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Operations and Services

Volcanic Ash, NWSPD 10-15

VOLCANIC ASH ADVISORY CENTERS

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(Signed)

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Director, Office of Climate, Water, and Weather Services

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Date

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1. Purpose

This instruction describes the National Weather Service's (NWS) U.S. Volcanic Ash Advisory Centers (VAACs), located in Camp Springs, MD, and Anchorage, AK.

2. Overview

Volcanic ash is a serious hazard to aviation. It can cause significant damage to aircraft and potentially lead to fatal accidents. In response to this acknowledgement, the International Airways Volcano Watch (IAVW) was created.

The IAVW is coordinated by the International Civil Aviation Organization (ICAO), and sets out arrangements between volcanological, aeronautical and meteorological organizations to facilitate the provision of warnings to aircraft on the presence of ash in the atmosphere.

The Anchorage and Washington VAACs are two of the nine VAACs around the world that have been established within the framework of the IAVW.

The procedures of the IAVW are described in ICAO Doc 9766: *Handbook on the International Airways Volcano Watch (IAVW)*. Any inconsistencies between the Handbook and this document should be brought to the attention of the VAAC Managers.

VAACs are primarily responsible for issuing Volcanic Ash Advisories (VAAs), which provides information on the distribution and forecast movement of ash. Under the ideal operation of the IAVW, the VAA message provides guidance to the appropriate Meteorological Watch Office (MWO) who then prepares the Volcanic Ash SIGMET. The Volcanic Ash SIGMET is the official aviation warning product.

3. General

The VAACs were established in 1997 by ICAO. These roles are defined by ICAO and the World Meteorological Organization (WMO), as well as various U.S. government agencies. The Federal Aviation Administration (FAA), the lead U.S. agency, who has designated the NWS to provide the required aviation weather products and services.

4. Goals

The goal of the volcanic ash program is to provide worldwide warnings and advisories to aviation interests regarding volcanic ash hazards.

VAACs are responsible for providing ash movement and dispersion guidance to MWOs and neighboring VAACs. Only two VAACs cover the United States: the Alaska Aviation Weather Unit in Anchorage and NESDIS Satellite Analysis Branch in Washington DC.

Each VAAC performs these functions:

- Provide model input parameters to the NOAA NCO SDM who execute volcanic ash dispersion models in real-time
- Keep up-to-date with information on volcanic activity within the region
- Continuously use satellite information to identify volcanic ash and to discriminate volcanic ash clouds from weather clouds.
- Issue VAAs, and provide guidance to MWOs for SIGMETs involving volcanic ash. Issue Volcanic Ash Graphics (VAG) that describes the VAA.
- Update VAAs and VAGs at least every 6 hours if not sooner.
- Cancel VAAs and VAGS when ash is no longer discernible or has entirely moved into adjacent VAAC area of responsibility (see handoff-ownership section below).
- Provide advisory service to Regional Area Forecast Centers, MWOs, Volcanic Observatories (VOs), Center Weather Service Units (CWSUs), and other VAACs.
- Coordinate with the aviation community, the public and neighboring VAACs about volcanic episodes.

NOAA's operational volcanic ash forecasting program is accomplished through a partnership between the NWS and the National Environmental Satellite and Data Information Service (NESDIS).

The two VAACs are responsible for the detection, analysis, and forecasting of volcanic ash plumes across their respective areas of responsibility. (**Figure 1**) The Washington VAAC is a partnership between the NWS and NESDIS. The NESDIS Office of Satellite and Product Operations (OSPO) Satellite Analysis Branch (SAB) is responsible for the detection, analysis, and forecasting of the volcanic ash plumes, while the NWS National Center for Environmental Prediction (NCEP) Central Operations is responsible for running and distribution of the NOAA HYSPLIT ash dispersion model. The Washington VAAC staff, located at SAB, is also responsible for other programs such as tropical weather and fire/smoke analysis. The Washington VAAC is staffed 24x7x365. Both groups (NESDIS SAB and NCEP NCO) are physically located on the 4th floor of the World Weather Building in Camp Springs, Maryland. The Washington VAAC services two U.S. and twenty one international MWOs.

