



*International Civil Aviation Organization*

**NINETEENTH MEETING OF THE METEOROLOGY SUB-GROUP  
(MET SG/19) OF APANPIRG**

Bangkok, Thailand, 3 – 6 August 2015

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**Agenda Item 6: Research, development and implementation issues in the MET field**

6.3) Forecasts, advisories and warnings

**DARWIN VAAC MANAGEMENT REPORT**

(Presented by Australia)

**SUMMARY**

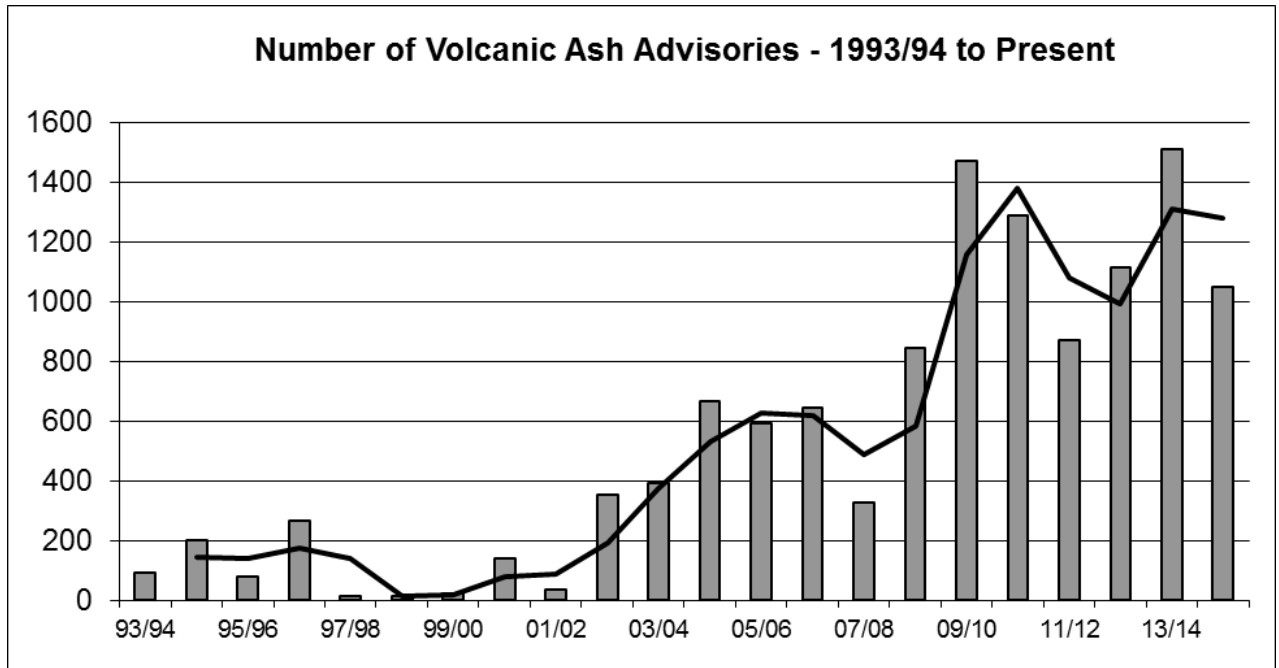
This paper presents the VAAC Darwin Management Report which addresses the main features of the IAVW operations, highlighting any recent developments and difficulties and future planned developments.

