

Operational use of numerical dispersion/fallout models at the USGS to advise partner agencies and the public of ashfall hazards

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WMO 7th International Volcanic Ash Workshop
Anchorage, AK

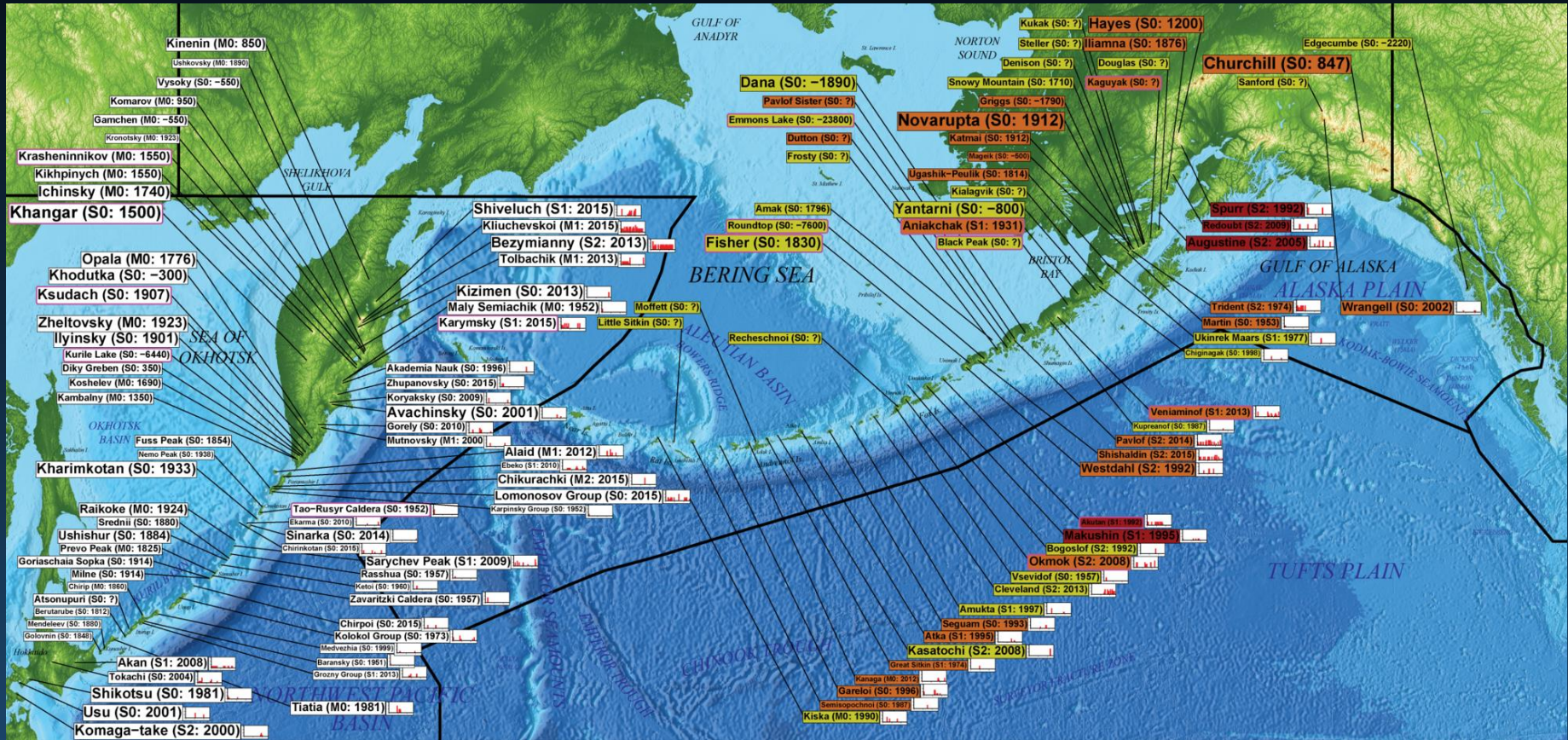


Outline

- USGS use of dispersion models
- Communicating to agency partners
- Communicating to general public
- Challenges bringing a research tool into broad operational use



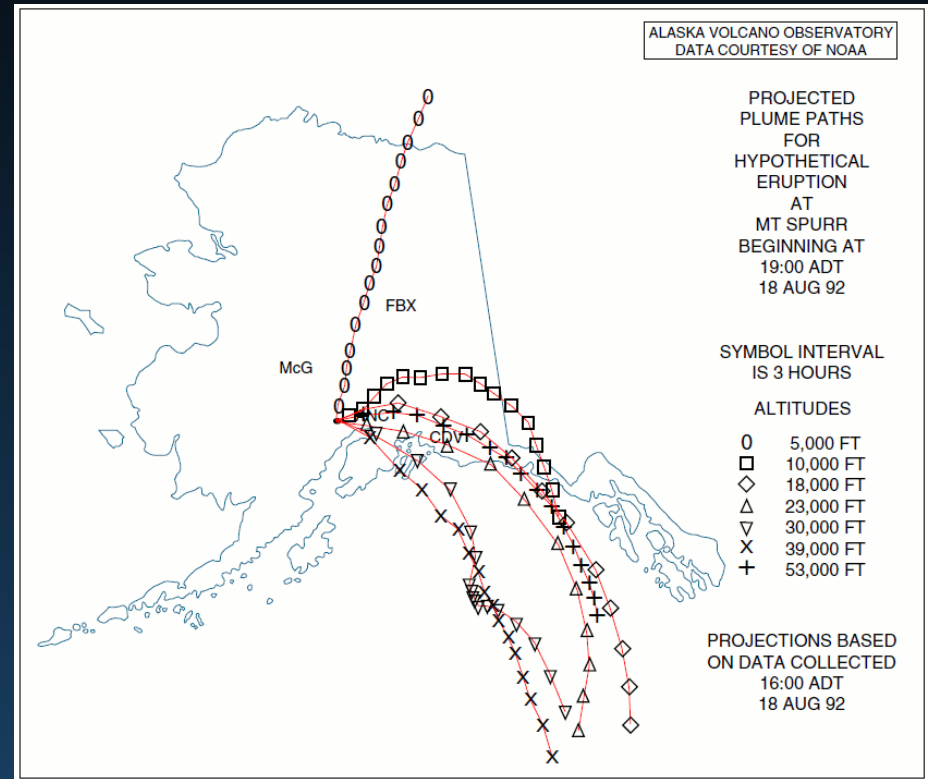
Volcanism in the North Pacific Rim



Dispersion models

Trajectory Models

- Hysplit (NOAA)
 - Used operationally by AVO since early 1990's (internally)
 - Publically available



http://ready.arl.noaa.gov/READY_traj_Alaska.php

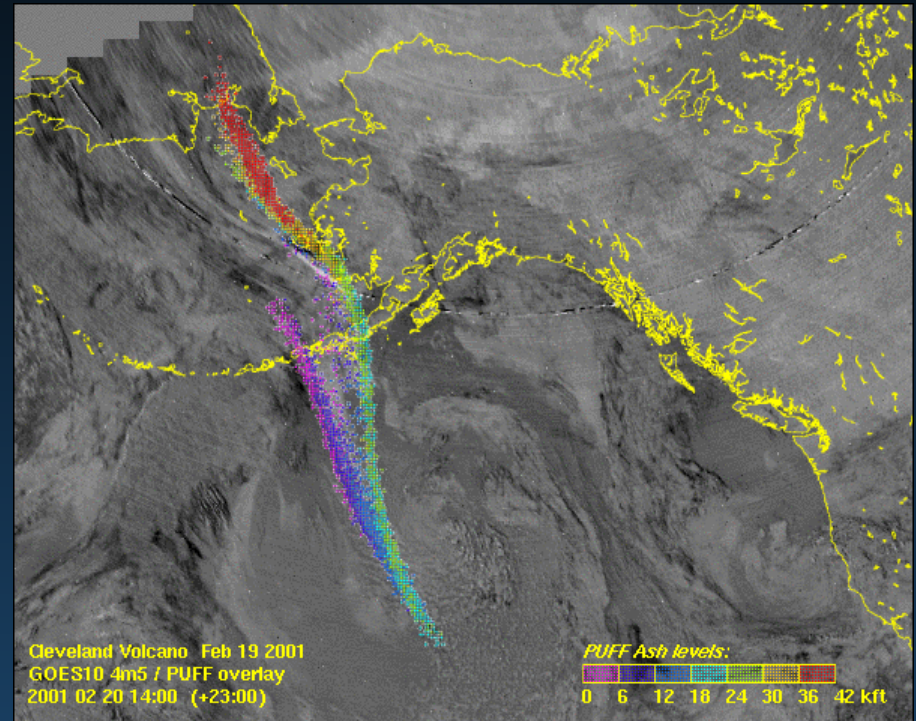


Dispersion models

Particle Models

- Puff (UAF-GI)
 - Used operationally by AVO since late 1990's (internally)
 - Automatic runs posted publically via UAF/AVO webpages
 - Interface to model is publically available

