



# National Weather Service in Alaska

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# NWS Overview

Most people see only tip of iceberg

NOAA Weather Radio

TV

Radio

Private Weather Companies

[www.weather.gov](http://www.weather.gov)

## 122 Weather Forecast Offices

Local Forecasts & Warnings

## 13 River Forecast Centers

Hydropower, Flood Warnings, Irrigation,

River Navigation

## National Centers for Environmental Prediction

Model Simulations, Climate & Seasonal Outlooks, Aviation & Marine Forecasts, Storm & Tornado Prediction, Hurricane Tracking

## Observations

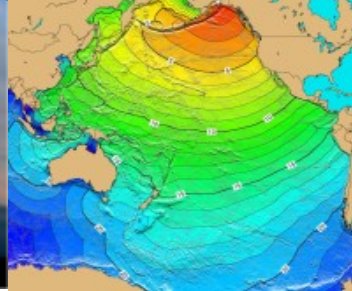
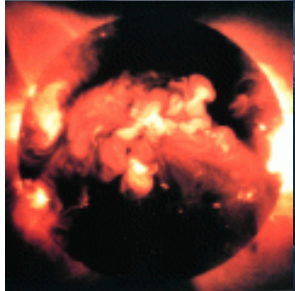
Radar Network, Satellites, Weather Balloons, Ground-Level Observations, Aircraft, Lightning Network, Data Buoys, Stream Gauge Network, 11,000 Volunteer Daily-Data Collectors, Volunteer Storm Spotters





# NWS Primary Service Areas

- Aviation
- Climate
- Fire Weather
- Offshore and Coastal Marine
- Public Forecasts and Warnings
- Rivers/Hydrology
- Space Weather
- Tsunami
- Volcanic Ash

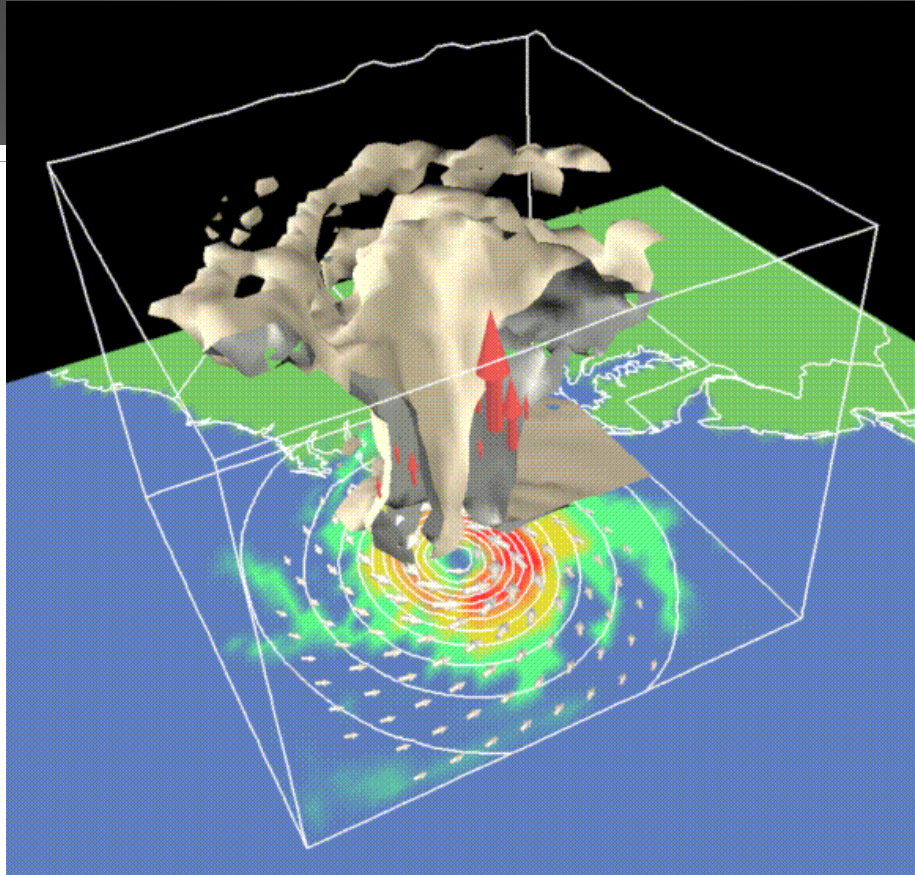




# NWS Alaska Region Facilities

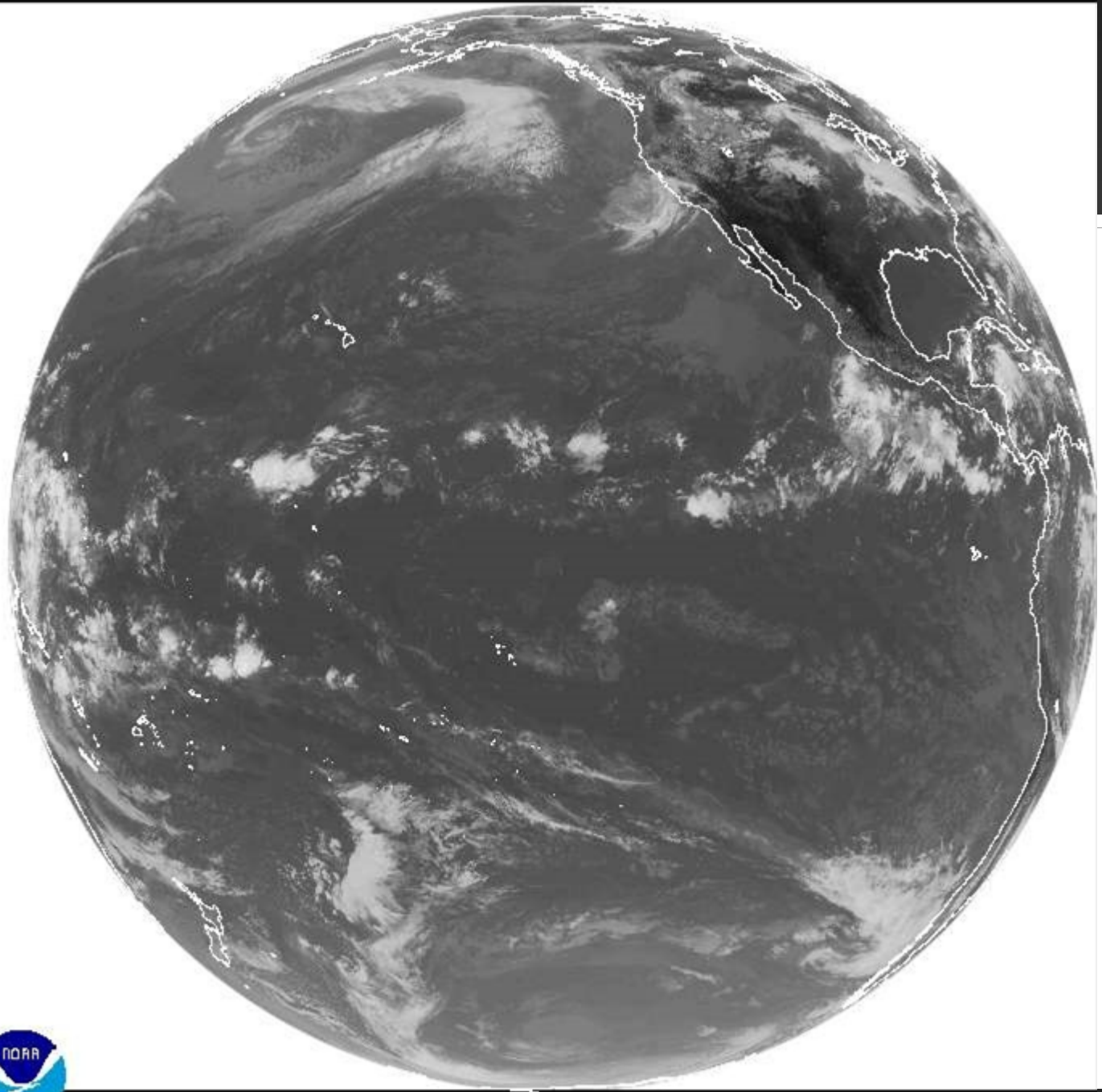
-  WFO
-  WSO
-  WCATWC
-  In Anchorage:
  - WFO
  - AAWU
  - CWSU
  - ARH
  - APRFC





