



# ALASKA CENTER FOR CLIMATE ASSESSMENT & POLICY

***Welcome to the webinar:***

**CLIMATE CHANGE IN ALASKA:  
FROM WEATHER TO WHETHER**

**June 21, 2011; 10 AM (Alaska Standard Time)**

***James Partain, NOAA Regional Climate Services Director,  
Alaska Region***

*This webinar will be recorded for an archive available to the public.*

**For more information, please contact ACCAP:  
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# Climate Change Impacts in Alaska: From Weather to Whether

June 21, 2011

James Partain

Regional Climate Services Director

Alaska Region



## Challenges Due to Weather/Climate Linkage

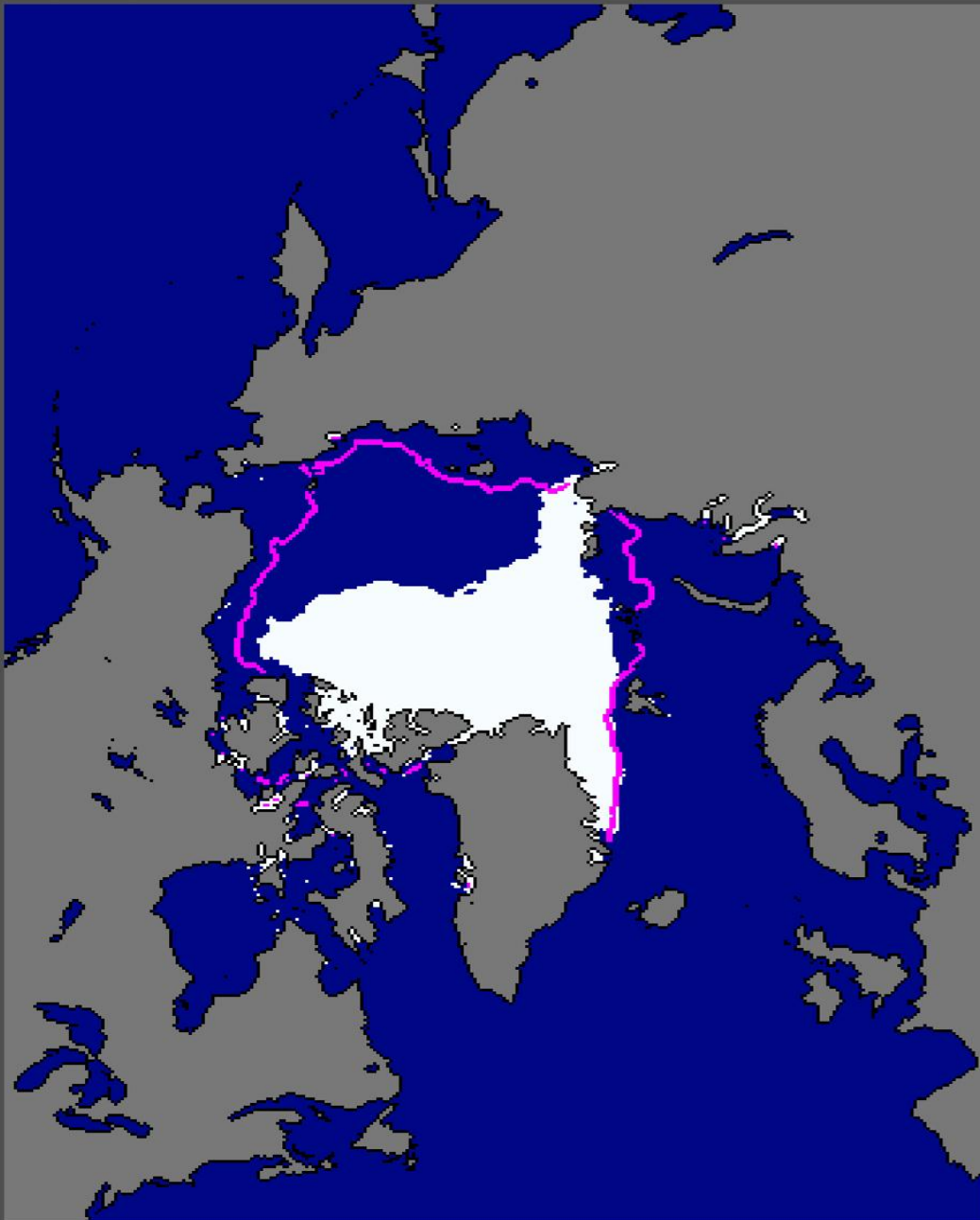
- Climate change in Alaska:
  - Decades-old warming at locations all across Alaska
  - Greatly reduced extent *and* thickness of multi-year sea ice
    - More impacts from coastal storms in Fall and Spring
    - Many resulting transportation, subsistence, hydrologic issues
  - Later freeze-up in Fall and earlier break-up in Spring
  - Glaciers retreating, Permafrost thawing with attendant issues.



