
A Multi-Agency Approach to Ash-Fall Preparedness and Response in Alaska

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*Originally Presented November 2012: Cities on Volcanoes
Colima, Mexico*

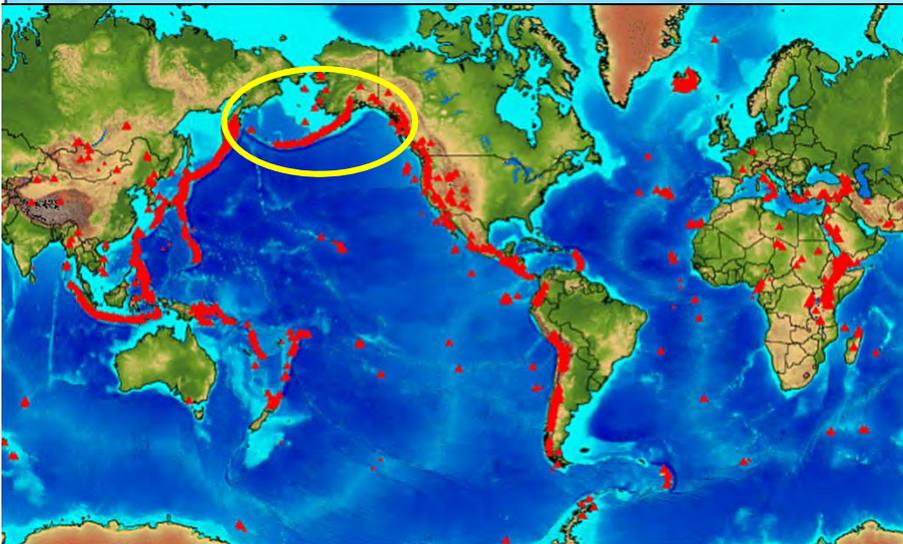
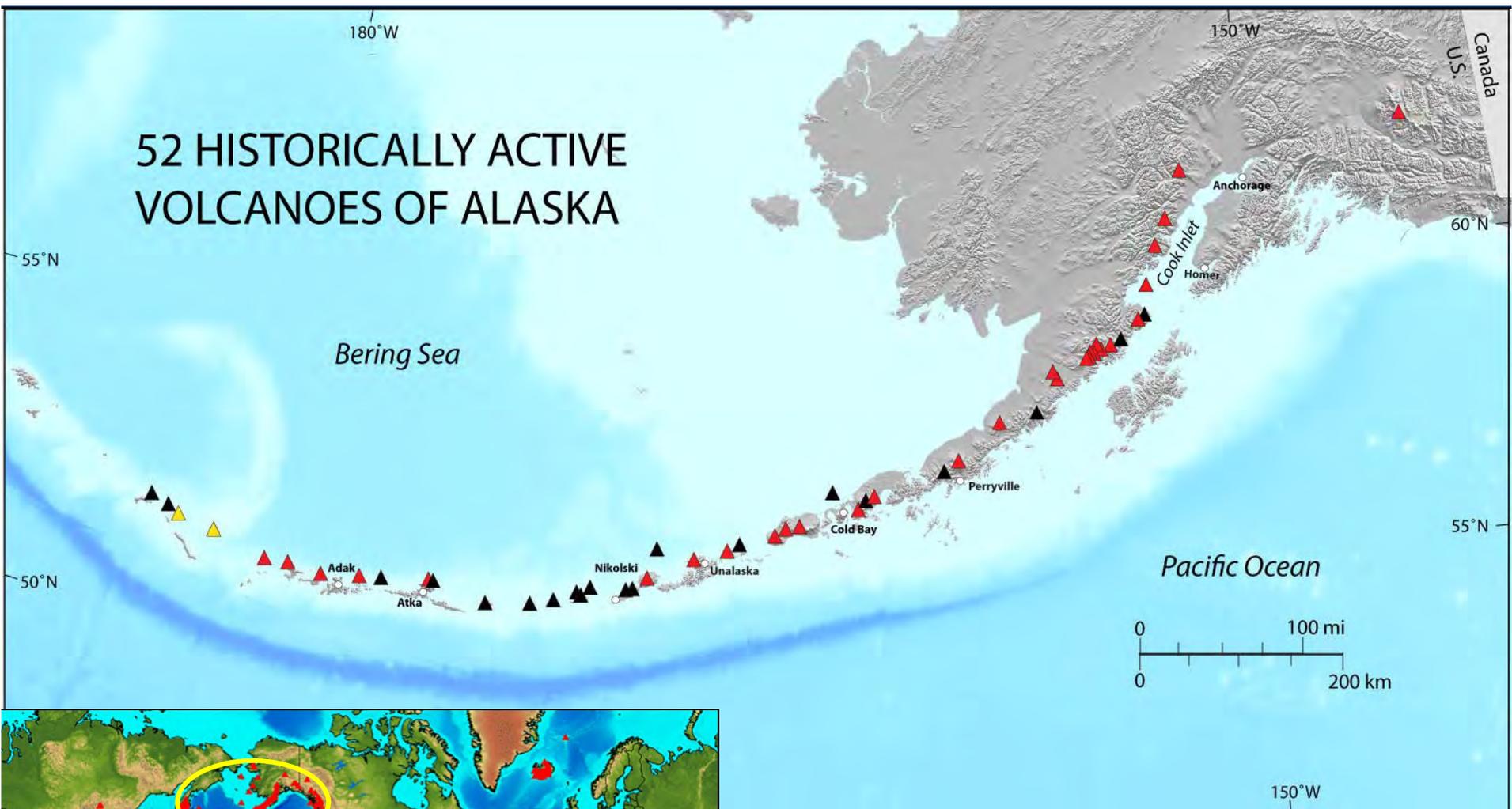
Presented again for ICAO Workshop 22 Sep 2014