meteorology—1. The study of the physics, chemistry, and dynamics of the earth's atmosphere, *including the related effects at the air–earth boundary over both land and the oceans*. Fundamental topics include the composition, structure, and motion of the atmosphere. The goals ascribed to meteorology are the complete understanding and accurate prediction of atmospheric phenomena.



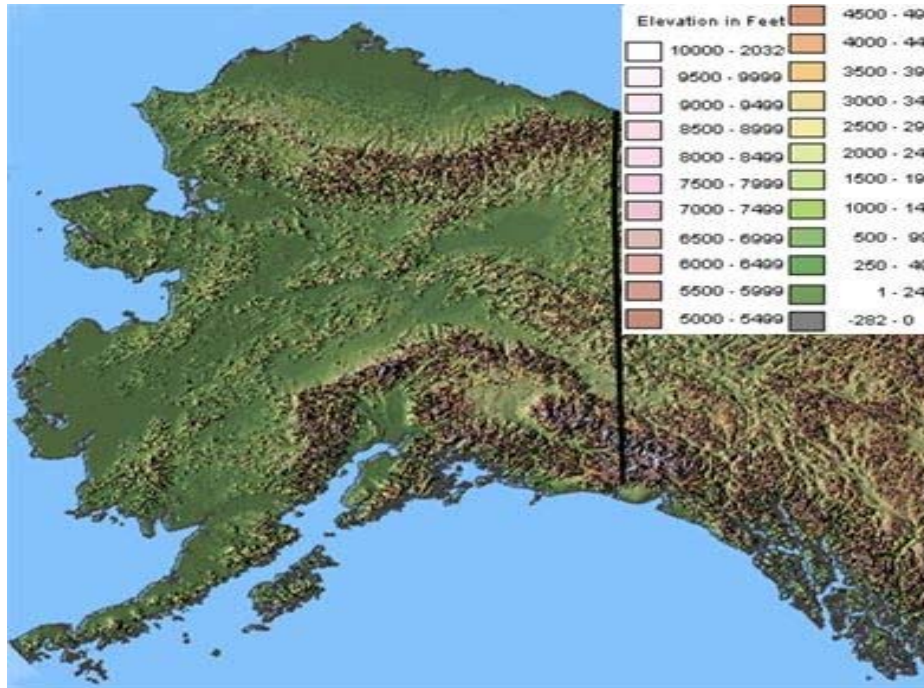


IR

6 15 2009 1800Z



# Alaska Climate Zones Linked To Topography







# Forecast Responsibilities





# The Forecast Process: (a.k.a., Scientific Method)

## **1. Analysis – Diagnose the Data**

Develop a “Conceptual Model” - Observations are critical

## **2. Test Your Diagnosis**

Use numerical weather models and other guidance

## **3. Reach Consensus Decision**

Collaborative process

## **4. Execute Decision – Create and Issue Forecasts**

Many formats – text, graphic, tabular, mobile, social media

## **5. Maintain Situational Awareness**





# Surface Observations: the Backbone of weather forecasts

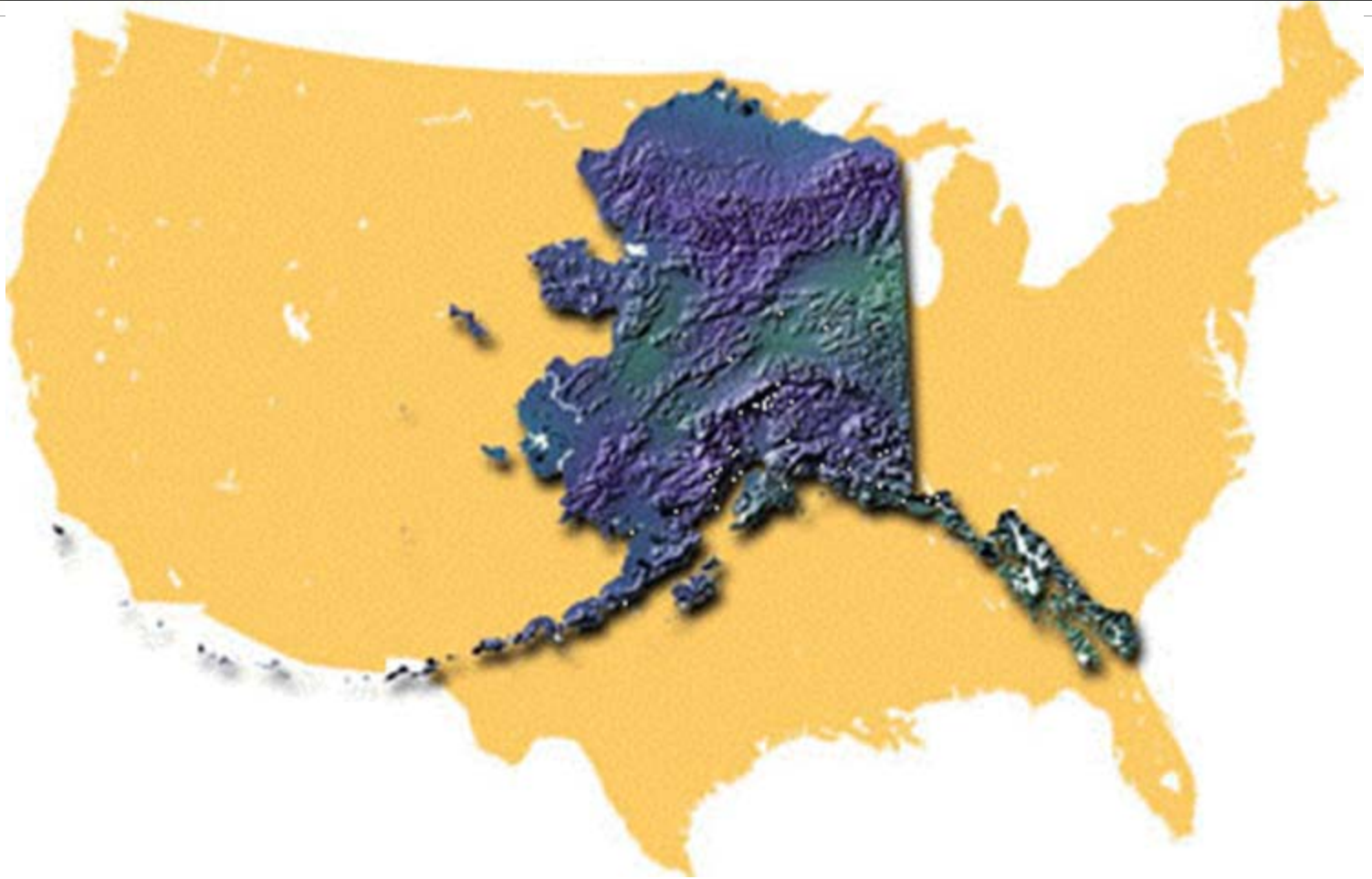
“You can’t forecast the weather if you don’t know what the weather is doing now.”