## Climate Impacts on NOAA's Service Programs

- Aviation – more frequent icing conditions, low visibility; changed flying “paradigms”
- Public - more frequent extremes in weather
- Marine - more frequent high-impact events, esp. in areas of reduced sea ice (e.g. coastal erosion, water quality)
- Wildfire - more variable regime-dependent fuel-moisture conditions (e.g. 2004 and 2005 burned record # of acres in Alaska, and also produced the greatest number of lightning strikes ever recorded)

Current Ice Extent  
09/16/2007



National Snow and Ice Data Center, Boulder, CO

Total extent = 4.1 million sq km

median  
ice edge

Ice-free area is 1.63 million square miles =

2 Alaska's + 1 Texas, or  
10 California's

4 times greater than the  
previous record (Sept 2005)

38,000 sq miles lost in last  
week (= Indiana)

Northernmost ice edge (85.5  
deg North at 160 deg East)  
ever recorded

NW Passage completely open  
since August 11

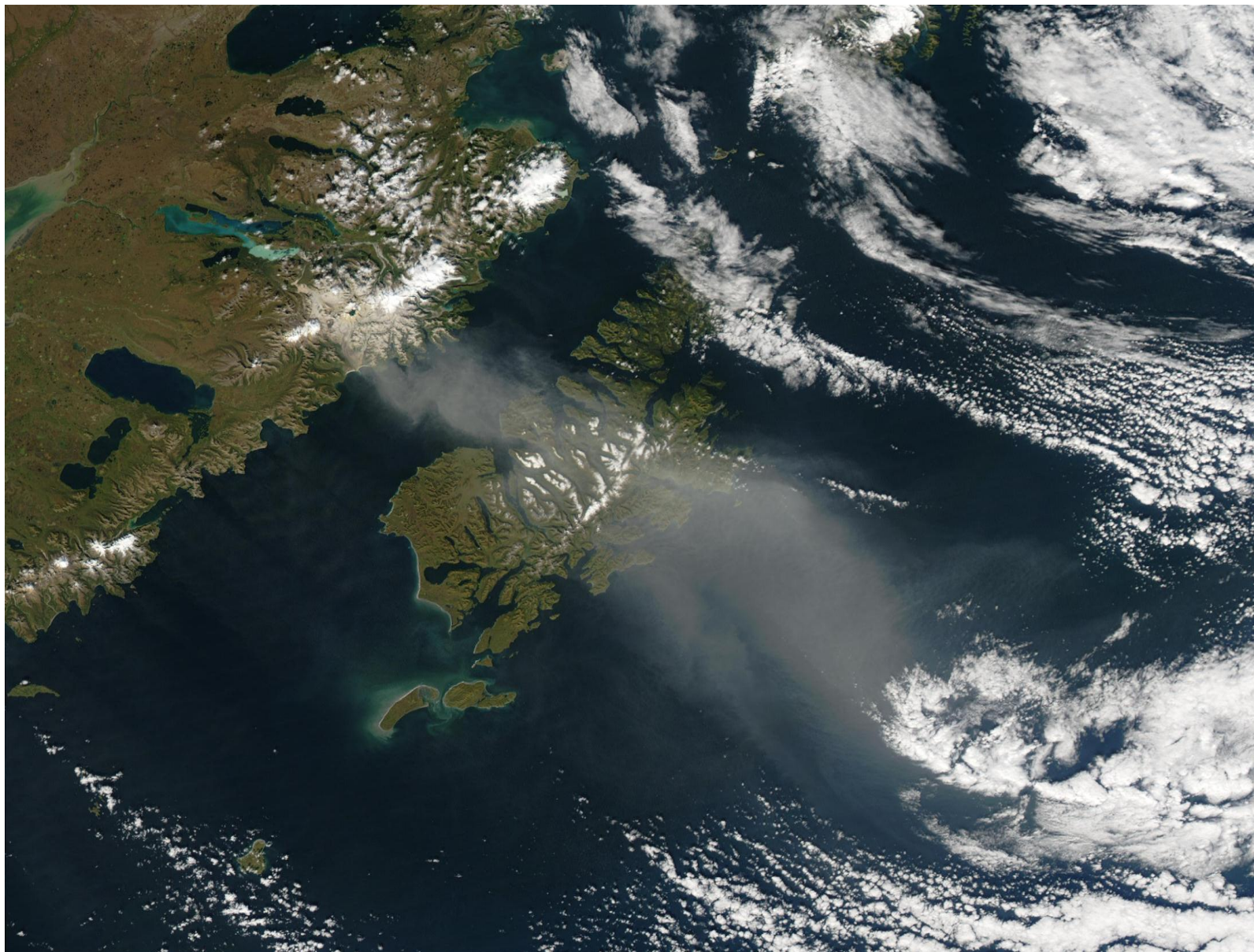


## Climate Impacts on NOAA's Service Programs

- Hydrology - greater variability in river volume & related flooding and erosion, transportation, and fresh-water availability; ice-dammed glacier lake releases
- Climate – loss of predictability for El Niño/La Niña events due to unknowns from climate change (e.g. open water impacts)
- Tsunami – sea-level rise may have eventual inundation impacts
- Volcanic Ash – resuspension of relic ash and resultant impacts on aviation, marine, and public services.



