



Volcanoes and Aviation - Detection, Prediction and Expectation

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1. Agreed ICAO IAVWOPSG-7 Outcomes
2. (To be) Agreed 'discernible ash' techniques...
3. European VAAC Collaboration
4. WEZARD EUVONET
5. International service delivery processes

----- Original Message -----

From: EMARC

Sent: Wednesday, November 13, 2013 08:36 PM

To: ML-VACP-MT

Subject: Iceland Met Office Update - No significant activity reported

Iceland Met Office Update - No significant activity reported

1. Agreed ICAO IAVWOPSG-7 Definitions (Doc 9691)



'Visible Ash'

...volcanic ash observed by the human eye

Encompasses a range of detection thresholds depending on:

- Day or night
- Eyesight and state of awareness of the observer
- Angle of the sun
- Orientation of the observer to the ash layer (above, within, underneath, side on)
- Thickness of the ash layer
- Other atmospheric contaminants e.g. haze, dust, water vapour
- Granularity of ash.





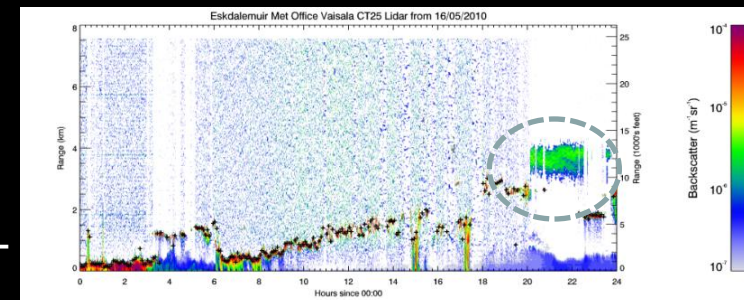
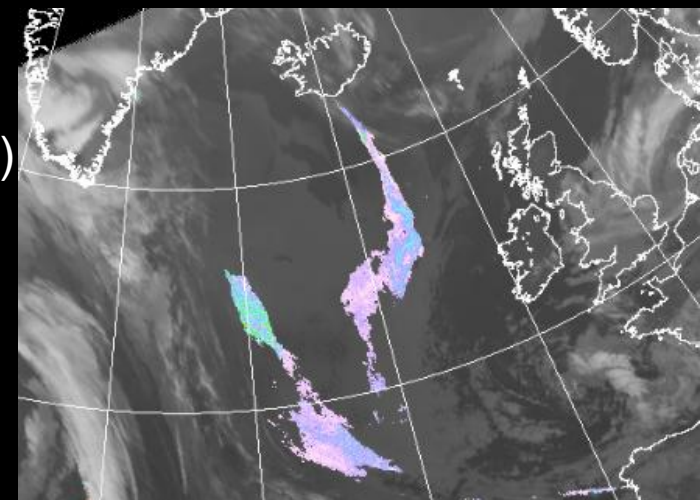
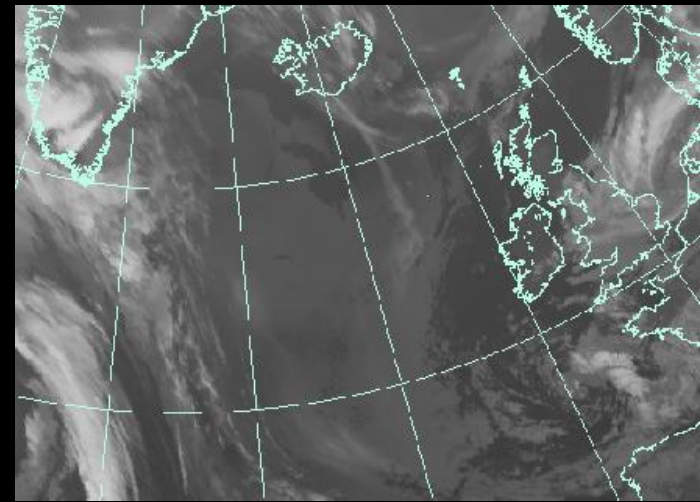
'Discernible ash'

...volcanic ash detected by: defined impacts on/in aircraft; or by agreed in-situ and/or remote sensing techniques