- Expected or Unexpected conditions
- Trend
- Hazard that requires a Warning
- The “sensible” weather is at the “surface” where people live!





# Scale Matters





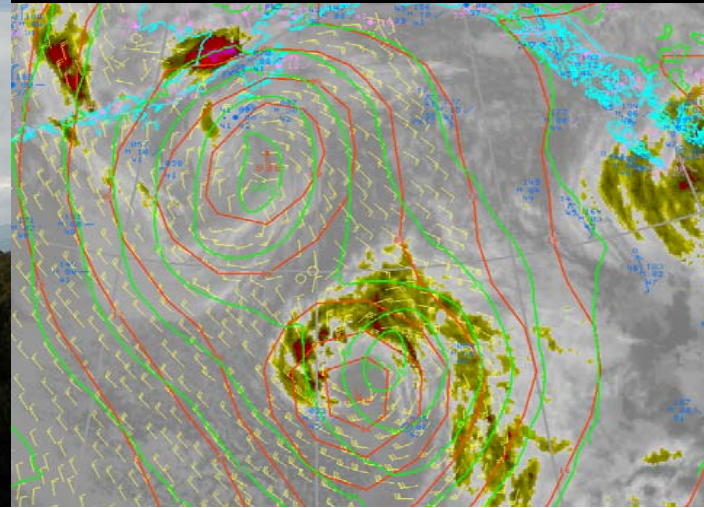
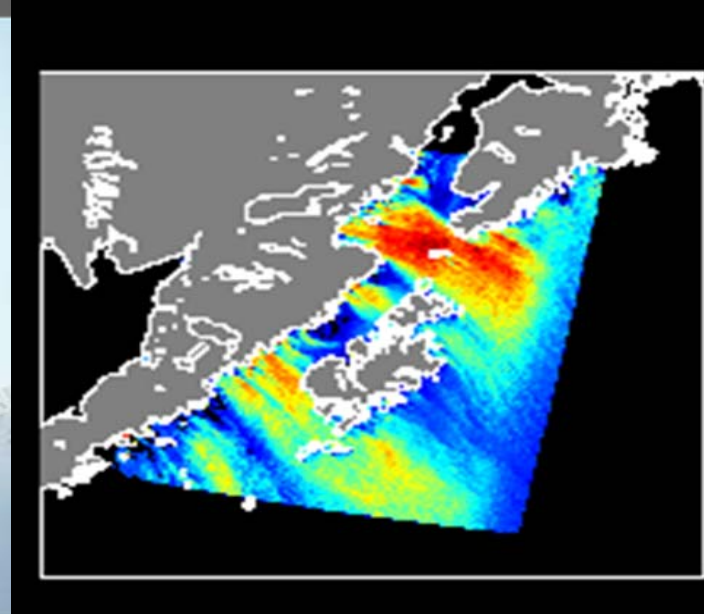
## 3 Levels of Surface Observations

