



International Civil Aviation Organization

AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP (APIRG) METEOROLOGY SUB-GROUP EIGHTH MEETING

(Nairobi, 25-27 June 2007)

Agenda Item 5: Provision of Tropical Cyclone and Volcanic Ash Advisories *Activities inherent to the Volcanic Ash Advisory Centre – VAAC Toulouse in the AFI Region*

(Presented by France)

SUMMARY

This paper provides information on AFI Region-related activities that involve the Volcanic Ash Advisory Centre (VAAC) of Toulouse, including developments that are in progress in the area concerned.

1. Introduction

1.1 Ever since summer 2005, the operational activities of the volcanic ash advisory centre (VAAC) in Toulouse, in relation to the AFI Region, were centered to four (4) volcanos. Fifty eight (58) messages in the form of volcanic ash advisories were transmitted during this period and no incident or accident related to volcanic ash was ever reported.

1.2 An alphanumerical tool for volcanic ash graphics (VAG) has been discovered and integrated into the software equipment available to forecasters at their work stations. The tool was developed by **Météo-France, SYNERGIE** and is at present fully operational. Volcanic ash advisories can also be started using volcanic ash graphics when the latter are developed.

1.3 Back-up procedures between VAAC Toulouse and VAAC London were developed including the adoption of special headings that would enable two volcanic ash advisory centers (VAAC) to transmit on behalf of one another in case of failure of either of the two VAACs.

1.4 A regular training programme was established in order to make sure that forecasters employed at the VAAC of Toulouse do not stay too long without applying the related-IAVW operational procedures.

1.5 The AFI Region has established exercises which are comparable to those which are planned for the European and NAT regions. The AFI procedures shall be coordinated in the near future between the ICAO Regional Offices concerned and the VAAC Toulouse in accordance with the request made to them by the ICAO Secretary General.

2. VAAC Operations (cases of real time eruptions)

2.1 From July 2005 up to the end of year, a total of thirty-one (31) volcanic ash advisories (VAA) were transmitted by VAAC Toulouse concerning the AFI Region; nine (9) volcanic ash advisories were reported about **Karthala** in Comoros on 25 and 26 November and on 5 December 2005; eighteen (18) other volcanic ash advisories concerning **Nyiragongo** in Democratic Republic of Congo were reported on 30 August, 04 September, 04 and 10 October, and 05, 07 and 13 November and 02 December); 04 volcanic advisories were reported concerning **Piton de la Fournaise** in La Réunion on 04 October and 29 November 2005.

2.2 In the year 2006, 20 volcanic ash advisories (VAA) and 11 volcanic ash graphics (VAG) were transmitted from the AFI Region as follows:

- 6 VAA involving Mount Karthala (Comoros, on 28 and 29 May);
- 14 VAA with 11 VAG about Mount Nyiragongo (Democratic Republic of Congo on 28 November, 02 December and 07 December).

2.3 Between January and April 2007, seven (07) VAAs were transmitted in AFI Region, namely: 07 VAAs about Piton de la Fournaise (Réunion, 06, 07 and 12 April).

2.4 The Karthala eruption in November 2005 produced some amounts of ash (deposits of 5 cm high were found in close proximity of the volcano in Moroni). The variegation and advected ash cloud could be seen on the satellite picture along with a well-known signature on the "FLAG CENDRE" images (multispectral processing by METEO-FRANCE that enables to distinguish the volcanic ash). Information on the first eruption (November 2005) was obtained from the observatory of the Piton de la Fournaise (la Réunion) and from the ASECNA Representative in Comoros. In relation to the second eruption (December 2005), phone calls were exchanged with volcanologists at the "Institut de Physique du Globe de Paris" during their trip to Comoros. This eruption has later on provided an interesting subject for study that was proposed to the engineering section students at METEO-FRANCE. On the same eruption, they tested several fine software settings for a scattering model based on *meso-scale* forecast model (non-hydrostatic scale which, at the present time, is only available in research mode.

2.5 The two volcanoes in the Democratic Republic of Congo (**Nyamuragira and Nyiragongo**) produced frequent eruptions of **SO₂** and water vapor. The use of “**FLAG CENDRE**” treatment never provided any positive signal. Some news from Agency “**France-Presse**” have only mentioned the eruption of ashes as per reports from eye witnesses but this was soon thereafter contradicted by other news reports. Measurements taken by **METEOSAT 8**, ideally located for the two volcanoes (at the Zenith of Gulf of Guinea) became extremely difficult due to daily occurrence of a thick gas-mask.