The VAACs will base their forecasts on the '*...agreed in-situ and/or remote sensing techniques*' noting that:

- Satellite ash detection threshold is 0.2 mgm^{-3} (+/- 0.15)
- Quantitative (particle size, mass column loading) estimates can be derived from multi-spectral satellite data available on MSG-SEVIRI and on some polar orbiting platforms
- Quantitative in-situ measurements (aircraft)
- Ceilometer and lidar ash detection thresholds are understood to be $\leq 0.03 \text{ mgm}^{-3}$
- Quantitative (particle size, ash concentration) estimates can be derived from multi-spectral lidar –

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Other IAVWOPSG-7 Recommendations

- QMS implementation
- VAAC Forecaster competency Standards
- State Volcano Observatory capacity development
- VAAC responsibilities (obs, modelling, AIREPs, areas, harmonisation)
- Confidence levels and SRA products
- No agreement on S02 requirements
- Nuclear and Space Weather requirements

IAVWOPSG/7-WP/3
Appendix E

APPENDIX E

RECOMMENDATIONS FOR AIRCRAFT INSTRUMENTATION FOR CONDUCTING VOLCANIC ASH CLOUD SAMPLING

(Extracted from Appendix C of the Report of IVATF/4)

3.5 Volcanic ash advisory centres

3.5.1 A Contracting State, having accepted, by regional air navigation agreement, the responsibility for providing a VAAC within the framework of the international airways volcano watch, shall arrange for that centre to respond to a notification that a volcano has erupted, or is expected to erupt or volcanic ash is reported in its area of responsibility, by arranging for that centre to:

- a) monitor relevant geostationary and polar-orbiting satellite data and, where available, relevant ground-based and airborne data, to detect the existence and extent of volcanic ash in the atmosphere in the area concerned;

Note.— Relevant ground-based and airborne data includes data derived from Doppler weather radar, ceilometers, lidar and passive infrared sensors.

2. (To be) Agreed 'discernible ash' techniques ideas...

- *IUGG/WMO Volcanic Ash Scientific Advisory Group (VASAG) led...*

'Low contamination' ash envelope:

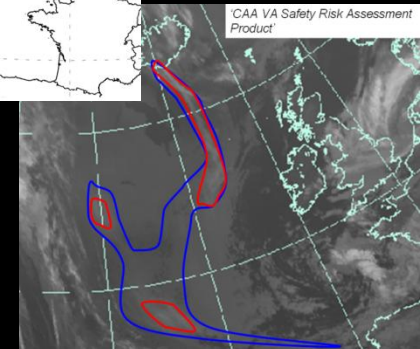
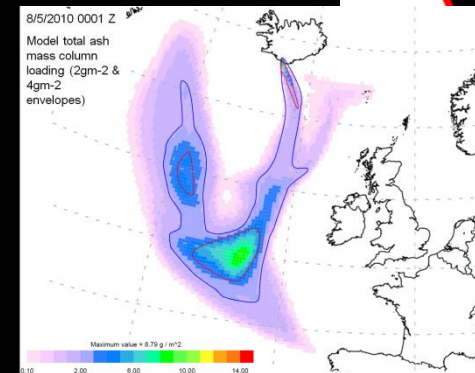
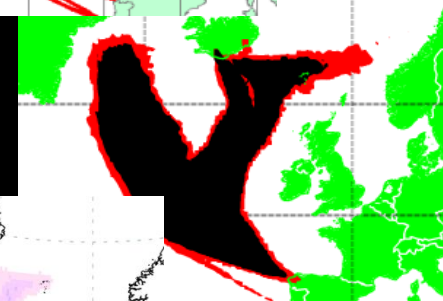
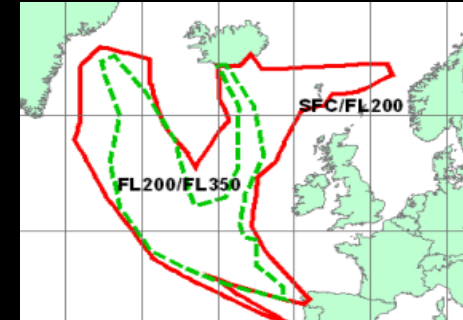
Model ash column loading output (0.2 gm^{-2} as proxy for 0.2 mgm^{-3}) verified, validated and amended against sources of **qualitative** in-situ and remote sensing **information & PIREPS** (evidence of **visible ash** only)