The Anchorage VAAC is a NWS entity which is operated by the Alaska Aviation Weather Unit (AAWU) and is part of NWS Alaska Region. The AAWU also serves as the MWO for the Anchorage Flight Information Region (FIR). The AAWU/Anchorage VAAC staffs two desks 24x7x365. The VAAC desk is also staffed by the AAWU lead forecaster during eruptive events. Additional personnel are called in to assist during large volcanic ash events. The AAWU/Anchorage VAAC is co-located with the Anchorage Weather Forecast Office (WFO) and the Alaska-Pacific River Forecast Center (APRFC) in the NWS Sand Lake Facility in Anchorage, Alaska. The Anchorage VAAC services one U.S. MWO

The VAACs are responsible for issuing VAA text and VAG products. (**Figure 2**) This is accomplished by using a wide array of remote sensing information (e.g. satellite, radar), insitu data (METAR, PIREP, Volcano Observatory reports) as well as ash dispersion and meteorological modeling output. In addition, each of the VAACs provide advice and

consultation to the MWOs, Weather Forecast Offices (WFOs), CWSUs, VOs, FAA Air Route Traffic Control Centers (ARTCCs) and many other partners and users.

The FAA is the meteorological authority, as defined by ICAO, for the United States, and works closely with the NWS on U.S. VAAC requirements. The FAA designated the NWS as the meteorological provider. The FAA represents U.S. interests at ICAO IAVW meetings and the U.S. VAAC managers generally serve as technical advisors to the FAA.

5. Volcanic Ash Advisory Centers (VAACs)

The VAAC is defined in ICAO Annex 3, *Meteorological Service for International Air Navigation*, Section 3.5, as a meteorological center designated by regional air navigation agreement to provide advisory information to meteorological watch offices, area control centers, flight information centers, World Area Forecast Centers (WAFCs) and international OPMET databanks regarding the lateral and vertical extent and forecast movement of volcanic ash in the atmosphere following volcanic eruptions. VAAC information includes text based VAA and graphical based VAG products.

6. Groups Addressing Volcanic Ash Services

There are several groups both within the United States and internationally that are addressing volcanic ash service issues. NOAA VAWG (Volcanic Ash Working Group) team members actively participate as partners in these collaborative activities. The following is a partial list of volcanic ash services related activities and a list of NOAA VAWG members who are associated with these groups.

6.1 ICAO International Airways Volcano Watch Operations Group (IAVWOPSG)

The ICAO IAVWOPSG is an active group that meets several times per year either through telcon or face to face meetings in Silver Spring, MD or Washington, DC. The U.S. working group to the IAVWOPSG is comprised of many of the members of the Office of the Federal Coordinator for Meteorology (OFCM) Working Group/Volcanic Ash (WG/VA). The chair of the U.S. delegation is the FAA (U.S. Meteorological Authority), and the technical leads are the two U.S. VAAC managers. The IAVWOPSG group meets formally every eighteen months to work on the policy and procedures for the upcoming amendments to ICAO Annex 3 or changes to the ICAO IAVW Handbook (Doc9766)

Anchorage and Washington VAAC Managers, NWS Volcanic Ash Program Manager, NOAA ARL HYSPLIT program (working group members)

6.2 ICAO International Airways Volcano Task Force (IAVTF)

This group was formed as a result of the Eyjafjallajökull eruptions. The first meeting was held at ICAO Headquarters in Montreal on July 27-30, 2010. The FAA has the lead for the U.S. and attends these meetings with the technical leads (two VAAC managers) and the NWS National Volcanic Ash Program Manager.

6.3 Alaska Interagency Volcanic Ash Services Working Group

The Alaska Interagency (IA) group meets 2-3 times each year. The “face to face” meetings alternate between the USGS Alaska Volcano Observatory (AVO) and the NWS Forecast Facility in Anchorage. The group consists of members from NOAA/NWS, FAA, USGS AVO, United States Coast Guard, Alaska Department of Homeland Security and Emergency Management, State of Alaska Department of Environmental Conservation Division of Air Quality, State of Alaska Health and Human Services and Joint Task Force Alaska (Department of Defense).

NWS Alaska Region Volcanic Ash Program Manager (co-chair), Anchorage VAAC Manager, WFO Anchorage WCM, Anchorage CWSU (ZAN) MIC (members)

6.4 National Marine Volcano Impacts Team (NMVIT)

This NOAA led team meets several times per year via telcon to discuss specific issues with respect to volcano hazards and marine issues. NOAA's National Center for Environmental Predictions Ocean Prediction Center leads this group which consists of NOAA/NWS, USGS Volcano Observatories and the United States Coast Guard.