**1. INTRODUCTION**

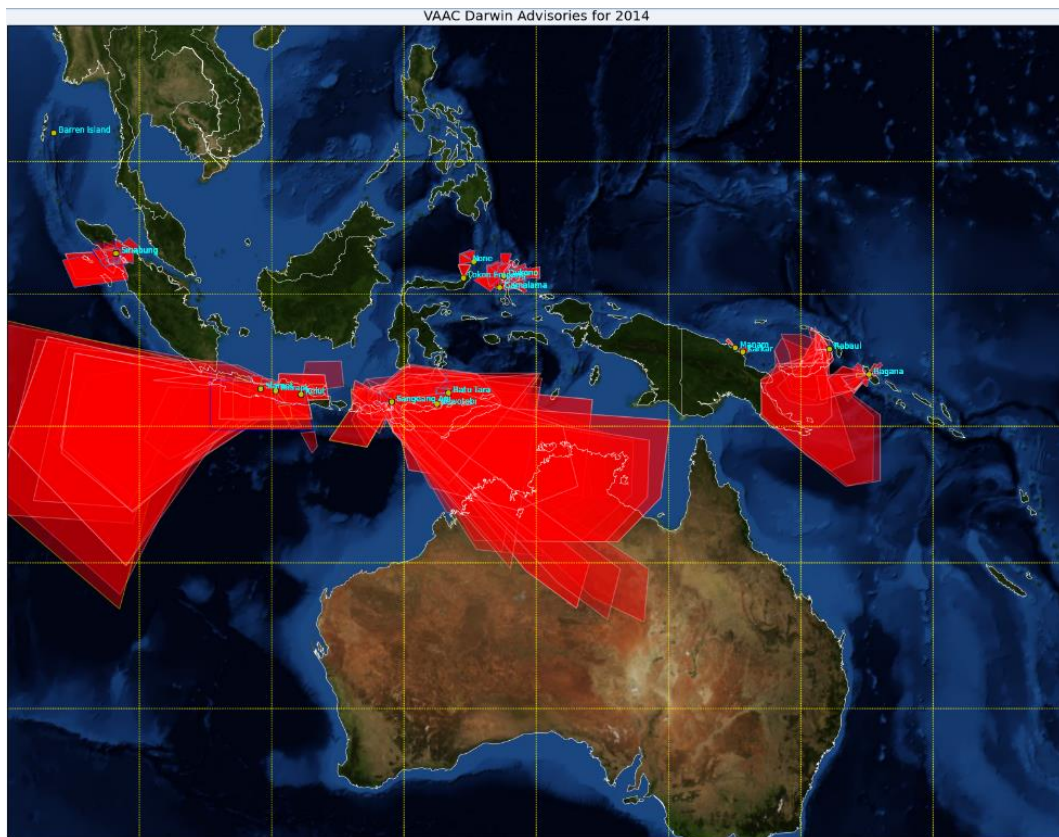
1.1 The Volcanic Ash Advisory Centre (VAAC) Darwin is responsible for monitoring the area from the Andaman Islands (India) eastwards to the Solomon Islands including the volcanically active Indonesian archipelago, Papua New Guinea and the southern Philippines. More than 150 active volcanoes lie within 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**

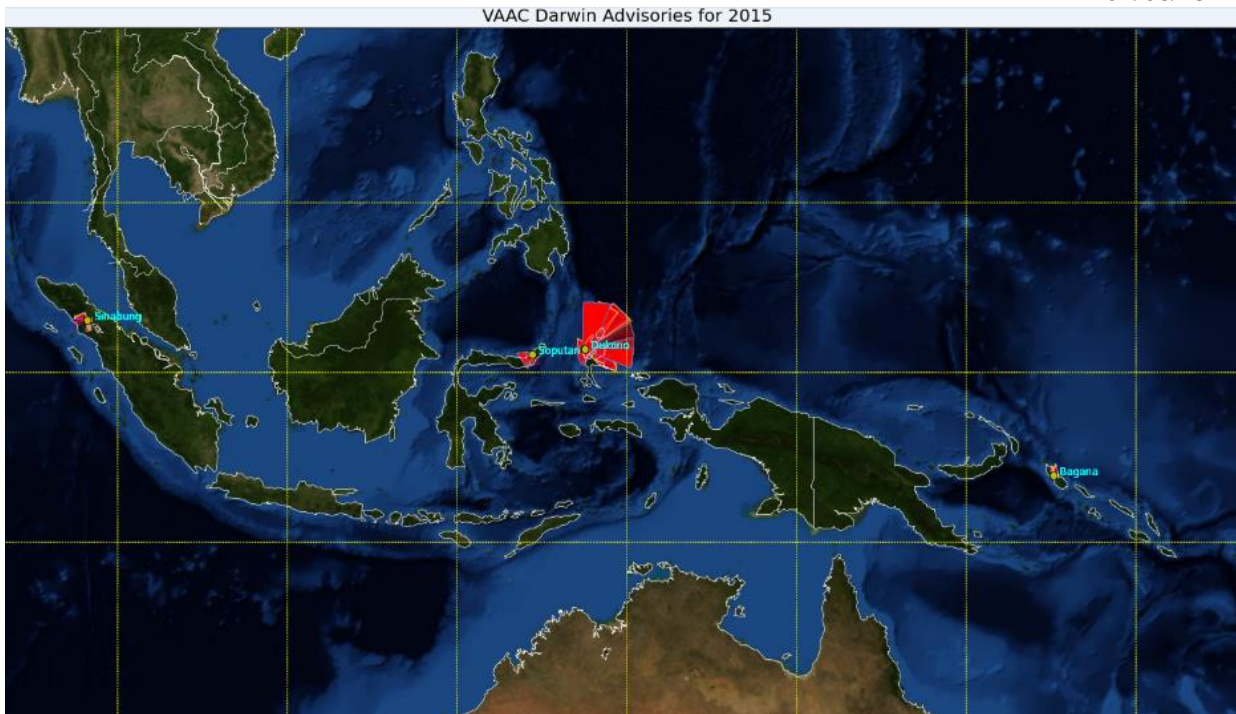
2.1 A total of 1048 Volcanic Ash Advisories (VAA) were issued by VAAC Darwin from the 1st of July 2014 to the 31st of May 2015 (see Figure 4). During this period the most significant ash events within the VAAC Darwin area were the high level eruptions of the volcanoes Rabaul in August 2014, Sinabung in January 2015 and Soputan in January 2015 (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. For the year 14/15, the advisory count is only till May 31<sup>st</sup> 2015.