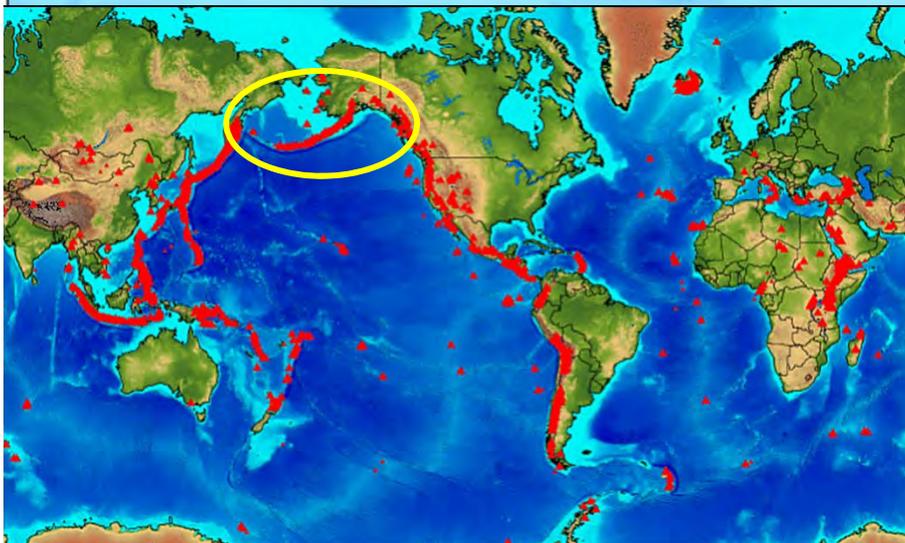
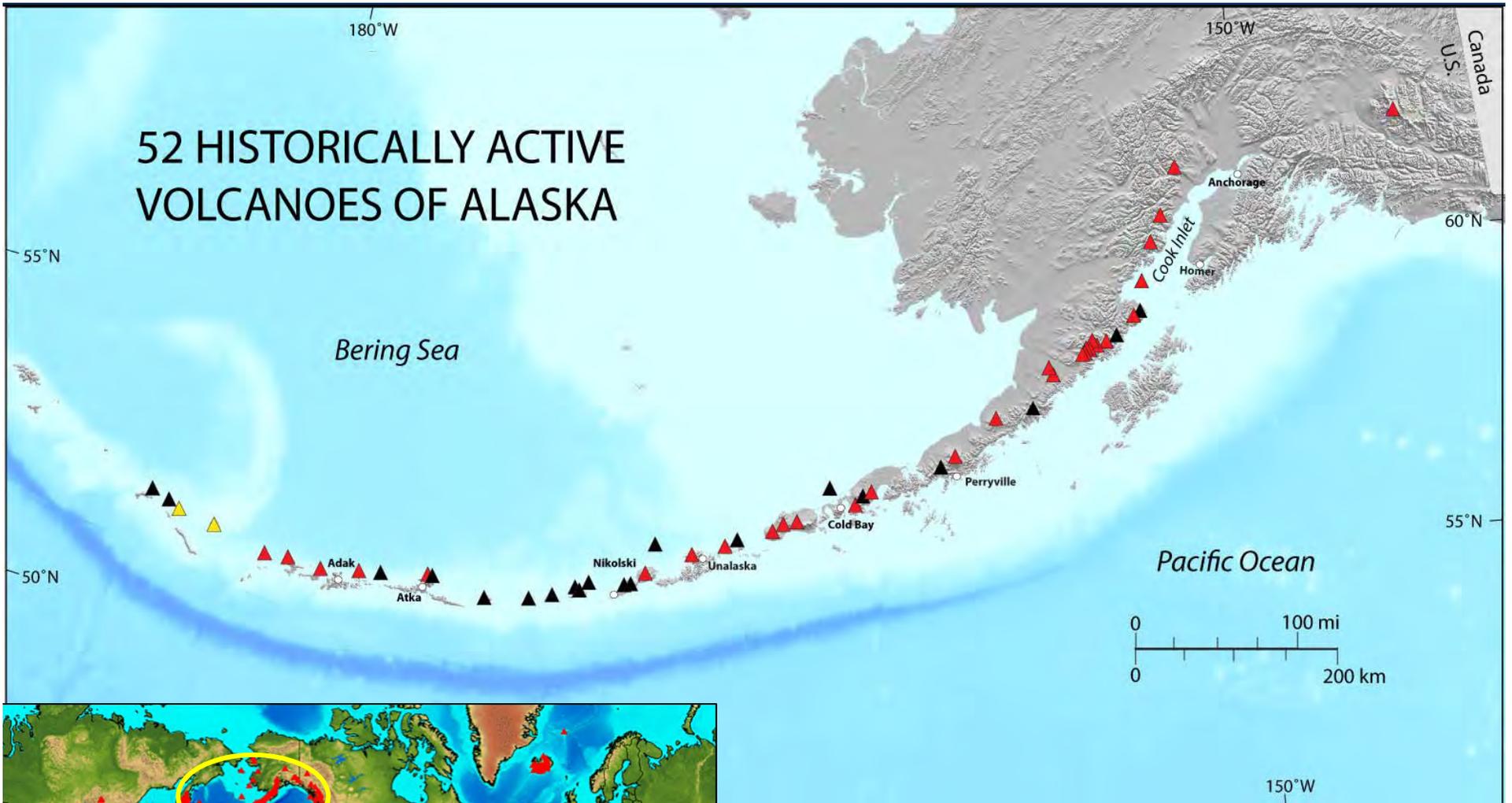