NCEP Ocean Prediction Center WCM (lead), NWS Volcanic Ash Program Manager, Anchorage and Washington VAAC Managers, WFO Anchorage WCM (members)

6.5 Office of the Federal Coordinator for Meteorology (OFCM)

The OFCM Working Group for Volcanic Ash (WG/VA) is an active group that meets several times per year either through telcon or face to face meetings in Silver Spring, MD. The group is comprised of representatives from several agencies including FAA, NOAA, USGS, Department of Defense (DOD) Air Force Weather Agency (AFWA), National Aeronautics and Space Administration (NASA), Smithsonian Institute (SI), and Airline Pilots Association (ALPA).

NWS Volcanic Ash Program Manager (co-chair), Anchorage and Washington VAAC Managers, NOAA ARL HYSPLIT program manager (members)

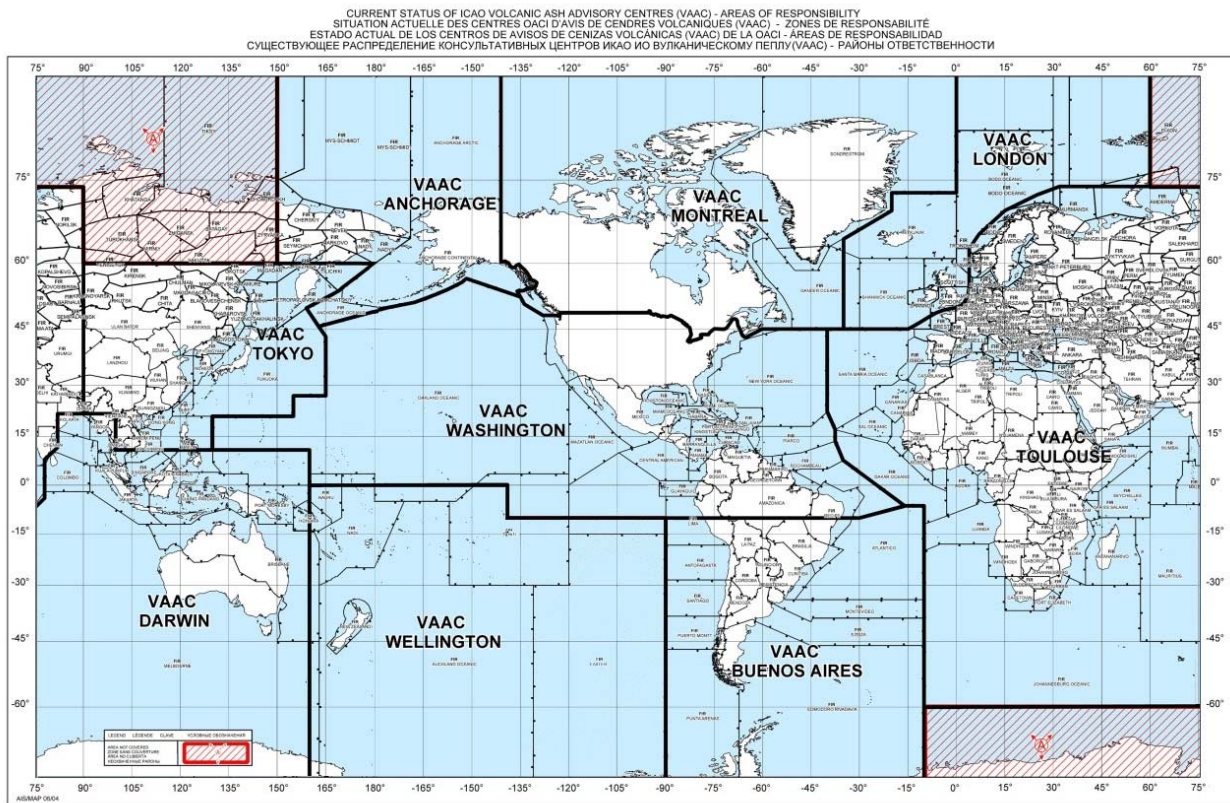


Figure 1: VAACs of the World (per ICAO Annex 3)

