



# Global Support to Aviation Control

***SAVAA is an CEOS Atmospheric Constellation (ACC) Project done with the ESA Data User Element***

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## **CEOS (Committee on Earth Observation Satellites)**

Background: CEOS is right now in process to respond to the GEOSS (Global Earth Observation System of Systems) 10-Year Implementation Plan:

- to provide an Implementation Plan for Space-based Observations for GEOSS
- to use as Implementation Framework ‘Virtual Constellations’ - 1 on Atmospheric Composition including the theme Air Quality



# GMES/PROMOTE/TEMIS

TEMIS was a precursor to the ESA project PROMOTE:  
Protocol Monitoring for the Global Monitoring of the Environment  
and Security Service Element: Atmosphere

GMES is the European Contribution to GEO

*Provision of NRT SO<sub>2</sub> and Aerosol information (occurrence, extension and movement of plume) as derived from satellite measurements over Europe and Africa. Emphasis has to be given to the timely delivery of the information to the user rather than to retrieve high precision geophysical (e.g. SO<sub>2</sub> column amount) quantities.*

**[www.temis.nl](http://www.temis.nl)**

**[www.gse-promote.org](http://www.gse-promote.org)**



# Triggering an event – SACS Alert

## Volcanic & Air Quality SO2 Service

Volcanic SO2 : [data archive](#) | [near-real-time](#)  
 Air Quality SO2 : [data archive](#) | [near-real-time](#) } [product information](#)



### Notification of exceptional SO2 concentrations

#### Exceptional SO2 concentrations

[Introduction](#)

[Archive of notifications per day](#)

[Archive of notifications per region](#)

[Subscription to email list](#)

The notification system looks at individual nadir states of SCIAMACHY measurements along its orbits. See the [Introduction](#) for information on what is presented here.

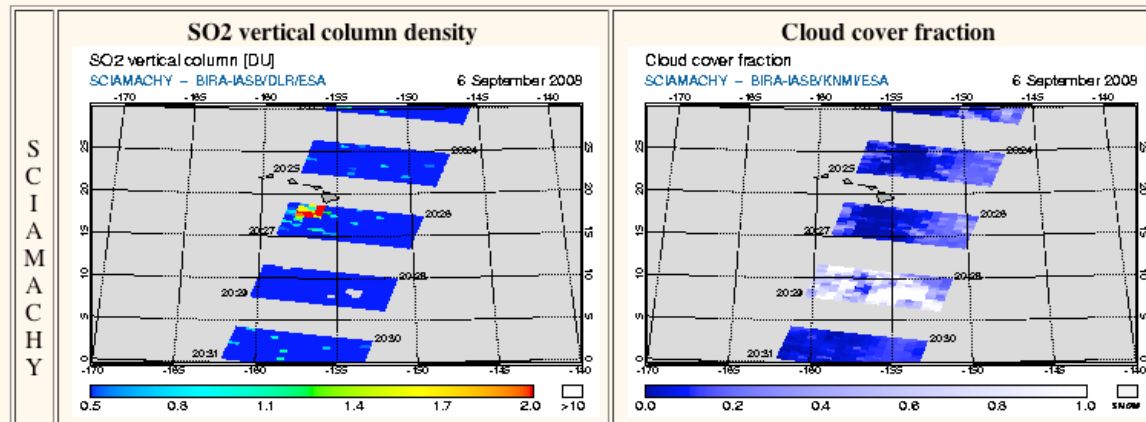
#### Near-real-time data

[Volcanic SO2 service](#)  
[Air Quality SO2 service](#)