## September 2003, Katmai "Re-Suspension" Event





# Climate Science Needs

- Improving Climate Science, and therefore Climate Services, involves, among other things:
  - Observations
  - Numerical models
  - Decision-support tools
  - Education & Outreach



# Climate Science Needs - Observations

- Observations form the backbone of forecast and warning services:
  - Allows forecasters and rest of the world know what's "really happening"
  - Allows decision-makers (e.g. harbormaster, airline dispatcher, Emergency Manager, civic planners, policy makers) and numerical modelers know what to do to make decisions and make things better
- Both remotely-sensed (e.g. radar, satellite) and in-situ (e.g. weather stations, humans) are needed



# Climate Science Needs - Models

- In Alaska, guidance from numerical models is especially critical for forecasts & warnings beyond 6-hours
- Models currently do poorest at the poles...Alaska is the 2<sup>nd</sup> worst of the 12 parts of the planet that are verified for global models (Antarctica is worst)
- Observations make the models better, as do R&D initiatives aimed at improving the models to better understand Arctic conditions and issues
- Improved models lead to improved and more confident services by forecasters and decision-makers with greater lead time



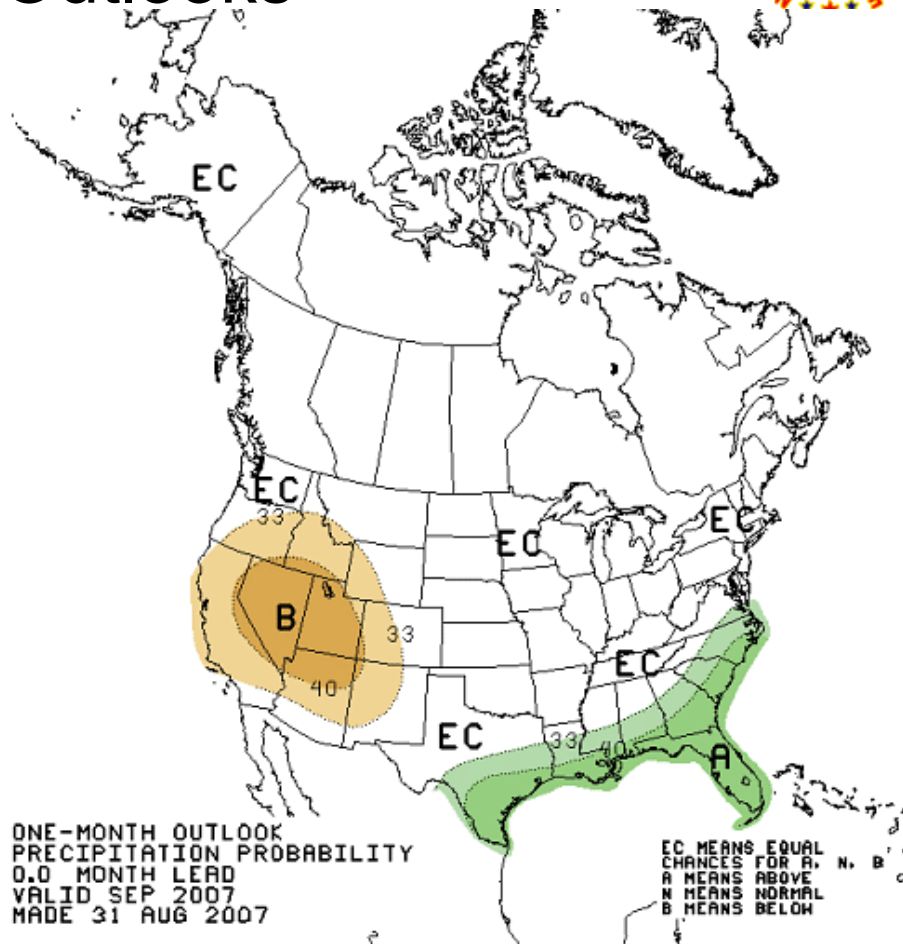
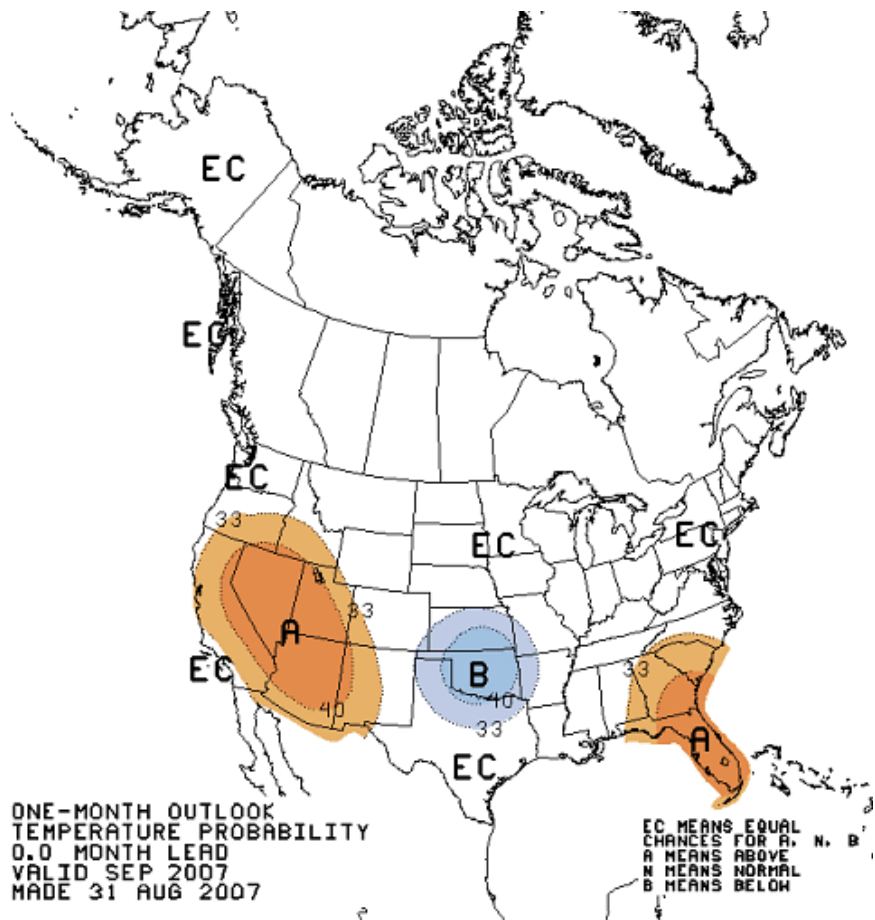
## Climate Science Needs – Decision Support and Outreach/Education