6.6 Example of a VAA and VAG

VAA

FVAK23 PAWU 021556

VAAAK3

VA ADVISORY

DTG: 20090402/1600Z

VAAC: ANCHORAGE

VOLCANO: REDOUBT 1103-03

PSN: N6029 W15245

AREA: SOUTH CENTRAL ALASKA

SUMMIT ELEV: 10198 FT/3109 M

ADVISORY NR: 2009-56

INFO SOURCE: PIREPS/RADAR/AVO/SURFACE OBSERVATIONS

AVIATION COLOUR CODE: RED

ERUPTION DETAILS: LOW LEVEL ASH EMISSIONS CONTINUE

OBS VA DTG: 16/1530 UTC

OBS VA CLOUD: SFC/FL150 N6114 W15043 - N6037 W14937 - N5955 W15020 -
N6007 W15305 - N6024 W15308 - N6114 W15043 MOVING NE 25 KNOTS.

FCST VA CLOUD +6 HR: 02/2200Z SFC/FL150 N6116 W15156 - N6040 W14859 -
N5957 W15012 - N6007 W15305 - N6025 W15322 - N6116 W15156

FCST VA CLOUD +12 HR: 03/0400Z SFC/FL150 N6117 W15211 - N6044 W14941
- N6017 W14958 - N5947 W15338 - N6029 W15322 - N6117 W15211

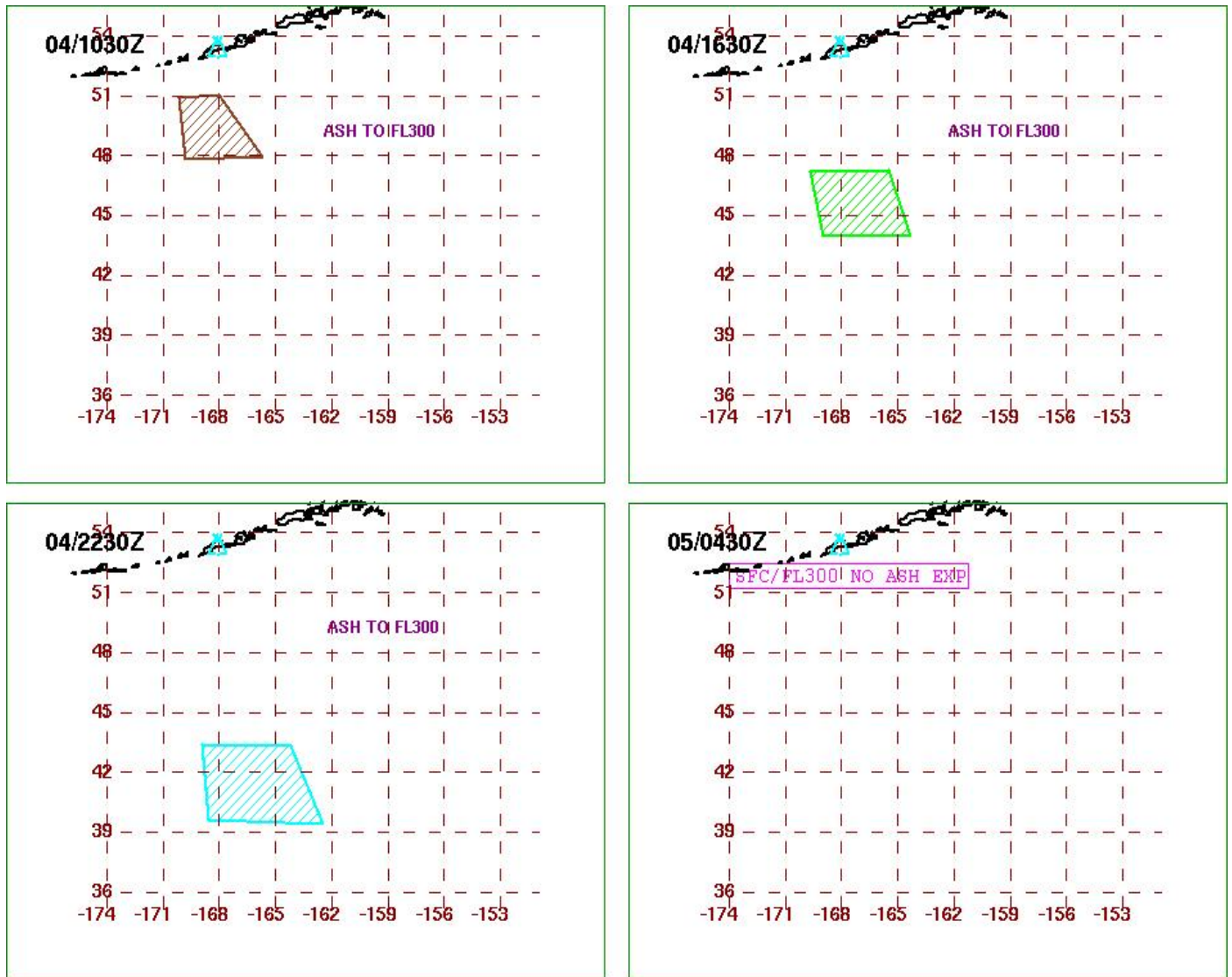
FCST VA CLOUD +18 HR: 03/1000Z SFC/FL150 N6117 W15416 - N6104 W15040
- N5949 W15043 - N6011 W15443 - N6117 W15416