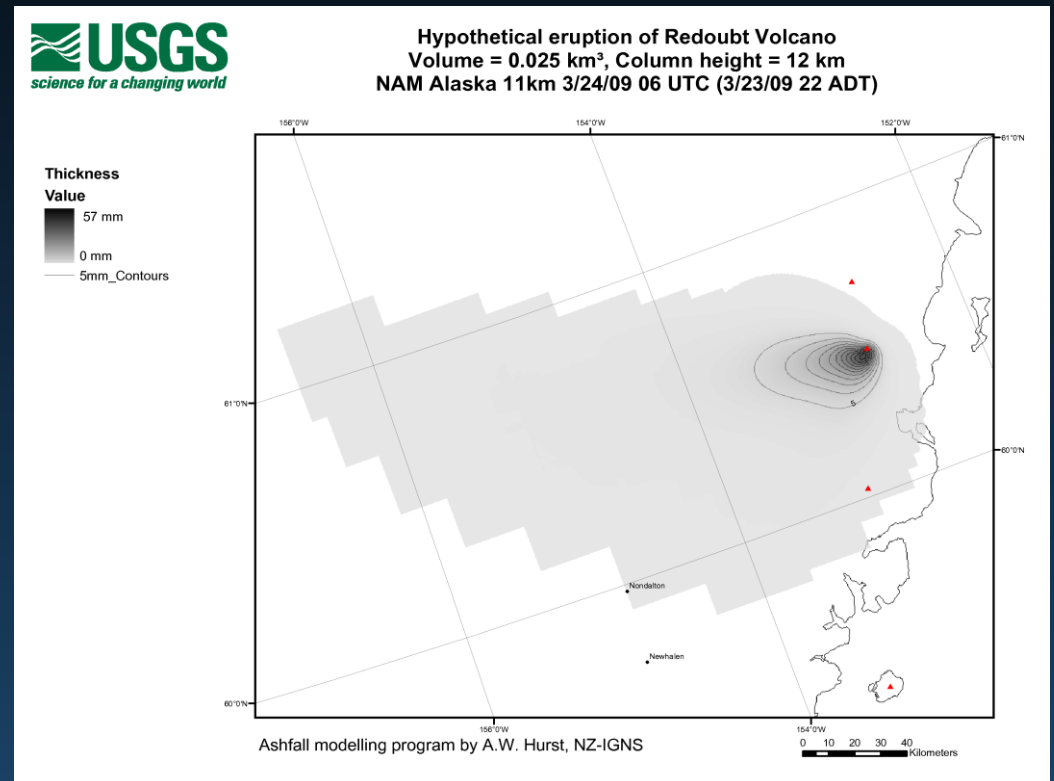
<http://volcview.wr.usgs.gov/puff/main.pl>



Fallout models

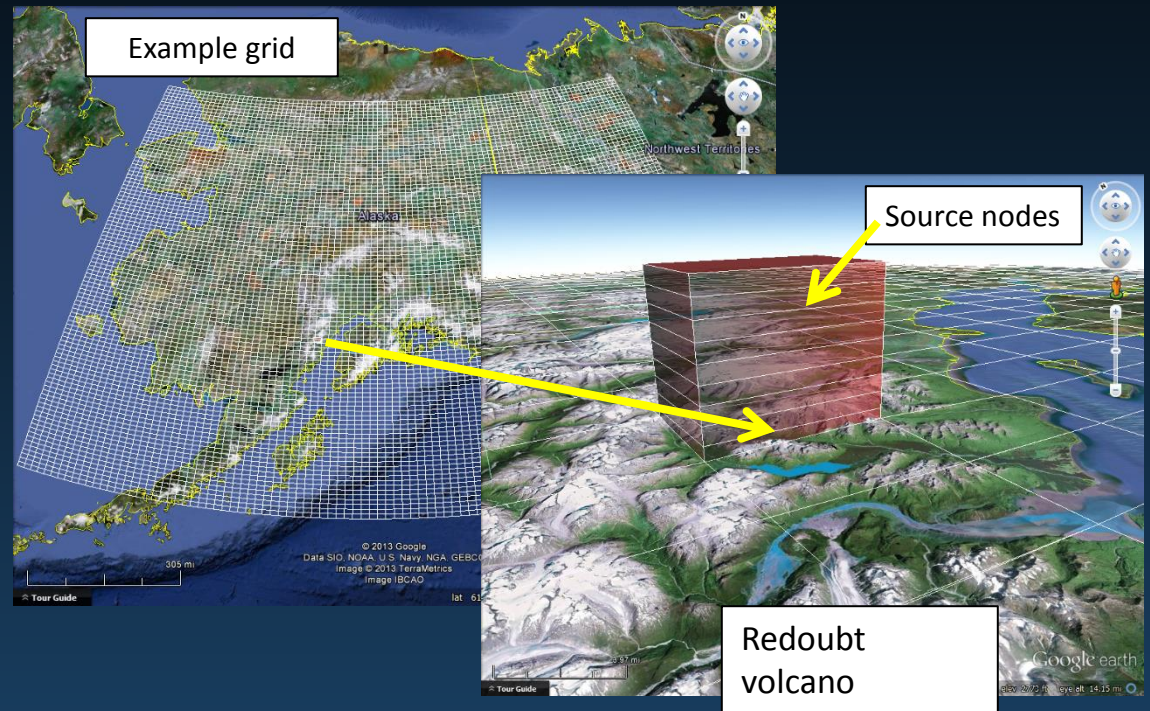
Ashfall

- Used operationally at CVO for MSH in 2004
- Used at AVO for Redoubt 2009
- Used internally to inform staff for communicating hazard assessment



The Ash3d dispersion model

- Developed in 2010
 - Both a research tool and used in operations
- Calculates airborne ash concentration and deposit thickness
- Used during unrest to anticipate
- Used during eruptions to forecast
- Runs on linux systems
- Web-based interface



