Alaska Region-specific Products: Satellite Data Activities and Impacts to NWS Alaska Operations

GOES-R OCONUS Workshop

Reported by

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With thanks to colleagues at

GINA, CIMSS, STAR, CIRA, SPoRT, and NWS

Overview

- Products deployed in Alaska
- Product flow
- Training
- Feedback

GEOGRAPHIC INFORMATION NETWORK OF ALASKA
UNIVERSITY OF ALASKA

3.6-meter Antenna

SeaSpace X-band Ground Station

MODIS on NASA Terra and Aqua

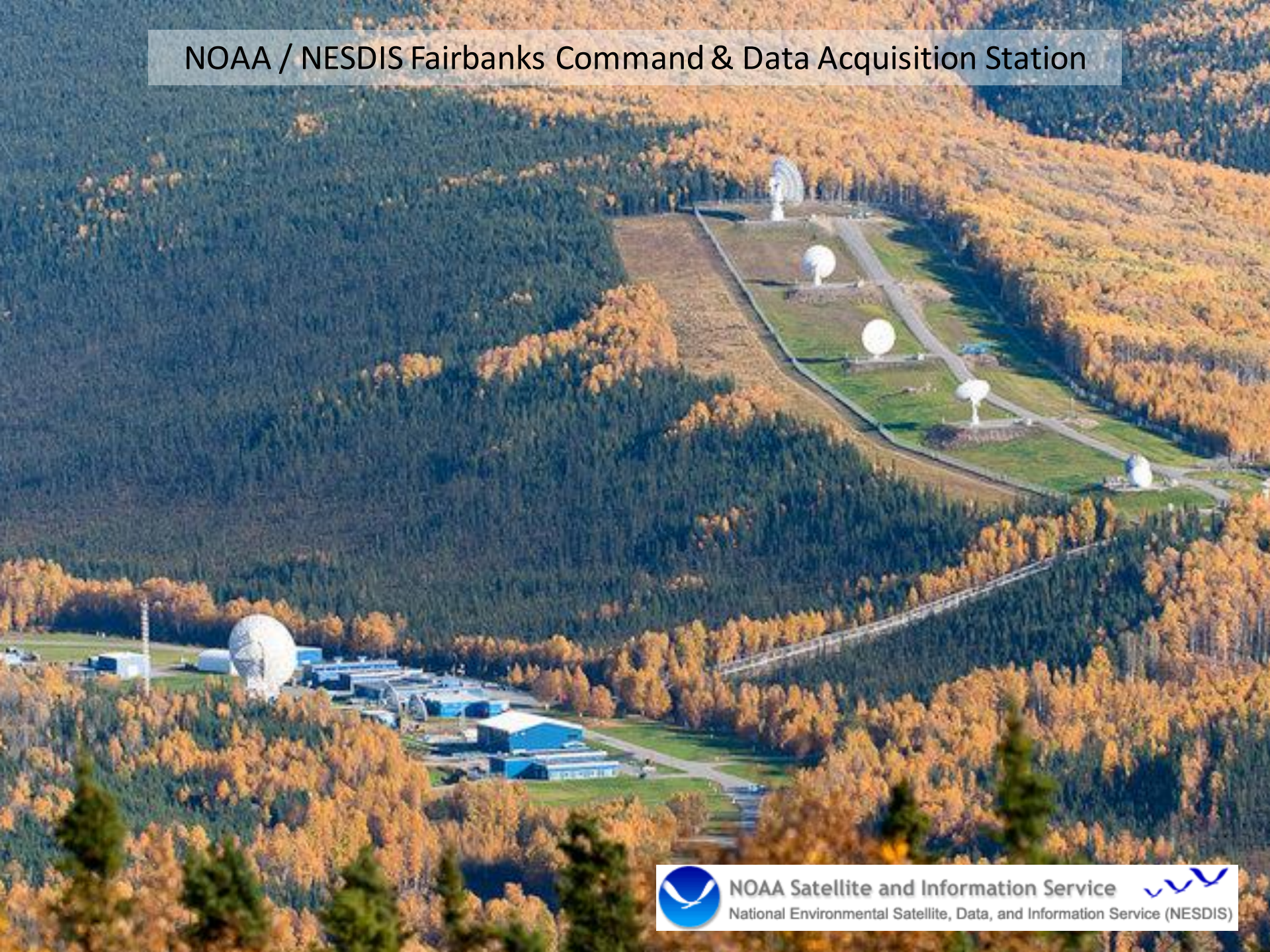
1.2-meter Antenna

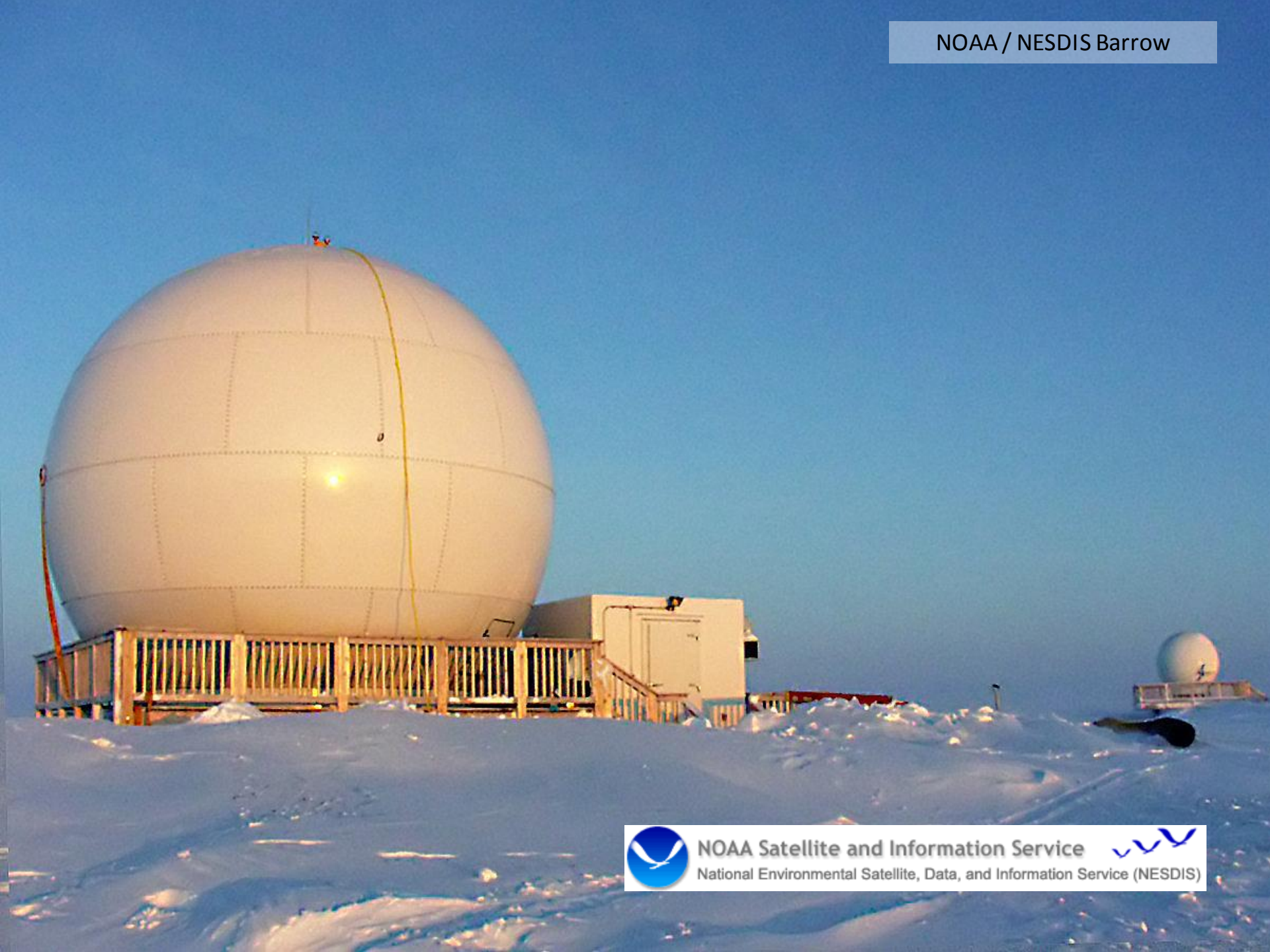
SeaSpace L-band Ground Station

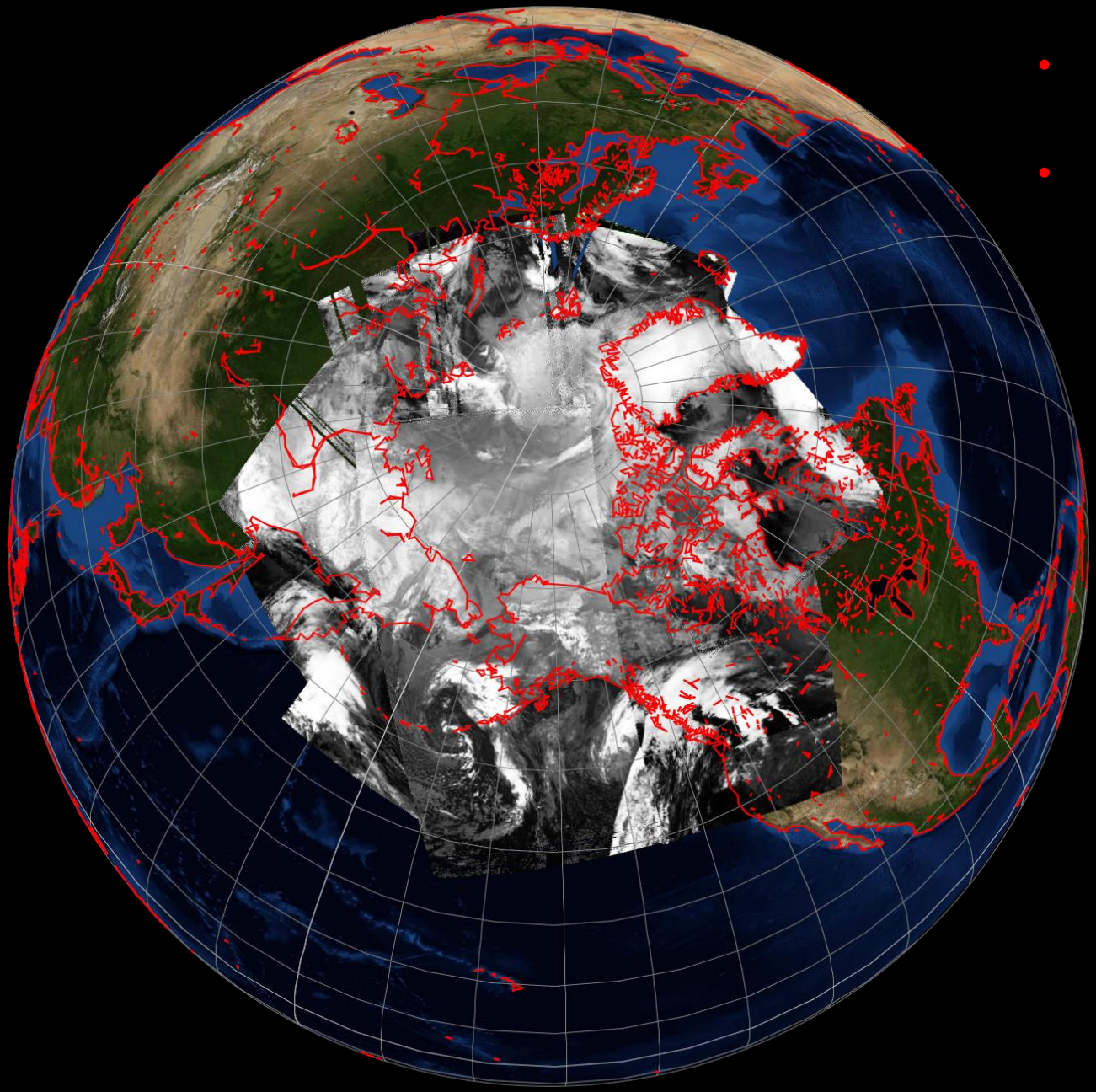
AVHRR on NOAA polar orbiters

SeaWiFS

NOAA / NESDIS Fairbanks Command & Data Acquisition Station




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



- UAF-GINA + NOAA-FCDAS Barrow Station Mask
- Passes per day:
  - NOAA AVHRR: 50
  - NASA Terra/MODIS: 10
  - NASA Aqua/MODIS: 10
  - DoD DMSP: 20