REMARKS: NONE

NXT ADVISORY: 20090402/2200Z

DH APR 2009

VAG



VOLCANIC ASH ADVISORY
 DTG: 20080804/1052Z
 VAAC: WASHINGTON
 VOLCANO: OKMOK 1101-29
 AREA: ALEUTIAN IS
 SUMMIT ELEV: 3520 FT (1073 M)
 ADVISORY NR: 2008/079

INFO SOURCE: GOES-11, GFS WINDS.
 ERUPTION DETAILS: DENSE PLUME OF ASH
 RMK: ASH PLUME SEEN IN MULTISPECTRAL IMAGERY MVG S 15-20
 KTS BETWEEN 48-51N AND 167-169W. FORECAST WINDS TO S THRU
 OUTLOOK PERIOD. ...EVANS
 NXT ADVISORY: WILL BE ISSUED BY 20080804/1645Z

Figure 2: Example of a VAG

7. Dispersion and Trajectory Models

Dispersion and trajectory model output is utilized by the VAACs to assist with the preparation of forecast ash boundaries. The models should be initiated as soon as possible after ash is detected to allow timely preparation of forecast positions. The model output may also assist with the detection of ash on satellite imagery, as it can give an idea of where the ash may be expected to be on the image.

The primary (official) dispersion model used by the Anchorage and Washington VAACs is the HYSPLIT model (Hybrid Single Particle Lagrangian Integrated Trajectory model). Other models are consulted such as the PUFF model (<http://puff.images.alaska.edu/monitoring.shtml>) and CANERM (Canadian). NOAA's Air Resources Laboratory (ARL) also distributes trajectory forecasts which are frequently used by the forecasters as well (http://ready.arl.noaa.gov/READY_traj_alaska.php).

8. U.S. VAAC Description

8.1 Anchorage VAAC

Although the area of the Anchorage Volcanic Ash Advisory Center is one of the smallest VAAC areas, it covers air routes over some of the most active volcanic areas in the world. Alaska has 80 percent of all active U.S. volcanoes and 8 percent of the active volcanoes world-wide. Alaska contains over 100 volcanoes and over 40 of these have been active in historic time.

The north Pacific air routes connecting Alaska to the Far East carry 10,000 people per day, and up to 50,000 aircraft per year. Some routes pass over the Kamchatka Peninsula with its 32 volcanoes. The Anchorage VAAC in cooperation with the AVO and the Kamchatka Volcanic Eruption Response Team has initiated a series of informal agreements to provide advisory assistance about volcanic activity on the Kamchatka Peninsula.

The AVO continuously monitors several of the Aleutian volcanoes and relaying its observations and forecasts to the NWS and the FAA.

How the process works:

- AAWU VAAC meteorologists use input from the AVO, satellite pictures, radar imagery and pilot reports to determine if an eruption has occurred and to understand the intensity of the eruption.
- An eruption SIGMET is issued to warn pilots about the danger.
- One or more computer models are used to forecast ash movement in the atmosphere HYSPLIT, PUFF and/or CANERM.
- A VAA is issued describing the three-dimensional location of the ash. An accompanying graphic is also issued (VAG).
- SIGMETs and advisories are updated to keep everyone current with the situation.