- Automated / Augmented / Paid
- Cooperative Observers
- Weather SPOTTERS



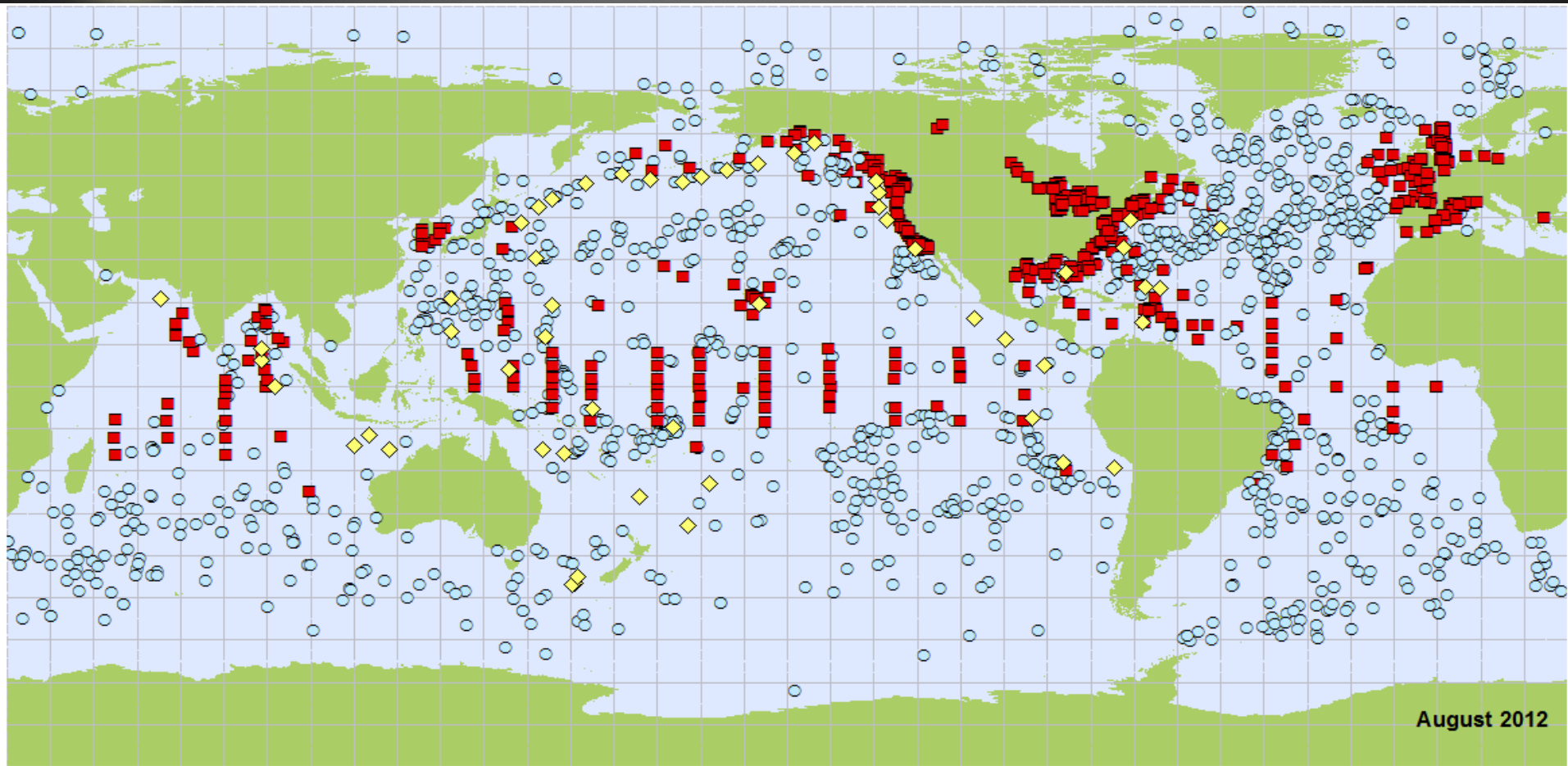


# Automated Observations





# Worldwide Distribution



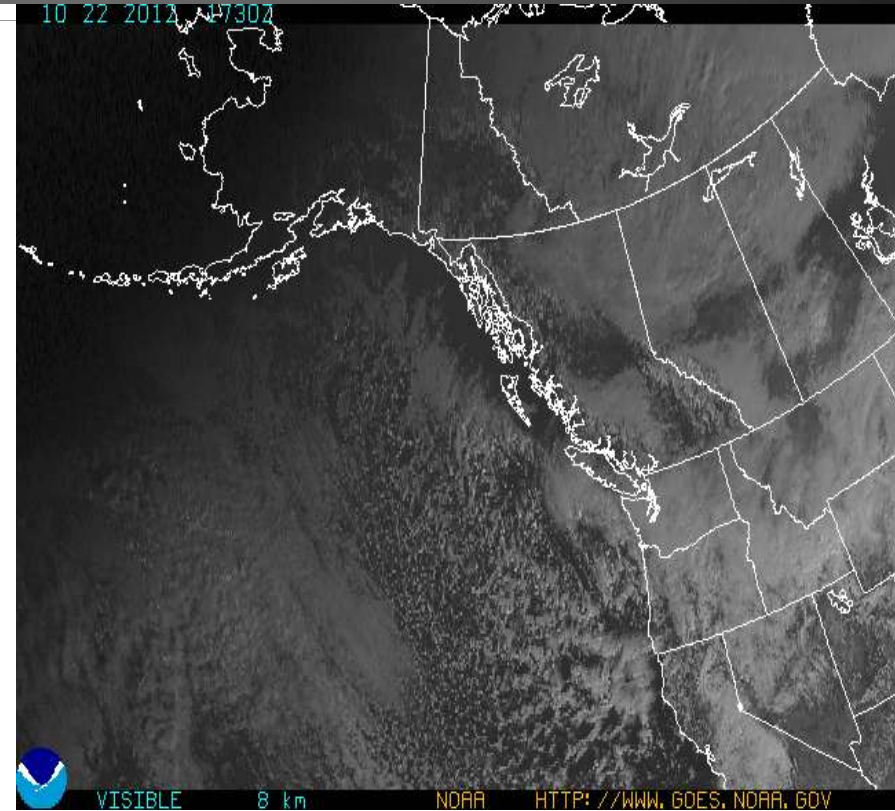
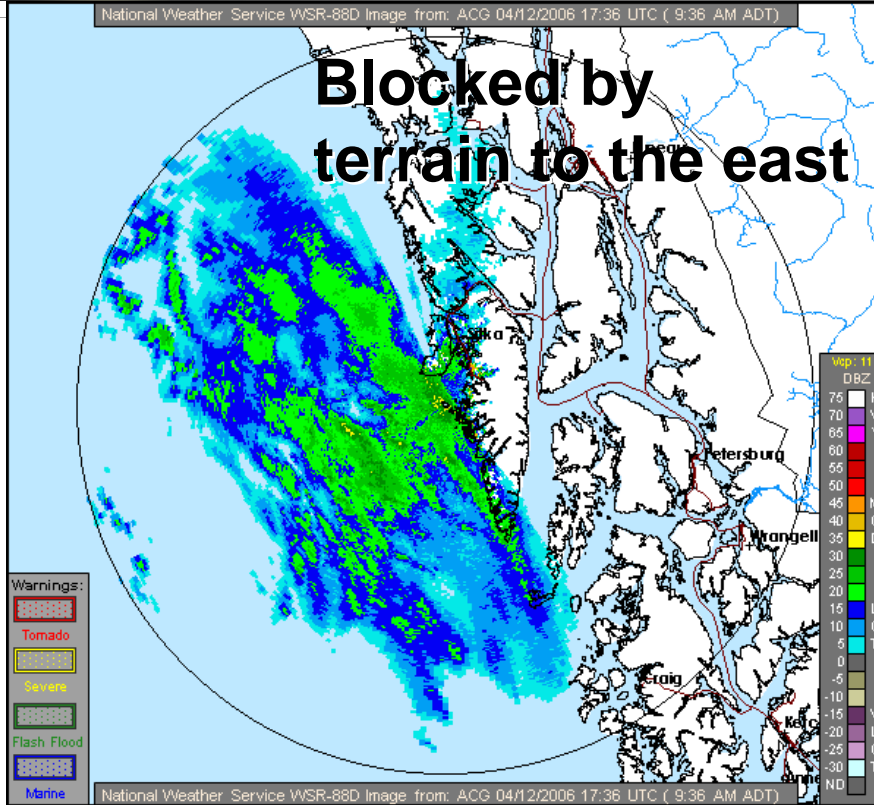
August 2012

■ Moored Buoys (506)    ● Drifting Buoys (1221)    ◆ Tsunameter Buoys (54)