- Decision-support bridges the realms of observations, models, research, and human factors and their implications for real-world application
  - In Alaska, help is needed by many, including those involved in transportation and subsistence activities, deciding where to move villages so they will not be in harm's way in 30 years, how to deal with toxic releases when a village washes into the ocean, etc
- Outreach and education are the tools by which decision-support outputs are made effective
  - A perfect forecast or warning is *entirely useless* unless the customer understands its meaning and impact and can make appropriate decisions to mitigate the impacts.



# Existing Climate Products

## 1-Month Outlooks

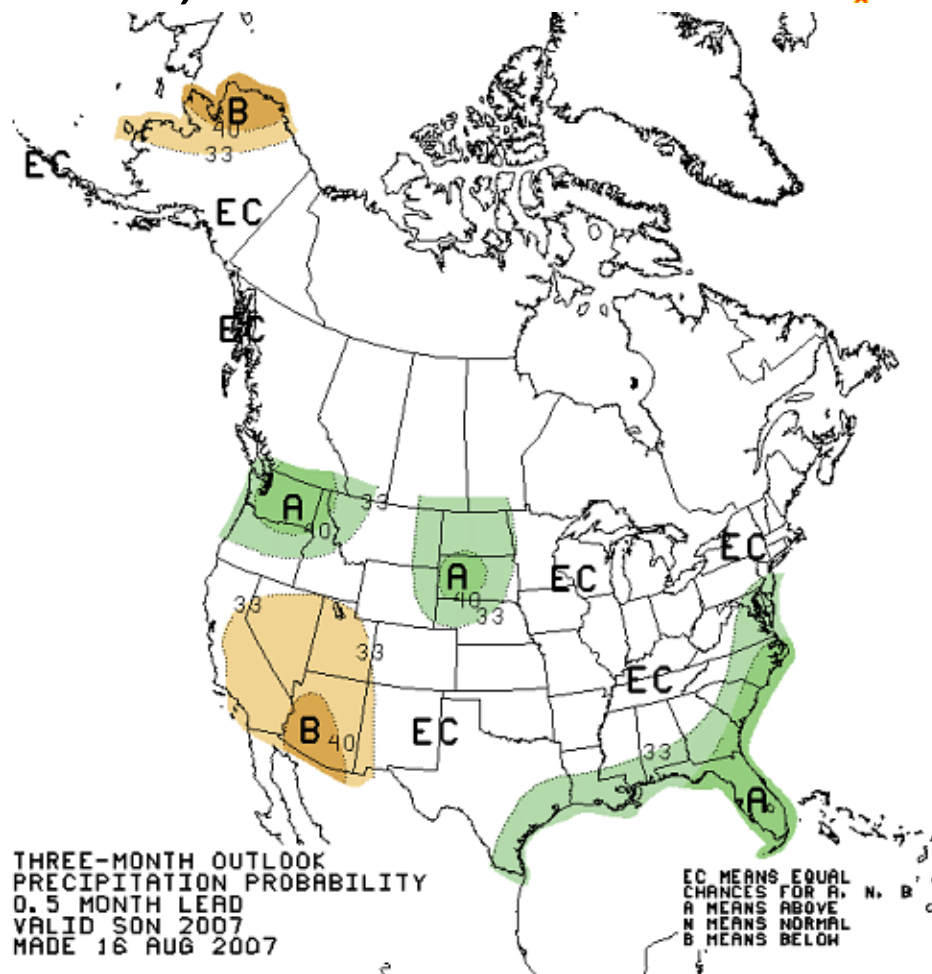
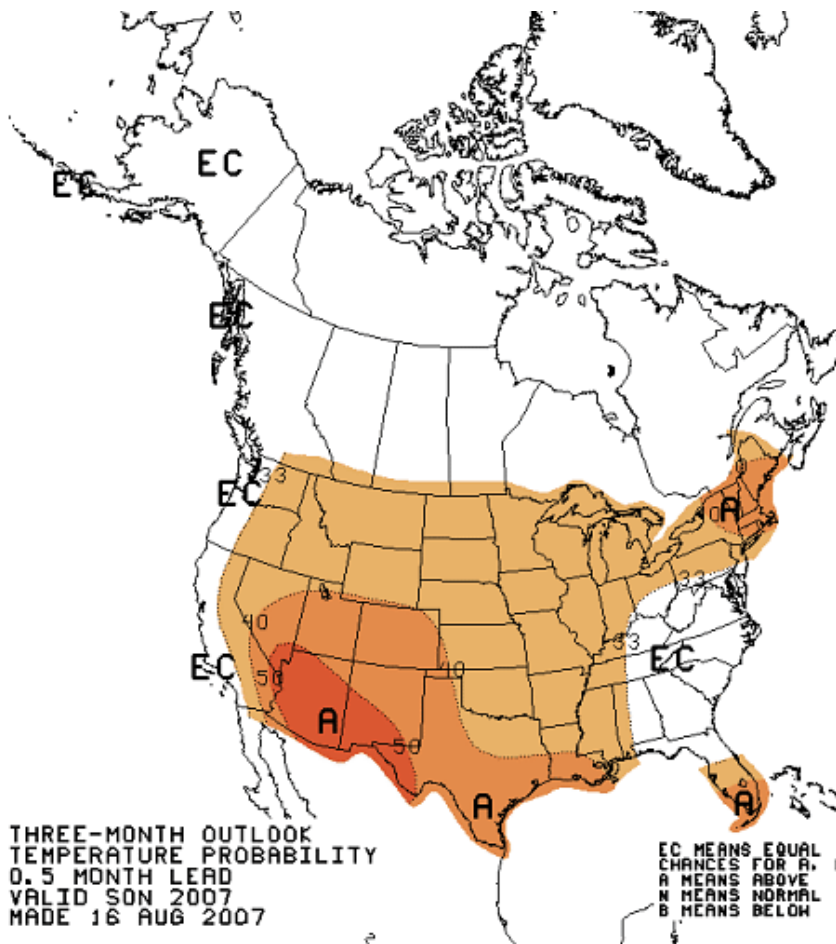


Contours/shading are odds of the most likely category of three: above, normal, below, whose random odds are 1/3 each.



