

# Challenges of Forecasting in the Fairbanks Area of Responsibility



# Presentation in Two Parts

- 1) Why satellite products are so important to WFO Fairbanks
- 2) Specific Examples: Proving Ground products in use at WFO Fairbanks



# Why Satellites are so Important

- Job of the forecaster
- Hydrometeorological Analysis in Alaska
  - Unique advantages of satellites



# Job of the Forecaster

## 1) Get data into your head

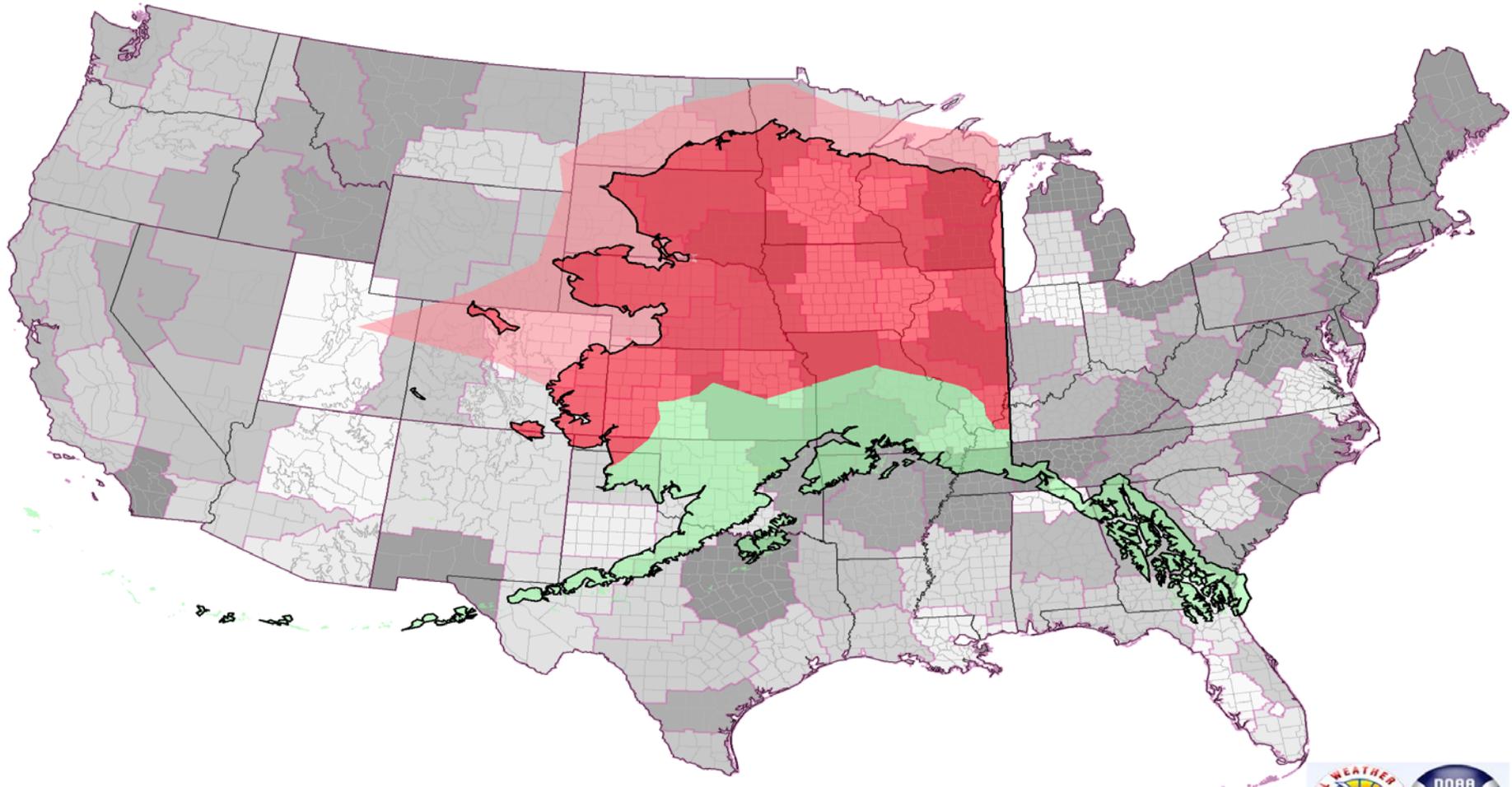
- Analysis data and forecast data
- Challenge: how best to do this efficiently and in a way that highlights the most-relevant data
- Fit data to conceptual models: understanding not only what is happening, but why

## 2) Make a meteorological decision

## 3) Communicate this decision to the world

- Old: Type words, one size fits everybody (and nobody)
- New: forecaster produces gridded database; users pull only info relevant specifically to them

