



INTERNATIONAL VOLCANIC ASH TASK FORCE (IVATF)

FIRST MEETING

Montréal, 27 to 30 July 2010

Agenda Item 3: Results of the EUR/NAT VATF Meeting (Plenary)

3.1: Evaluation of the Eyjafjallajökull eruption and lesson learned

EUR/NAT VOLCANIC ASH EXERCISES STEERING GROUP (EUR/NAT VOLCEX/SG) LESSONS LEARNED AND RECOMMENDATIONS

(Presented by the Secretariat)

SUMMARY

This paper outlines lessons learned and recommendations to emerge from the European and North Atlantic Volcanic Ash Exercises Steering Group (EUR/NAT VOLCEX/SG) in light of the eruption of the Eyjafjallajökull volcano in Iceland during April and May 2010.

1. INTRODUCTION

1.1 In addition to the temporary EUR/NAT Volcanic Ash Task Force (EUR/NAT VATF), as described in WP/02, the European and North Atlantic Regional Office has a permanent Volcanic Ash Exercises Steering Group (EUR/NAT VOLCEX/SG). The EUR/NAT VOLCEX/SG is charged principally to improve the response to volcanic eruptions and volcanic ash clouds by the relevant service providers (ATS, AIS, ATFM, MET) and airspace users (airlines) in the EUR and NAT Regions through the organizing of regular volcanic ash exercises. Regional volcanic ash exercises in the EUR and NAT Regions are held on an annual or bi-annual basis in order to validate and continually improve the regional volcanic ash contingency plans and procedures.

1.2 The VOLCEX/SG provides regular updates on its activities to subsidiary groups of the European Air Navigation Planning Group (EANPG) and North Atlantic Systems Planning Group (NAT/SPG). The EUR/NAT VOLCEX/SG is comprised of experts from France, Iceland, Italy, Portugal, the United Kingdom, EUROCONTROL CFMU and IATA. The EUR/NAT VOLCEX/SG meets annually, with the most recent meeting (VOLCEX/SG/5) taking place in Reykjavik, Iceland, on 28 and 29 June 2010. During VOLCEX/SG/5, the meeting conducted a review of the eruption of the Eyjafjallajökull

volcano in Iceland during April and May 2010, in view of the significant disruption caused to air traffic in the EUR and NAT Regions from the eruption.

1.3 This paper outlines the lessons learned and recommendations to emerge from the EUR/NAT VOLCEX/SG for the information of the International Volcanic Ash Task Force (IVATF).

2. REVIEW OF ERUPTION OF EYJAFJALLAJÖKULL VOLCANO BY EUR/NAT VOLCEX/SG

2.1 The VOLCEX/SG noted that the eruption of Eyjafjallajökull had principally been a series of explosive events during March, April and May 2010 but with little lava. Relative to other volcanic eruptions around the world, this eruption of Eyjafjallajökull was considered to have been *medium* sized. There had been significant local ash fall across southern Iceland, which had more recently (June 2010) led to complications at Reykjavik and Keflavik airports, as well as elsewhere within the Reykjavik FIR, due to the re-suspension of the ash (i.e. wind-blown ash). The VOLCEX/SG noted the difficulties faced by Iceland in terms of the lack of direct observation of the eruption in the near field – i.e. limited sight by the Keflavik Doppler radar of Eyjafjallajökull below a height of about 3 km, little or no lidar, radiosonde, dropsonde or other observational information.

2.2 In the context of the re-suspension of volcanic ash, the VOLCEX/SG noted that no provisions currently exist in ICAO Annex 3 – *Meteorological Service for International Air Navigation* – to observe (in METAR/SPECI), forecast (in TAF) or warn (in VA SIGMET) about re-suspended ash, although the steering group noted that volcanic ash from an eruption *per-se* could already be reported using ICAO provisions. Interim [ICAO] guidance related to re-suspended volcanic ash had been provided to Iceland by the Secretariat, although the matter would require further consideration by ICAO.