# Existing Climate Products

## 3-Month (Seasonal) Outlooks

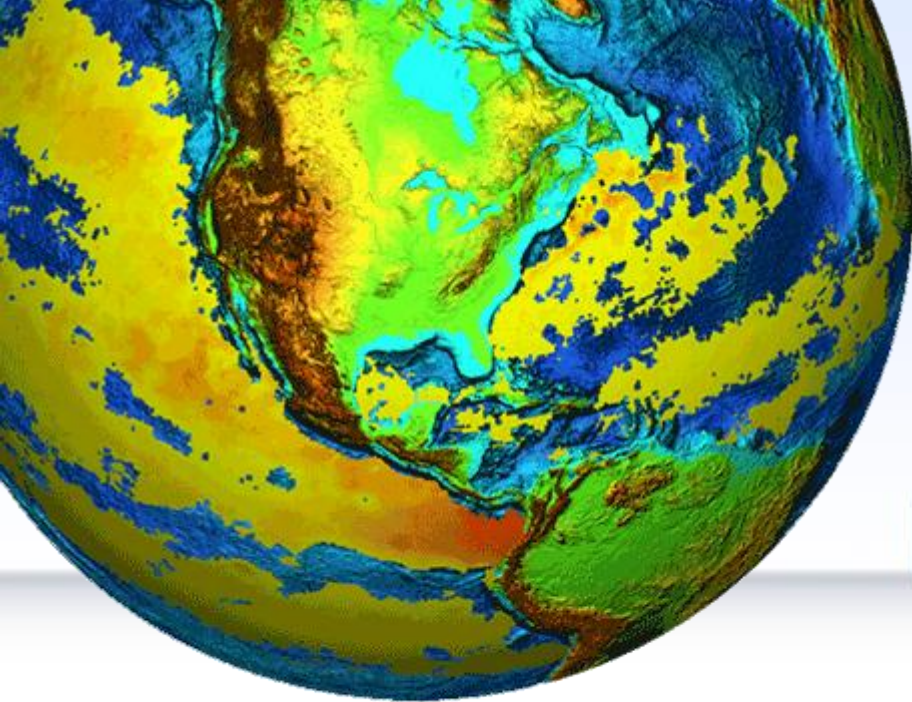


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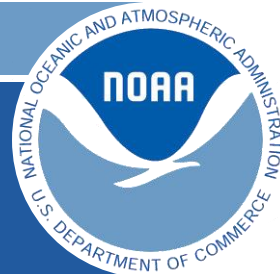
## Now...the Whether part...

- As was shown earlier, there are many needs and gaps in our understanding and capabilities that must be met in order to provide Alaskans with timely, reliable, and useful climate services
- NOAA has proposed to create a new Line Office, at the same level as the Weather Service – called the Climate Service
- This Climate Service would reorganize NOAA’s existing climate capabilities under one roof, bringing a focus to currently disassociated activities
- The “Whether” question...Whether Congress will allow NOAA to do so!
- First...more on the Climate Service



# THE CLIMATE SERVICE





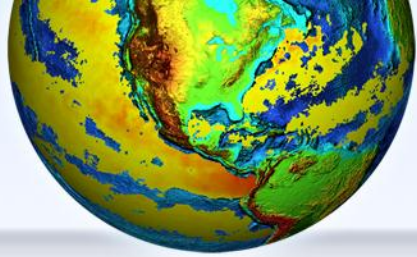
# Meeting the Rising Demand for Climate Services

1. NOAA's existing framework for climate was established before climate services were recognized as essential, and is not optimized for climate service delivery.
2. While NOAA has continued to build its suite of climate services within its existing framework, including our interagency approach to delivering drought information services, much of the demand remains unmet.
3. To meet climate service demands, NOAA must direct efforts to develop a framework that will:
  - Connect users to existing climate products and services, while continuing to develop new authoritative, reliable services;
  - Transform current science and data into understandable, usable and accessible information; and
  - Actively engage users in service development.
4. NOAA's climate framework must deliver needed climate services while maintaining leadership in observing, research, modeling and assessments

*"If America is to avoid the most damaging effects of climate change, we have to first understand it – and that is where the Department of Commerce is instrumental." - Secretary of Commerce, Gary Locke*

# Progress Since February 2010

- Regional Climate Services Directors hired and plans for early activities completed
- Congressional requested National Academy of Public Administration Study complete
- Development and submission of reprogramming package
  - Consultation with Congress
- Development of Vision and Strategic Framework document



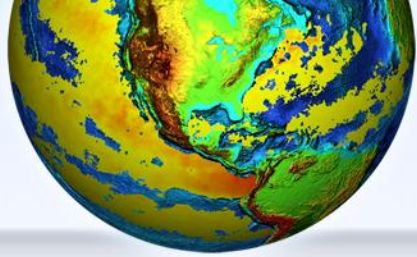
# Climate Service Mission

Improve understanding and prediction of changes in climate and promote a climate-resilient society by:

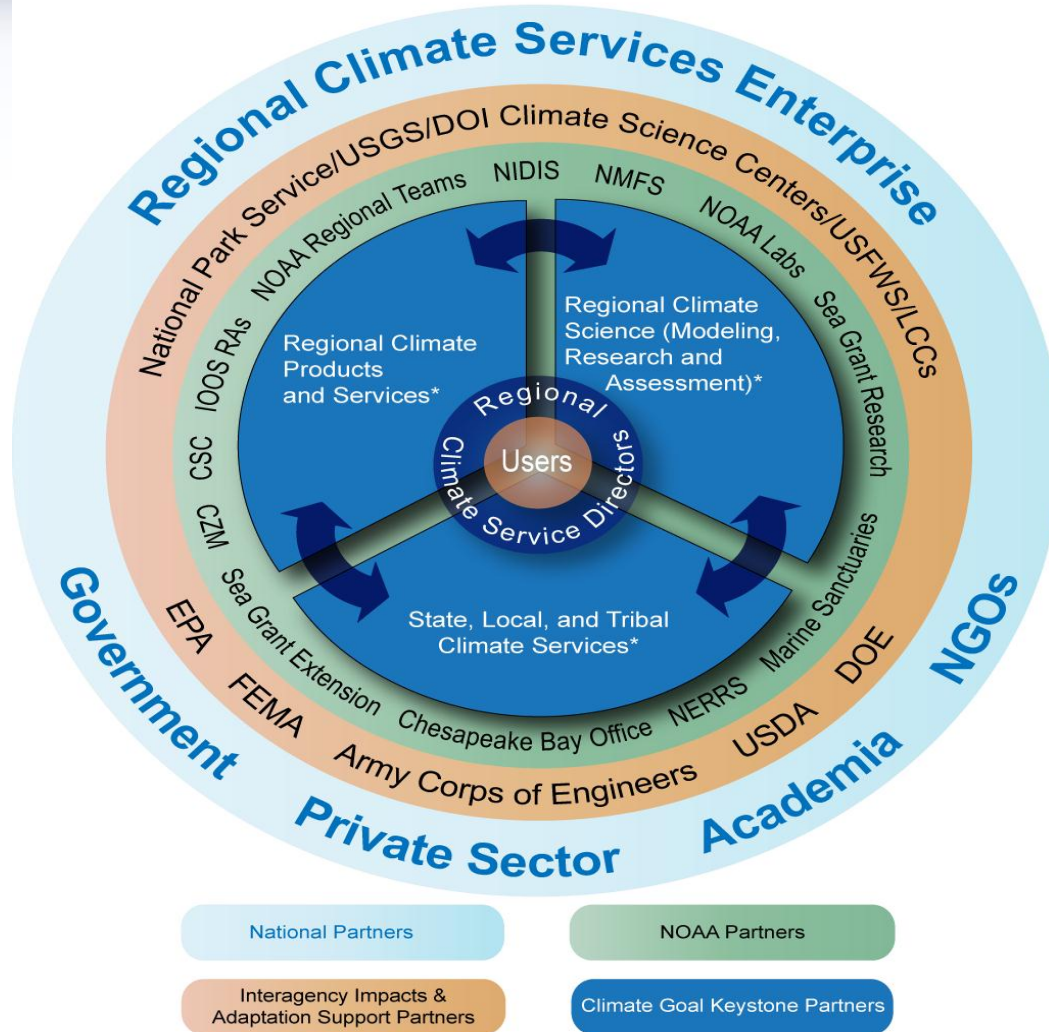
- Monitoring climate trends, conducting research, and developing models to strengthen our knowledge of the changing climate and its impacts on our physical, economic, and societal systems
- Providing authoritative and timely information products and services about climate change, climate variability, and impacts
- Informing decision making and management at the local, state, regional, national, and international levels

# Partners

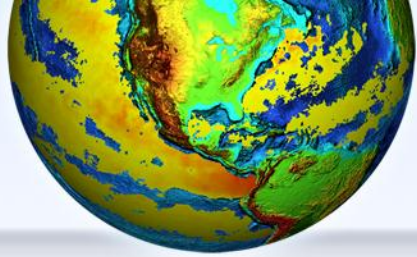
- Partners from across the broader climate community both contribute to and benefit from the core capabilities
  - Other parts of NOAA, Federal, state, tribal and local agencies, cooperative institutes and other academic partners, the private sector, NGOs and the international community