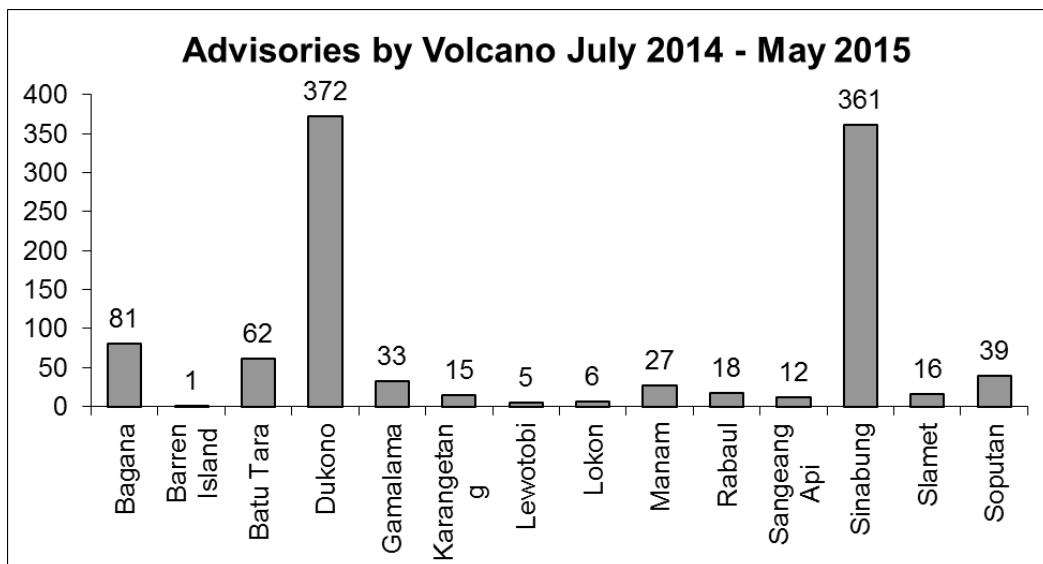
**Figure 2** - Areas covered by volcanic ash forecasts during 2014



**Figure 3 – Areas covered by volcanic ash forecasts during the period January 2015.**

2.2 During the first 11 months of the 2014/15 year, there were 1048 VAA compared to 1511 VAA during the 12-month period of 2013/14. The number of VAA for the 2014/15 year indicates an approximately 31% decrease in activity compared with 2013/14.

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 July 2014 – May 2015 is shown in Figure 4. Two highly active volcanoes, Dukono in Halmahera and Sinabung in the northern Sumatra region were responsible for 70% of all the advisories issued during the period.

