Photo: Lisa Hupp/USFWS

Briefing on the US Arctic Observing Network

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Vibrant colors of the tundra at the base of the Greenland Ice Sheet near Kangerslussuaq, Greenland.
Photo by Tina Ciarametaro (PolarTREC 2014), Courtesy of ARCUS

Overview

Who we are

What we do

Report back from ASSW/AOS

Look forward

Concepts: AON, US AON, SAON

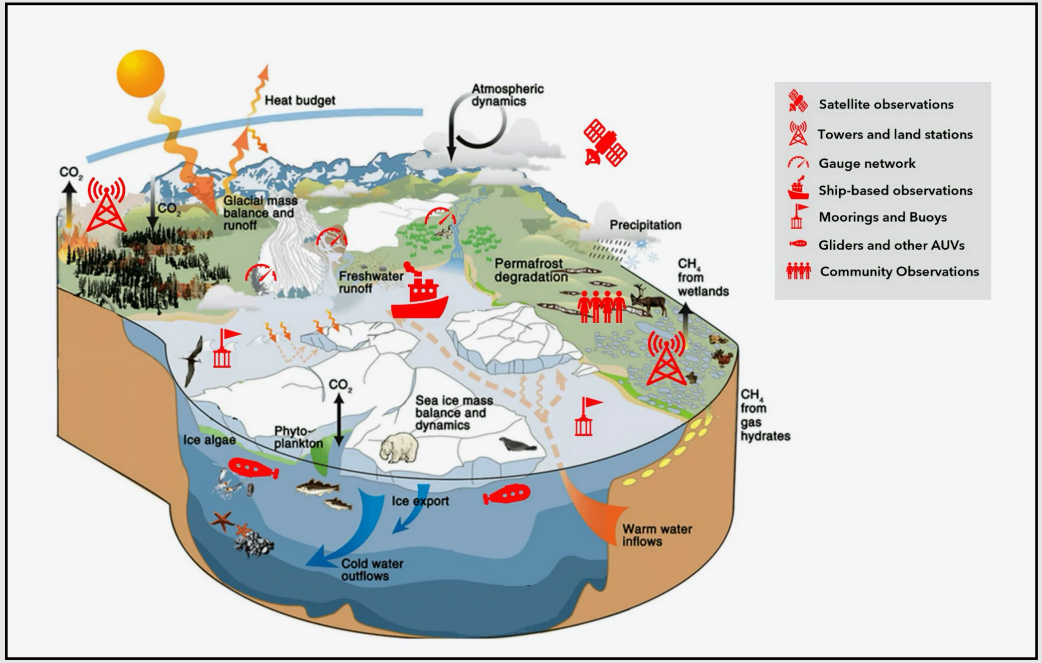


Image adapted from Roberts et al., 2010

AON = the pan-Arctic 'network of networks' implementing Arctic data collection and sharing

US AON = US-led coordination and planning initiatives to support effective AON efforts & the US National Committee to SAON

SAON = the international facilitator of Arctic & non-Arctic states, Permanent Participants & Arctic Council Working Groups to advance the AON.