The Ash3d web interface

- Password-controlled site

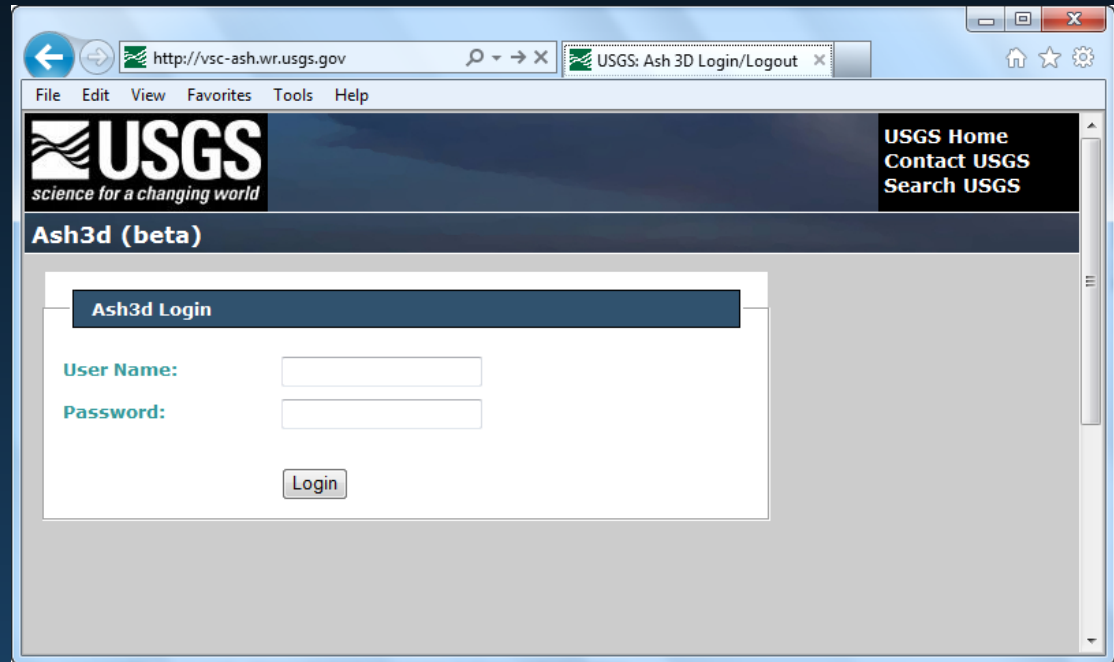
<http://vsc-ash.wr.usgs.gov>

- Public site

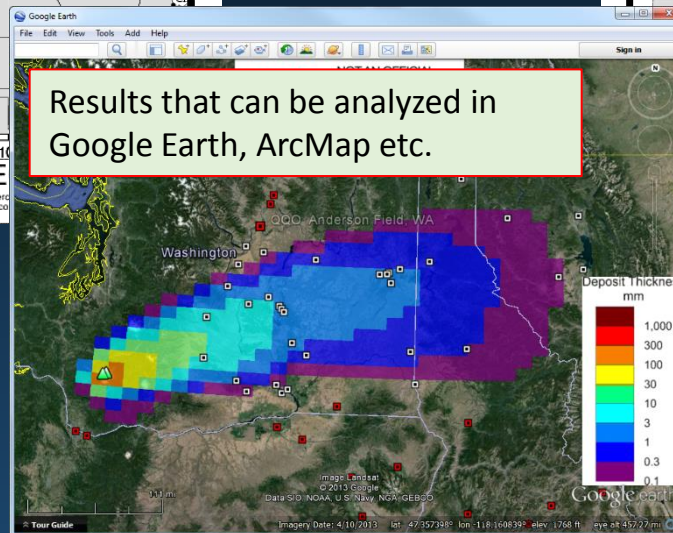
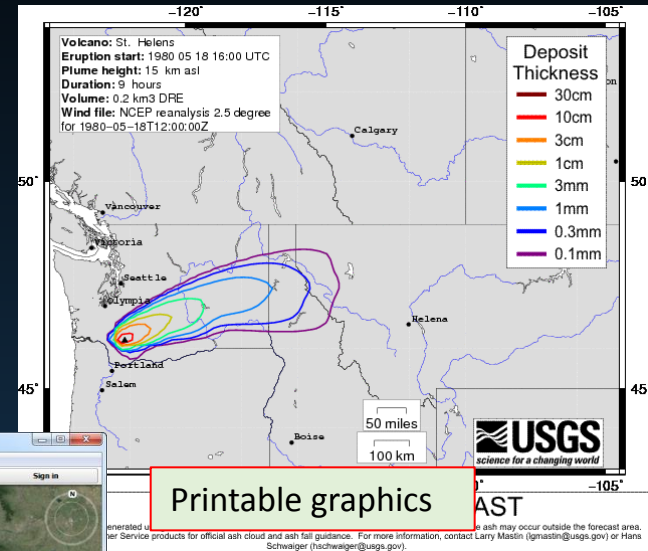
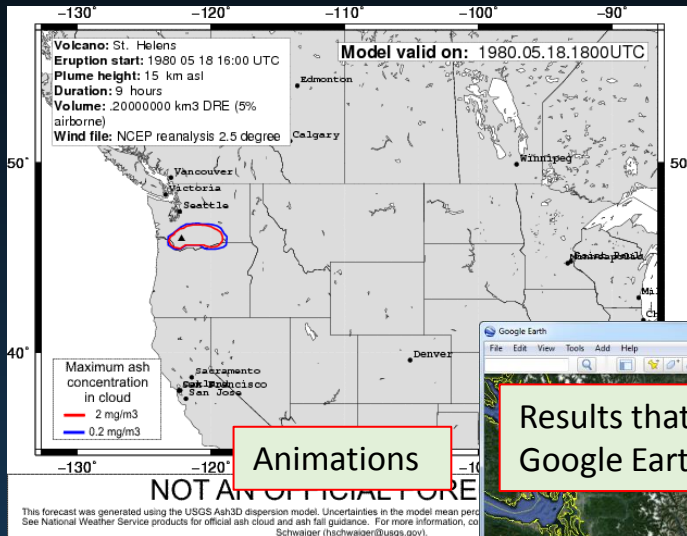
<http://vsc-ash.wr.usgs.gov/public.php>

- 3 Servers

- AVO, CVO, Menlo Park



Ash3d output



ARRIVAL TIME OF ASH IN AREA MODELED BY ASH3D
 Simulation using Input File: ash3d_input.txt
 Model run date: 2013.07.10, time UTC: 17:31

PLUME	START TIME UTC	DURATION HRS	PLUME HEIGHT km	PLUME HEIGHT Feet	VOLUME km ³
1	1980-05-18T16:00:00Z	9.00	15.0	49212.	0.20000

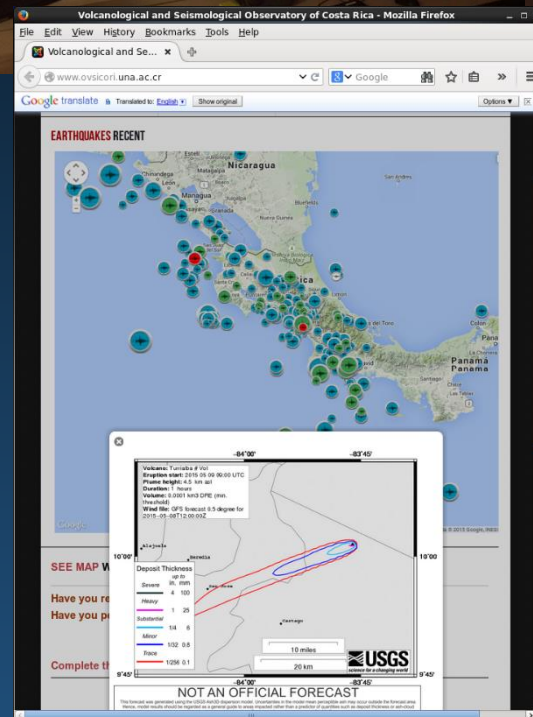
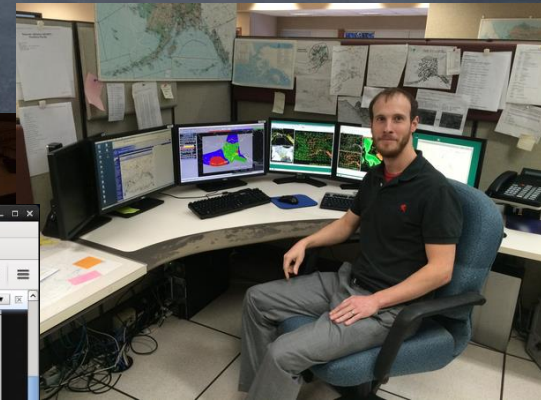
LOCATION	DEPOSIT		
(Airport code &) Place name	Latitude Longitude	Depos	date
YKH Yakima Air Terminal, WA	46.5669 -120.5378	1980-05-1	1980-05-1
BLN Bowers Field, WA	47.0319 -120.5103	1980-05-1	1980-05-1
JZN Quincy Muni, WA	47.2117 -119.8397	1980-05-1	1980-05-1
EPW Ephrata, WA	47.3062 -119.9235	1980-05-1	1980-05-1
EAT Pangborn Field, WA	47.3997 -120.2078	1980-05-1	1980-05-1
MWH Grant County Airport, WA	47.2078 -119.3203	1980-05-1	1980-05-1
WLG (Oroses Lake Mean), WA	47.1733 -119.2833	1980-05-1	1980-05-1
LRN Larson AFB, WA	47.1431 -119.2403	1980-05-1	1980-05-1
FUN Othello Muni, WA	46.7950 -119.0803	1980-05-18T22:14:00Z	06:14 11:27 1.57 minor
ZXZ Waterville, WA	47.6542 -120.0542	1980-05-18T22:26:00Z	06:26 02:00 0.08 trace or less

Tables of arrival times etc.