Image by NASA

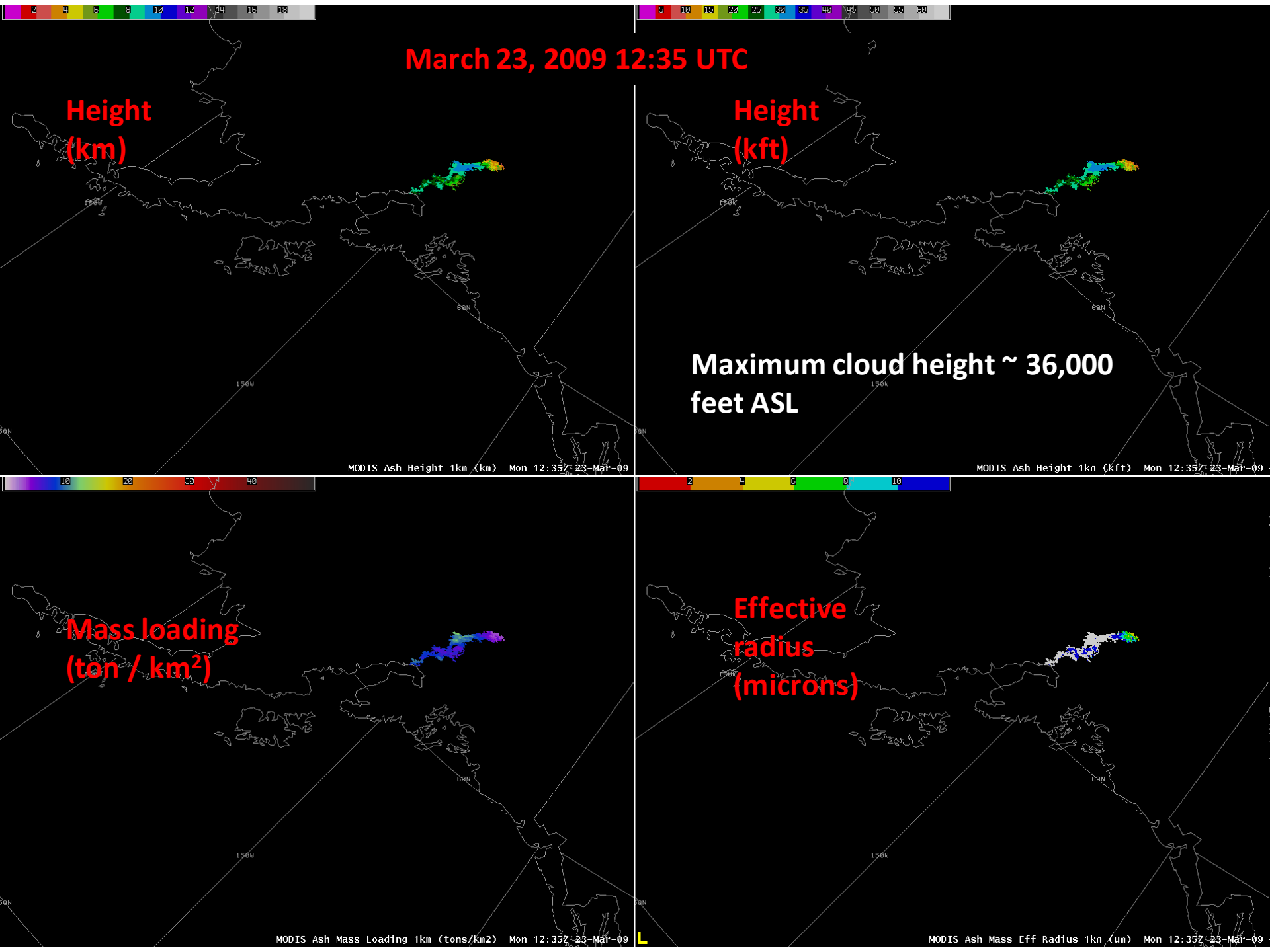
Geographic Information Network of Alaska
University of Alaska

MVFR Probability

IFR Probability

Cloud Type

FLS Depth


March 23, 2009 12:35 UTC
Height (km)
Height (kft)
Maximum cloud height ~ 36,000 feet ASL
Mass loading (ton / km²)
Effective radius (microns)
MODIS Ash Height 1km (km) Mon 12:35Z 23-Mar-09
MODIS Ash Height 1km (kft) Mon 12:35Z 23-Mar-09
MODIS Ash Mass Loading 1km (tons/km2) Mon 12:35Z 23-Mar-09
MODIS Ash Mass Eff Radius 1km (um) Mon 12:35Z 23-Mar-09