#### SCIAMACHY nadir state info

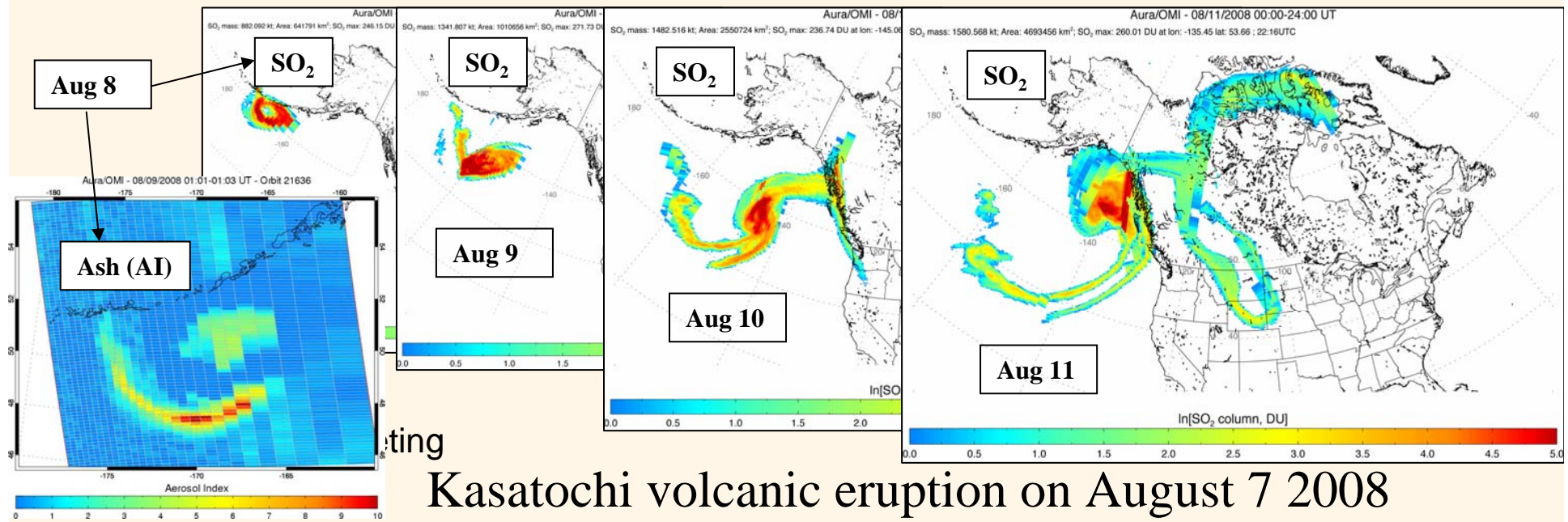
```

Start date   : 2008 09 06
Start time   : 20:26:36.552 UTC
Aver. long.  : -154.1 deg.
Aver. latit. : 16.1 deg.
Aver. sza    : 28.3 deg.
Max. SO2 scd : 8.9 DU
SO2 vcd @ max: 5.6 DU
Cloud data   : used for vcd
  
```



## Status of US effort: volcanic aviation hazards alerts

- Linear Fit (LF) SO<sub>2</sub> algorithm operationally used with NRT Aura/OMI data. LF is accurate up to SO<sub>2</sub> ~150DU with 100% plume detection capability (daylight only).
- Cloud noise corrected by using OMI Rotational Raman cloud heights
- Volcanic ash detected using UV Aerosol Index (AI). Interference from absorbing aerosols (dust, smoke) and sun glint.
- NOAA/NESDIS NRT volcanic web site pre-operational (need screening OMI instrumental artifacts in Northern Hemisphere)