# Remote Sensing necessary but...



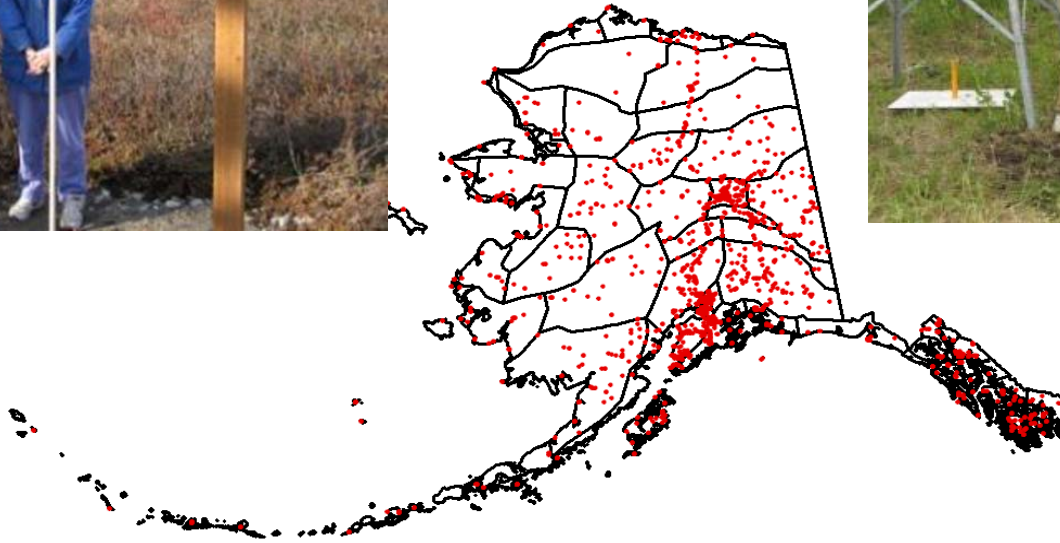
...insufficient





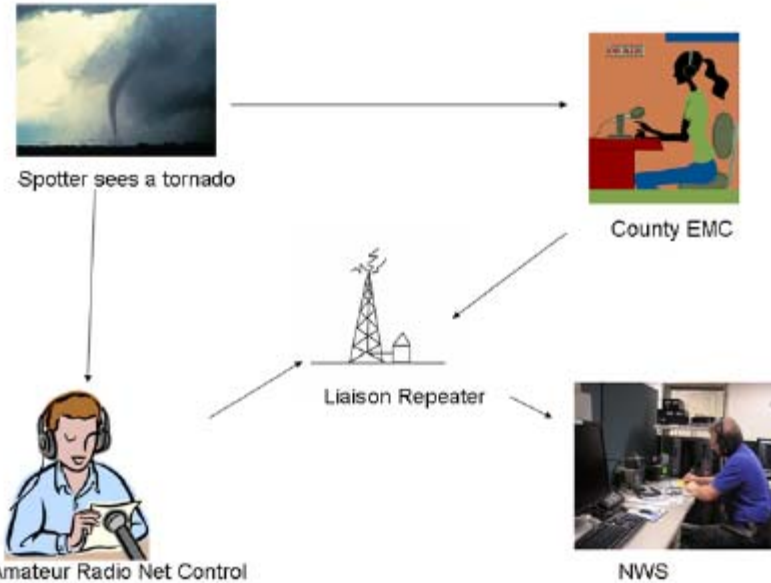
# Cooperative Observers

## Dedicated volunteers





# “Spotters” Periodic and rare



### Updraft

A thunderstorm is a **PROCESS** that releases **ABUNDANT ENERGY**

**VERTICAL WINDS**  
50 - 100+ mph:

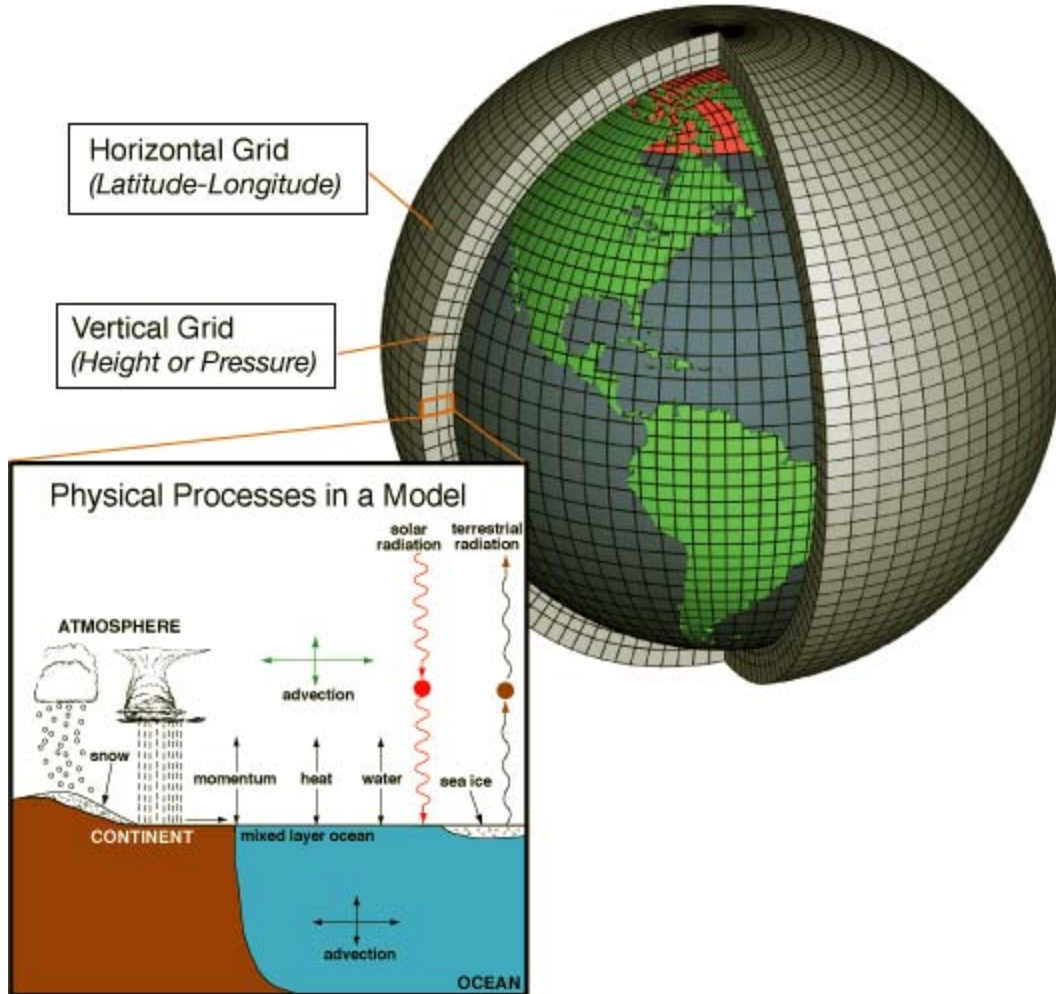
**LATENT HEAT ENERGY:**  
Water Vapor  $\rightleftharpoons$  Liquid & Ice

Photo: Jimmy DeGuzire





# Numerical Weather Prediction Guidance

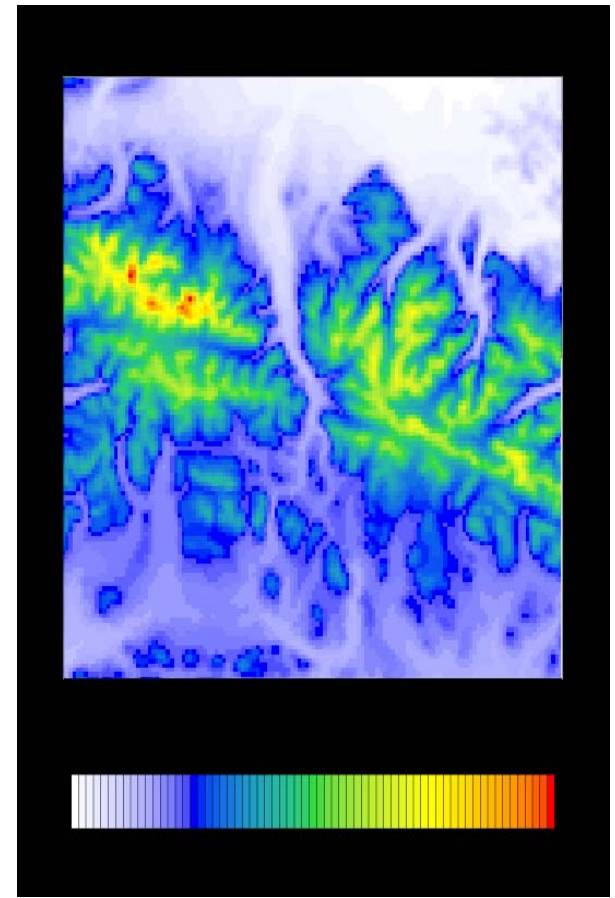
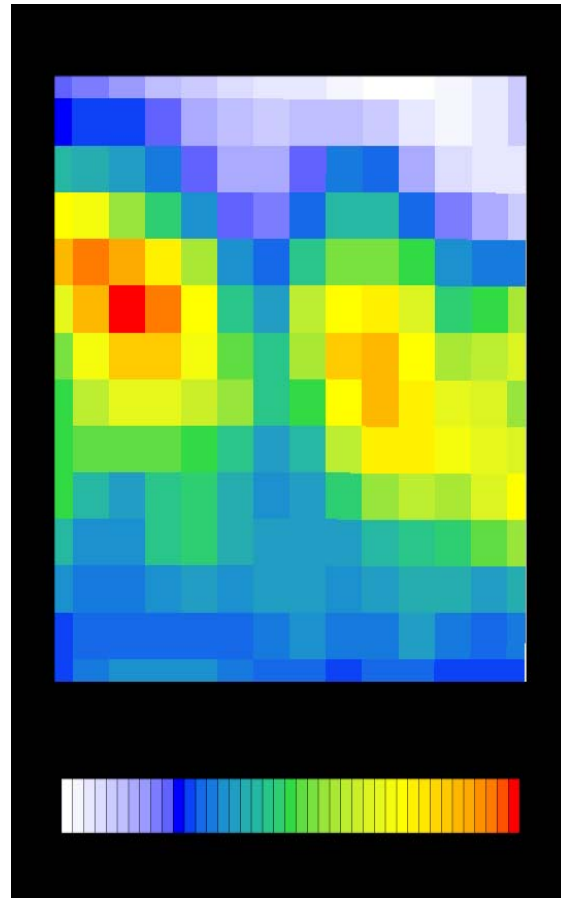