Ash3d users

- ~175 users
- Used operationally at AVO and CVO
- Local and national government agencies
- International users
 - volcano observatories
 - Geological/Meteorological offices
 - VDAP
- Individual researchers



Operational: Simplified web interface

Times

Windfile: 2015-10-14 04:00:00 UTC

Local: 2015-10-14 07:09:28 UTC

Name: Redoubt Event 5

Run Type: Both Airborne and Deposit

When Complete: Do not send email

Note: Model runs generally complete in about 10 minutes.

Use Advanced Options:

Volcano/Site: Redoubt

Latitude: 60.48527778
Longitude: -152.74194444
Elevation: 3,108 (m)

Eruption Start Time: Specific Date/Time

2009-03-23 12:58:00 UTC
(YYYY-MM-DD HH:MM)

Simulation Duration: 24 Between 3 and 48 hours

Eruption Duration: 0.1 At Most 24 Hours
Default eruption duration for this volcano is 0.33 hours ([apply](#)).

Plume Height: 15 km ASL

Erupted Volume: 0.002 Km³
Default erupted volume for this volcano is 0.006 Km³ ([apply](#)).
Value if unspecified: 0.0006 Km³
DRE: airborne ash fraction = 5%

Share With Public: Most recent run result freely available.

Dashboard Export: Check when output from this job should

To facilitate widespread use, we provide a simplified web interface with instructions and pre-set parameters



Research: full-featured web interface

USGS: Ash 3D CVO Ash3d Job - Mozilla Firefox

USGS: Ash 3D CVO A... x

https://vsc-ash.wr.usgs.gov/job/ash3d_job_edit.php?action=select&token=

Use Advanced Options:

Advanced Options

Eruption Source Parameters

Vent Latitude:

Vent Longitude:

Vent Elevation (m):

Plume Type:

Eruption Start Time UTC	Eruption Duration	Plume Height km	Erupted Volume km ³
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Grain Size Model:

Physics

Diffusion:

Topography:

Fall Model:

Output

Output Times:

Optional comma delimited list of desired output times in hours since the start of the simulation (1, 5, 7, ...).

Output Type	gif	kmz	netcdf
Deposit Concentration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deposit Thickness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deposit Arrival Time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ash Cloud Arrival Time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Max Airborne Ash Concen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ash Cloud Height	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Some output type functionality is still under development.

Numerical Details

Spatial Grid:

Lower Left Latitude:

Lower Left Longitude:

Width:

Height:

dx:

Select users can access 'advanced' options for research investigations

Most research investigations use Ash3d directly (i.e. not through the web interface)



Communicating results with partner agencies

USGS: Ash 3D CVO Ash3d Job - Mozilla Firefox

USGS: Ash 3D CVO A...

https://vsc-ash.wr.usgs.gov/job/ash3d_job_edit.php?action=select&token=...

Eruption Duration: 1 At Most 24 Hours
Default eruption duration for this volcano is 0.33 hours (apply).

Plume Height: 50,000 ft ASL
Default plume height for this volcano is 49212.6 ft (apply).

Erupted Volume: Km³
Default erupted volume for this volcano is 0.006 Km³ (apply).
Value if unspecified: 0.0064 Km³
DRE: airborne ash fraction = 5%

Share With Public: Most recent run result freely available.

Dashboard Export: Check when output from this job should appear on dashboard page for this volcano.

Description:

Description appears on public page if job is public. May appear in other locations in the future.

Share With Groups: **Available** (Click + To Add):
AVO Internal
NWS_ANC

Save Changes Delete Job and Model Runs

USGS: Ash 3D AVO - Mozilla Firefox

USGS: Ash 3D AVO

https://avo-vsc-ash.wr.usgs.gov/?token=7e69b13d445e0bb463077f58bca58c3d19011e7c0df2fa9...

Semisopochnoi Aware	Run Now	Results Airborne Finished: 2015-05-08 17:18:47 UTC Download Data
- Shared: AVO Internal, NWS_ANC, Public, Dashboard (Auto)		Results Deposit Finished: 2015-05-08 17:19:51 UTC Download Data
Shishaldin (High) Aware	Run Now	Results Airborne Finished: 2015-05-08 17:18:47 UTC Download Data
- Shared: AVO Internal, NWS_ANC, Public, Dashboard (Auto)		Results Deposit Finished: 2015-05-08 17:19:51 UTC Download Data
Shishaldin (Low) Aware	Run Now	Results Airborne Finished: 2015-05-08 17:18:47 UTC Download Data
- Shared: AVO Internal, Public (Auto)		Results Deposit Finished: 2015-05-08 17:19:51 UTC Download Data
Spurr test	Run Now	
Veniaminof Aware (Auto)	Run Now	Results Airborne Finished: 2015-05-08 17:18:47 UTC Download Data
		Results Deposit Finished: 2015-05-08 17:19:51 UTC Download Data

Note: Run results are removed after 10 days.

Shared Run Results

Redoubt

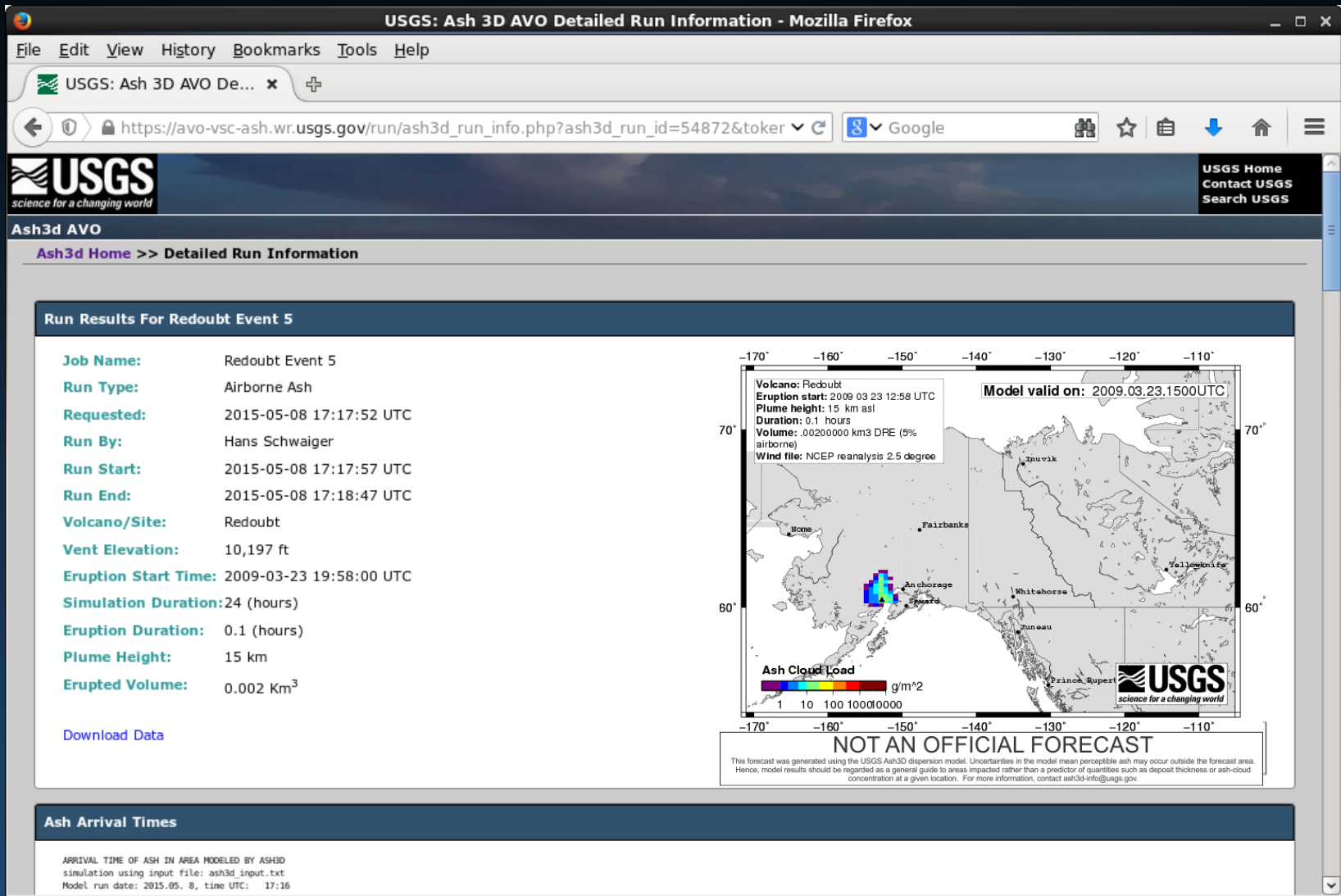
Redoubt Event 5, hschwaiger	Results Airborne Finished: 2015-05-08 17:18:47 UTC Download Data
Redoubt Event 5, hschwaiger	Results Deposit Finished: 2015-05-08 17:19:51 UTC Download Data

