

# Seventh meeting of the WMO-IUGG Volcanic Ash Scientific Advisory Group (VASAG/7)

## Outcomes of WMO VAAC BP/5 (2017) of relevance to the VASAG



**WMO OMM**

World Meteorological Organization  
Organisation météorologique mondiale

*21 to 23 August 2017  
USGS, Vancouver, WA, United States*


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# WMO VAAC BP/5 (2017)

- Held 7 to 9 June 2017 @ JMA, Tokyo
  - Two days closed (in-camera) session followed by 1 day open session
- Representation from all 9 VAACs
  - Plus WMO, ICAO, IATA, Rolls-Royce, University of Iceland and JMA



# WMO VAAC BP/5 (2017)

- 15 agreed outcomes, lots of consensus
  - Majority of outcomes served as inputs to ICAO METP WG-MOG/5 (IAVW) and WG-MISD/3 (VA SO<sub>2</sub>) held 12 to 14 June 2017 @ JMA
- VAAC BP/5 (2017) Final Report [available here](#)
- PPT items marked with a  are considered noteworthy for VASAG



# VAAC Collaboration Tools and IWXXM/XML developments

- Early collaboration tools under development (some VAACs)
  - Handovers
  - Information exchange
  - Assistance requests
- Preliminary set of functional needs developed
  - Agreement to finalize offline
- VAACs with existing/emerging capability to develop a suitable, single web-based platform
- Report to next workshop
- All VAACs currently or soon-to-be IWXXM capable
- Clarification needed on the differences between IWXXM v2.1 and v3.0 plus timeline for v3.0
- Future VAAC-related requirements to only be in IWXXM-compatible formats
  - For near term, make VAA/VAG in IWXXM format available on websites (to start) and extended AMHS (eventually)
- Report to next workshop



# VONA and aviation colour codes



- Long history
  - Inclusion on VAA preceded inclusion on VONA
- Multiple products
  - VONA, VAA/VAG, ASHTAM/NOTAM, ...
  - Potential for confusion, inconsistency and/or duplication in supply and use of aviation colour codes
- Propose to WG-MOG/5:
  - removal of aviation colour code from VAA/VAG; and
  - (in parallel) elevation of VONA to status of a recommended practice and (eventually) a Standard in ICAO Annex 3

# Eruption source parameters

- Completion in 2016, by all VAACs, of a questionnaire on the global ESP database targeting dispersion modellers with a view to informing future work on the database
- Outcome VW4-O-08 complete

# Volcanic hazard monitoring and observing capabilities



- Enhancement and improved coordination of aircraft reports of volcanic ash, in-situ, remote sensing and volcano monitoring information
  - availability and dissemination processes
  - development of associated best practice guidance
- Recurrent activity (business as usual)
- Outcome VW4-O-16 kept open



# Key performance indicators

- Adherence to Annex 3 standards
- Tendency for 'local' KPIs development
  - Non-uniform, non-harmonized across all VAACs
- Initial set of timeliness, accuracy and compliance VAAC KPIs developed
- Propose KPIs to WG-MOG/5 for consideration



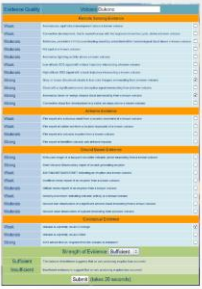
# Reporting of 'ash'/'no ash'

- Potentially valuable source of evidence
  - Validate/corroborate VAAC output
- Limited actual reporting by flight crew
- Some VAACs already undertake direct liaison with ANSP and AO contact points to seek ash/no ash information
  - Often yielding positive results
- Propose further consideration at WG-MOG/5

# Discernible ash strength of evidence checklists



Overview | Tick box style checklist

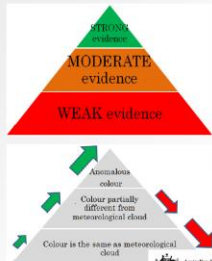


- Remote sensing evidence
- Airborne evidence
- Ground based evidence
- Conceptual (situational) evidence
- Evidence quality (weak, moderate or strong)

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Department of Infrastructure, Transport, Regional Development and Postal Services

Overview | Pyramid style checklist

- Ground based evidence (e.g. VONA), airborne evidence (e.g. PIREP) trigger discernible ash detection procedures
- Pyramid levels: Triggers to start, Static and Loops, Loop and Model, Environment, Location – Issue VAA
- Situational (conceptual) evidence (e.g. aviation colour codes, SVO advice) or ground based evidence of high impact event may result in progressing straight to VAA issuance and follow up using remote sensing pyramid checklist.