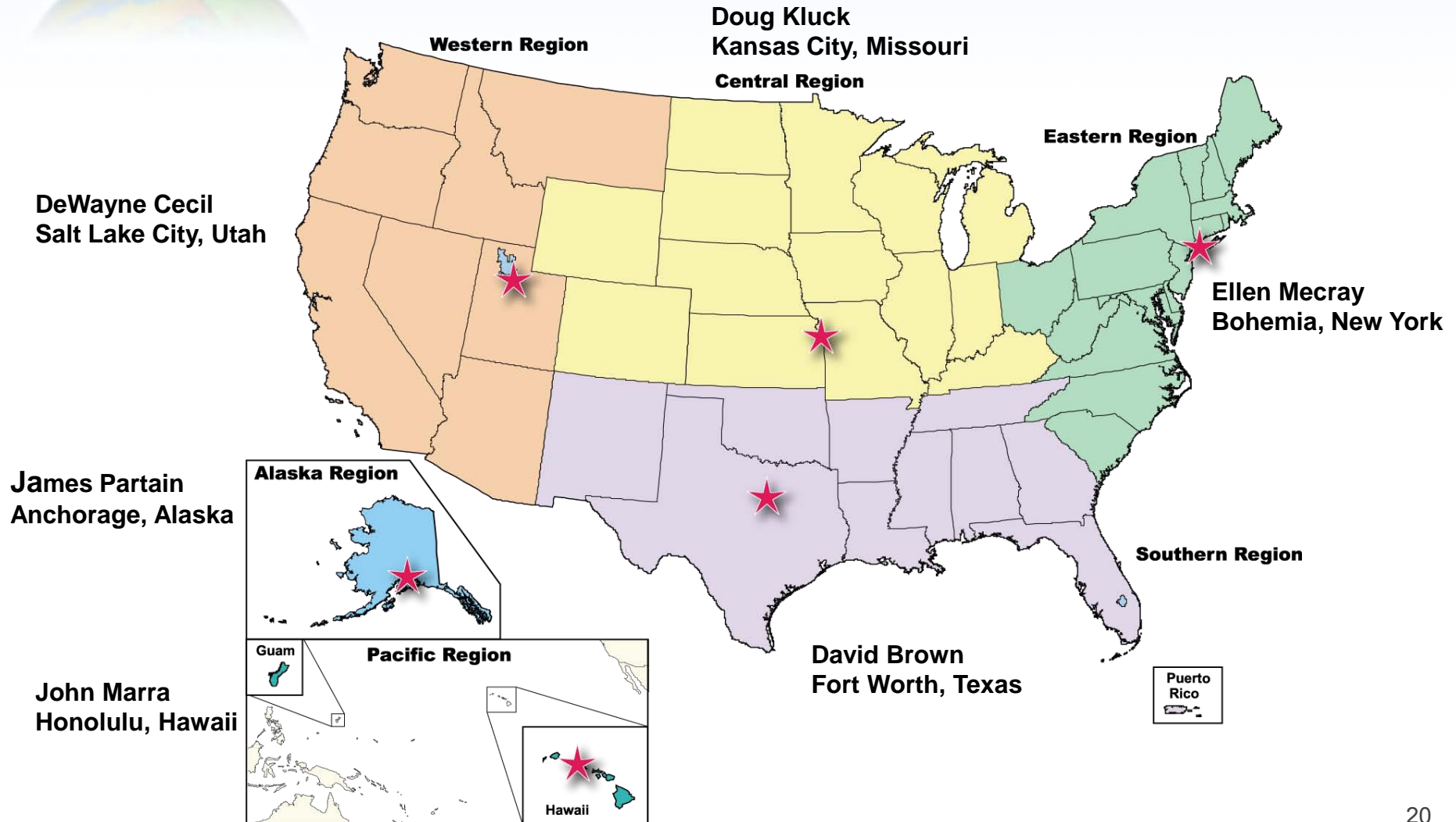
# Regional Climate Services Partnership: A Conceptual Pearl

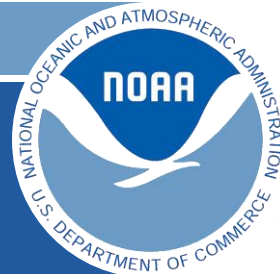


\*See Figure 2 for details



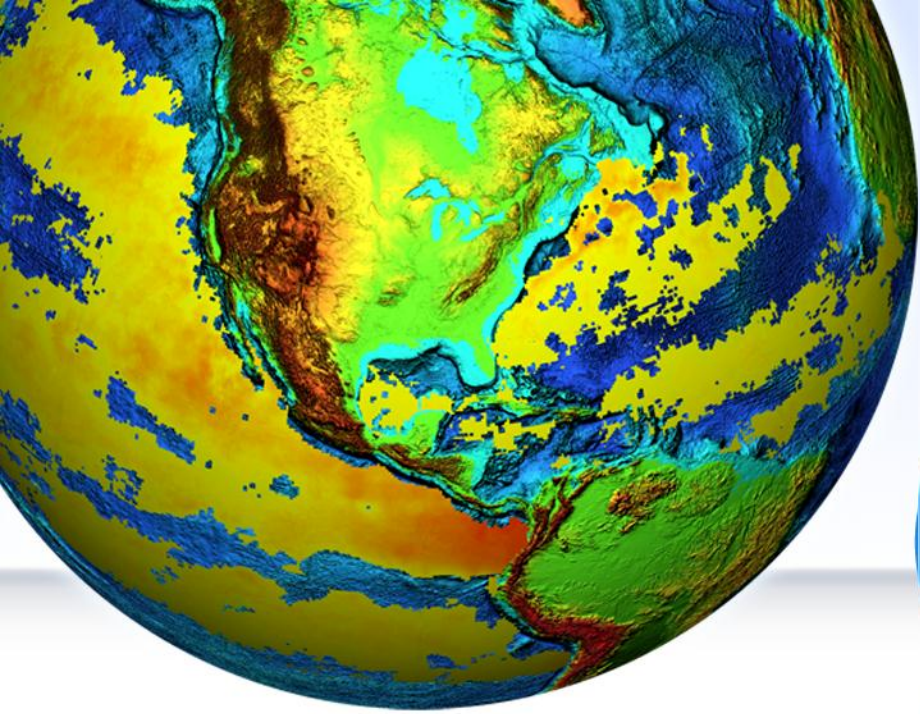
# Regional Climate Service Directors





# NWS and the Climate Service

- Climate Prediction Center products and services are central to overall Climate Service success
- Shared responsibility for “seamless suite” of weather and climate products
- Critical partners in regional climate services
  - CSD, NWS Regions and WSFOs
  - River Forecast Offices
  - Co-location of Regional Climate Service Directors
  - NWS as trusted information brokers



# THE CLIMATE SERVICE

Thank You...

Questions?