US AON
A Sub-Committee of the IARPC

POLICY, RESOURCE & PLANNING ISSUES

SCIENCE & TECHNOLOGY ISSUES

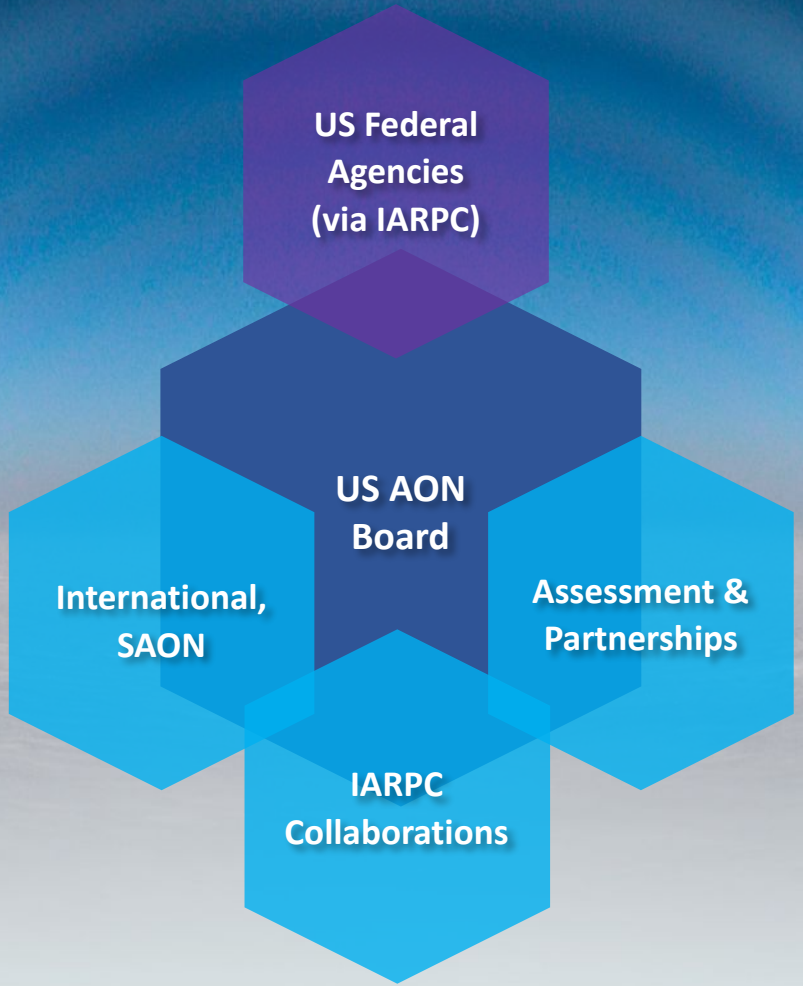


Photo courtesy of Chris Cox

US AON Accomplishments Report

www.usaon.org/resources

Photo: M. Fitz/NPS

BENEFIT Assessment & Tool

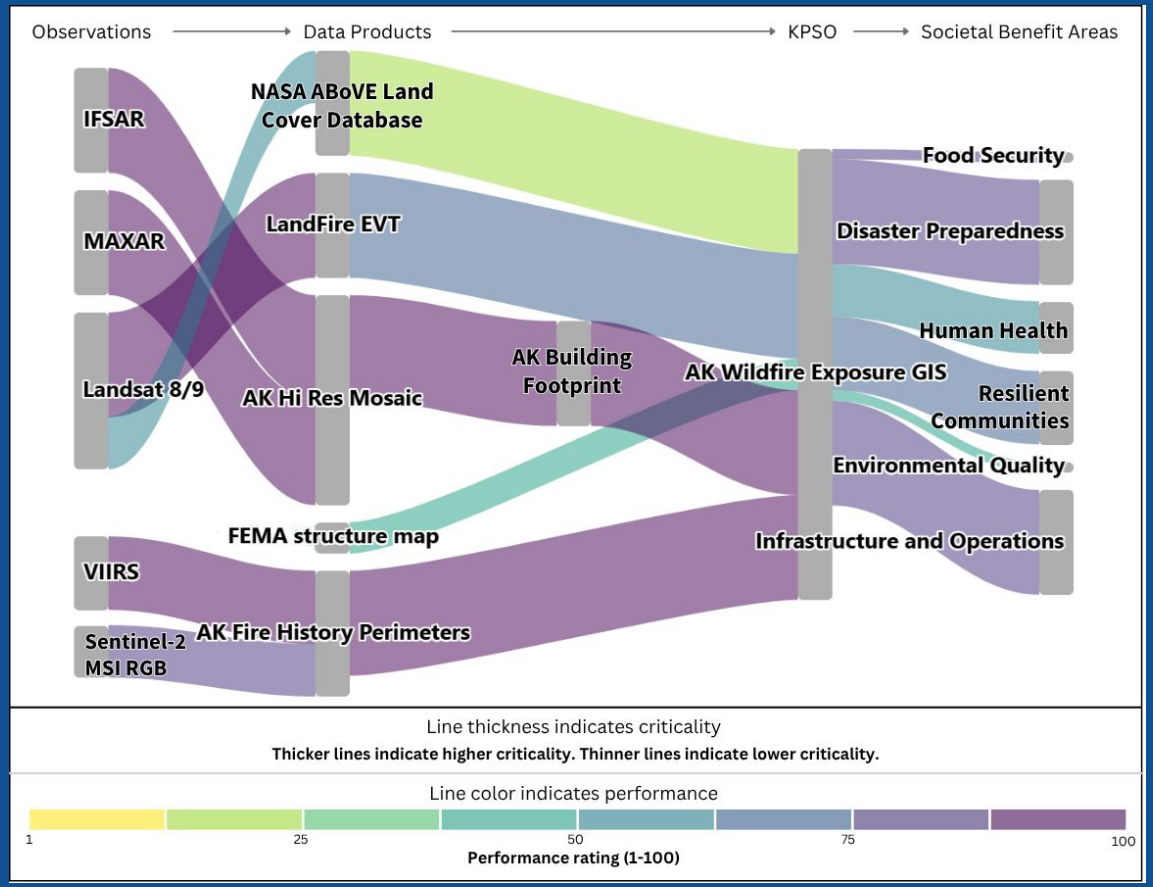
Participatory method co-designed with federal agencies, researchers, Indigenous scholars, and community partners

Maps the full pathway from observing system inputs → data products → applications → societal benefits