Product status

Product	Fairbanks WFO	Anchorage WFO	Juneau WFO	Alaska Aviation Weather Unit	River Forecast Office
MODIS Ash Mass Loading	☑	☑	☑	☑	NA
MODIS Ash Height	☑	☑	☑	☑	NA
MODIS Ash Effective Radius	☑	☑	☑	☑	NA
GEOCAT MODIS SO2 Detection	☑	☑	☑	☑	NA
GEOCAT MODIS SO2 Loading	☑	☑	☑	☑	NA
GEOCAT MODIS Fog Probability	☑	☑	☑	☑	?
GEOCAT MODIS Fog Mask	☑	☑	☑	☑	?
GEOCAT MODIS Fog Depth	☑	☑	☑	☑	?
GEOCAT MODIS Cloud Type	☑	☑	☑	☑	?

☑ = Product in NWS LDM and available in AWIPS

GOES-R Proxy Data Flow

- Current (for GOES-R ABI proxy algorithms)
  - Data captured by UAF-GINA or NESDIS-FCDAS
  - Sent to UW-Madison CIMSS for processing
  - CIMSS LDM -> GINA LDM -> Alaska NWS LDM
  - Alaska NWS LDM -> AWIPS
- Future
  - Data captured by UAF-GINA or NESDIS-FCDAS
  - Processed by GINA at FCDAS site
  - GINA LDM -> Alaska NWS LDM -> AWIPS

Additional Data Flows

- Data captured by UAF-GINA or NESDIS-FCDAS
  - GINA-processed products (e.g. natural color images) staged to GINA LDM
  - Level 1 MODIS data staged to ADDE server
  - DMSP data pulled by AAWU and put onto NWS LDM -> AWIPS
  - DMSP data pulled by AFWA
  - Natural color imagery pulled into Sea Ice Desk GIS
  - Natural color images viewed via web

Training Status

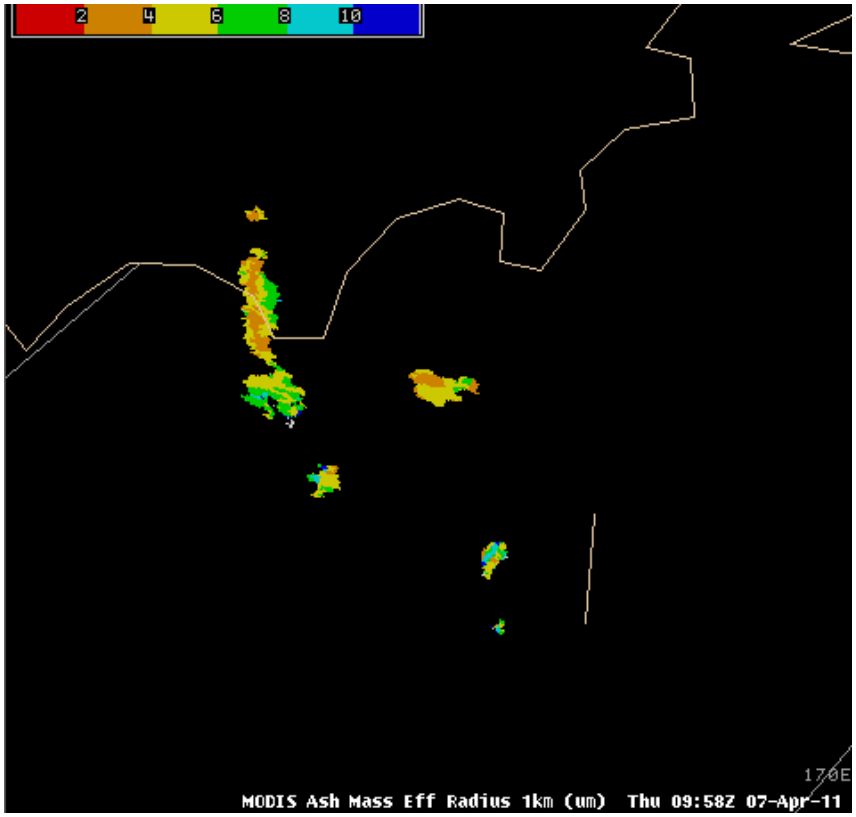
- Volcanic ash and SO2
  - 3 sessions
  - AAWU mandatory attendance
  - Completed May 2011
- Fog and cloud products
  - 2 sessions in July 2011