'Medium contamination' ash envelope (SRA products only):

Model ash column loading output (2 gm^{-2} as proxy for 2 mgm^{-3}) verified, validated and amended against available **quantitative** in-situ and remote sensing **data & PIREPS** (qualitative evidence of **visible ash** or **impact** as described in **Doc 9974**)

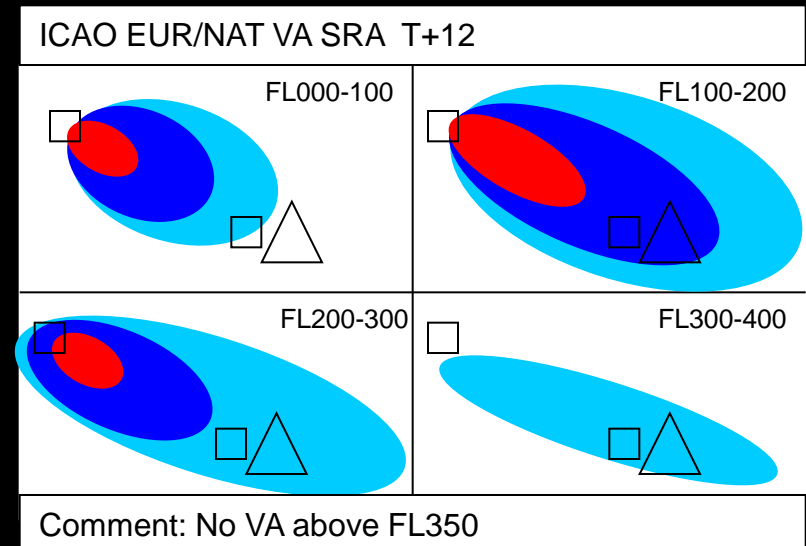
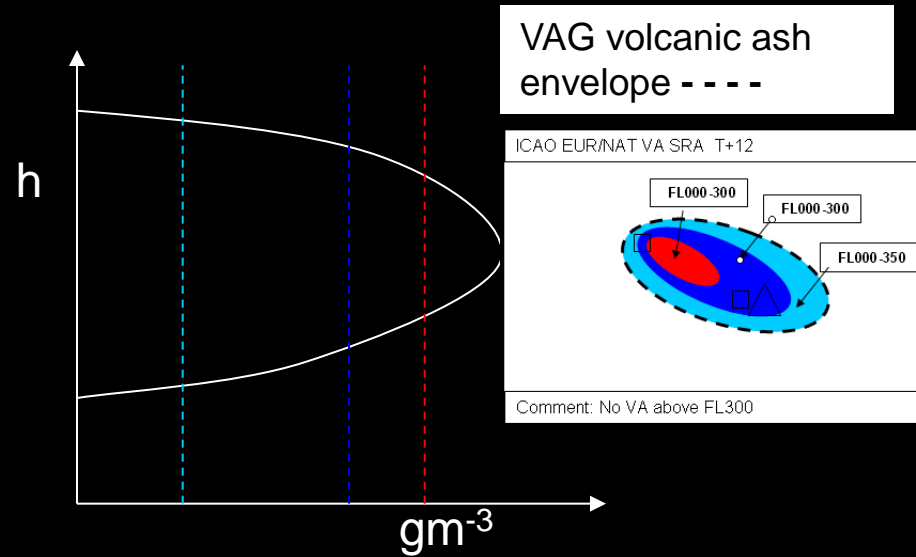
'High contamination' ash envelope (SRA products only):

Qualitative assessment of the **contiguous eruptive plume** and; model ash column loading output (4 gm^{-2} as proxy for 4 mgm^{-3}) verified, validated and amended against available **quantitative** in-situ and remote sensing **data & PIREPS** (qualitative evidence of **visible ash** or **impact** as described in **Doc 9974**)