Identifies performance gaps and criticality across that chain

***B**enefit **E**valuation. **N**etwork **E**xploration. **F**ind gaps. **I**mprove **T**ogether.*

BENEFIT Tool



Example from wildfire assessment completed by Jen Schmidt of UAA (currently in review)

https://www.usaon.org/apps/benefit-tool/

Photo: Lisa Hupp/USFWS

BENEFIT in action

130+ users, 50+ assessments in-progress since launch in March 2024

Risks & Hazards findings

- US AON applied BENEFIT toward four high-priority Alaska hazards
  - coastal flooding
  - wildfires
  - aviation weather
  - landslides
- Engaged 60+ partners from federal/state agencies, academia, and Tribal and community-led organizations

www.usaon.org/resources

Risks & Hazards findings - learn more

Arctic Observations Storylines briefs & upcoming AGU book chapter

Arctic Observation Storylines: Coastal Flooding

WHY OBSERVING MATTERS AND HOW WE CAN MAKE IT BETTER TOGETHER

The challenge

Coastal flooding poses an increasing threat to many Alaskan communities, particularly Alaska Native villages along the western and northern coasts. Over 30 communities face imminent risks, forcing them to decide whether to protect existing infrastructure, retreat, or relocate entirely. These communities and many others are also located on tidally influenced rivers.

A primary driver of increased flooding risk is the significant reduction in protective sea ice. Annual sea ice duration is decreasing, leaving coastlines exposed to powerful storms for longer periods. These storms, which are increasing in frequency and intensity, can generate destructive storm surges and waves. The effects of coastal storm surges in combination with high river flows add further complexity to flood hazards at upstream communities. Three major storm systems in the last four years, including Typhoons Merbok and Halong in 2022 and 2025, have exposed long-standing gaps in federal and state resources for storm preparedness, infrastructure management, and disaster recovery.

Beyond damaging infrastructure, storm events threaten food security and cultural continuity by disrupting essential subsistence activities and destroying vital equipment. In the short term, a lack of reliable sensor equipment and real-time data limits the accuracy of storm forecasts, constraining early warning systems that could otherwise provide longer lead times, enhance community preparedness, and strengthen decision support ahead of an event. For long-term resilience, decision-makers need forward-looking adaptation tools, such as flood maps that account for future risk scenarios and updated infrastructure guidelines, to ensure that new and replacement infrastructure can withstand future conditions.

See Resources and Further Reading for references that support this summary (page 13).

The US Arctic Observing Network (US AON) is funded by the National Oceanic and Atmospheric Administration's Global Ocean Monitoring and Observing/Arctic Research Program and the National Science Foundation.

Coastal Flooding

Arctic Observation Storylines: Airport Weather Stations

WHY OBSERVING MATTERS AND HOW WE CAN MAKE IT BETTER TOGETHER

The 148 automated weather observations at airports are the predominant source of surface weather and climate information in Alaska. These measurements support operations for both civilian and military aviation, but also constitute the backbone of NOAA's weather and climate data products, as manual measurements have declined in recent decades.

The Automated Surface Observing System (ASOS) is a joint effort between NOAA's National Weather Service (NWS) and the Federal Aviation Administration (FAA), while the Automated Weather Observing System (AWOS) is operated and maintained by the FAA. The US Department of Defense also operates its own AWOS sites. These stations nominally report observations on cloud ceilings, visibility, atmospheric pressure, air temperature, dew point, wind, and precipitation accumulation.

While the information from these sites plays a crucial role in Alaska's aviation and public safety, it requires reliable data transmission, as well as sensor maintenance, and many stations have outages for months at a time. Agreements between agencies and telecommunication companies make it difficult to perform repairs, extending the data gap. Automated precipitation measurements in cold regions may also have systematic biases when wind-driven undercatch, ice buildup, and other phenomena are not accounted for.

In a state with few roads and a heavy dependence on aviation, these outages and biases pose a threat to public safety and commerce.

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Airport Weather Stations

www.usaon.org/resources

Risks & Hazards findings

www.usaon.org/resources

Strengths:

- Satellites
- Boundary-spanning coalitions
- Community-led observations

Gaps:

- Automated weather stations
- Telecoms and maintenance gaps
- Foundational geospatial data
- Sustained funding

Impacts of recurring structural barriers

ASSW and AOS highlight

Interest in observing system inventories

- IPY opportunity
- Session co-lead with US AON, Committee on Networks (SAON CON) and Polar Observing Assets working group (POAwg)
- Whitepapers
- Forum of Arctic Research Operators (FARO)

Photo: Danielle Brigida/USFWS

ASSW and AOS highlight

- Future of the Arctic Observing Summit
- SAON's Arctic Roadmap for Observing and Data Systems (ROADS)
- Arctic Ocean Regional Alliance (ArORA) Task Team
- Co-production of Knowledge
- Indigenous-Led and Community-Based Monitoring Initiatives
- Data stewardship
- Technology

Photo: Danielle Brigida/USFWS

Future directions informed by ASSW and AOS

- US AON capacity and synergies
  - Convening
  - BENEFIT tool
  - Risk & hazard assessments
  - ROADS & international partnerships
  - Observing inventories
- IPY5 is seen as a major opportunity, but US involvement remains undefined

Photo: Neal Herbert/NPS

Thank you!

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Upcoming webinar:

Arctic Observing Summit recap & next steps

Tuesday, May 12

10-noon AKT / 2-4 pm ET

Photo: Hazel Shapiro