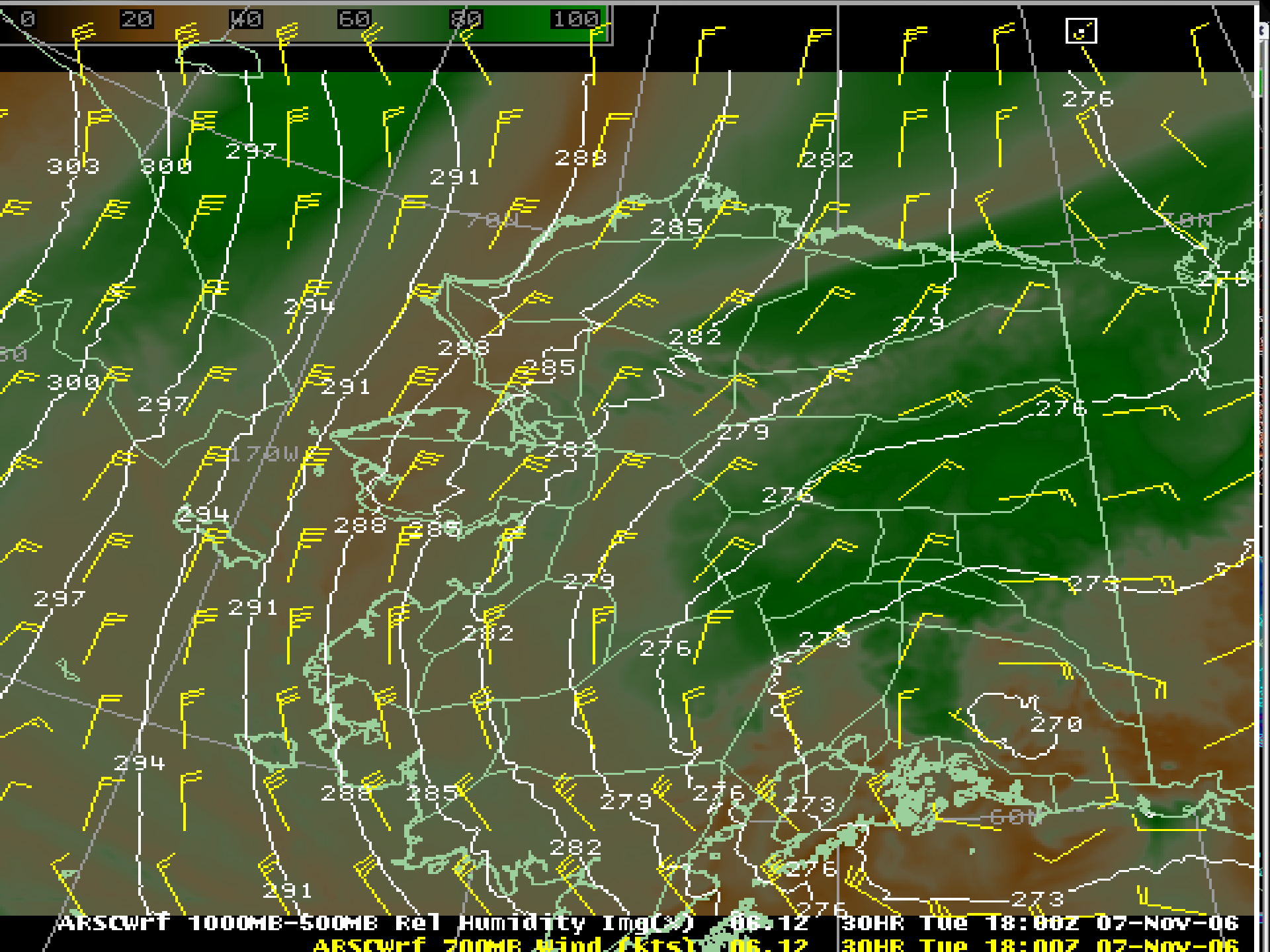


# Numerical Weather Prediction Resolution



Don Morton- ARSC



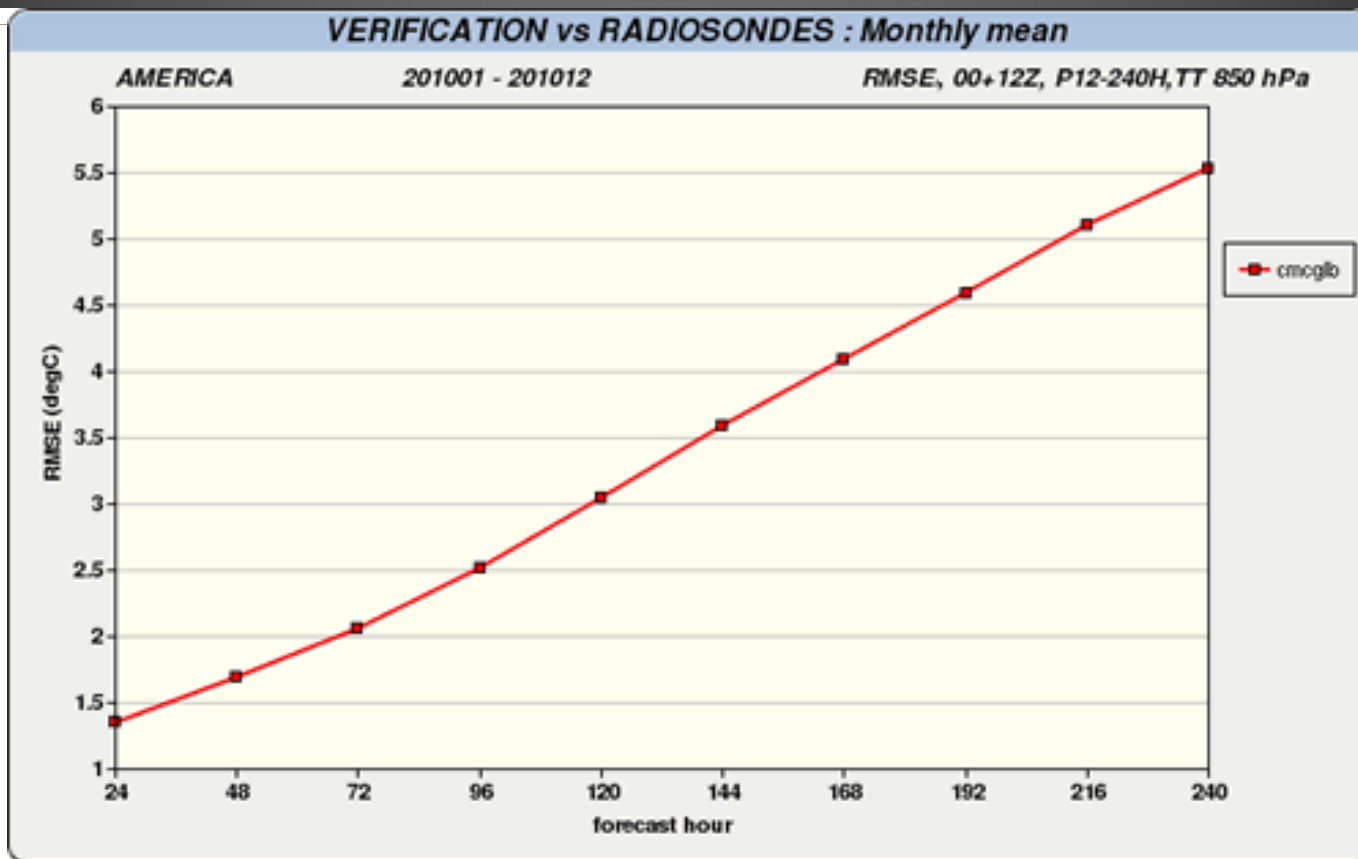


ARSCrf 1000MB-500MB Rel Humidity Inq(%) 06.12 30HR Tue 18:00Z 07-Nov-06

ARSCrf 200MB Wind (kts) 06.12 30HR Tue 18:00Z 07-Nov-06



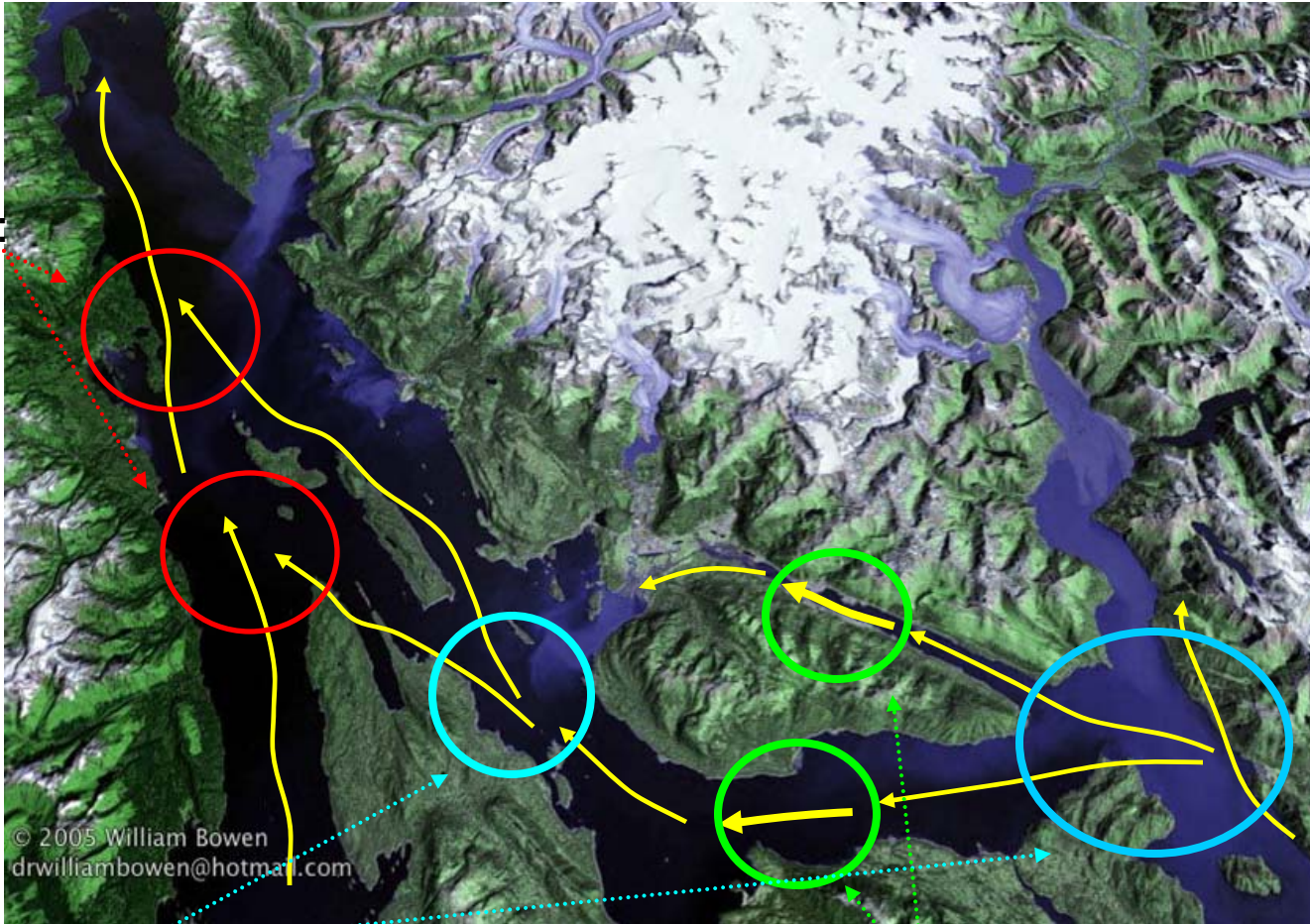
# Rate of Error Increases with time





# Very Localized Weather

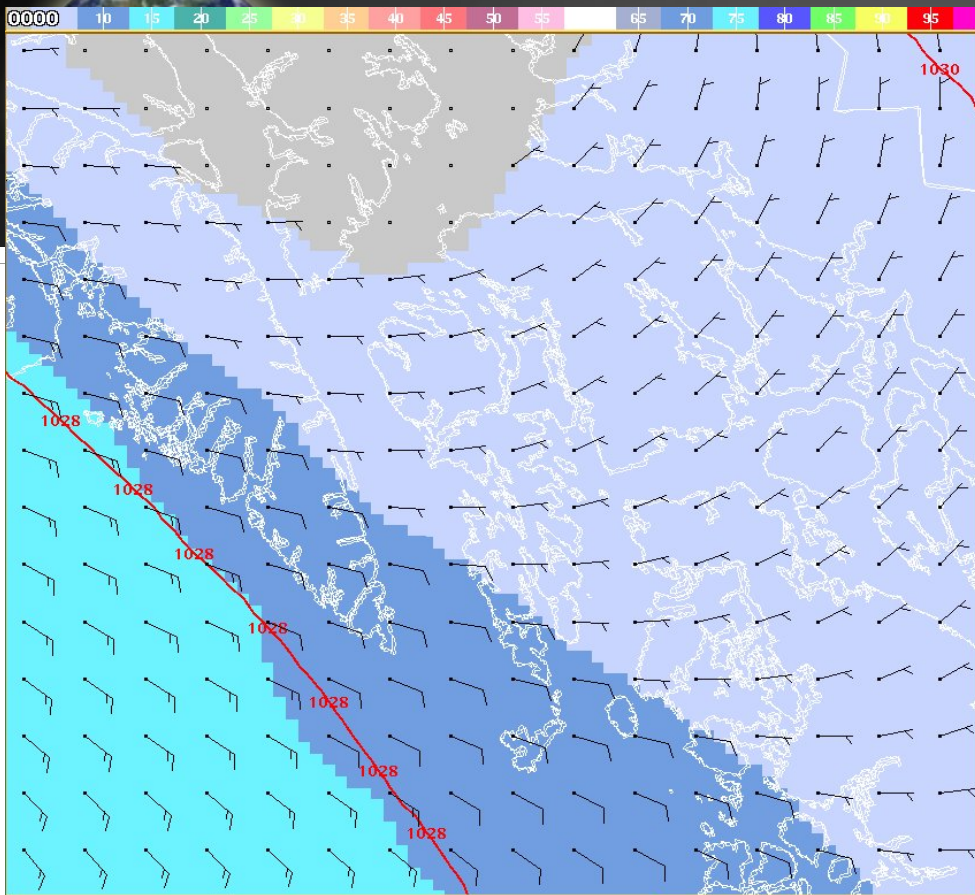
CONVERGENCE:  
TURBULENT,  
ACCELERATED  
FLOW,  
ENHANCED  
