NOAA’s National Weather Service
Alaska Region Weather and Climate Services

First IPY Workshop
Sustaining Arctic Observing Networks
Stockholm, Sweden
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Outline

• Alaska Climate Trends
• NOAA Products and Services
• Partnerships
• Overview
• CRN Lessons Learned
Alaska’s Changing Climate

Source: NASA, GISS (2007)
Temperature Change in Alaska

Mean Annual Temperature Departure for Alaska (1949 - 2005)

Alaska Climate Research Center
Geophysical Institute - UAF
Alaska’s Changing Climate
Cont’d

Increase in Average Annual Temperature, Selected Alaska Places, 1949 - 2005
(In Fahrenheit Degrees)

Source: UAF, Geophysical Institute (2006)
Climate Change Impacts

• Earlier Spring and Later Fall
• Thawing Permafrost
• Changes in Sea-level
  – inundation & subsidence
• Accelerated Coastal Erosion
• Increased Likelihood of “Extreme Events”
• Greater Incident of Aviation Icing Conditions
Climate Services Focal Points

- Serve as customer interface
  - Provide customer service
  - Conduct climate outreach and education
  - Develop partnerships
  - Utilize available tools for customer interface
Planned Arctic Activities

• Alaska
  – 29 Climate Reference Network (CRN)
  – 40 Historical Climate Network (HCN)
  – COOP 21st Century – 200 stations

• 330 Canadian CRNs
  – in coordination with NOAA
Deploy Climate Reference Network (CRN) Stations in Alaska

Approach: Deploy and operate 29 CRN stations across Alaska, leveraging the lessons learned and proven processes from the U. S. Climate Reference Network (USCRN) project in the lower 48 states and the four operational prototype CRN stations in Alaska since 2001 (Point Barrow, St. Paul, Sitka, and Fairbanks)

Partners:
• NOAA Line Offices (OAR, NESDIS, NWS, NOS)
• University of Alaska (Fairbanks) IARC
• NSF Arctic Program, NPS, USGS, Alaska, Canadians
• U.S. GCOS
• Individual Local Site Hosts for stations

Climate Reference Network (CRN) Station, Pt. Barrow, AK
U.S. Climate Reference Network (USCRN)
Alaska Locations

Single sites installed (2): Pt. Barrow & Fairbanks

Single sites to be installed: FY 10-14 (27 locations)

GCOS single sites installed (2): Sitka & St. Paul Island
NOAA’s NWS Climate Services
Climate Record Stewardship through COOP

• COOP Paperless Initiative
  – Electronic Ingest of Manual Observations - Upfront QC
• COOP 21st Century Transition Plan
  – Remedial actions to ensure maximum quality data
• HCN Modernization
  – Automating our longest-record stations
• Fisher/Porter Automated Rain Gauge Upgrade
  – Comprehensive hourly precipitation network
- Electronic Ingest - uses PC/web & phone

- Virtual elimination of formatting and transcription errors as well as out-of-range or inconsistent entries

- More than triple (thousands more) the number of surface observations available daily

- Greatly reduced data collection and processing costs
Plan in coordination with NWS field and NCDC

- leverages
  - NWS field offices and RCC and SC partner expertise
  - non-NOAA mesonets
- improves data quality
- addresses exposure issues
- fixes or closes degraded stations (rooftops, missing data etc.)
- honors century old tradition and pride of volunteers
NOAA’s NWS Climate Services

**COOP HCN Modernization**
- Currently ~ 1,200 HCN stations
  - all but 50 non-airport COOPs with 80+ years and good continuity and quality
- 1,000 to be modernized with AR, PR, and Caribbean future goal
- Automated temp. & precip. - snowfall & snow depth future goal
- Expandable platform

**Fisher/Porter Automated Rain Gauge Upgrade**
- ~ 2,500 gauges nationwide
  - Replaces unreliable mechanical punch tape with electronics
  - Supports future communications
  - Reduces missing data as well as reduced maintenance costs
  - Good RFP response; 3-4 years to complete
Partnerships (to name a few)

• Alaska State Climatologist
  – University of Alaska Anchorage

• Alaska Climate Research Center
  – University of Alaska Fairbanks
  – Potential site for Alaska Region Climate Center

• Alaska Center for Climate and Policy Assessment
  – NOAA’s Regional Integrated Services Assessment
September 2007

- Significant Sea Ice Decline
- Home Frost Free for June through September
- Anchorage Warmer and Wetter than Normal
- Bering Sea Storm Threatens and Causes Coastal Flooding
- Pacific Cyclone Strikes Alaska Panhandle
- Second Pacific Cyclone Hits Alaska Panhandle
- Anaktuvuk River Wildfire Becomes Largest in North Slope’s History
- High Temperatures in Barrow
- Fourth Wettest September on Record in King Salmon
NOAA Climate Services
(Overview)

What we have now

- Forecasts
- Monitoring
- Analysis
- Data archive
- Policy
- Training
- Outreach
- Partnership Development
- International
- Flood and flow
- Customer interface
- Forecast improvements
- Decision support tool development
- Coastal climatologies
- Applications research
- Regional and local expertise
- Policy support
- Data integration
- Data quality control

NOAA Partners
Regional Initiatives
Under Development
AK CRN Lessons Learned

- Sturdiest possible equipment to withstand wildlife curiosity
- Plan for deep snow, & raise station vertically
- Record data locally in case communications go out
- Build stations in places where there is power
Bent & twisted radiation shield – instrument OK.

Crushed radiation hat – instrument continued functioning nominally

Polar Bear “hugs” at Pt. Barrow, Alaska
Barrow Alaska – Lesson Learned:

Build the wind shield above the record snowfall ...

(March 2004)