8.1.1 Anchorage VAAC Duties

During a volcanic event, the AAWU initiates the Anchorage VAAC. The Anchorage VAAC responsibilities are handled by the AAWU lead forecaster, however during significant eruptive events, the VAAC requires its own staffing. The AAWU does have a VAAC desk (fully equipped with AWIPS, administrative pc and phone) to facilitate this function.

During a significant eruptive event the following options are available:

- Lead forecaster "load sheds" to the North Desk (as appropriate) and takes on VAAC duties

- Lead forecaster calls on administrative shift forecaster (if available) to assume AAWU and/or VAAC duties
- Lead forecaster calls on Meteorologist In Charge (MIC) or Scientific Operations Officer (SOO) to assume either routine aviation (AAWU) duties or VAAC duties. Note that MIC or SOO may be busy with DHS&EM calls, coordination with other VAACs or MWO office managers, media calls, etc.
- Lead forecaster calls in overtime shift to cover AAWU and/or VAAC duties

A volcanic event can range from a minor impact event (e.g. low level eruption in Kamchatka or Aleutians) to a high impact event (Cook Inlet volcano event).

The following products are issued by the VAAC forecaster:

- VAA and VAG (every 6 hours and updated as needed)
- Volcanic Ash SIGMET (AAWU only-every 6 hours and updated or amended as needed)
- Provide input parameters and coordinate with NCEP NCO on HYSPLIT run
 - Using the 4 ash reduction results provided by NCEP NCO, Anchorage VAAC forecaster then needs to validate which solution is correct (by using remote sensing/observational data)
 - Anchorage VAAC forecaster then coordinates with NCEP NCO to advise on which reduction to disseminate long line
 - The VAAC forecaster also runs the PUFF model and uses Hypothetical trajectories provided by the ARL to aid in VAA/VAG/SIGMET production

8.2 Washington VAAC

The Washington VAAC (W-VAAC) is a collaborative effort of both NWS's NCEP and the NESDIS Office of Satellite and Product Operations (OSPO), Satellite Analysis Branch (SAB). Most of the duties of the VAAC however are performed by the satellite analysts in SAB. The NCEP portion of the W-VAAC is responsible for maintaining and running of the HYSPLIT model in a 24/7 operational environment on its computer system. NCEP also runs the Global Forecast System (GFS) atmospheric model four times a day in 6-hour cycles for input to the HYSPLIT model.

8.2.1 W-VAAC Duties

The analysis of imagery and issuance of both the VAA and VAG are done by the SAB satellite analyst. When ash is reported or detected within the Washington VAAC boundaries, the analyst will discontinue other operational activities and immediately begin gathering information about the ash/eruption.

- The first priority is to notify the affected MWO(s) usually by phone to facilitate their issuance of a Volcanic Ash SIGMET.
- Next, the analyst prepares a VAA.
- If ash is detectable in satellite imagery, a VAG is also issued. The VAG consists of the current horizontal and vertical extent of the ash "cloud" and the +06, +12 and +18 hour forecasted positions of the ash.

While the analysis of the ash cloud is being done, the NCEP Senior Duty Meteorologist sets up a file containing the inputs for the volcanic ash plume provided by SAB. The SDM then runs the model by requesting the NCO Systems Operations Specialist (SOS) to run the computer job to generate the HYSPLIT graphic. Upon model completion, the graphic output is reviewed for consistency with the meteorology fields, satellite imagery, and any observed data in the vicinity of the ash cloud. Once satisfied with the HYSPLIT depiction, another computer job is run to disseminate the HYSPLIT output to the NWSTG for distribution to users. VAA, VAG and HYSPLIT are updated at least every six hours, but sooner if the ash situation changes substantially.

9. Distribution of Products

VAAC products are available from the following communications circuits:

- **VAA:** Global Telecommunications System (GTS) and Family of Services (FOS)
- **VAA and VAG, SIGMETS:** AAWU Internet home pages (AAWU and VAAC)
- **VAA, graphic and HYSPLIT:** SSD Internet home pages
- **VAA (no graphic), HYSPLIT:** World Area Forecast Satellite Broadcast System (WAFS)
- **HYSPLIT:** Digital Facsimile (DIFAX)
- **VAA (no graphic):** Advanced Weather Interactive Processing System (AWIPS), and Aeronautical Fixed Telecommunications Network (AFTN)

FAXING SERVICES are discouraged as an operational method of dissemination.