Kasatochi volcanic eruption on August 7 2008



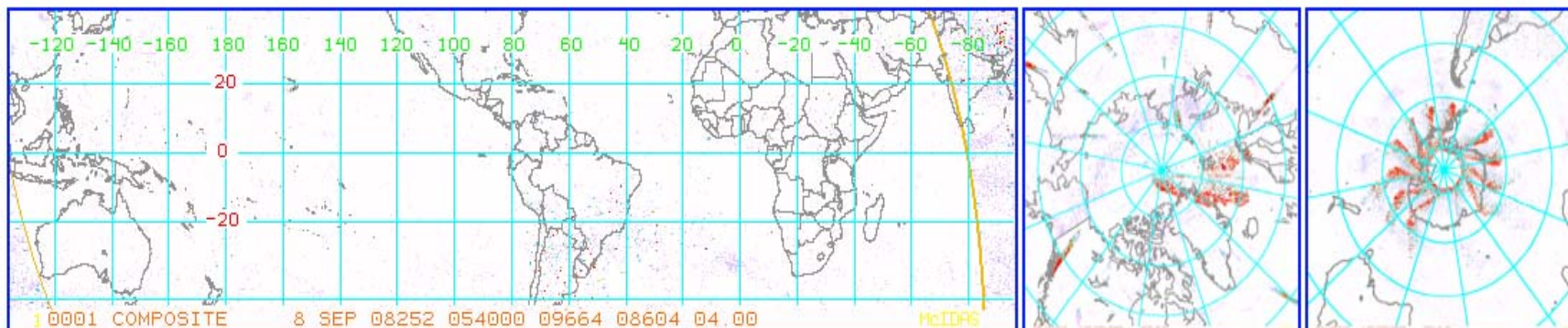
# Triggering an event – OMI Alert

<http://satepsanone.nesdis.noaa.gov/pub/OMI/OMISO2/index.html>



NOAA Satellite and Information Service  
National Environmental Satellite, Data, and Information Service (NESDIS)

## Latest OMI\_SO2 Column 5Km - 24-Hour Composite Images



Current OMI SO2 Composites	<a href="#">Tropics</a>	<a href="#">Northern Hemisphere</a>	<a href="#">Southern Hemisphere</a>
Current & Previous Digital Images GeoTiff, NetCDF, McIDAS, GIF	<a href="#">Tropics</a>	<a href="#">Northern Hemisphere</a>	<a href="#">Southern Hemisphere</a>

## Latest OMI\_SO2 Column 5Km by Volcano

<a href="#">Alaska, USA</a>	<a href="#">Aleutian Islands, Alaska, USA</a>	<a href="#">Anatahan, Mariana Islands</a>	<a href="#">Central America</a>
<a href="#">Comoro Islands</a>	<a href="#">Ecuador</a>	<a href="#">Etna, Sicily, Italy</a>	<a href="#">Galapagos Islands, Ecuador</a>
<a href="#">Hawaii, USA</a>	<a href="#">Japan</a>	<a href="#">Java, Indonesia</a>	<a href="#">Kamchatka, Russia</a>
<a href="#">Mexico</a>	<a href="#">Montserrat, West Indies</a>	<a href="#">New Zealand</a>	<a href="#">Northern Chile</a>
<a href="#">Nyiragongo, DR Congo</a>	<a href="#">Peru</a>	<a href="#">Philippines</a>	<a href="#">Papua New Guinea</a>
<a href="#">Reunion Island, Indian Ocean</a>	<a href="#">Southern Chile</a>	<a href="#">Sulawesi Sangihe, Indonesia</a>	<a href="#">Vanuatu, South Pacific</a>



# **Workshop on 26/27 Nov. 2007 at Toulouse VAAC**

Assemble Key Players

Get an overview of the  
status/resources/planning of existing projects  
(including ground-based activities as well as  
contributing scientific projects)

Establish co-operation and interaction

Develop a project plan within ACC



# SAVAA (Support to Aviation for Ash Avoidance) Project (DUE)

- **NILU**

- IR satellite retrievals
- Transport/dispersion modelling
- Inversion
- Data-base management



- **INGV**

- Volcanology
- User networks
- Natural laboratories
- Seismic/remote sensing data



- **Bremen**

- Satellite instruments/algorithm experts
- GOME/GOME-2/SCIAMACHY



- **BOKU**

- Inversion theory
- Error analyses





- SAVAA

- Dedicated DUE project with a duration of 3 years
- Coordination with ongoing projects (SACS, NOAA project) via yearly Workshops
- Direct link to end-users (VAACs) essential
- Operational Service (Webpage, e-mail alerts)