2.6 Eruptions from the Piton de la Fournaise in 2005 and 2006 were effusive only (lack of ash). They did not have anything to do with aviation. The 2007 eruption, however, induced the collapse of a crater followed by ash eruptions.

3. Detection Capabilities

3.1 **SACS** or support to aviation control service (<http://sacs.aeronomie.be/>) is a service that is provided within the framework of a project named “**PROMOTE**” which was derived from a collective initiative taken within the European Commission in association with the European Space Agency known as “**Global Monitoring for Environment and Security**” (**GMES**). **SACS** will provide VAAC Toulouse, in almost real times, with information based on analysis of data obtained from satellites which are in evolution into polar orbit, on **SO₂** and aerosols of volcanic origin. An automatic alerting service by email responsible for sending warnings on unusual concentrations of **SO₂** around the Globe is currently being assessed.

4. Volcanic Ash Advisories and Volcanic Ash SIGMET-Related

4.1 At the time of eruption of Piton de la Fournaise in April 2007, two pilot reports pointed out the appearance of volcanic ash at **FL 400**. The area control centre (ACC) in Mauritius flight information region (FIR) received one of those reports only, but the information was not relayed in real time to VAAC Toulouse through the FIR CVM as required by the established procedure.

4.2 Two volcanic ash advisories related to SIGMET were transmitted on behalf of Mauritius FIR on 07 April 2007 at 00H00 UTC and 06H30 UTC but were different from those VAA advisories which were transmitted by VAAC Toulouse on 06 April 2007 at 21H00 UTC and on 07 April 2007 at 03H00 UTC.

4.3 No SIGMET was transmitted in relation to the Nyamuragira and Nyiragongo eruptions.

4.4 No SIGMET was transmitted either in relation to Karthala.

4.5 A change to the headings of messages transmitted by VAAC Toulouse was brought to the attention of **World Meteorological Organization (WMO)** and the

International Civil Aviation Organization (ICAO) and became effective on 19 January 2007.

- The new VAA headings replacing FVEU01LFPW, FVAW01LFPW, FVAF01LFPW are as follows:
 FVXX01LFPW first volcano in activity, VAAC TOULOUSE
 FVXX02LFPW second volcano in activity, VAAC TOULOUSE
 FVXX03LFPW third volcano in activity, VAAC TOULOUSE
 FVXX04LFPW fourth volcano in activity, VAAC TOULOUSE
 FVXX05LFPW used by VAAC LONDON as back-up for VAAC TOULOUSE
- The new VAG headings replacing PVRD00LFPW, PVRE00LFPW, PVXX00LFPW are the following:
 PFXD01LFPW first volcano in activity, VAAC Toulouse
 PFXD02LFPW second volcano in activity, VAAC Toulouse
 PFXD03 LFPW third volcanic in activity, VAAC Toulouse
 PFXD04LFPW fourth volcano in activity, VAAC Toulouse
 PFXD05LFPW used by VAAC London as back-up for VAAC Toulouse

5. Current and Future Developments

5.1 An alphanumerical tool for volcanic ash in graphical format has been made available with effect from **summer 2006**. This software is already fully operational as a graphics tool and is provided by the forecaster, at entry points, with starting functions in VAAC of same network connection.

5.2 This should reduce tangibly the risks of possible errors when describing the ash cloud boundaries in terms of latitude and longitude geographical coordinates and, similarly, would ensure a sound coherence between VAAs and VAGs.

5.3 The internet website for VAAC Toulouse was rearranged by the end of the year 2006. In particular, VAAs and VAGs that are transmitted by VAAC Toulouse are, as of today, available on-line in real time on the following website: <http://www.meteo.fr/info/vaac>

6. Back-up Procedures for VAACs

6.1 Back-up procedures involving VAAC London have been established but not tested todate. As a matter of principle, London and Toulouse assist each other on mutual basis. In the event, very unlikely, where it would be impossible to develop and transmit VAAs for either of the two VAACs, the other VAAC will take over the responsibility for the preparation and transmission of VAAs on behalf of the disabled VAAC. To this end, the VAAC that has remained operational will use one of the headings indicated in paragraph 4.5 above.

6.2 In clear terms, London shall transmit VAAs on behalf of Toulouse using the heading **FVXX05LFPW**, whereas Toulouse, in respect of the VAAs to be transmitted in the name of London, shall use the heading **FVXX05EGGR**.

7. Action requested

7.1 The meeting of the Sub-Group is invited to:

- a) take note of the information contained in this paper;
- b) give good credit to the work so far accomplished by VAAC Toulouse; and
- c) provide comments, if any, that may be deemed useful.

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