10. Areas of Responsibility

Anchorage VAAC: The Anchorage VAAC area includes the entire Anchorage FIR in addition to an area bounded on the west by 150 E longitude and on the south by 60 N latitude. This area includes all of the volcanoes within the state of Alaska and closely monitors adjacent volcanoes located in Kamchatka Peninsula and the Northern Kurile Islands of Russia.

Within the Anchorage VAACs area of responsibility are NOPAC jet routes that link North America with Asia. The jet routes pass within close proximity of over 100 historically active volcanoes. Significant eruptions, which produce ash to heights greater than FL250, can greatly impact air traffic across the North Pacific region. In 2008, 62,778 flights were made across the NOPAC routes, a decrease of 22% from 2007. However, Polar flights are slowly increasing, 5465 Polar routes were flown. Between the Polar routes and the NOPAC routes are the Russian Trans-East routes. There were 18,030 flights on the Russian Trans-East routes in 2008.

Washington VAAC: The Washington VAACs area of responsibility stretches from 40 degrees West to 130 degrees East and includes the areas of the United States Continental, New York and Oakland Oceanic Flight information Regions (FIR) and southward through Central America, the Caribbean to 10 degrees South in South America.

11. Transfer of Responsibility of Volcanic Ash Products

In cases where volcanic ash cloud crosses the boundary between VAAC areas of responsibility, the first VAAC should retain responsibility for the issuance of advisories until such time as the handover of responsibility has been agreed between VAACs. Standardized operational procedures for the coordination and transfer of responsibility between VAACs for volcanic ash events are located in the IAVW Handbook (DOC 9766) and are explained below.

Note: In other words, while the volcanic ash cloud straddles the common boundary, only one VAAC will issue advisories at any time, and these advisories are sent by each VAAC to MWOs and ACCs in their respective areas of responsibility.

VAACs should insert a note in their “last”/“first” advisory of the message and graphical series in the remarks section that the “hand-off” will take place at that message/graphic number.

As soon as one of the VAACs learns of an eruption (for a volcano erupting within 5° degrees latitude of the VAACs boundary) or when an ash cloud is expected to come within 5° (latitude) of the VAACs and/or FIR boundary, an information /coordination phone call will be made. The possibility of a hand-off will be discussed, if appropriate.

Hand-off of operational responsibility is coordinated by the lead VAAC with adjacent affected VAACs and MWOs when the ash cloud is not less than 5° (latitude) from a VAAC and/or FIR boundary. In the rare situation of large or persistent ash emissions, adjacent responsible VAACs, upon coordination, may agree to divide the operational forecast responsibility.

Once a hand-off has been decided, the last volcanic ash advisory issued by the lead VAAC before hand-off will include the following at the end of the message (in the REMARKS):

“THE RESPONSIBILITY FOR THIS ASH EVENT IS BEING TRANSFERRED TO VAAC **aaaa** THE NEXT ADVISORY WILL BE ISSUED BY VAAC **aaaa** BY **xxxx** UTC UNDER HEADER **bbbb**.”

Where:

aaaa is the name of the VAAC taking over

bbbb is the bulletin header that will be used by the VAAC taking over (FVCN01 CWA0, FVXX21 KWBC, FVAK20 PANC, etc.)

xxxx is the time in UTC

Example:

“THE RESPONSIBILITY FOR THIS ASH EVENT IS BEING TRANSFERRED TO VAAC MONTREAL. THE NEXT ADVISORY WILL BE ISSUED BY VAAC MONTREAL BY 2200 UTC UNDER HEADER FVCN01 CWA0.”

The first volcanic ash advisory issued by the VAAC that has taken over responsibility will include the following:

“VAAC **cccc** HAS TRANSFERRED RESPONSIBILITY OF THIS EVENT TO VAAC

dddd. THIS ADVISORY UPDATES MESSAGE **eeee**.”