3. European VAAC Collaboration

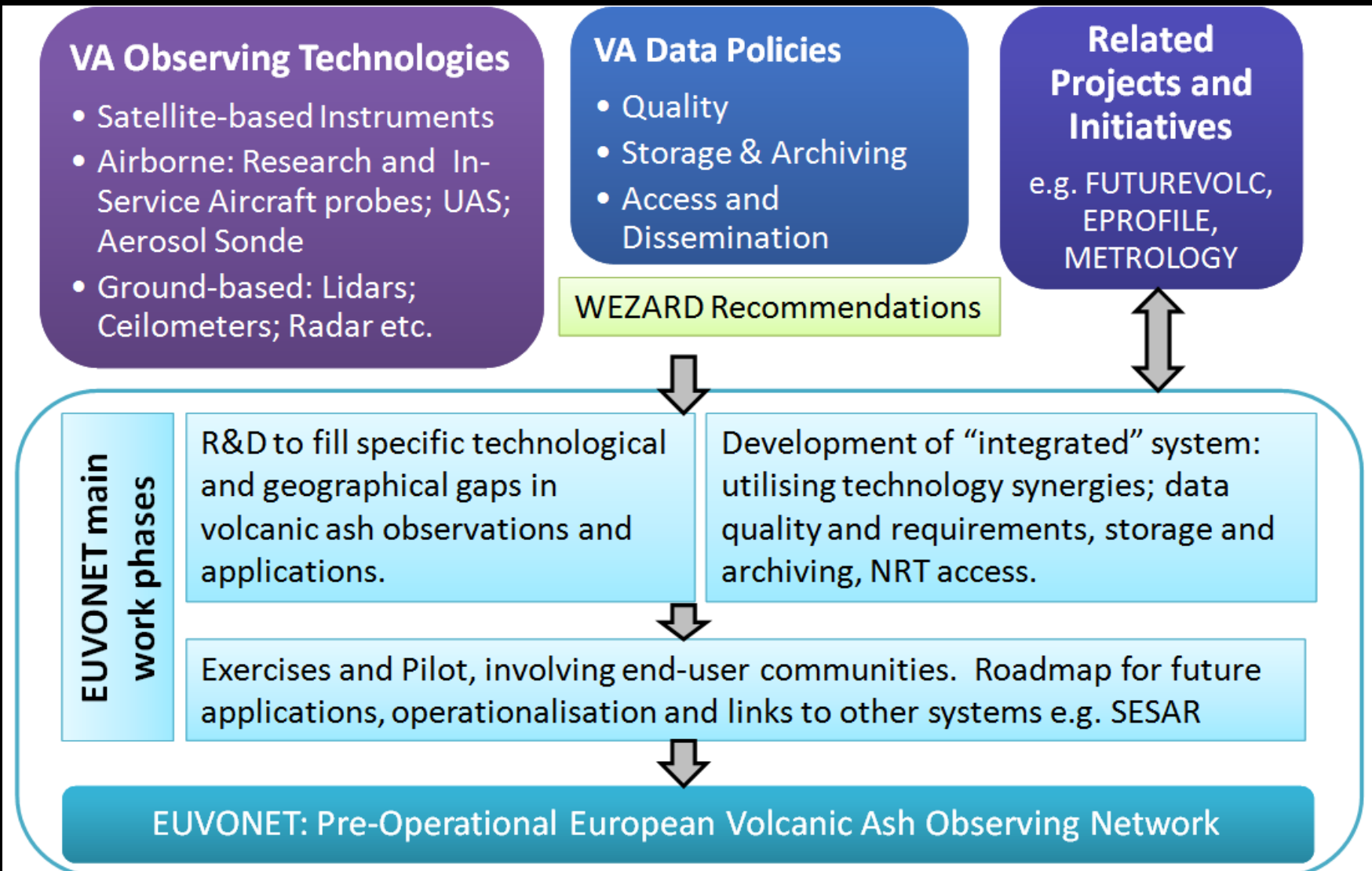
- Meteo-France and Met Office workshops
- Ash mass column-based low, medium & high contamination contour lines
- Best practice use of NRT observations as available
- Low contamination envelope identical to VAG 'VA' envelope
- Risk-based proxy for mass concentrations
- Modelling, satellite and lidar science collaboration & coordination