Public Run Results

View Public Run Results



Results page (airborne)



Results page (deposit)

USGS: Ash 3D AVO Detailed Run Information - Mozilla Firefox

USGS: Ash 3D AVO De... x

https://avo-vsc-ash.wr.usgs.gov/run/ash3d_run_info.php?ash3d_run_id=54873&tokor

USGS Home
Contact USGS
Search USGS

Ash3d AVO

Ash3d Home >> Detailed Run Information

Run Results For Redoubt Event 5

Job Name:	Redoubt Event 5
Run Type:	Ash Deposit
Requested:	2015-05-08 17:17:52 UTC
Run By:	Hans Schwaiger
Run Start:	2015-05-08 17:18:02 UTC
Run End:	2015-05-08 17:19:51 UTC
Volcano/Site:	Redoubt
Vent Elevation:	10,197 ft
Eruption Start Time:	2009-03-23 19:58:00 UTC
Simulation Duration:	24 (hours)
Eruption Duration:	0.1 (hours)
Plume Height:	15 km
Erupted Volume:	0.002 Km ³

[Download Data](#)

Volcano: Redoubt
Eruption start: 2009 03 23 12:58 UTC
Plume height: 15 km asl
Duration: 0.1 hours
Volume: 0.002 km3 DRE
Wind file: NCEP reanalysis 2.5 degree for 2009-03-23T12:00:00Z

62°

60°

156° 154° 152° 150°

25 miles

50 km

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NOT AN OFFICIAL FORECAST

This forecast was generated using the USGS Ash3D dispersion model. Uncertainties in the model mean perceptible ash may occur outside the forecast area. Hence, model results should be regarded as a general guide to areas impacted rather than a predictor of quantities such as deposit thickness or ash-cloud concentration at a given location. For more information, contact ash3d-info@usgs.gov.

Ash Arrival Times

ADDITIONAL TIME OF ASH TO REACH SPECIFIC LOCATIONS



Full data bundles

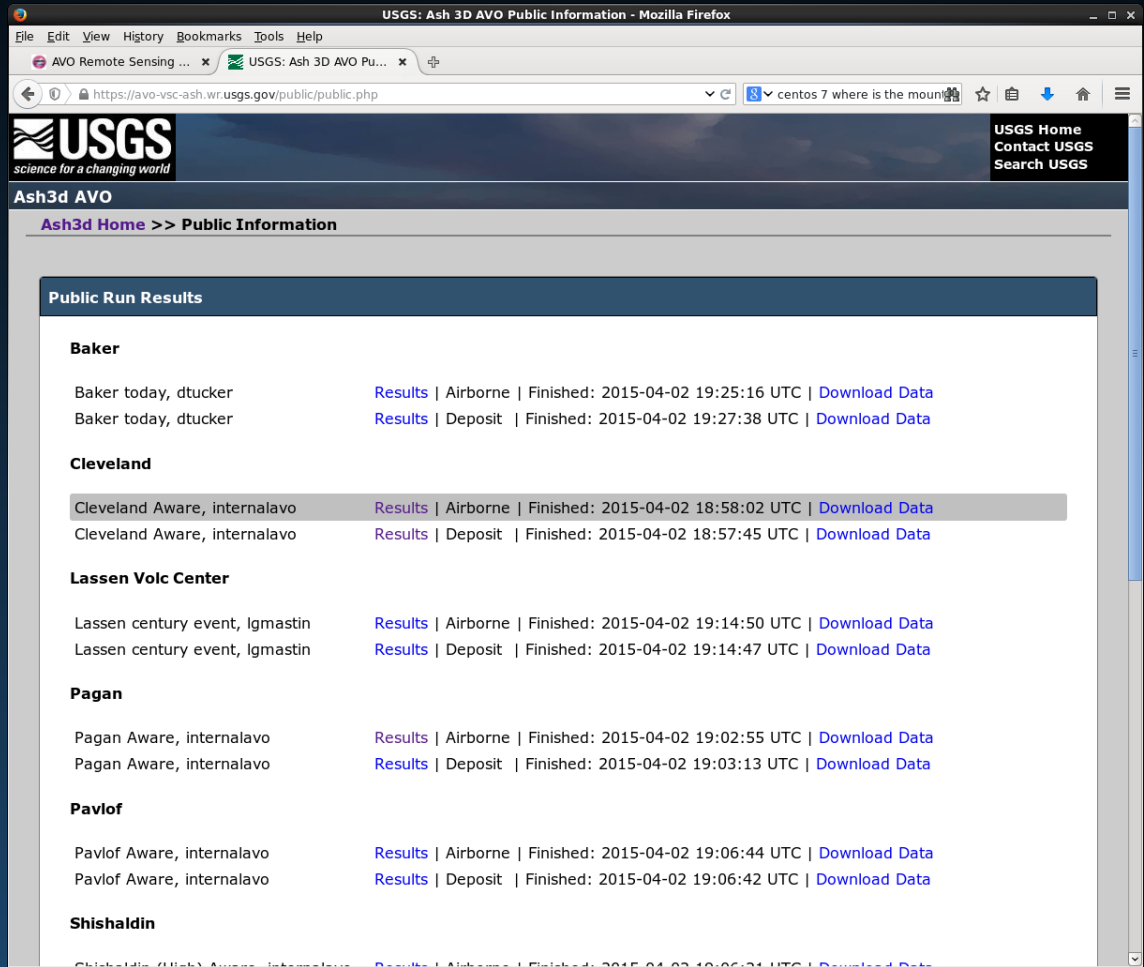
- Airborne run zip file contain
 - Individual graphics
 - Input files
 - Kmz files of additional variables
 - Text files of affected airports
 - documentation
- Deposit run zip file can be downloaded separately

```
hschwaiger@ramp:~/Ash3d_Download
File Edit View Search Terminal Help
[hschwaiger@ramp Ash3d_Download]$
[hschwaiger@ramp Ash3d_Download]$
[hschwaiger@ramp Ash3d_Download]$
[hschwaiger@ramp Ash3d_Download]$
[hschwaiger@ramp Ash3d_Download]$ ls -l
2014.04.21.0859UTC.gif
2014.04.21.1159UTC.gif
2014.04.21.1459UTC.gif
2014.04.21.1759UTC.gif
2014.04.21.2059UTC.gif
2014.04.21.2359UTC.gif
2014.04.22.0259UTC.gif
2014.04.22.0559UTC.gif
2014.04.22.0859UTC.gif
ash3d_input.txt
ash3d_Rahat_First_airborne_test_air_20140421-06:42:36z.zip
cloud_animation.gif
cloud_arrivaltimes_airports.kmz
cloud_arrivaltimes_airports.txt
cloud_arrivaltimes_hours.kmz
CloudConcentration.kmz
CloudHeight.kmz
CloudLoad.kmz
README.pdf
[hschwaiger@ramp Ash3d_Download]$
```



Communicating results with public

- No log-in credentials are needed
- Full download bundles are available for airborne and deposit simulations



The screenshot shows a web browser window displaying the USGS Ash 3D AVO Public Information page. The page title is "USGS: Ash 3D AVO Public Information - Mozilla Firefox". The URL in the address bar is "https://avo-vsc-ash.wr.usgs.gov/public/public.php". The page features the USGS logo and navigation links for "USGS Home", "Contact USGS", and "Search USGS". The main content area is titled "Ash3d AVO" and "Public Information". It lists "Public Run Results" for several locations: Baker, Cleveland, Lassen Volc Center, Pagan, Pavlof, and Shishaldin. Each location has a list of simulation runs with links for "Results", "Airborne", "Deposit", and "Download Data".