Where:

cccc is the name of the VAAC which had the lead before the hand-off

dddd is the name of the VAAC which has taken over

eeee is the full bulletin header (e.g FVAK PANC 261200) of the last message issued by the VAAC which had the lead before the hand-off.

Example:

“VAAC ANCHORAGE HAS TRANSFERRED RESPONSIBILITY OF THIS EVENT TO VAAC MONTREAL. THIS ADVISORY UPDATES MESSAGE FVAK20 PANC 261200.”

When the lead VAAC is issuing messages covering a portion of another VAAC’s area of responsibility, or an ash cloud is approaching (within 5 degrees of latitude) the area of responsibility of a non-lead VAAC, the non-lead VAAC should issue a volcanic ash advisory directing the user to the correct product. It should be noted that the Washington and Anchorage VAACs refer to these as “**near**” or “**pointer**” VAAs.

The following wording is suggested:

“PLEASE SEE **ffff** ISSUED BY VAAC **gggg** WHICH DESCRIBES CONDITIONS OVER OR NEAR THE VAAC **hhhh** AREA OF RESPONSIBILITY.”

Where:

ffff is the full bulletin header of the message issued by the lead VAAC

gggg is the name of the lead VAAC

hhhh is the name of the VAAC re-broadcasting the lead VAAC message

Example of rebroadcast message issued by VAAC Montreal:

PLEASE SEE FVAK20 PANC 121200 ISSUED BY VAAC ANCHORAGE WHICH DESCRIBES CONDITIONS OVER OR NEAR THE VAAC MONTREAL AREA OF RESPONSIBILITY”

Example of rebroadcast message issued by Anchorage VAAC:

FVAK23 PAWU 061818
VAAAK3
VA ADVISORY
VAAC: ANCHORAGE
VOLCANO: KIZIMEN 1000-23
PSN: N5508 E16019
AREA: KAMCHATKAN PENINSULA
SUMMIT ELEV: 8201 FT/2485 M
ADVISORY NR: 2011/001

PLEASE SEE FVFE01 RJTD ISSUED BY TOKYO VAAC WHICH DESCRIBES CONDITIONS OVER OR NEAR THE ANCHORAGE VAAC AREA OF RESPONSIBILITY.

For situations in which two or more distinct ash clouds would be present (different eruptions or one eruption for which the ash cloud has divided in two or more distinct parts), the “hand-off” only applies to the ash cloud approaching or crossing VAAC boundaries.

The ending of an advisory for a volcanic ash event is performed by the lead VAAC upon coordination with the adjacent affected VAACs and MWOs.

Only the lead VAAC issues volcanic ash advisories in graphical format on ISCS or SADIS.

12. Backup

The Washington VAAC performs back up operations for the Anchorage VAAC. The Air Force Weather Agency (AFWA) performs back up operations for the Washington VAAC. Back up procedures are defined in Appendix D of the IAVW Handbook (DOC 9766).

13. Contact information for Anchorage and Washington VAAC

ANCHORAGE (Alaska, USA)

Supervisor Alaska Aviation Weather Unit - Meteorologist in Charge
Mailing Address Alaska Aviation Weather Unit
6930 Sand Lake Road
Anchorage, Alaska, USA 99502

AFTN address via KWBCYMYX
VAA WMO header FVAK21-25 PAWU
VAG WMO header PFXD21-25 PAWU

Internet home page <http://vaac.arh.noaa.gov>
Hours of operation 24 hour/day

Trajectory/dispersion model HYSPLIT, PUFF dispersal model
HYSPLIT dispersal model development: NOAA ARL
Run PUFF: <http://pafc.arh.noaa.gov/puffweb2/puffweb.php>
Occasionally reference the MLDP0 (Canadian) dispersal models

WASHINGTON (D.C., USA)

Supervisor Satellite Analysis Branch, NESDIS

Mailing Address 5200 Auth Road, Room 401
Camp Springs, MD 20746

VAA WMO Headers	FVXX KNES 20-27
Internet home page	VAAS: http://www.ssd.noaa.gov/VAAC/ HYSPLIT: http://www.ssd.noaa.gov/VAAC/vaftad.html
Hours of operation	24 hours/day
Trajectory /dispersion model	HYSPLIT dispersal model development: NOAA ARL NOAA Air Resources Laboratory Office of Oceanic and Atmospheric Research