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SCOPE Nowcasting for Aviation

Volcanic Ash Algorithm Intercomparison

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(on behalf of the SCOPE Nowcasting Steering Group)



World
Meteorological
Organization

IPET-SUP-1 - March 16, 2015



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Key Points



- ***Volcanic ash remote sensing is an important global problem***
- ***While there is no doubting the value of volcanic ash remote sensing, the problem is extremely challenging and complicated***
- ***Due to the complexity of the problem, different techniques can produce very different answers, in some cases. We need to understand the reason for these differences. An organized intercomparison workshop is the only reasonable way forward.***

Workshop Work Plan (1)

- **Action SNWC-PP2-2:** Determine satellite-based volcanic cloud retrieval intercomparison workshop organizing committee (January 2014)
 - **Status: The core organizing committee has been established**
- **Action SNWC-PP2-3:** Determine participants, dates, and location of satellite-based volcanic cloud retrieval intercomparison workshop (March 2014)
 - **Status: The workshop will be held the week of June 29, 2015 in Madison, WI USA.**
- **Action SNWC-PP2-4:** Define test cases for intercomparison, identify available validation sources, and define key common algorithm inputs (e.g. index of refraction for volcanic ash) (15 November 2014)
 - **Status: Test cases have been selected and an intercomparison work plan has been written**

Workshop Work Plan (2)

- **Action SNWC-PP2-5:** Host satellite-based volcanic cloud retrieval intercomparison workshop with the following goals: 1). Establish basic product validation protocol, 2). Quantify differences (and overall spread) in products for pre-selected cases and begin interpreting the differences with the goal of identifying some best practices for extracting information on volcanic cloud properties and conveying the results to end users. 3). Standardize volcanic cloud geophysical parameters relevant to VAAC and MWO operations, including units and associated quality flags (29 June 2015)
- **Action SNWC-PP2-6:** Finalize workshop report (31 August 2015)
- **Action SNWC-PP2-7:** Use workshop results to define steps required to make products that meet the agreed upon standards available to users at VAACs. One possibility is the development of community software packages (e.g. CSPP, EUMETSAT SAF) that generate volcanic cloud products. The software packages would ideally allow users to generate products using multiple algorithms. (30 September 2015)



Participants (Total: 38)



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Country/Organization	Number of Participants	Institutions Represented
Argentina	1	Argentine Met Service
Australia	1	BoM
Belgium	2	BIRA, Academia
China	1	CMA
ESA	1	-----
EUMETSAT	3	-----
Germany	2	DLR
Italy	5	INGV, Academia
Japan	1	JMA
New Zealand	1	MetService
Rep Korea	1	KMA
Russia	1	PLANETA
UK	8	Met Office, RAL, Academia
USA	10	NASA, NOAA, USGS, Academia

Intercomparison Cases

- *Eyjafallajökull (2010)*
- *Grimsvötn (2011)*
- *Sarychev Peak (2009)*
- *Kelut (2014)*
- *Puyehue-Cordón Caulle (2011)*
- *Kirishimayama (2011)*

Algorithm Contributions

Case	Sarychev Peak (2009)	Eyjafallajökull (2010)	Grimsvötn (2011)	Puyehue-Cordón Caulle (2011)	Kirishimayama (2011)	Kelut (2014)
Sensor						
AIRS						
AVHRR	11	9, 11	9, 11	11	11	11
CrIS	NA	NA	NA	NA	NA	
IASI	10, 11	6, 10, 11	6, 10, 11	6, 10, 11	10, 11	10, 11
MODIS	7, 10	3, 7, 10	3, 7, 10	7, 10	7, 10	7, 10
MTSAT	4, 7, 9	NA	NA	NA	4, 7, 9	4, 7, 8, 9
SEVIRI	NA	1, 2, 7, 9, 10	1, 2, 7, 9, 10	1, 2, 7, 9, 10	NA	NA
VIIRS	NA	NA	NA	NA	NA	7
GOME-2/AVHRR/IASI)	2	2	2	2	2	2
MISR		5	5			

1:DLR

2:EUMETSAT

3:INGV

4:JMA

5:NASA Goddard/JPL

6:Université Libre de Bruxelles

7:NOAA/NESDIS

8:BoM

9:UKMO

10:Oxford


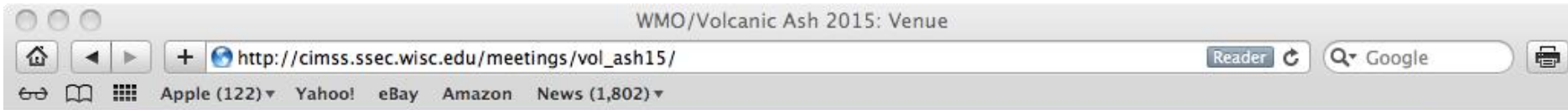
11:Planeta

Reference Data Contributions

Case	Sarychev Peak (2009)	Eyjafallajökull (2010)	Grimsvötn (2011)	Puyehue-Cordón Caulle (2011)	Kirishimayama (2011)	Kelut (2014)
Data Source						
BAe-146	NA	X	NA	NA	NA	NA
CALIOP	X	X	X	X	X	X
DLR-Falcon	NA	X	NA	NA	NA	NA
EARLINET	NA	X	X	NA	NA	NA
IMO RADAR	NA	X	X	NA	NA	NA

Timeline

- February 16, 2015 – deadline for accepting invitation to submit data to the intercomparison study and attend the intercomparison meeting in Madison, WI, USA
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- April 10, 2015 – submission deadline for algorithm data sets to be included in intercomparison analysis
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- June 15, 2015 – results of intercomparison are distributed to all participants for review.
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- June 29 – July 2, 2015 – results of intercomparison are discussed in detail at meeting in Madison, WI, USA



WMO Intercomparison of Satellite-based Volcanic Ash Retrieval Algorithms Workshop

29 June - 2 July 2015
The Pyle Center
University of Wisconsin-Madison

Volcanic ash from Pavlof Volcano as photographed by astronauts aboard the International Space Station on May 18, 2013 (credit: NASA)

Venue	Program	Hotel	Register	Madison
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Description of Meeting

In support of aeronautical meteorological services, WMO is sponsoring the Intercomparison of Satellite-based Volcanic Ash Retrieval Algorithms Workshop, which presents an excellent opportunity to improve the consistency of quantitative volcanic ash products from satellites. This meeting will be hosted by NOAA and Space Science and Engineering Center (SSEC) at the University of Wisconsin in Madison WI, USA, on 29 June through 2 July 2015. The volcanic ash intercomparison activity is embedded in the WMO-sponsored SCOPE-Nowcasting initiative (Sustained Coordinated Processing of Environmental Satellite Data for Nowcasting), which aims at improved rapid access to satellite data by member states, and at improved confidence in satellite products for nowcasting. The meeting in Madison is supported by the WMO Space Programme, the Aeronautical Meteorological Programme, and the Atmospheric Research and Environment Programme.

The meeting will begin at 1:00 p.m. on Monday, 29 June, and conclude at 3:00 p.m. on Thursday, 2 July 2015.