Evaluation Schedule

- Preliminary:
  - Volcanic Ash and SO2: complete
  - Fog and Cloud Products: late August 2011
- Final:
  - October 30, 2011

Kamchatka Volcanoes – Spring 2011

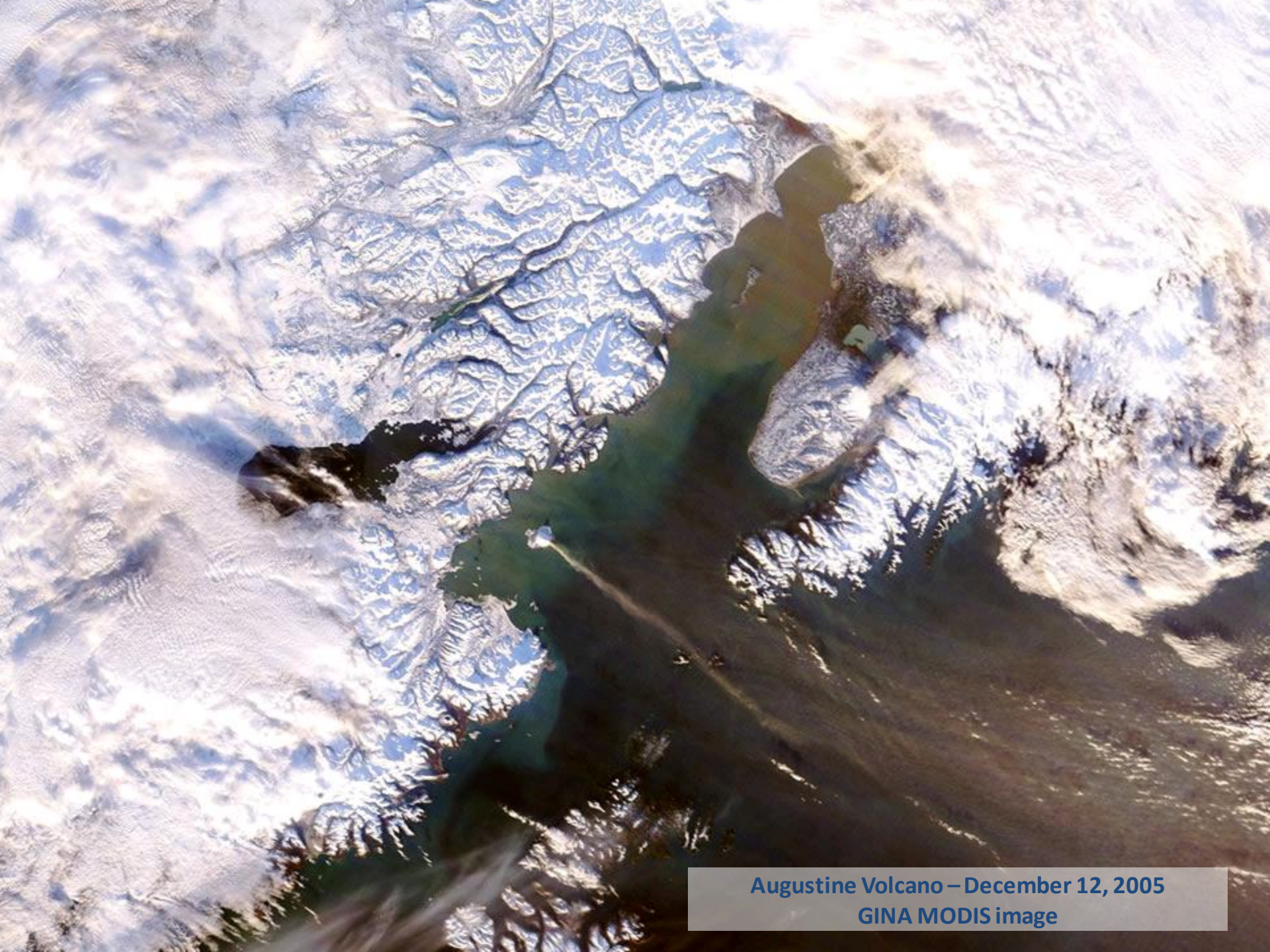
- Volcanic ash products
  - In AWIPS in NWS Alaska WFOs and AAWU
  - Training completed
- March 29th, 2011: eruption of Kizimen Volcano
- April 7th, 2011: Kizimen and Sheveluch Volcano Event
  - "The ash heights from Kizimen were in good agreement, not only with Tokyo VAAC who was doing the forecasting, but also with the wind analysis from 500mb winds." Nathan Eckstein, Anchorage VAAC SOO