# Fairbanks Area of Responsibility VS Lower 48



Our Area of Responsibility -  
Largest land area of any other  
NWS office ~ 359,427 sq.  
Marine (coastal and offshore) = 256,818 mi<sup>2</sup>.  
**Total area = 616,245 sq miles!!**

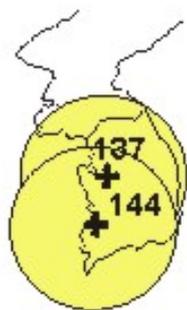
- Average lower 48 area of responsibility  
~ 25,145 sq mi
- WFO Fairbanks approx 14 times more  
land area to cover (land only)
- WFO Fairbanks total area ~ 25 times  
more than avg lower 48 WFO

# Hydrometeorological Analysis in Alaska

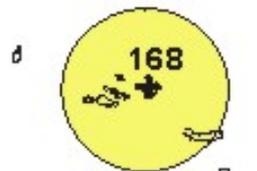


- First analyze, then forecast
  - Need to know where the chess pieces are on the board
- Alaska is big and suffers a comparatively sparse density of observations
- Observations often suffer limited representativeness
  - Topography is complex
  - Baroclinic forcing can be weak

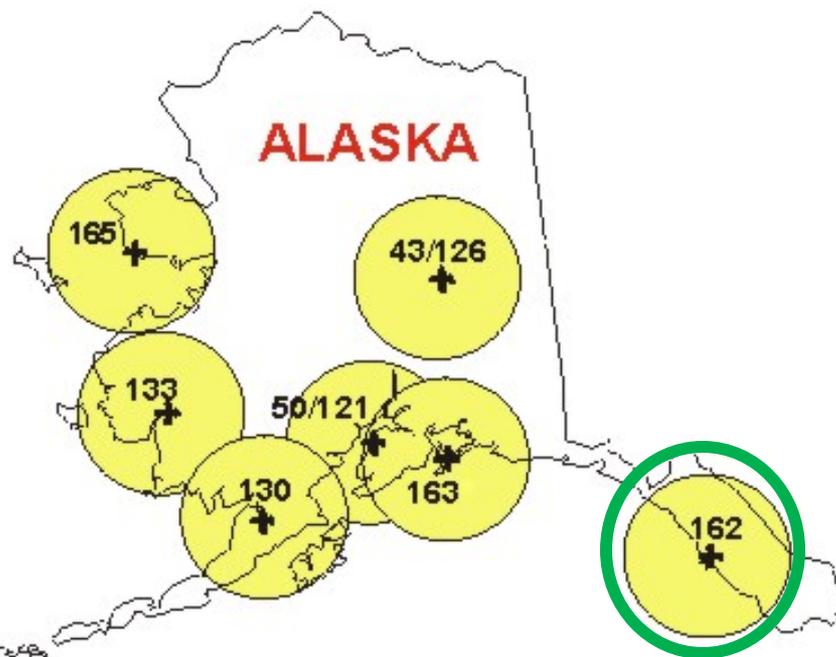
# COMPLETED WSR-88D INSTALLATIONS



**SOUTH KOREA**

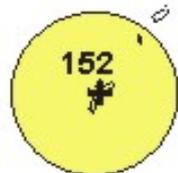


**AZORES**

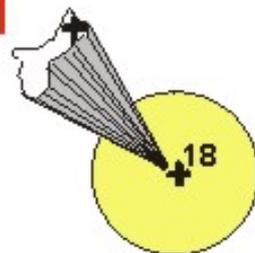


**ALASKA**

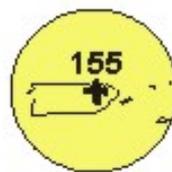
**OKINAWA**



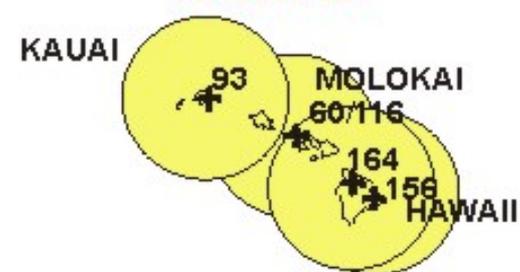
**GUAM**



**PUERTO RICO**



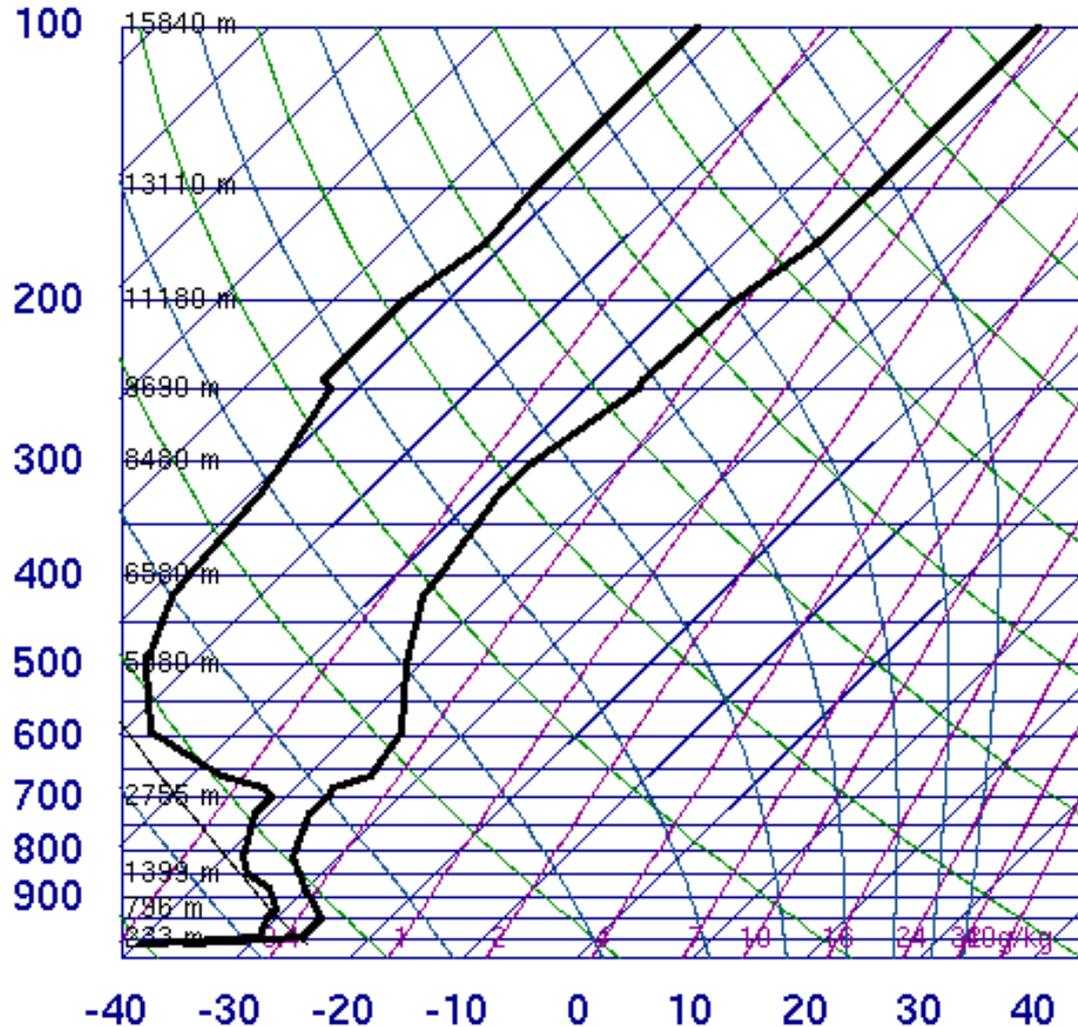
**HAWAII**



**OPERATIONAL SUPPORT FACILITY  
NORMAN, OKLAHOMA**