Location	Simulation Name	Results	Download Data
Baker	Baker today, dtucker	Results Airborne	Download Data
	Baker today, dtucker	Results Deposit	Download Data
Cleveland	Cleveland Aware, internalavo	Results Airborne	Download Data
	Cleveland Aware, internalavo	Results Deposit	Download Data
Lassen Volc Center	Lassen century event, Igmastin	Results Airborne	Download Data
	Lassen century event, Igmastin	Results Deposit	Download Data
Pagan	Pagan Aware, internalavo	Results Airborne	Download Data
	Pagan Aware, internalavo	Results Deposit	Download Data
Pavlof	Pavlof Aware, internalavo	Results Airborne	Download Data
	Pavlof Aware, internalavo	Results Deposit	Download Data
Shishaldin	Shishaldin Aware, internalavo	Results Airborne	Download Data
	Shishaldin Aware, internalavo	Results Deposit	Download Data

<http://vsc-ash.wr.usgs.gov/public.php>



Communicating results with public: AVO homepage

The screenshot shows two browser windows. The left window displays the AVO homepage with navigation tabs for Home, About AVO, Current Volcanic Activity, and Volcano Information. The right window shows the 'Shishaldin: Color Code ORANGE Alert Level WATCH' activity page. This page includes a map of the volcano's location, a list of updates, and several forecast graphics. The 'ASH FALL FORECASTS' section contains 'ASH FALL FORECAST' and 'REPORTED ASHFALL' maps. The 'ASH CLOUD FORECASTS (AIRBORNE):' section includes 'ASH3D CLOUD HEIGHT', 'ASH3D CLOUD LOAD', 'PUFF CLOUD HEIGHT', and 'TRAJECTORY FORECASTS: HYSPLIT TRAJECTORY' graphs. A disclaimer states: 'THESE PRODUCTS MAY NOT BE CURRENT. During an actual eruption, see National Weather Service forecasts of airborne ash hazard to aircraft (SIGMETs: http://aaawh.arh.noaa.gov and Volcanic Ash Advisories: http://vaac.arh.noaa.gov) as well as forecasts of ash fall: http://pafc.arh.noaa.gov.'

<http://avo.alaska.edu>



Communicating results with public: AVO homepage

AVO Shishaldin - Activity Page - Mozilla Firefox

USGS: Ash 3D AVO De... x AVO Shishaldin - Activi... x

avo.alaska.edu/activity/Shishaldin.php

Shishaldin: Color Code ORANGE Alert Level WATCH

SHISHALDIN LINKS

- Description
- Images
- Maps
- Bibliography
- Reported Activity
- Current Activity

SAMPLES

- Map Display
- List Display

OTHER LINKS

- ASH FALL ALERTS
- Ted Stevens Airport Flight Status (Anchorage)
- Ashfall collection instructions
- USGS Ashfall Preparedness website
- IS ASH FALLING?
- Send us an email

COLOR CODE TIMELINE

- Mar 28, 2014 14:19
- Jan 30, 2014 11:39

CODE DEFINITIONS

INSTRUMENT DATA

LINKS

Shishaldin Ash3D Ash Fall Model - Mozilla Firefox

USGS: Ash 3D AVO De... x Shishaldin Ash3D Ash ... x

avo.alaska.edu/activity/ash3d/ashfall.php?vid=ak252

Alaska Volcano Observatory

Home About AVO Current Volcanic Activity Volcano Information Library Images Searches

Summary Webcams Webicorders RSAM Activity Notifications Notification Search Cleveland Shishaldin Semisopchnoi

You are here: Home > Current Volcanic Activity > Shishaldin > Ash3d Ash Fall Model

ASH3D: ASH FALL

Volcano: Shishaldin
Eruption starts: 2015 05 08 19:26 UTC
Plume height: 13.7 km asl
Duration: 1 hours
Volume: 0.046728 km³ DRE
Wind file: GFS forecast 0.5 degree for 2015-05-08T12:00:00Z

NOT AN OFFICIAL FORECAST

During an actual eruption, see National Weather Service forecasts of airborne ash hazard to aircraft (SIGMETs: <http://aawu.arh.noaa.gov> and Volcanic Ash Advisories: <http://vaac.arh.noaa.gov>) as well as forecasts of ash fall: <http://pafc.arh.noaa.gov>.

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Contact AVO Privacy Accessibility Information Quality FOIA

URL: avo.alaska.edu/activity/ash3d/ashfall.php



Communicating results with public: AVO homepage

Shishaldin ASH3D: Ash Cloud Height Model - Mozilla Firefox

USGS: Ash 3D AVO De... x Shishaldin ASH3D: Ash... x

avo.alaska.edu/activity/ash3d/cloud_height.php?vid=ak252

Alaska Volcano Observatory

Home About AVO Current Volcanic Activity Volcano Information Library Images Searches

Summary Webcams Webicorders RSAM Activity Notifications Notification Search Cleveland Shishaldin Semisopchnoi

You are here: Home > Current Volcanic Activity > Shishaldin > ASH3D: Ash Cloud Height Model

ASH3D: ASH CLOUD HEIGHT & TRANSPORT

Model valid on: 2015.05.08.2059UTC

Volcano: Shishaldin
Eruption start: 2015 05 08 19:25 UTC
Plume height: 13.7 km a.s.l.
Duration: 1 hours
Volume: 00402800 km3 DRE (5% airborne)
Wind filler: GFS forecast 0.5 degree for 2015-05-08T12:00:00Z

Max. Ash Cloud Height (Feet, ASL)

10,000 20,000 30,000 40,000 50,000

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NOT AN OFFICIAL FORECAST

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THESE PRODUCTS MAY NOT BE CURRENT.

During an actual eruption, see National Weather Service forecasts of airborne ash hazard to aircraft (SIGMETs: <http://aawu.arh.noaa.gov> and Volcanic Ash Advisories: <http://vaac.arh.noaa.gov>) as well as forecasts of ash fall: <http://pafc.arh.noaa.gov>.

Color Code **ORANGE** Alert Level **WATCH**

SHISHALDIN LINKS LOCATION

Description Images Maps Bibliography Reported Activity Current Activity

SAMPLES Map Display List Display

OTHER LINKS ASH FALL AND ASH CLOUD FORECASTS: MODEL OUTPUT

ASH FALL ALERTS

Ted Stevens Airport Flight Status (Anchorage)

Ashfall collection instructions

USGS Ashfall Preparedness website

IS ASH FALLING?

Send us an email

COLOR CODE TIMELINE

Mar 28, 2014 14:19

Jan 30, 2014 11:39

CODE DEFINITIONS INSTRUMENT DATA LINKS

ASH FALL FORECAST REPORTED ASHFALL

ASH3D CLOUD HEIGHT ASH3D LO

Enlarge and learn more Enlarge and learn more Enlarge and learn more Enlarge and learn more

THESE PRODUCTS MAY NOT BE CURRENT.

