruption from Indonesia’s Kelut volcano lofted ash to at least 26 km and produced a large stratospheric ash and SO<sub>2</sub> cloud. The Kelut eruption caused widespread impacts on the aviation industry across the region and resulted in the closure of several international airports, the diversion and cancellation of hundreds of flights and significant impacts to nearby population centres. The heights and region covered by VAA during the Kelut eruption are shown in Figure 5.

2.5 For the first time in the 21 year history of the VAAC, large areas of Australia’s Northern Territory, including Darwin, were directly affected by volcanic ash. The significant eruption of the volcano Sangeang Api (see Figure 6) off the northeast coast of the island of Sumbawa sent two large plumes of ash towards Australia; one across central Australia and the second across northern parts of the continent which resulted in the closure of the Darwin International Airport and the diversion and cancellation of many flights between Australia and Indonesia.



**Figure 5:** Kelut Volcanic Ash Advisories by height

**Figure 6:** Sangeang Api eruption column<sup>1</sup>

<sup>1</sup> 30 May 2014. Courtney Robba, Dunia Baru / [www.duniabaruadventures.wordpress.com](http://www.duniabaruadventures.wordpress.com)

### **3. IAVW**

3.1 Over the past year the VAAC has continued progress towards improving the implementation of the International Airways Volcano Watch (IAVW) in the region, through ongoing engagement with volcano observatories, other VAACs, meteorological agencies, airlines and the scientific community.

3.2 Following the conclusions of the ICAO International Volcanic Ash Task Force (IVATF), the VAAC has liaised with Indonesian government agencies to progress International Airways Volcano Watch matters. The latest meeting, conducted in June 2014 resulted in a number of significant outcomes including: VAAC inclusion within Indonesia's Volcanic Activity Report Dissemination System, greater Indonesian participation in volcanic ash collaborative analysis and decision making, and; the drafting of a Scheme of Cooperation for information sharing between Indonesian Meteorological Climatological and Geophysical Agency (BMKG), CVGM, Indonesian Directorate General of Civil Aviation (DGCA) and the Australian Bureau of Meteorology (BoM).

3.3 Australia was strongly represented at the 8<sup>th</sup> meeting of the ICAO International Airways Volcano Watch Operations Group (IAVWOPSG/8) which was held in Melbourne in February 2014. Representatives from BoM continue to make significant contributions towards improving the operation of the IAVW and are actively involved with several IAVWOPSG outcomes.

### **4. VAAC Backup**

4.1 Significant progress has been made regarding the provision of operational backup services as specified by the Handbook of the International Airways Volcano Watch (IAVW) as outlined in Appendix D to ICAO Doc 9766 – *Handbook on the International Airways Volcano Watch (IAVW)*.

4.2 A Memorandum of Understanding between BoM and the New Zealand MetService was signed in July 2013, formalizing the backup arrangements between VAACs Darwin and Wellington south of 20°S.

4.3 A Scheme of Cooperation between BoM and the Japanese Meteorological Agency was signed in February 2014, formalizing the backup arrangements between VAACs Darwin and Tokyo north of 20°S.

4.4 Testing of the VAAC Darwin operational backup procedures between VAACs Darwin, Tokyo and Wellington is scheduled for October 2014.

### **5. Quality Management**

5.1 Operations at VAAC Darwin are certified to AS/NZS ISO 9001:2008 quality management standards and VAAC Darwin remains the only VAAC to have obtained this level of certification in its own right. Regular audits are conducted at the VAAC to ensure compliance with ISO specifications.

### **6. Action by the Meeting**

6.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.

-----