2.3 The VOLCEX/SG noted that there was a need to perhaps consider how to move towards a simpler format VA SIGMET message, without being unnecessarily or overly conservative when defining the area of volcanic ash contamination. The Eyjafjallajökull eruption had shown how a volcanic ash cloud can spread across large parts of FIRs, sometimes even covering *entire* FIRs in the EUR Region. Multiple levels and multiple coordinate points in volcanic ash advisories from VAAC London often meant that such messages were often very lengthy (beyond the 1800 character limit of AFTN) and very time consuming for MWOs to use in VA SIGMET production. The VOLCEX/SG noted that one way to reduce the length of the VA SIGMET messages was to adopt coordinate points in the form ‘Nnn Wnnn’ rather than ‘Nnnnn Wnnnnn’, and to amalgamate some of the vertical layers (e.g. SFC – FL350, rather than SFC-FL200 and FL200-FL350); however, such simplification or rounding was far from an ideal solution as airspace restrictions may be imposed in some part of the FIR unnecessarily.

2.4 The VOLCEX/SG noted that there was a clear need to move away from volcanic ash “presence” to volcanic ash “concentration”. The recent availability of volcanic ash concentration guidance charts, indicating peak concentrations at differing thresholds, had been developed by the meteorological office co-located with VAAC London (UK Met Office) under the direction of the UK regulator (CAA). Further consultation with the regulator and manufacturers would undoubtedly lead to a refinement of the concentration zones and thresholds. The VOLCEX/SG recommended that the vertical segmentation of volcanic ash advisory information should be reconsidered during a future exercise or real event to more appropriately aid the utilisation of non-contaminated airspace. Consistent use of “traditional” vertical segmentation such as SFC-FL200, FL200-350 and FL350-550 may not suit a changing/evolving situation. However, there may be system limitations that prevent a VAAC from being

able to produce frequently changing vertical segmentation on a regular basis, as well as implications for users if vertical layers were to change frequently through an incident.

2.5 In considering the proliferation of different products for the same volcanic event from different organizations (e.g. official VAA/VAG from VAAC London, ash concentration guidance charts from UK Met Office, EUROCONTROL sector contamination charts), the VOLCEX/SG noted that such developments, whilst welcomed, had not always proved beneficial from a decision making perspective. Occasionally it had been challenging for ANSPs, amongst others, to handle the different procedures and products whilst the eruption was ongoing.

2.6 In considering the numerical models used to predict the movement and dispersal of volcanic ash, the VOLCEX/SG noted that there was a need to better characterize the eruption source parameters. Whilst the dispersion models used to predict the transportation and dispersal of volcanic ash have been proven to be very reliable, they were only as reliable as the observational information used to initialize them. Such observational information concerning a volcanic eruption is often limited or non-existent – particularly for volcanoes which are poorly monitored. Consequently, an integrated observation-validation system would go a long way towards improving source parameterisation taking into account ground-based, airborne and satellite-based remote sensing systems.

2.7 In considering the restrictions placed on airspace to prevent volcanic ash encounters by aircraft, the VOLCEX/SG noted that closed or restricted airspaces had often not been coincident with traffic volumes, and that during the crisis there was an unsustainable rate of manual exclusions, and uncertainty regarding the period of airspace closure or restriction. The VOLCEX/SG noted that the measures contained in the (prevailing) volcanic ash contingency plan on 14 April 2010, and the subsequent early days of the incident, had worked well. However, as the crisis deepened, the airspace restrictions imposed across the EUR and NAT Region became unsustainable. When dealing with aircraft operators (AOs), unsecure teleconferences organized by EUROCONTROL CFMU occasionally became chaotic and unmanageable simply due to the sheer number of people taking part. Limiting teleconference participation (say, to only the ANSPs, CFMU and VAACs) could improve the conducting of future teleconferences.