During an actual eruption, see National Weather Service forecasts of airborne ash hazard to aircraft (SIGMETs: <http://aawu.arh.noaa.gov> and Volcanic Ash Advisories: <http://vaac.arh.noaa.gov>) as well as forecasts of ash fall: <http://pafc.arh.noaa.gov>.

Contact AVO Privacy Accessibility Information Quality FOIA

@alaska_avo alaska.avo

Receive volcano updates by email: USGS VNS

URL: avo.alaska.edu/activity/ash3d/cloud_height.php
Page modified: October 7, 2014 07:27
Contact Information: AVO Web Team



Communicating results with public: AVO homepage

Shishaldin ASH3D Cloud Load Model - Mozilla Firefox

USGS: Ash 3D AVO De... x Shishaldin ASH3D Clo... x

avo.alaska.edu/activity/ash3d/cloud_load.php?vid=ak252

Alaska Volcano Observatory

Home | About AVO | **Current Volcanic Activity** | Volcano Information | Library | Images | Searches

Summary | Webcams | Webicorders | RSAM | Activity Notifications | Notification Search | Cleveland | Shishaldin | Semisopchnoi

You are here: Home > Current Volcanic Activity > Shishaldin > ASH3D Ash Cloud Load Model

ASH3D: ASH CLOUD LOAD (AMOUNT)

Model valid on: 2015.05.08.20:59UTC

Volcano: Shishaldin
 Eruption start: 2015-05-08 19:25 UTC
 Plume height: 13.7 km ash
 Duration: 1 hours
 Volume: 00402800 km3 DPE (5% airborne)
 Wind file: GFS forecast 0.5 degree for 2015-05-08T12:00:00Z

Ash Cloud Load: g/m²

1 10 100 1000 1000000

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NOT AN OFFICIAL FORECAST

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THESE PRODUCTS MAY NOT BE CURRENT.

During an actual eruption, see National Weather Service forecasts of airborne ash hazard to aircraft (SIGMETs: <http://aawu.arh.noaa.gov> and Volcanic Ash Advisories: <http://vaac.arh.noaa.gov>) as well as forecasts of ash fall: <http://pafc.arh.noaa.gov>.

Contact AVO | Privacy | Accessibility | Information Quality | FOIA

@alaska_avo
alaska.avo
Receive volcano updates by email: USGS VNS

URL: avo.alaska.edu/activity/ash3d/cloud_load.php
 Page modified: October 7, 2014 07:28
 Contact Information: AVO Web Team

Shishaldin: Color Code ORANGE Alert Level WATCH

SHISHALDIN LINKS

LOCATION

Description
 Images
 Maps
 Bibliography
 Reported Activity
 Current Activity

SAMPLES

Map Display
 List Display

OTHER LINKS

ASH FALL AND ASH CLOUD FORECASTS: MODEL OUTPUT

ASH FALL ALERTS

Mathematical models help forecast where an ash cloud will drift, how fast, and how high, as well as forecast winds and assumptions about the size of the eruption to generate forecast graphics. AVO runs eruption occurred. **This DOES NOT mean that an ash cloud has been produced.** For actual erupt Click on individual models graphics to learn more.

ASH FALL FORECASTS

ASH FALL FORECAST REPORTED ASHFALL

Enlarge and learn more

ASH CLOUD FORECASTS (AIRBORNE):

ASH3D CLOUD HEIGHT ASH3D LO

Enlarge and learn more

Enlarge and learn more

Enlarge and learn more

Enlarge and learn more

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During an actual eruption, see National Weather Service forecasts of airborne ash hazard to aircraft (SIGMETs: <http://aawu.arh.noaa.gov> and Volcanic Ash Advisories: <http://vaac.arh.noaa.gov>) as well as forecasts of ash fall: <http://pafc.arh.noaa.gov>.

INSTRUMENT DATA

LINKS

COLOR CODE TIMELINE

Mar 28, 2014 14:19
 Jan 30, 2014 11:39

CODE DEFINITIONS



Communicating results with public: AVO homepage

Shishaldin PUFF: Ash Cloud Height Model - Mozilla Firefox

USGS: Ash 3D AVO De... x Shishaldin PUFF: Ash C... x

avo.alaska.edu/activity/ash3d/puff.php?vid=ak252

Alaska Volcano Observatory

Home About AVO Current Volcanic Activity Volcano Information Library Images Searches

Summary Webcams Webicorders RSAM Activity Notifications Notification Search Cleveland Shishaldin Semisopchnoi

You are here: Home > Current Volcanic Activity > Shishaldin > PUFF: Ash Cloud Height Model

PUFF: ASH CLOUD HEIGHT & TRANSPORT

Model valid on: 2015_05_08_2059UTC

Volcano: Shishaldin

Eruption start: 2015_05_08_19:28 UTC

Plume height: 12.7 km a.s.l.

Duration: 7 hours

Volcano: 0402000 hwd SFE 9%

Shishaldin

Wind file: GFS forecast 0.5 degree for 2015-05-08T12:00:00Z

- PUFF is another model that shows the expected movement of an ash cloud should a significant eruption occur.
- Colors represent the expected height of ash cloud in feet above sea level as it drifts downward.
- AVO will run this model when a volcano is restless to prepare for possible eruptions. **IT DOES NOT mean an ash cloud has been produced.** See [current status for Shishaldin](#)
- During an eruption, AVO will update this model with more detailed information (eruption start time, height, duration) as it becomes available.
- This model **DOES NOT** show ash fallout; please go [here for ash fall model output](#). Note that it is possible for ash clouds to move overhead and produce little or no ash fall.
- For more information about PUFF, see <http://pafc.arh.noaa.gov/puff/index.html>.

[View all model output side by side](#)

THESE PRODUCTS MAY NOT BE CURRENT.

Some ash hazard to aircraft (SIGMETS: <http://aawu.arh.noaa.gov> and Volcanic Ash Advisories: <http://vaac.arh.noaa.gov>) as well as forecasts of ash fall: <http://pafc.arh.noaa.gov>.

URL: avo.alaska.edu/activity/ash3d/puff.php
Page modified: October 7, 2014 07:30
Contact Information: [AVO Web Team](#)



Communicating results with public: AVO homepage

Shishaldin NOAA Trajectory Model - Mozilla Firefox

File Edit View History Bookmarks Tools Help

USGS: Ash 3D AVO De... Shishaldin NOAA Traje...

avo.alaska.edu/activity/ash3d/hysplit.php?vid=ak252

Alaska Volcano Observatory

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You are here: Home > Current Volcanic Activity > Shishaldin > NOAA Trajectory Model

NOAA HYSPLIT MODEL

Forward trajectories starting at 1200 UTC 09 May 15
12 UTC 08 May GFSG Forecast Initialization

Source * at 54.75 N 163.97 W

Feet AGL

50000 *	40000 *	31000 *	22000 *	19000 *
40000 *	31000 *	22000 *	19000 *	13000 *
30000 *	22000 *	19000 *	13000 *	5000 *

13 14 15 16 17 18

This is not an official forecast for an eruption and does not show ash fall. If the volcano erupts see official forecasts.
Created 20150509 1745 UTC (AKDT-UTC minus 8 hours)

- This graphic from NOAA shows the expected direction and speed of an ash cloud should a significant eruption occur. It **DOES NOT** mean that such an ash cloud has been produced.
- Colored lines show the direction a cloud would travel at different altitudes in feet above ground level (AGL; see key below map plot). A given eruption cloud may not reach all altitudes shown.
- Symbols are spaced one hour apart and reflect the forecast speed of the ash cloud.
- HYSPLIT is updated every 6 hours.
- UTC to AKDT conversion (Alaska Daylight Time):
 - 0000 UTC = 4:00 PM AKDT on the previous day as UTC
 - 0600 UTC = 10:00 PM AKDT on the previous day as UTC
 - 1200 UTC = 4:00 AM AKDT on the same day as UTC
 - 1800 UTC = 10:00 AM AKDT on the same day as UTC
- For more information about HYSPLIT see: http://www.arl.noaa.gov/ready/traj_alaska.html.