Outline

- **Ash hazards and exposure in Alaska**
- **Distributed agency responsibilities**
- **Planning, coordination, practice**
- **Some lessons**
- **Ongoing challenges**

52 HISTORICALLY ACTIVE VOLCANOES OF ALASKA



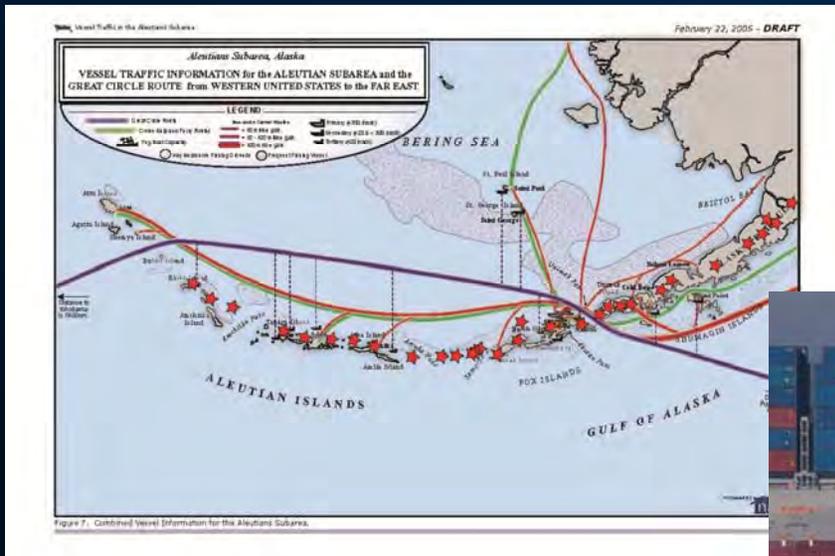


- Average 1-2 eruptions per year
- Most involve ash clouds and ash fall

Sectors at risk from ash fall (1)



Aviation: ~200 overflights per day; international cargo hub



Marine vessel traffic: ~350 large ships per month



Sectors at risk from ash fall (2)