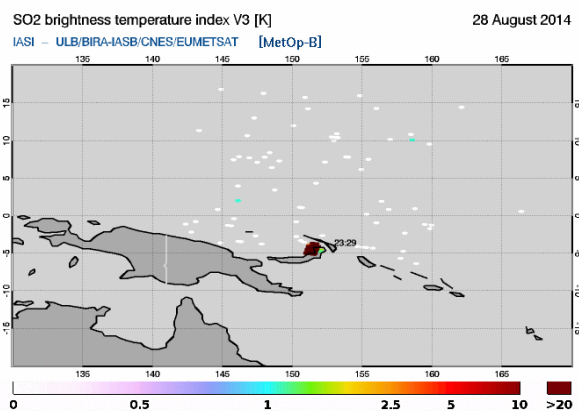


**Figure 4: Number of advisories issued per volcano during the period July 2014 – January 2015.**

2.4 The strombolian eruption from Papua New Guinea's Rabaul volcano (Tavurvur crater) sent ash to a height of 18 km and produced a strong SO<sub>2</sub> cloud signature. The Rabaul eruption made global headlines.



**Figure 5:** Rabaul eruption<sup>1</sup>



**Figure 6:** Rabaul eruption SO<sub>2</sub>

2.5 There were three high level eruptions within the first two weeks of January 2015. Two of the eruptions were at Sinabung (in northern Sumatra) on 3 January (7.3 km) and 12 January (4.6 km). The third eruption at Sopotan (in northern Sulawesi) reached a height of 8.3 km.

#### International Airways Volcano Watch (IAVW)

2.6 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. Australia remains an active member of the ICAO International Airways Volcano Watch Operations Group (IAVWOPSG).

#### Significant Operational Changes

2.7 As of 8 October 2014, VAAC Darwin enacted a dedicated roster where VAAC forecasters are no longer responsible for shared aviation duties. Current monitoring standards were reviewed and forecasters received additional training on new products and enhanced monitoring requirements for VAAC Darwin. VAAC Darwin forecasters monitor the VAAC's area of responsibility (AOR) for satellite, airborne, ground-based and conceptual evidence to detect ash clouds.

2.8 In October 2014 VAAC Darwin commenced the replacement of its Volcanic Ash Warning System (VAWS) with a new IBL Software Engineering Visual Weather based system known as the Volcanic Ash Module (VAM). The new system encompasses the entire VAA production process including satellite monitoring, dispersion model initialization and display and product generation.

<sup>1</sup> 28 August 2014, 20:25 UTC. PNG Climate Network / [www.pngclimate.net](http://www.pngclimate.net)

2.9 VAAC Darwin is undergoing a significant capacity upgrade to prepare for the arrival of data from JMA’s Himawari 8 satellite. As part of this upgrade the VAAC Darwin’s phone number has changed to +61 3 9669 8490.

Social Media

2.10 Several of the VAACs main stakeholders use social media to share operationally relevant information. This includes changes in Alert Levels from Observatories, Volcanic Activity, reports and photos shared via Twitter and Facebook. On 8 October 2014, the VAAC began monitoring social media operationally as part of the duty roster. Forecasters are trained on the use of social media for monitoring of volcanic activity and information as this is often the first indication of new activity. Social media has also improved forecasters situational awareness when ash is not discernable due to meteorological clouds.

VAAC Backup

2.11 VAAC Tokyo successfully operationally backed up VAAC Darwin during the testing of the VAAC Darwin operational backup procedures between VAAC Darwin and Tokyo on 22 October 2014.

2.12 VAAC Tokyo also operationally backed up VAAC Darwin during maintenance on Darwin’s AIFS system in November 2014. In January 2015, VAAC Darwin backed up VAAC Tokyo during an operational outage and successfully issued a VAA on behalf of Tokyo for the volcano Asosan.

2.13 Backup testing with VAAC Wellington is expected to occur later in 2015.

Quality Management

2.14 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 internal and external audits are conducted at the VAAC to ensure compliance with ISO specifications.

Himawari 8

2.15 The recent operational use of JMA’s Himawari 8 satellite has dramatically increased the quality and quantity of remote sensing data that can be accessed by VAAC forecasters. As volcanic ash forecasters begin to fully exploit the information provided Himawari 8 it is expected that the timeliness and accuracy of volcanic ash warnings will continue to increase during 2015.

**3. ACTION BY THE MEETING**

- 3.1 The meeting is invited to:
  - a) note the information contained in this paper; and
  - b) discuss any relevant matters as appropriate.

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