2.8 The VOLCEX/SG noted that the EUROCONTROL CFMU Network Operations (NOP) Portal, which provided a range of volcanic ash information including AIM messages and sector contamination plots, was pushed to the limits – with 13½ million page impressions on one day alone. A CFMU NOP Portal prototype, currently under development, may provide a future centralised repository to access and display all volcanic ash related aeronautical messages (e.g. VAA/VAG, ASHTAM/VA NOTAM, VA SIGMET, AIM, ANM).

2.9 In noting a recent proposal for amendment to the volcanic ash contingency plan of the EUR and NAT Regions, and the introduction of ash concentration guidance providing information on areas of low/medium/high contamination, the VOLCEX/SG highlighted a concern related to the interface between adjoining FIRs where States establish Danger Areas based on different criteria. For example, supposing State A establishes a Danger Area for FIR A based on areas of medium and high contamination, whilst neighbouring State B establishes a Danger Area for FIR B based only on areas of high contamination, how should traffic be managed across the FIR interface? The VOLCEX/SG acknowledged that this would be tested during a future exercise or real event, and had already been highlighted by the EUR/NAT VATF.

2.10 The VOLCEX/SG noted that EUROCONTROL and the European Commission had recently established a European Aviation Crisis Coordination Cell (EACCC), to be activated when circumstances beyond the normal environment of operation are evident – e.g. volcanic activity, terrorism. The VOLCEX/SG noted that the EACCC would facilitate the management of a future crisis amongst, at least, ECAC member States; and may go some way towards providing a focal coordinating body within the EUR Region.

2.11 The VOLCEX/SG noted that, traditionally, volcanic ash exercises conducted in the EUR and NAT Regions had been held across one working day. In future, the VOLCEX/SG agreed that due consideration would be given to conducting regional exercises across 2 or 3 days, say, to increase participation and improve the coordinated response to a future volcanic ash event. Longer duration exercises would also better identify the adequacy of the volcanic ash contingency plan during the reactive and proactive phases in particular. In addition, the VOLCEX/SG recommended that national regulatory authorities, such as national CAAs, should be encouraged to become more involved in facilitating the conducting of the regular volcanic ash exercises.

3. RECOMMENDATIONS ARISING FROM EUR/NAT VOLCEX/SG LESSONS LEARNED

3.1 Recommendations to emerge from the lessons learned amongst members of the EUR/NAT VOLCEX/SG can be summarised as follows:

- a) establish [ICAO] standards and guidance concerning re-suspended (wind-blown) ash in METAR/SPECI, TAF and VA SIGMET;
- b) consider VA SIGMET simplification when complex (multi layered, multi coordinate) ash clouds develop;
- c) review the vertical segmentation of the VAAC products in order to maximise the use of non-contaminated airspace;
- d) reduce source parameter uncertainty through improved ash cloud detection and reporting;
- e) further refine the ‘safe’ levels of ash concentration;
- f) consider longer duration volcanic ash exercises in order to increase participation and improve the coordinated response to a future volcanic ash event;
- g) identify a leadership/coordinating body that will facilitate the management of a crisis (in the region);
- h) encourage national regulatory authorities, such as national CAAs, to become more involved in facilitating the conducting of the regular volcanic ash exercises in the EUR and NAT Regions;
- i) limit CFMU teleconference participation and establish secure communications lines; and

- j) exercise interface changes between adjacent FIRs when Danger Areas are established based on different ash concentration thresholds.

3.2 The VOLCEX/SG noted that some of the above recommendations were of relevance purely for the VOLCEX/SG (such as the consideration of longer duration exercises), whilst others would require regional or global consideration (such as the establishment of [ICAO] standards and guidance concerning the re-suspension of volcanic ash). In addition, the VOLCEX/SG recognized that many of the above recommendations have been suitably encapsulated within the recommendations to emerge from the EUR/NAT VATF (WP/02 refers).

3.3 Lastly, the VOLCEX/SG affirmed the pivotal roles that preparation and training, and ultimately collaboration and coordination, play in the response to a future volcanic event.

4. **ACTION BY THE IVATF**

4.1 The IVATF is invited to note the contents of this information paper.

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