**Communities/Infrastructure:
2/3rd of the state's population
lives <300 km from an active
volcano**



**Fisheries and other
resource extraction (oil,
mining, timber)**

Unique consequences in Alaska

Alaska is remote - cascading hazards are possible

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Anchorage

Southcentral Alaska walloped by yet another powerful winter storm

Craig Medred | Jan 09, 2012



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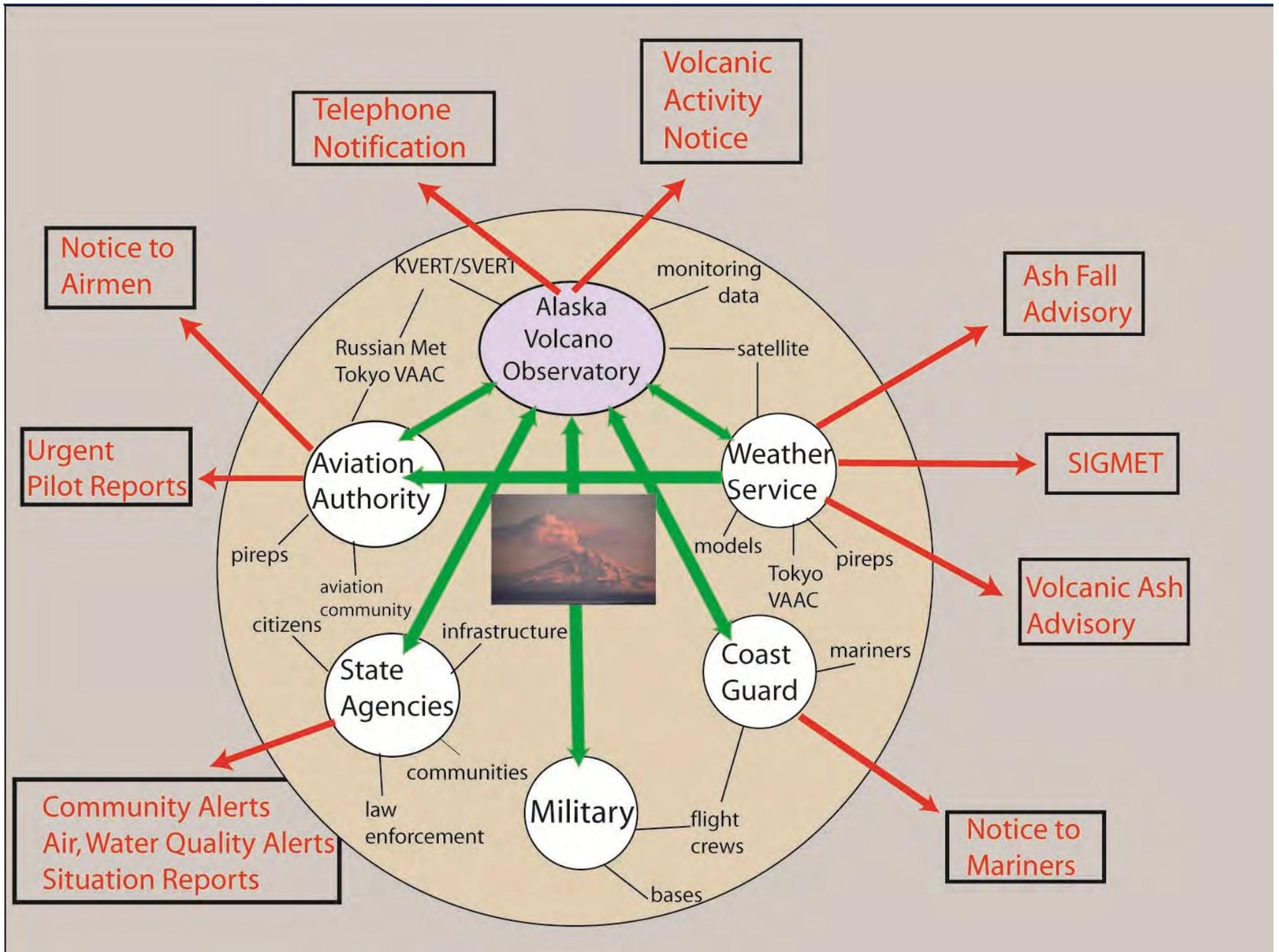
'Mega storm' slams parts of Alaska

A large eruption in winter, for example



Multiple agencies produce hazard warnings, have jurisdictional responsibilities, expertise





Simultaneous Product Examples

Volcanic Activity Notice

AVO/USGS Volcanic Activity Notice

Volcano: Redoubt (CAVW #1103-03-)

Current Volcano Alert Level: WARNING

Current Aviation Color Code: **RED**

Issued: Saturday, April 4, 2009, 6:51 AM AKDT
(20090404/1451Z)

Source: Alaska Volcano Observatory

Notice Number: 2009/A33

Location: N 60 deg 29 min W 152 deg 44 min

Elevation: 10197 ft (3108 m)

Area: Cook Inlet-South Central Alaska

Volcanic Activity Summary. Another significant explosive event occurred at Redoubt Volcano at approximately 5:58 am AKDT (13:58 UTC). At this time, the cloud height is estimated to be 50,000 feet based on National Weather Service radar. The cloud is drifting to the southeast of the volcano. AVO seismometers indicate a lahar has developed in the Drift River Valley.

Ashfall Advisory

URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE
ANCHORAGE AK 628 AM AKDT SAT APR 4
2009

WESTERN KENAI PENINSULA- INCLUDING
THE CITIES OF ...KENAI... SOLDOTNA...
HOMER... COOPER LANDING 628 AM
AKDT SAT APR 4 2009

...ASHFALL ADVISORY IN EFFECT UNTIL
10 AM AKDT THIS MORNING...