# Limited Representativeness of Surface-based Data

70261 PAFA Fairbanks



SLAT	64.81
SLON	-147.86
SELV	138.0
SHOW	24.28
LIFT	28.70
LFTV	28.70
SWET	25.00
KINX	-32.2
CTOT	4.70
VTOT	9.20
TOTL	13.90
CAPE	0.00
CAPV	0.00
CINS	0.00
CINV	0.00
EQLV	-9999
EQTV	-9999
LFCT	-9999
LFCV	-9999
BRCH	0.00
BRCV	0.00
LCLT	240.8
LCLP	913.7
MLTH	247.1
MLMR	0.29
THCK	4847.
PWAT	0.93

12Z 14 Mar 2007

University of Wyoming



# Hydrometeorological Analysis in Alaska

## –Unique Advantages of Satellite Data

- Satellite Imagery is spatially comprehensive
  - Other observation platforms in Alaska suffer poor spatial density. Example: NEXRAD 88D
  - Due to Alaska’s complex topography and the prominence of microclimates, surface observations can be of limited representativeness
- Polar orbiting satellites provide more passes per day over Alaska than over the Lower 48
- Alaskan winter has ample moonlight
- ***Alaska is “different,” and different is usually code for “bad.” But here, different is good.***



# The Alaskan Winter: Solar Famine, Lunar Feast



	Hours of Sunshine	Max Solar Elevation	Hours of Moonshine	Max Lunar Elevation
Washington, DC	9 hours, 27 minutes	28°	14 hours, 51 minutes	71°
Fairbanks, AK	3 hours, 46 minutes	2°	19 hours, 45 minutes	45°

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– Tag Team Handoff!