PRECIPITATION



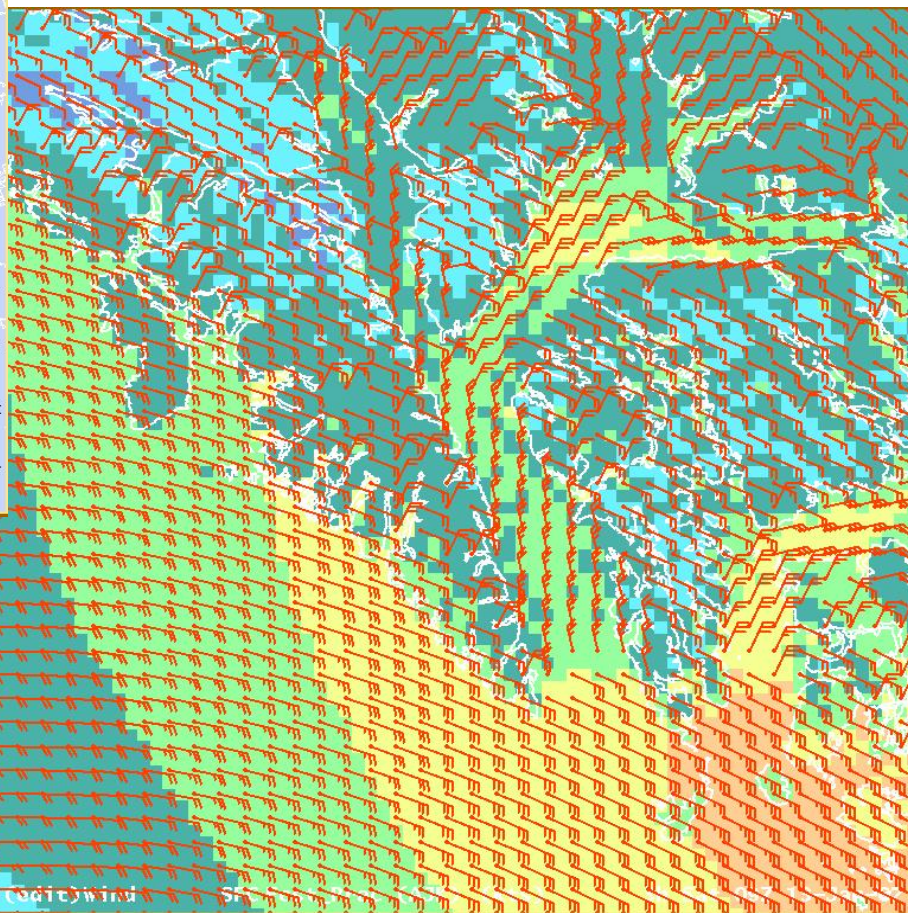
DIVERGENCE: DIMINISHED  
FLOW, LESS PRECIPITATION

CONFLUENCE: ACCELERATED FLOW

# Execute Decision



**Model Winds**



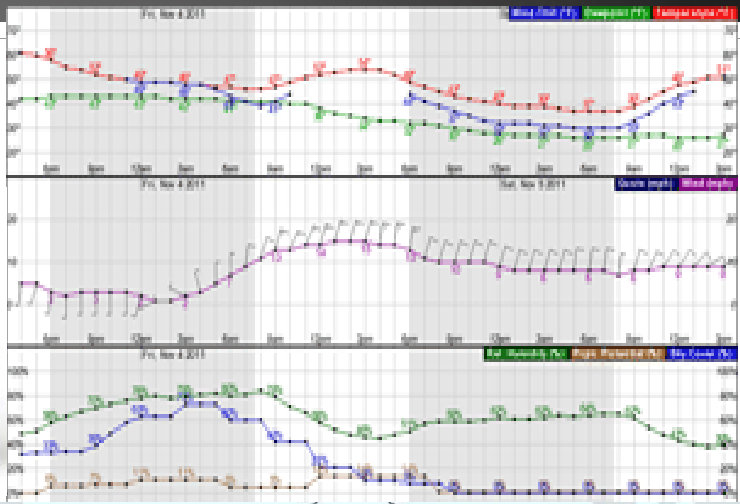
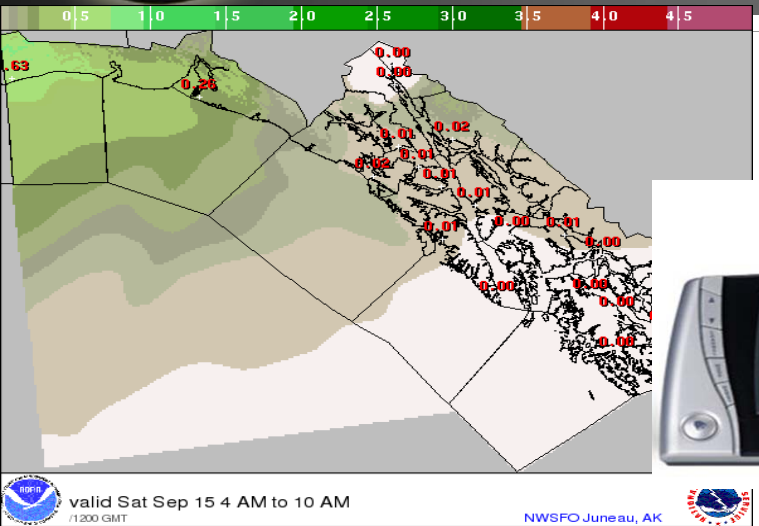
**Forecaster Winds**





# Disseminate Decision

## Multiple formats



TIME (AKDT)	7 PM	9 PM	11 PM	1 AM	3 AM	5 AM
SKY (%).....	100	100	100	100	100	100
WEATHER COV.....	DEFNTE	DEFNTE	DEFNTE	DEFNTE	DEFNTE	DEFNTE
WEATHER TYPE....	RAIN	RAIN	RAIN	RAIN	RAIN	RAIN
TEMP.....	55	55	54	54	53	53
RH.....	96	97	100	98	97	98
WIND.....	SE 10	SE 10	SE 10	SE 10	SE 10	SE 10
WIND GUST.....	25	25	25	15	15	15
SWELL .....	SW 0	SW 0	SW 0	SW 0	SW 0	SW 0
WAVE HEIGHT (FT)	4	4	3	3	3	2





# Social Science Decision Support

- How do people respond to warnings?
- How to best express forecasts?
- How do people get weather information?
- What form do they want the weather?
- What decisions are people making?





# Thank you. Any questions?