THE NATIONAL WEATHER SERVICE IN
ANCHORAGE HAS ISSUED AN ASHFALL
ADVISORY ..WHICH IS IN EFFECT UNTIL
10 AM AKDT THIS MORNING.

REDOUBT VOLCANO ERUPTED AROUND
600 AM THIS MORNING AND THE ASH
CLOUD IS MOVING TO THE SOUTHEAST.
MINOR ASHFALL CAN BE EXPECTED
FROM NINILCHIK SOUTHWARD THROUGH
MID MORNING.

Simultaneous Product Examples

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AVO/US... Volcanic Activity Notice

Volcano (ID #1103-03-)

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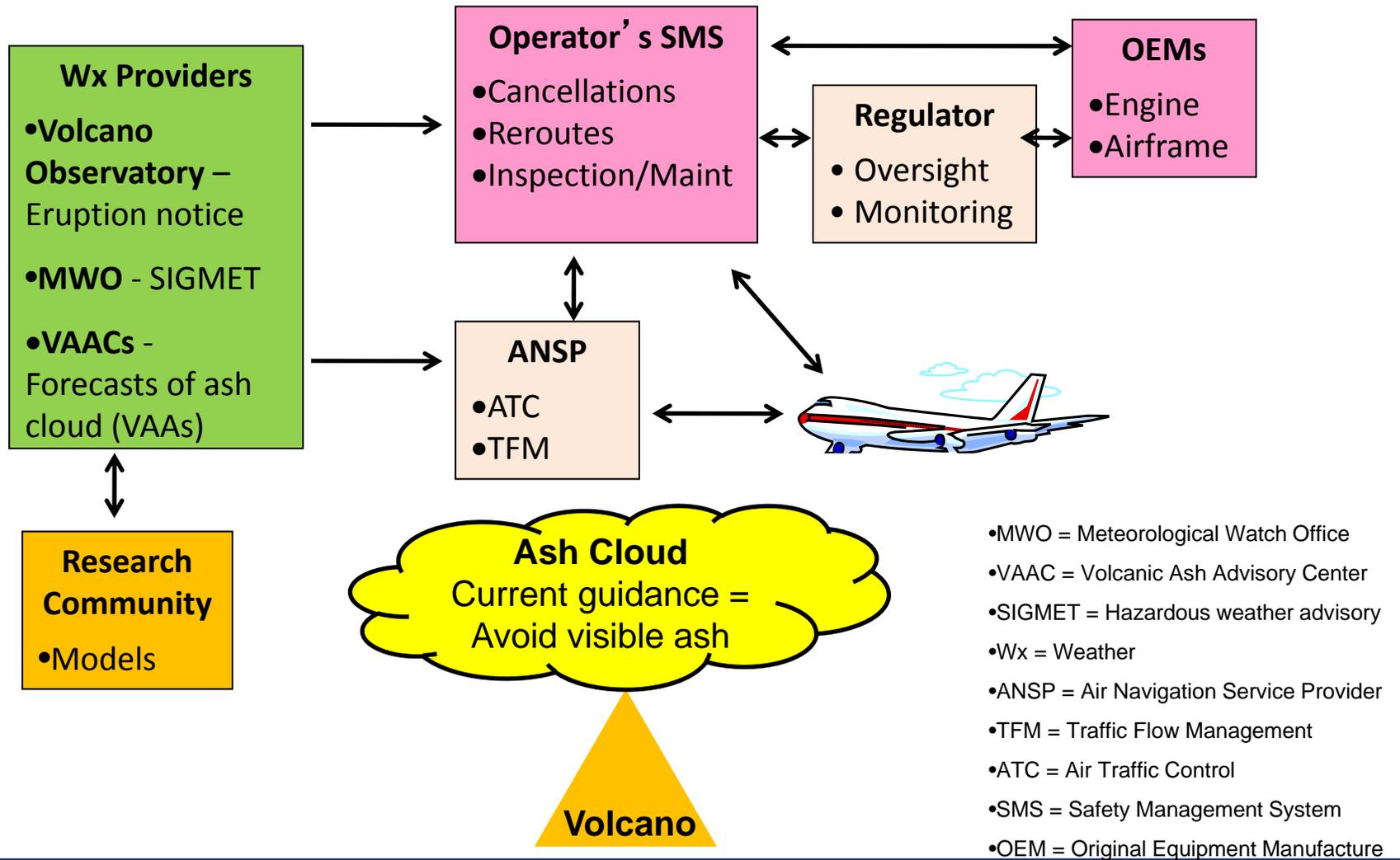
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**Message consistency is key!
This requires real time coordination.**