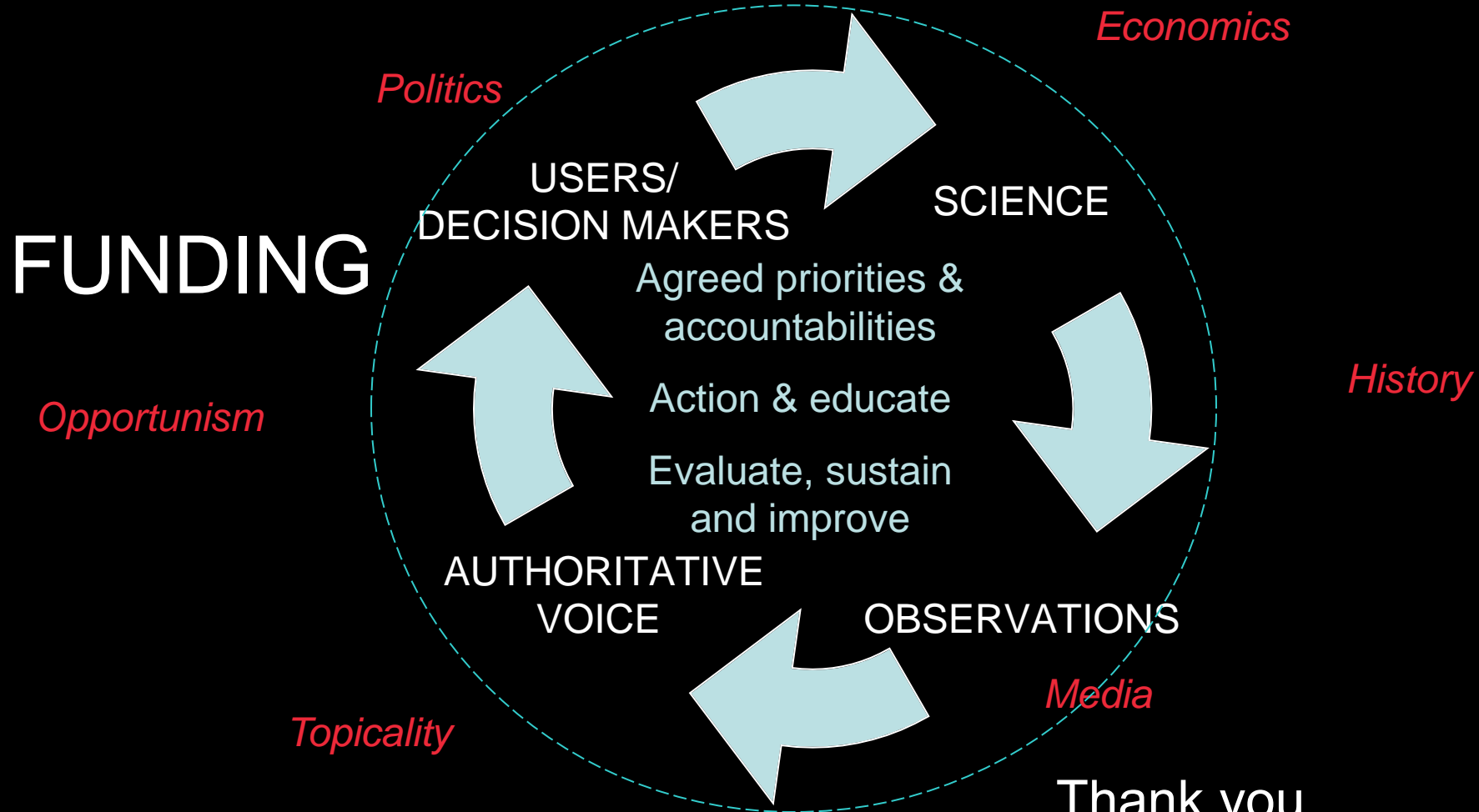


Met Office

4. EUVONET



5. International volcanic Ash service delivery process



Thank you....
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