View all model output side by side

SHISHALDIN: Color Code ORANGE Alert Level WATCH

SHISHALDIN LINKS LOCATION

- Description
- Images
- Maps
- Bibliography
- Reported Activity
- Current Activity

SAMPLES

- Map Display
- List Display

OTHER LINKS

ASH FALL AND ASH CLOUD FORECASTS: MODEL OUTPUT

Mathematical models help forecast where an ash cloud will drift, how fast, and how high, as well as what forecast winds and assumptions about the size of the eruption to generate forecast graphics. AVO runs eruption occurred. **This DOES NOT mean that an ash cloud has been produced.** For actual eruption Click on individual models graphics to learn more.

ASH FALL FORECASTS

ASH FALL FORECAST REPORTED ASHFALL

Enlarge and learn more

ASH CLOUD FORECASTS (AIRBORNE):

ASH3D CLOUD HEIGHT ASH3D LOCATION

Enlarge and learn more

THESE PRODUCTS MAY NOT BE CURRENT.

During an actual eruption, see National Weather Service forecasts of airborne ash hazard to aircraft (SIGMETs: <http://aawu.arh.noaa.gov> and Volcanic Ash Advisories: <http://vaac.arh.noaa.gov>) as well as forecasts of ash fall: <http://pafc.arh.noaa.gov>.

INSTRUMENT DATA LINKS

COLOR CODE TIMELINE

- Mar 28, 2014 14:19
- Jan 30, 2014 11:39

CODE DEFINITIONS



Customer needs/wants from dispersion models

- General Public
 - In anticipation of an event
 - Where might it go?
 - In response to events
 - Where is it going?
 - When is it going to get here?
 - How much?
 - How long?
- Agency partners
 - VAAC/AAWU/FAA
 - Cloud top/bottom in FL
 - Ash Fall Advisory
 - NOAA Impact levels
 - Local time zone
 - Probabilistic/ensemble models
- International partners
 - Metric units
 - Custom locations on maps
 - Limited internet



Challenges: disseminating model results to public

Distinction between

- automated hypothetical runs
- forecasts based on most recent knowledge of ongoing eruption

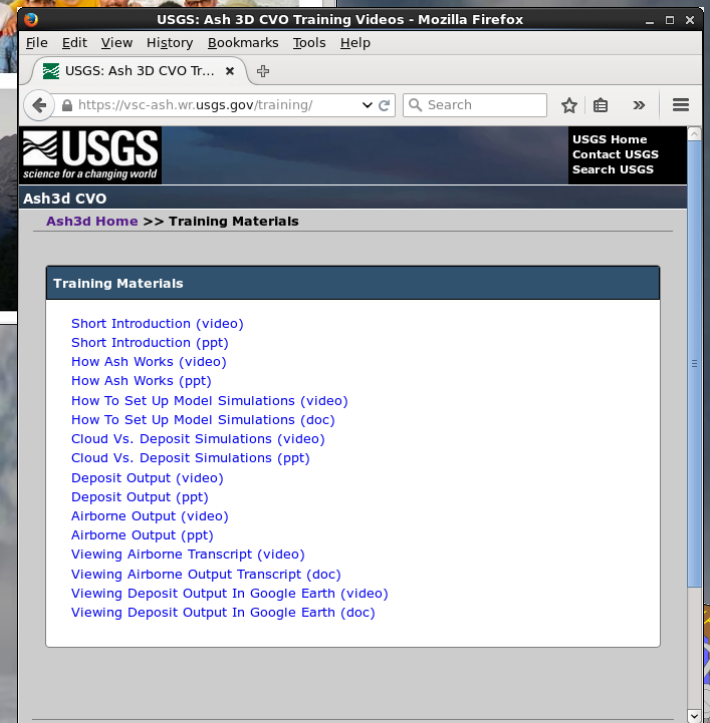
Mitigation efforts

- Activity page will prominently state if an eruption has begun
- Comments are included on all activity pages stating that models will be updated with current information when available
- Provide links to official products



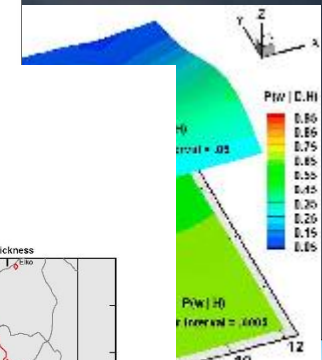
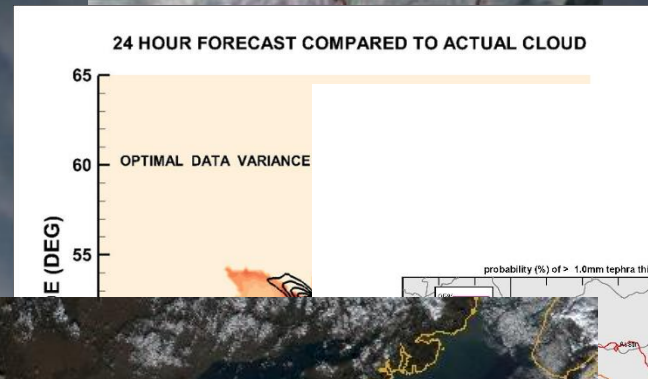
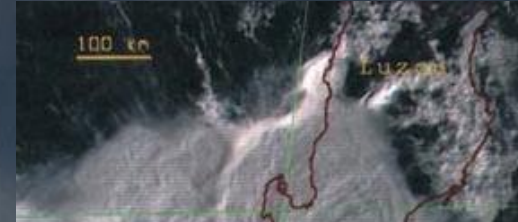
Challenges: Educating users

- Usage of interface
 - CSAV course
 - Online training
- Interpretation of results and the limitations of the model
 - Sources of errors
 - Wind data
 - Eruption Source Parameters
 - Plume height
 - Erupted mass
 - Grainsize distribution
 - Start time/duration

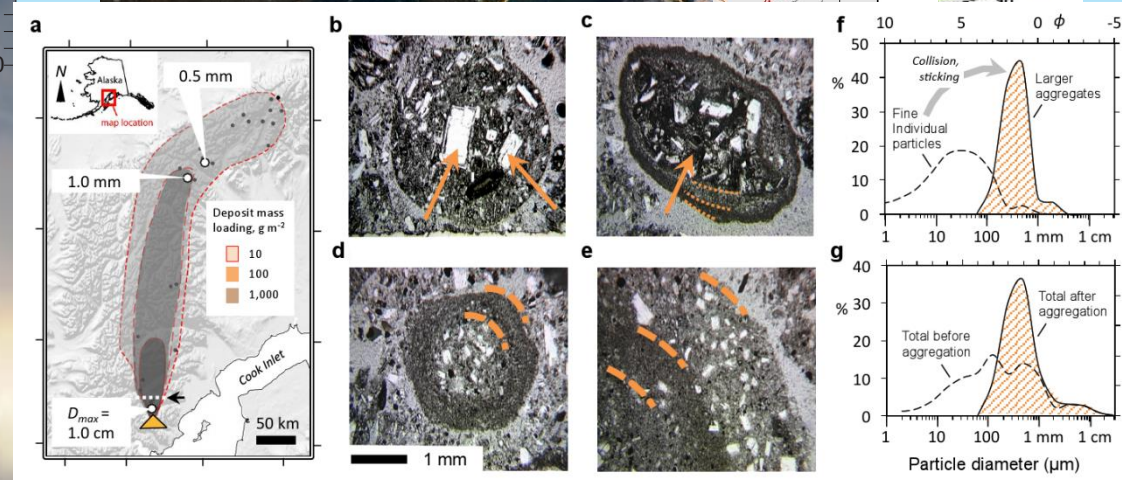


Challenges: Transferring research to operations

- Column models (umbrella cloud)
- Inverse methods
- Satellite data
- Ensembles/probabilistic maps
- Resuspension
- Non-linear processes (aggregation)



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Conclusions

- AVO has a long history of internal use of dispersion models
- Communicating results with agency partners is more developed, more frequently reviewed
- Output graphics of automated runs are posted to the AVO webpage with links to more detailed output and supporting documentation
- Largest impediments to transferring research efforts to operations are
 - Training end users
 - Computational resources