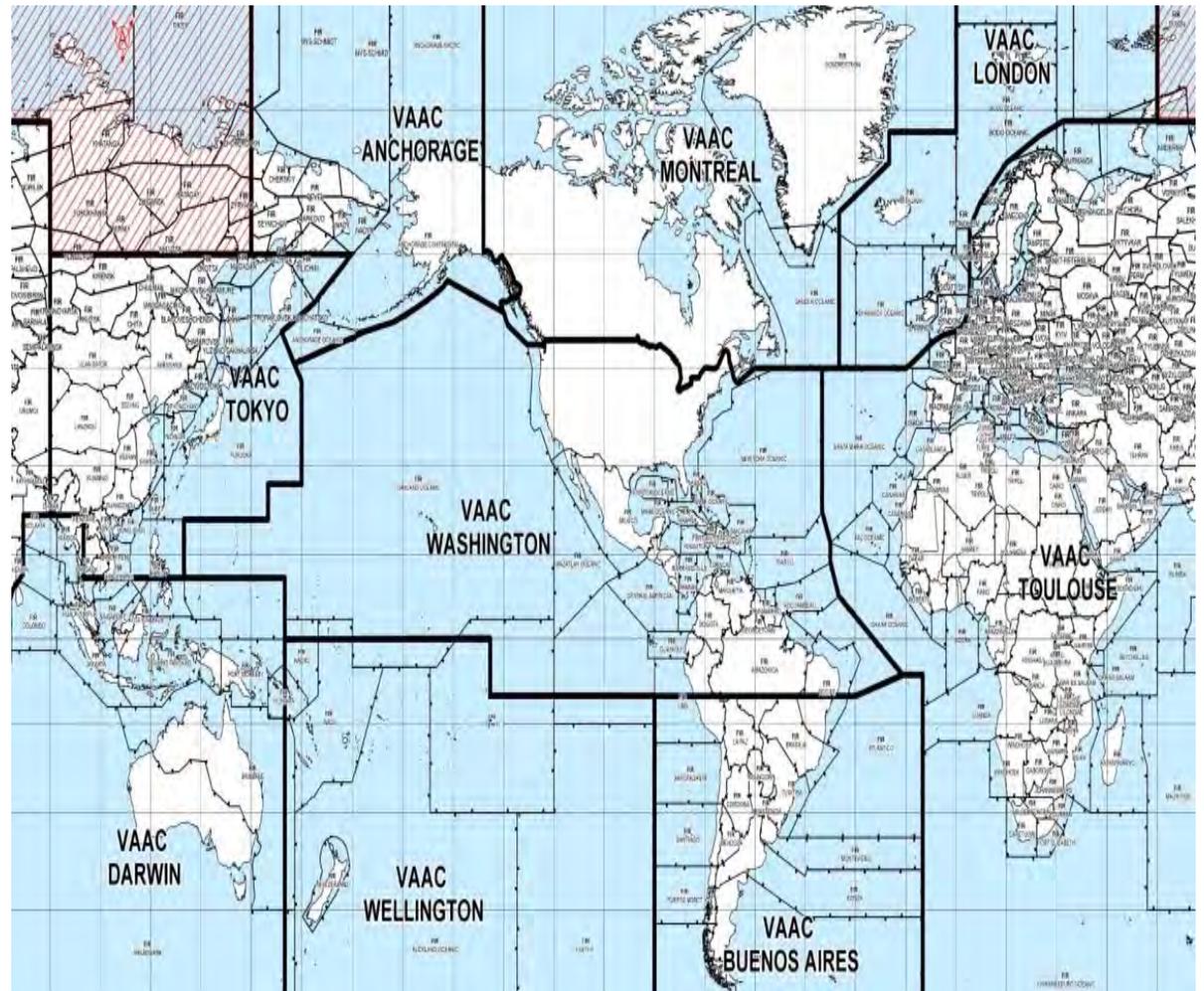
| NWS Product | Accumulation | Accumulation Term | Impact Thresholds | Call-to-Action Statements |
|---------------------------------|--------------------------------|-------------------------|---|---|
| Special Weather Statement (SPS) | <0.03 in (<1 mm) | Trace or dusting | Minor irritant, very low level impact for most people | Avoid excessive exposure to ash, especially those with chronic respiratory sensitivities. Protect critical electronics and other equipment from contamination. |
| Ashfall Advisory (NPW) | 0.03 – ¼ in (1-6 mm) | Light | Possible crop, animal, equipment, infrastructure problems; widespread clean up likely | Seal windows and doors. Protect electronics and cover air intakes and open water supplies. Minimize driving. Listen to NOAA Weather Radio or local media for further information. |
| Ashfall Warning (NPW) | ¼ - 1 in (6-25.4 mm) | Moderate | Ash removal efforts significant | Seal windows and doors. Protect electronics and cover air intakes and open water supplies. Avoid driving. Listen to NOAA Weather Radio or local media for further information. |
| | 1-4 in (25.4 – 102 mm) | Heavy | Weaker roofs can begin collapse at ~4 inches of wet ash accumulation | Remain indoors unless absolutely necessary. Use extreme caution clearing rooftops of ash. Avoid driving. Listen to NOAA Weather Radio or local media for further information. |
| | 4 in – 1 foot (10.2 – 30.4 cm) | Very Heavy | Roof collapse possible, damage to trees, services interrupted | |
| | >1 foot (>30.4 cm) | Severe | Roads impassible, severe infrastructure damage. heavy plant | |