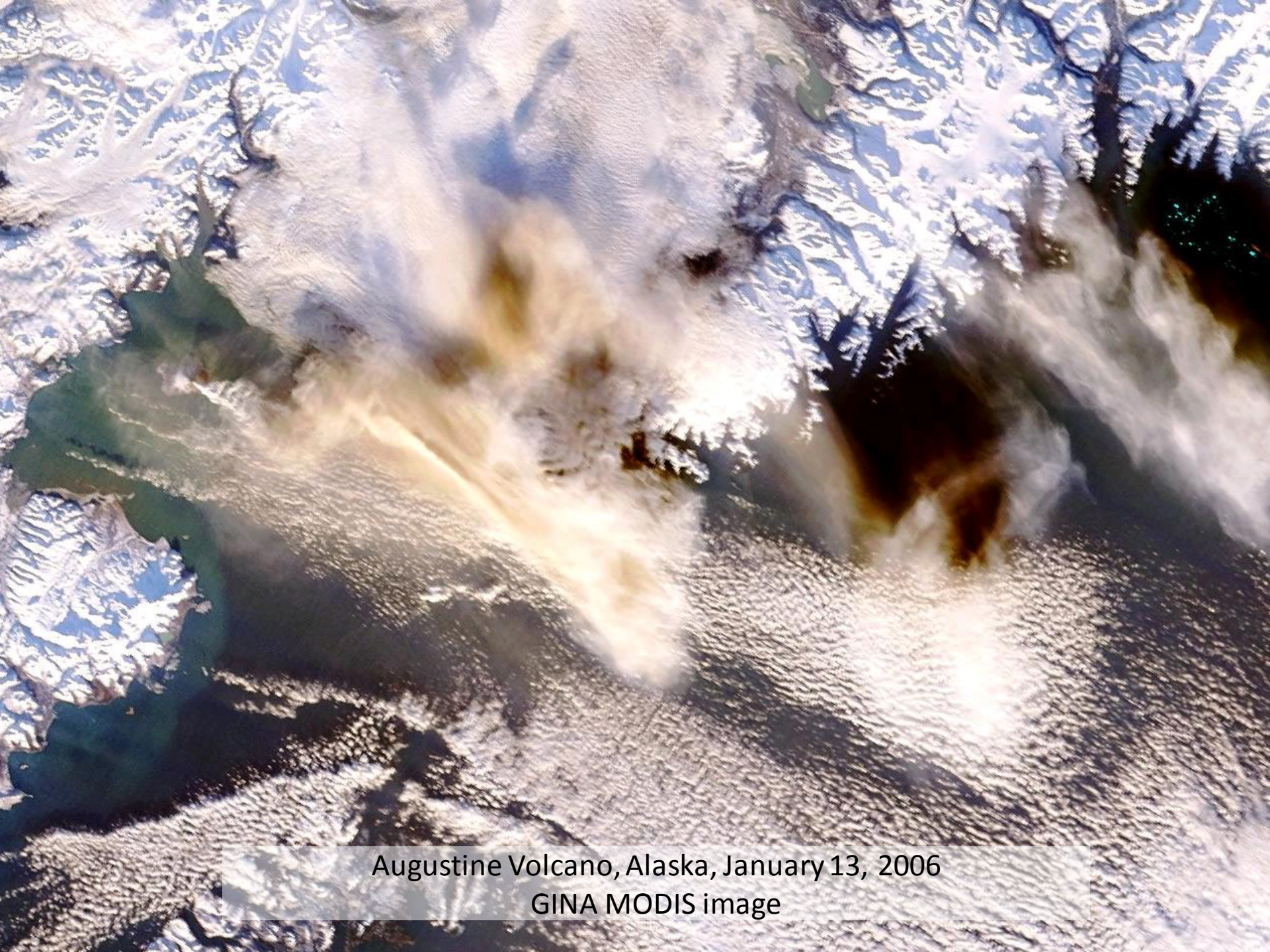
GOES-R Ash Effective Radius Product using MODIS imagery. 0958Z 7 April 2011. Much of the ash detected shows moderate size ash particles which gives forecasters an idea of atmospheric residency times. In this particular case, ash was detectable for longer than expected given the relatively low heights.