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- Valuable tool when there is a lack of (or ambiguity in) VA evidence/reports
- QMS best practice, credibility to decisions and output
- **Seek VASAG advice in maturing the methodology**
- Further trial the checklists
- Report to next workshop

# Satellite inter-comparison



- Satellite system advances, incl. Himawari-8
  - Improved detection of small eruptions and small areas of VA
  - Better identification of VA under poor observing conditions
  - Distal areas of VA improved detection and tracked for longer
- Operational side-effects/consequences
  - Forecaster workloads have gone up – monitoring more obs, imagery, products
  - Increase in the number of VAA/VAG issued
  - Challenges in ensuring cross-VAAC consistency
- Paradigm shift in the information available to the VAACs
- Undertake further comparisons, where feasible
- **Link with VASAG considerations**
- Report to next workshop



# Re-suspended ash



- Recent VAAC operational experience
  - Iceland and Kamchatka peninsula
- Rare events
  - Nonetheless, can pose a significant hazard to aviation
- Eruption may or may not be occurring at the time
- Need for re-suspended VA indicator in VAA/VAG
  - VA SIGMET can continue to use ‘VA CLD’
  
- Propose further consideration at WG-MOG/5

# T+0 confidence



- All VAACs in a position to express confidence
  - VAA/VAG, supplementary confidence products, or both
- BUT:
  - Existing template for VAA is a limiting factor in being able to adequately describe confidence
    - Does not fully meet perceived user requirement
  - Very limited user feedback of a continued need and derived benefit of confidence information
- Propose to WG-MOG/5 that T+0 confidence be **DISCONTINUED** while other options explored

# Model VAG and Model SVA

- Appendix 1 to Annex 3
  - WMO as ‘owner’
- Prevailing shortcomings in examples used
  - projections and polygons
- Ensure consistency with ICAO provisions
- Two examples to be developed for each VAG and VA SIGMET
- Report to WG-MOG/5

# T+24 VAG trial



- Issued whenever ash expected to be discernible beyond 18 hours or requested by a user
- Most but not all VAACs capable of producing T+24 VAG
  - Onerous and resource intensive on VAAC operations
  - Unsustainable without some form of cost recovery
- Limited user feedback of a continuing need and derived benefit of T+24 product
  - Some situational awareness, strategic planning use but too unreliable for operational use
- Propose to WG-MOG/5 that T+24 trial be DISCONTINUED

# Quantitative VA contamination products



- Consideration of latest research, technological and scientific developments in the detection, modelling and jet engine ingestion impacts
- Support to a globally harmonized VA safety risk assessment process
- CML trial (EUR VOLCEX) discontinued
  - Negative user feedback
- SCI and TECH advances, OEM engine tolerability
- Propose to WG-MOG/5 to revisit the quantitative VA contamination issue (viz. ash concentration charts)





# VA SO<sub>2</sub>



- Most but not all VAACs currently have SO<sub>2</sub> detection, monitoring and/or prediction capabilities
  - Where capability does exist, it's mainly in the research/non-operational area
- Report to WG-MISD/3 that a requirement for SO<sub>2</sub>-related information would require additional VAAC resources and would require appropriate cost recovery arrangements



# VA impacts on jet engines



- Rolls-Royce update (public domain)
  - Susceptibility to VA of all R-R Trent and RB211 engine marks ([link](#))
  - R-R position in respect of VA and aviation based on scientific and operational developments since 2010 ([link](#))
  - How operators can maximize airspace during volcanic eruptions through the matching of engine durability against ash cloud occurrence ([link](#))
- Great significance in the context of the IAVW
- **Bring to attention of VASAG and others**



# Next workshop



- Offer by MetService of New Zealand to host in 2018
  - Precise date and location to be determined

**Outcome VW5-O-15**

- Mutually beneficial to convene the next or other future workshop in concert with a VASAG
  - Back-to-back, overlapping or in parallel
- **Discuss with VASAG**
- Preference to have breathing space (3 months, say) between future VAAC BP and WG-MOG meetings

# Thank you Merci



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