Functional Description of Information Flow- **Information Overload**



Global Infrastructure and US Components

- **Wash DC: Issues 1,300 ash forecasts per yr**
- **Anchorage: Issues 200 forecasts per yr**
- **There is always an eruption somewhere on the globe that is a concern to air navigation**



Effective coordination takes time

- Know each other personally prior to an eruption crisis: a formal working group
- Face-to-face meetings especially critical after long periods of volcanic quiet
- Cross train to learn each agency's mission and requirements
- During an event, have frequent phone contact
- If resources allow, co-locate during a crisis



A written plan helps

Alaska Interagency Operating Plan for Volcanic Ash Episodes



August 1, 2011

- Explains agency roles and responsibilities
- Update regularly
- Incorporate into training for staff
- Add new partners as needed

Exercise the plan



- Table top simulations
- Scripted exercises
- Use these to update protocols, refresh knowledge and relationships

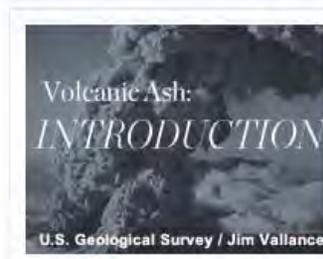
Cross training and shared outreach

Volcanic Crisis Awareness, FEMA 2012



NWS/USGS Volcanic Ash series Online courses through COMET

Volcanic Ash: Introduction



Languages: English, Spanish

Publish Date: 2011-04-13

Skill Level: 1

Completion Time: 25 - 50

Includes Audio: no

Required Plugins: Flash, Java

Topics:

Aviation Weather, Environment and Society, Oceanography/Marine Meteorology

Included in Courses:

Volcanic Ash: Science, Impacts and Forecasting Course, Review of Aeronautical Meteorology - Africa

Reviews:

★☆☆☆☆ (0 reviews)

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ASH ALERT!

HOW TO PROTECT YOUR FAMILY, HOME, AND BUSINESS

The Alaska Peninsula, Kodiak Island, Kanihi Peninsula, and Cook Inlet areas are the most likely to be covered with volcanic ash, which is usually produced rock from the volcanic eruptions.

Fresh volcanic ash may be harsh, acidic, gritty, and smell like sulphur. Heavy ashfall may reduce sunlight, causing a sudden demand and possibly breakdown of electrical power. Ash can clog watercourses, sewage plants, and all kinds of machinery. A one-inch layer of ash weighs ten pounds per square foot, and fine ash is extremely slippery, hampering both driving and walking.

Ash can also damage the lungs of small animals, the very old and infirm, or those already suffering from respiratory illnesses.

Prepare ahead of time.

Checklist

Home

- ___ NIOSH approved dust/mist respirators (looked TC-21C-XXXX). Some will not fit children; check before buying.
- ___ Non-perishable food for two weeks
- ___ Water (1.5 gallons/person in clean plastic containers)
- ___ Medicines and first aid kit
- ___ Battery operated radio and extra batteries
- ___ Extra wet land if applicable
- ___ Fire extinguisher

Auto

- ___ Rechargeable respirators
- ___ Glasses to replace contact lenses
- ___ Blankets
- ___ Fire extinguisher
- ___ Extra clothing
- ___ Emergency food stores
- ___ First aid kit and related medications
- ___ Flashlight, extra batteries and bulbs
- ___ Basic tool kit
- ___ Portable radio and extra batteries
- ___ Shovel
- ___ Gasoline, candles, emergency flares
- ___ Heavy rope or tire cable
- ___ Extra air filter
- ___ Extra windshield wiper fluid
- ___ Extra windshield wiper blades

Workplace

- ___ Keep plastic bags to protect office equipment
- ___ Check if personal medications

Home Preparation

Shovel additional sand if your water supply is vulnerable to power outages or contamination. Maintain a home emergency kit (see checklist).