Future Products

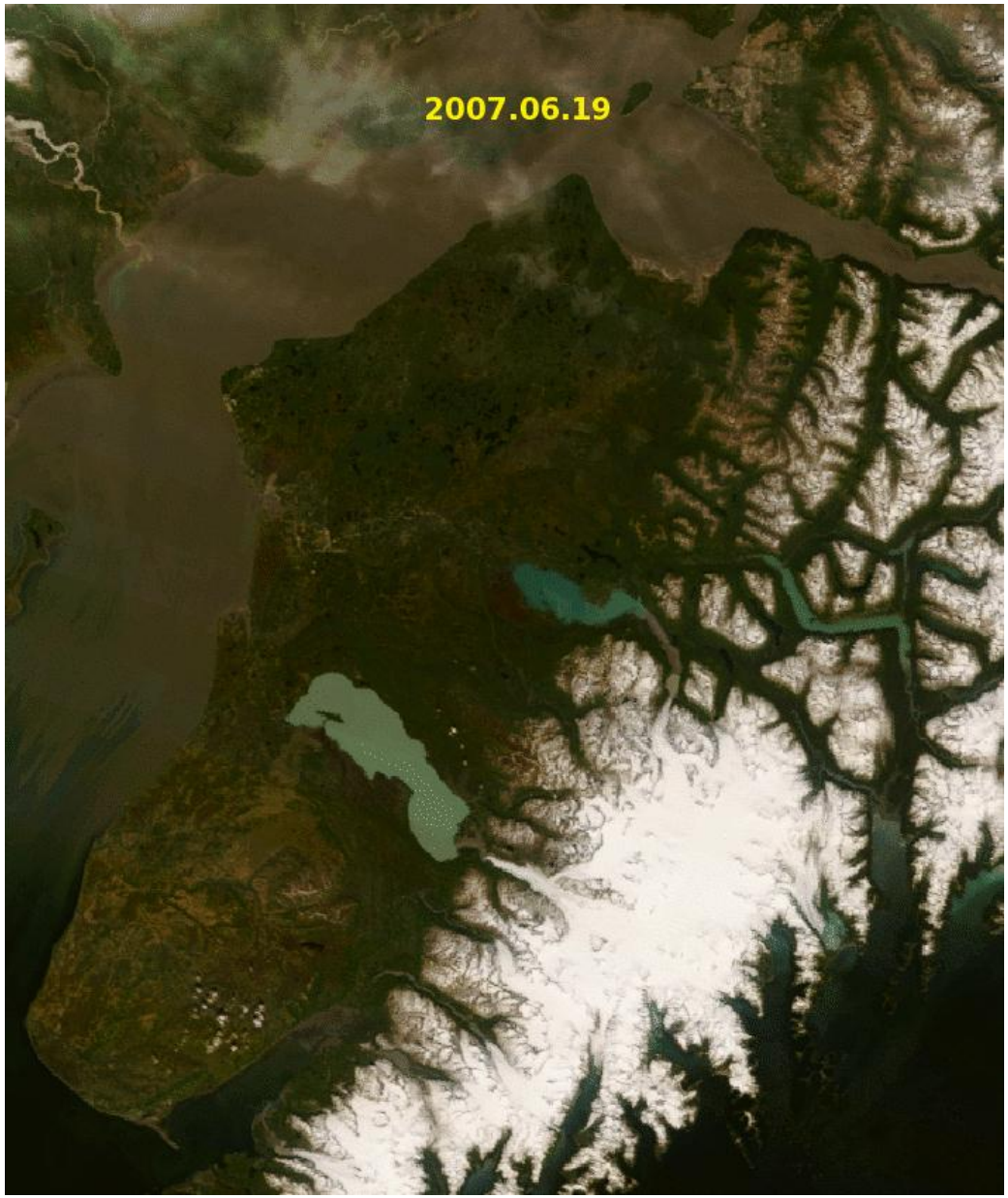
- Volcanic ash and SO2 and Fog and Cloud product delivery in place
  - Delivery to NWS will continue following end of experiment
- Will work with NWS users and algorithm developers to select next round of products to deliver in federal FY12



Augustine Volcano – December 12, 2005
GINA MODIS image



Augustine Volcano, Alaska, January 13, 2006
GINA MODIS image



Caribou Hills Fire, June 2007, Kenai Peninsula, Alaska