



WORKING PAPER

INTERNATIONAL VOLCANIC ASH TASK FORCE (IVATF)

FIRST MEETING

Montréal, 27 to 30 July 2010

Agenda Item 4: Review of operational response to volcanic ash aircraft encounter and notification and warning for VA (ATM sub-group)

Agenda Item 5: Development of ash concentration thresholds (AIR sub-group)

Agenda Item 6: Improvement of ash detection/avoidance systems (Science sub-group)

Agenda Item 7: Improvement and harmonization of dispersion models and their visual presentation (IAVW Coordination Group)

CONSIDERATIONS FOR THE EQUATORIAL TROPICS

(Presented by Australia)

SUMMARY

The response to the Eyjafjallajökull event will necessarily focus on the conditions experienced at the time. This paper highlights considerations from Australia's experiences that may be relevant in deciding universally appropriate actions to take in follow-up.

1. INTRODUCTION

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

1.2 As has been noted in many fora, SIGMET & NOTAM issuance is generally poor in the region, and as a consequence the VAAC assumes internally that the Advisories issued will be used as default warnings. Feedback from airlines consistently indicates that that is in fact the case.

1.3 VAAC Darwin has in recent years put considerable effort into science and operational issues. This year a comprehensive competency-based training and assessment program has been implemented for VAAC meteorologists. In April 2010, VAAC Darwin was certified as complying with AS/NZS ISO 9001:2008 Quality Management Standard by Lloyd's Register of Quality Assurance (LRQA).

1.4 The workload at VAAC Darwin has been generally increasing as skills and information flow increase and procedures are bedded down. Even without any major eruptions, over 1400 Volcanic Ash Advisories have been issued in each of the previous two financial years (July-June). The task force (TF) will appreciate that, given the workload implied by Figure 1 below, any significant proposed changes to procedures that affect advisory content, particularly for low altitude advisories that make up the great majority of events, will be of interest to Australia.