During an Ashfall

- Stay indoors if possible.
- Close doors, windows, and draperies
- Avoid hanging washcloths or linens.
- Elevate dust sources.
- Do not use vacuum cleaners or clothes dryers.
- Listen to your radio.
- Vacuum brooms, carpets, etc. and try not to wipe, to ash will scratch.
- Laundry, brush, dust, and vacuum clothes. Use plenty of water and detergent. Do not use soap or bleach to get up.
- If you have been working in ashfall, have your work clothes washed or scrub in outside the home.
- Cover and don't use personal computers, sensors, and other sensitive equipment.

After an Ashfall

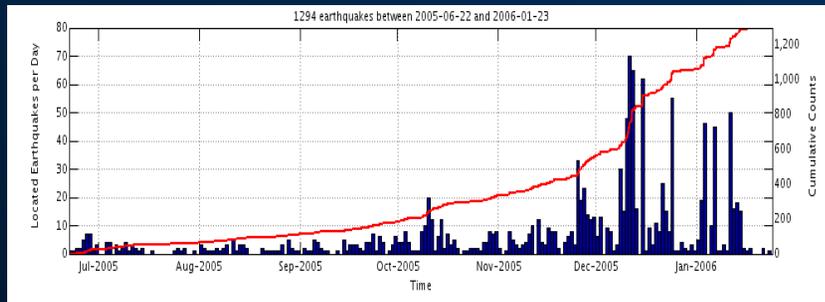
- Wipe a respirator during ash cleanup
- Consider using goggles for eye protection.
- Remove heavy accumulations of ash from flat or low pitched roofs and from roof gutters.
- When sweeping, change or replace ash with "volcanic brine" or avoid sweeping unnecessary dust.
- Never leave when doing ash bag, back-cleaning to reduce dust.
- Replace items used from the emergency kit.

Publications from the National Weather Service are a part of the Federal Emergency Management Agency, Washington, D.C. 20547

Ash education materials done in collaboration



Augustine 2005-6, Redoubt 2009



- Pre-eruption multi-agency press conference: ready!
- Public meeting in downwind community
- Media outreach: what is 1 mm of ash?



Post-eruption reviews, lessons learned

Appendix 2. Interagency After-Action Pre-Meeting Questionnaire

PRE-MEETING ASSIGNMENT TO PARTICIPANTS:

Please use the attached forms to submit the following information to no later than COB April 14. Responses will help guide the discussion and ensure we address key issues.

- A. **AGENCY GOALS FOR THE AFTERACTION:** what does your agency hope to get out of this meeting?
- B. **SUCCESSSES!** What specific actions, policies, procedures, etc. were effective? These may be from your own agency or from any part of the interagency effort. What can we learn from this?
- C. **CHALLENGES!** What actions, policies, procedures, etc. were lacking in effectiveness and require improvement. How can we accomplish this?

PLEASE ANSWER THESE QUESTIONS prior to the meeting and be prepared to discuss:

- A. Did you or your agency make use of the published U.S. Geological Survey Volcano Hazard Assessment for Augustine Volcano? If not, why? If so, was it helpful?
- B. Were the daily coordination conference calls effective? How can they be improved?
- C. Was information about likely impacts of eruptive activity easy to obtain?
- D. Was there a good balance between Internet-based and other forms of communication?
- E. How did you receive the most critical information (phone? E-mail? Other?)
- F. Should a Joint Information Center have been established? If so, what would this look like, what is its purpose, and who would lead the JIC?
- G. What were the primary concerns of your agency and constituency and were these adequately addressed?

DO YOU HAVE ANY SPECIFIC QUESTIONS THAT YOU WOULD LIKE TO DISTRIBUTE TO THE GROUP PRIOR TO THE MEETING?



FOR IMMEDIATE RELEASE

March 23, 2010

National Weather Service Releases Assessment Report on Mt. Redoubt Eruptions



NOAA

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
UNITED STATES DEPARTMENT OF COMMERCE



Some insights from recent Alaska after-actions

- **Volcano warning information is scattered; need to centralize guidance.**
- **Clarify agency roles and responsibilities. People want to know how they will be alerted and by whom.**
- **Improve the ash fall warnings to provide more specific guidance.**
- **Provide broad education about ash hazards; involve air quality, water quality, and public health.**

Ongoing challenges

- Agency cultures and missions are different
 - Volcanic crises stress each agency differently
 - Volcano Observatories focus 100% on volcanoes
 - Long quiet periods strain connections
 - Understanding of volcanic hazards (including infrequent volcanic ash) is limited
- Despite these challenges, agency collaboration really does improve preparedness and response in Alaska. *Our current fiscal climate demands it.*

A landscape photograph capturing a sunset or sunrise. The sky transitions from a deep orange near the horizon to a dark blue at the top. A crescent moon is visible in the upper right portion of the sky. The foreground shows the dark silhouettes of mountains and a body of water reflecting the orange light of the sun.

Preguntas?