



**WORKING PAPER**

**MEETING OF THE METEOROLOGY PANEL (METP)  
METEOROLOGICAL INFORMATION AND SERVICE  
DEVELOPMENT WORKING GROUP (WG-MISD)**

**FIRST MEETING**

**Washington DC, United States, 16 to 19 November 2015**

**Agenda Item 6: Matters Relating to WG-MISD Volcanic Ash Information Work Stream  
6.1: New Job Card: Provision of Information on Sulphur Dioxide (SO<sub>2</sub>) and Other  
Hazardous Gases in the Atmosphere**

**INTRODUCTION OF THE SULPHUR DIOXIDE (SO<sub>2</sub>) JOB CARD**

**(Presented by Steve Albersheim)**

**SUMMARY**

The WG-MISD Volcanic Ash Information Work Stream has been allocated an additional job card, since the 20-24 April 2015 METP/1 in Montreal. This paper introduces the new job card, concerning the provision of information on sulphur dioxide (SO<sub>2</sub>) and other hazardous gases in the atmosphere, which will be presented for initial discussion at the meeting.

Action by the METP-WG/MISD Volcanic Ash Work Stream is in paragraph 4.

**1. INTRODUCTION**

1.1 The fourth meeting of the Volcanic Ash Task Force (IVATF), held in Montreal from 13 to 15 June 2012, formulated 24 recommendations. Recommendation 4/11 states:

**Recommendation 4/11** That, in the context of the hazards posed by sulphur dioxide (SO<sub>2</sub>) and other hazardous gases in the atmosphere, the International Airways Volcano Watch Operations Group (IAVWOPSG) be invited, as part of deliverable IAVWOPSG-04, to progress work on identifying and quantifying any associated health risks to aircraft occupants in coordination with the World Meteorological Organization (WMO)-International Union of Geophysics and Geodesy (IUGG) Volcanic Ash Scientific Advisory Group (VASAG), with a view to enhancing the guidance contained in the *Handbook on the International Airways Volcano Watch — Operational Procedures and Contact List* (Doc 9766).

1.2 Following the METP reorganization (METP/1, 20-24 April 2015, Montreal), a job card concerning “the provision of information on sulphur dioxide and other hazardous gases in the atmosphere that pose a risk to aircraft occupants” was approved by the ANC and forwarded to the METP WG-MISD.

1.2.1 At the seventh meeting of the International Airways Volcano Watch (IAVWOPSG/7), the Secretariat was tasked with consulting the appropriate ICAO expert group (or groups), to determine thresholds for volcanic gases in the atmosphere that, after passing through an aircraft ventilation system, could pose a health risk to the aircraft’s occupants.

1.2.2 At IAVWOPSG/8, a job card was drafted, calling for further development, in-consultation with the Flight Operations Panel (OPS) and the Aviation Medicine Panel (MED), for report-out at IAVOPSG/9 (OBE).

1.3 This paper presents, via presentation format, the new SO<sub>2</sub> job card forwarded by the ANC, and is intended to drive initial discussion surrounding the approach for addressing SO<sub>2</sub> and other volcanic gases/contaminants.

## 2. DISCUSSION

2.1 The language in the job card focuses, very specifically, on risks posed to aircraft *occupants*. As such, the Volcanic Ash Information Work Stream will need to consult (and leverage) subject-matter expertise from several other ICAO Panels, including but not limited to: Flight Operations, Medicine, Airworthiness, etc.

2.2 Challenges related to traditional observation of volcanic ash, inherent in addressing the SO<sub>2</sub> issue, include:

- Determining the location and concentration of SO<sub>2</sub> plumes
- Tracking and modelling volcanic gases with differing atmospheric dispersion properties

2.3 A second set of additional, non-meteorological challenges will likely necessitate significant consultation and collaboration with other ICAO Panels:

- Identifying concentration and dosage thresholds for human health
- Developing methods and procedures for tracking human health over time (e.g., potential monthly, yearly, and lifetime exposure limits, not entirely-unlike radiation due to space weather)
- Developing SOPs for in-flight encounters of SO<sub>2</sub> (and other volcanic gases/contaminants)
- Determining if SO<sub>2</sub> poses a risk to avionics (e.g., acidity, flammability)
- Certifying the engineering and maintenance of aircraft sensors and ventilation equipment

2.4 This meeting will discuss the approach for a draft work plan, and the degree to which the WG-MISD Volcanic Ash information Work Stream plays a leading role (or otherwise) in addressing non-meteorological questions related to the job card task.

### 3. CONCLUSION

3.1 Given the above, and the expected discussion during the meeting, the METP WG-MISD Volcanic Ash Information Work Stream is invited to agree on the following action:

**Draft Action 1/x: Develop a work plan to, ‘Assess how to provide information on sulphur dioxide and other hazardous gases in the atmosphere that pose a risk to aircraft occupants.’**

That, the Work Stream Coordinator will lead an ad hoc group consisting of (...), to:

- a) identify the ICAO Panels relevant to the SO<sub>2</sub> issue,
- b) poll the Panels on the current state of the science in their respective areas of subject-matter expertise,
- c) invite input from WMO and IUGG on scientific issues related to SO<sub>2</sub>, and
- d) draft a work plan detailing the approach in assessing the need for, and potential provision of, SO<sub>2</sub> information,
- e) in time for delivery by **DD MMMM 2016**.

### 4. ACTION BY THE METP-WG-MISD SPACE WEATHER WORK STREAM

4.1 The METP WG-MISD Volcanic Ash Information Work Stream is invited to:

- a) note the information in this paper, and
- b) consider the draft action proposed in 3.1.

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