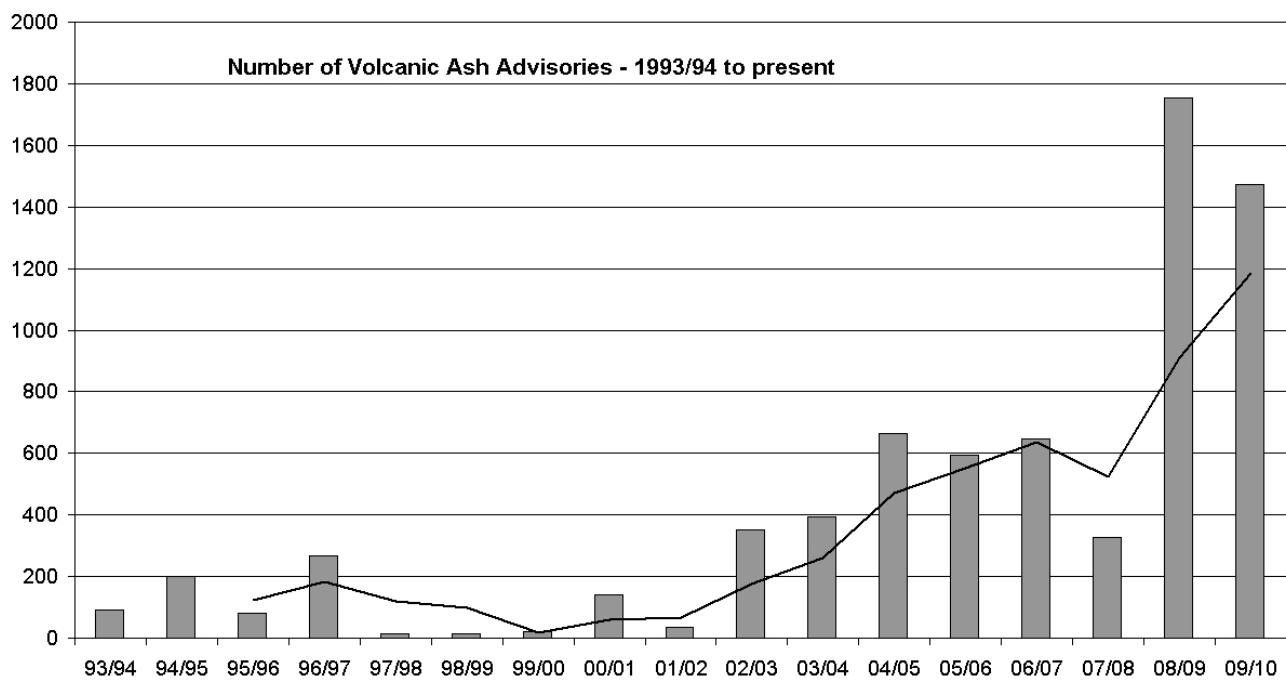


Figure 1.- Total volcanic ash advisories by year from VAAC Darwin. Solid line is the three-year moving average.

1.5 The remainder of this paper introduces specific issues for consideration by the task force during deliberations.

2. DISCUSSIONS ON AGENDA ITEMS 4 TO 7

2.1 Agenda Item 4

2.1.1 In relation to EUR/NAT VATF recommendation 1.5 (common methodology for simplifying complex airspace descriptions), Australia believes that there is considerable variation between VAAC approaches for VAA issuance, and discussion around standardisation of technique will be useful. Our own tendency is to use the minimum possible number of levels and points to describe a cloud.

2.1.2 In considering the possible aggregation of NOTAM and SIGMET messages (EUR/NAT VATF recommendation 1.8), the importance of pre-eruption NOTAM for planning purposes must not be forgotten. For unmonitored volcanoes in remote areas and in cloudy conditions, the notification time for even a major eruption can be significant – for example in 2005, a 14 hour gap between eruption and VAA issuance occurred for a stratospheric-level eruption in Papua New Guinea.

2.1.3 In Australia's view, central repositories for VAR and encounter reports (EUR/NAT VATF recommendations 1.11 & 1.12) are potentially of great value. Australia has been invited to trial such a repository for VAR (IAVWOPSG 5/12 refers), and would welcome any assistance with this task.

2.2 **Agenda Item 5**

2.2.1 There are scientific issues related to the practical implementation of commonly agreed threshold values and terminology for airspace contamination. These are magnified in the moist tropics by a) cloud cover, b) dynamical considerations and c) lack of ground observations. This might usefully be considered when debating the proposed values and terminology.

2.3 **Agenda Item 6**

2.3.1 As indicated in the above discussion, the tropical regions tend to be observation poor, including in regard to remote sensing in the rainy seasons (as the tropical tropopause is far above cruising levels, cirrus shielding of eruptions is common). Scientific standards and specifications developed in response to Iceland should explicitly consider the practicality of implementation across the world, and in particular noting the relatively undeveloped state of volcanic monitoring in many countries.

2.4 **Agenda Item 7**

2.4.1 Australia would be greatly concerned if ash concentration models were to be distributed to users without explicit integration of observations (EUR/NAT VATF recommendation 1.20), or if inconsistent products were to be distributed. VAAC Darwin has developed a set of 'rules of evidence' to assist in integrating dispersion model guidance with observations from all sources (including pilot reports, remote sensing, expert volcanological input), to ensure that Volcanic Ash Advisories are evidence-based and integrate the professional judgement of meteorological analysts as well as dispersion model output. Our strong preference would be to refine existing products (ie. the VAA) rather than move to operational provision of model output.

2.4.2 In regard to EUR/NAT VATF recommendation 1.21 (common user requirements for vertical segmentation), VAAC Darwin's practice is to choose vertical layers that provide the most elegant description of where the ash cloud(s) are. This can often be determined by meteorological conditions – for example, a strong inversion at FL250 might result in a natural cloud separation near FL250, and a VAA written to highlight that point. Also in regard to this recommendation, there is likely to be a need to consider whether and when it is in fact safe to fly under a precipitating ash cloud.

2.5 **Conclusions**

2.5.1 The diversity in VAAC operations across the world, influenced by local challenges such as those encountered in the moist equatorial tropics, should be considered when discussing internationally consistent responses to Eyjafjallajökull.

3. **ACTION BY THE IVATF**

3.1 The IVATF is invited to:

- a) note the information in this paper; and
- b) consider the comments above when discussing the relevant agenda items

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