



WORKING PAPER

INTERNATIONAL VOLCANIC ASH TASK FORCE (IVATF)

FIRST MEETING

Montréal, 27 to 30 July 2010

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

7.2: Need for further refinement of current visual VAAC products

USE OF COMMA-SEPARATED VARIABLE (CSV) FILES FOR THE PRODUCTION OF NOTAM AND SIGMET RELATING TO VOLCANIC ASH

(Presented by United Kingdom)

SUMMARY

The paper presents a proposal to provide automatically generated data files of coordinates used in the new volcanic ash concentration charts issued by VAAC London, at the request of airlines. Such data files would assist with the provision of SIGMET and NOTAM.

1. INTRODUCTION

1.1 According to guidance contained in the *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (Doc 9691), the recommended procedure in the case of volcanic ash, regardless of its concentration, is for aircraft to avoid it.

1.2 Initially all UK NOTAMs, relating to volcanic ash, were produced, in accordance with the guidance given ICAO Annex 3 and ICAO EUR Doc 019 (*Volcanic Ash Contingency Plan for the EUR Region*). The volcanic ash NOTAMs were based on the standard Annex 3 — *Meteorological Service for International Air Navigation* volcanic ash advisory graphic charts and the volcanic ash advisory texts, which provided latitude and longitude coordinates of the ash boundaries depicted on the graphic charts. These could easily be manually extracted from the advisory texts, but manual plotting and visual assessment were required to determine the coordinates of the intersection of FIR boundaries with the volcanic ash boundaries.

1.3 When VAAC London was requested by airlines to develop and introduce supplementary volcanic ash concentration charts into operational service, a method was required to extract the volcanic ash boundaries in latitude and longitude coordinates, for the various concentration levels depicted on the

new charts, in order to enable the dissemination of NOTAM warnings. (*Note. - Volcanic Ash SIGMET continued to be based on the standard Annex 3 Volcanic Ash Advisory*). The remainder of this paper discusses the process, the rationale behind it, and makes proposals for a wider adoption of the end product.

2. DISCUSSION

2.1 From 20 April 2010, the newly developed vertically segmented ash concentration charts were introduced into operational service. Volcanic ash-related NOTAM production from this time was based on the new ash concentration charts. Initially the polygon co-ordinates of the volcanic ash boundaries were extracted from the charts manually, i.e. visually. This was a slow and labour intensive process and to speed this up a new method needed to be developed to generate the NOTAM ash boundary coordinates from the ash concentration charts.

2.2 On 23 April 2010, a system of manually produced comma-separated variable (CSV) files was introduced by the forecasters in the Emergency Monitoring and Response Centre (EMARC) at the Met Office, (co-located with VAAC London). An important benefit of CSV file use is that they facilitate the plotting of ash concentration areas and enable easier generation of NOTAMs. Initially they were produced manually but this was a relatively labour intensive process for the VAACs. Further developments led to the introduction of an automated system of CSV file generation. This reduced the workload for the forecasters but, in order to accurately describing each turning point of the ash concentration boundary, a relatively large number of coordinates were generated.

2.3 As a result it was necessary to develop a further process that smoothed polygons with the associated data files containing fewer numbers of latitudes and longitudes. The package of smoothed data prescribes the various levels of contamination in the three flight level segments from SFC-FL200, FL200-350 and FL350+. Hence, the package provides the latitudes and longitudes for each NOTAM ready for dissemination. Further work is planned to enable the smoothing to be carried out as part of the production process.

2.4 Automated CSV file usage has three benefits for the production of NOTAMs. Firstly, the process is less labour intensive. Secondly, provision of co-ordinates in CSV files removes the need for the NOTAM producer to visually determine the polygon ash boundary co-ordinates and FIR/ash boundary intersection points for dissemination in the NOTAM. Thirdly, NOTAM producers can be more selective in choosing representative coordinates to define the polygon ash boundaries promulgated in the NOTAM. In short, better, more accurate latitude and longitude co-ordinates of volcanic ash boundaries can be provided quicker, not only for polygon generation, but also in a format required for NOTAM production. As CSV files can contain several hundred points, a possible disadvantage of their use is that of overloading the users of the data, but in practice this is easily overcome by, as mentioned above, selectively choosing key points to determine polygon boundary and NOTAM coordinates.

2.5 In addition, the CSV files allowed operators and other organisations to plot the volcanic ash information on their own mapping systems and internal briefing systems, thus resulting in consistency of the information being shown.

2.6 It is recognized that States have a sovereign right to arrange NOTAM production in a way that best suits them. Nevertheless, there may be benefits utilising files of the same or other format to assist with the production of volcanic ash SIGMET and NOTAM. Globally, there are different levels of capability between the VAACs, given that visual and manual generation of latitudes and longitudes from

volcanic ash graphics for Volcanic Ash SIGMET and NOTAM production can be a difficult and tedious process. This raises two key questions; firstly whether States would welcome or benefit from additional information being provided by the VAACs to assist in the generation of Volcanic Ash SIGMET, NOTAMs and ASHTAMs as appropriate; and secondly, whether there should be an additional provision in Annex 3 or development of guidance material that would result in the VAACs generating the appropriate files. This approach is not inconsistent with the concept being considered by the Meteorological Warnings Study Group (METWSG) for SIGMET production in the round.

3. CONCLUSIONS

3.1 Following the Eyjafjallajökull volcanic eruption, new volcanic ash concentration charts were developed and introduced by VAAC London, at the request of airlines, to supplement the standard Annex 3 VAAC advisory graphic charts. Coupled with this was the development of CSV files that gave the coordinates of the ash concentration boundaries, to facilitate the production of NOTAM. However, these files have wider utility for the production of SIGMET and/or ASHTAM as well.

4. ACTION BY THE IVATF

4.1 The IVATF is invited to:

- a) note the information in this paper; and
- b) task the IAVW coordination group to:
 - 1) consider the requirement for the provision of automatically generated data files of coordinates to assist with NOTAM and SIGMET production; and
 - 2) investigate the benefit of the VAACs assisting other States to provide more consistent Volcanic Ash SIGMET and NOTAMS from CSV data files, by including the determination of the ash boundary within specific FIR intersection points.

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