International Civil Aviation Organization



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## 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

PRODUCTION OF VOLCANIC ASH CONCENTRATION CHARTS

(Presented by United Kingdom)

#### SUMMARY

This paper provides brief details of the new charts developed by VAAC London in response to the eruption and requests ICAO to consider the future usefulness of the products and whether other VAACs should be recommended or required to make them available in their areas of responsibility.

#### 1. **INTRODUCTION**

1.1 The protracted eruption of the Eyjafjallajokull volcano, ejecting a debris plume over 30,000 feet into the atmosphere, had a severe effect on the densely populated European air transport network. Shortly after the start of the eruption, the UK CAA initiated a regular series of international teleconference calls that enabled participation from a wide range of stakeholders to address how to deal with the impact of the on-going disruption. During this process, airline representatives asked for new supplementary graphical charts to be developed as a matter of urgency. As a result, the standard Volcanic Ash Advisory Graphic charts, provided in accordance with Annex 3 — *Meteorological Service for International Air Navigation* requirements by VAAC London, were supplemented by a series of new products to better meet the operational requirements of the aviation community. The combined information provided the initial indications of volcanic ash contamination on which subsequent operational decisions were based, regarding go/no-go decisions and likely areas of safe flight operations.

#### 2. **DISCUSSION**

#### 2.1 VAAC London – Initial Response

2.1.1 On 18 April 2010, urgent work was started to transpose existing non operational ash concentration contour plots into products. This work was successfully completed two days later, on 20 April 2010, resulting in the first production run of the new series of operational VAAC London NWP Volcanic Ash Concentration charts.

#### 2.2 VAAC London – New Product Development

2.2.1 The main product that was developed as a supplementary to the standard Volcanic Ash Advisories was an ash concentration chart, visualized on a mapping facility and made accessible via the public Internet. The charts were provided in three vertical height bands (SFC-FL200, FL200-350 and FL350+), indicating the predicted boundaries of airspace of the following areas:

- a) Area of Low Contamination: where volcanic ash may be encountered at concentrations equal to or less than  $2x10^{-3}$  g/m<sup>3</sup>;
- b) Area of Medium Contamination: where volcanic ash may be encountered at concentrations greater than  $2x10^{-3}$  g/m<sup>3</sup>, but less than  $4x10^{-3}$  g/m<sup>3</sup>; and
- c) Area of High Contamination: where volcanic ash may be encountered at concentrations equal to or greater than  $4x10^{-3}$  g/m<sup>3</sup>.
- 2.2.2 The charts were issued every 6 hours for validity times of 0000, 0600, 1200 and 1800 UTC.
- 2.2.3 In addition the following ash concentration charts were produced:
  - a) *Five-day planning ash concentration contour charts*: charts indicating the anticipated situation in 3 vertical height bands (SFC-FL200, FL200-350 and FL350+). The charts were issued every 12 hours for validity times of 0000 and 1200 UTC;
  - b) Ash concentration charts with greater vertical granularity: charts with vertical segmentation at 5,000 foot intervals were provided to aid over-flight of the ash contamination by providing a better resolution of the maximum predicted height of the volcanic ash for NOTAM purposes. Work continues to assess usability as part of any under-flight policy; and
  - c) Ash concentration charts: charts with higher temporal resolution, i.e. time steps of 3 hours for the 3 vertical height bands. These charts were aimed to give assistance with planning so that, in particular, aerodromes could conduct improved operations planning.

#### 3. CONCLUSION

3.1 The protracted eruption of the Eyjafjallajokull volcano on 14 April 2010 had a severe effect on the densely populated European air transport network. In response to requests from airlines

during international teleconference calls, VAAC London took urgent steps to develop and introduce a number of new supplementary graphical ash concentration charts into operational use, in addition to continuing to produce the standard Volcanic Ash Advisory Graphic charts, provided in accordance with Annex 3 requirements.

#### 4. **ACTION BY THE IVATE**

- 4.1 The IAVTF is invited to:
  - a) note the information in this paper;
  - b) task the IAVW coordination group to:
    - 1) determine the usefulness and benefits of the new supplementary graphical volcanic ash concentration charts for operational use;
    - 2) consider whether wider generation of these products should be recommended to other VAACs; and
    - 3) assess whether, in the interest of maintaining standardization of VAAC products, any of these new products should be incorporated in Annex 3 as required VAAC outputs.

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