



Improving data interoperability and reuse under SAON's Roadmap for Arctic Observing and Data Systems

SAON's
Roadmap for Arctic
Observing and Data
Systems
(ROADS)
by SAON's
Roadmapping Task Force
In collaboration with the
Arctic Observing Summit



SIOS Data Core WS
November 5, 2020



Sandy Starkweather

Executive Director – US Arctic Observing Network (US AON)

Chair – Sustaining Arctic Observing Networks (SAON)



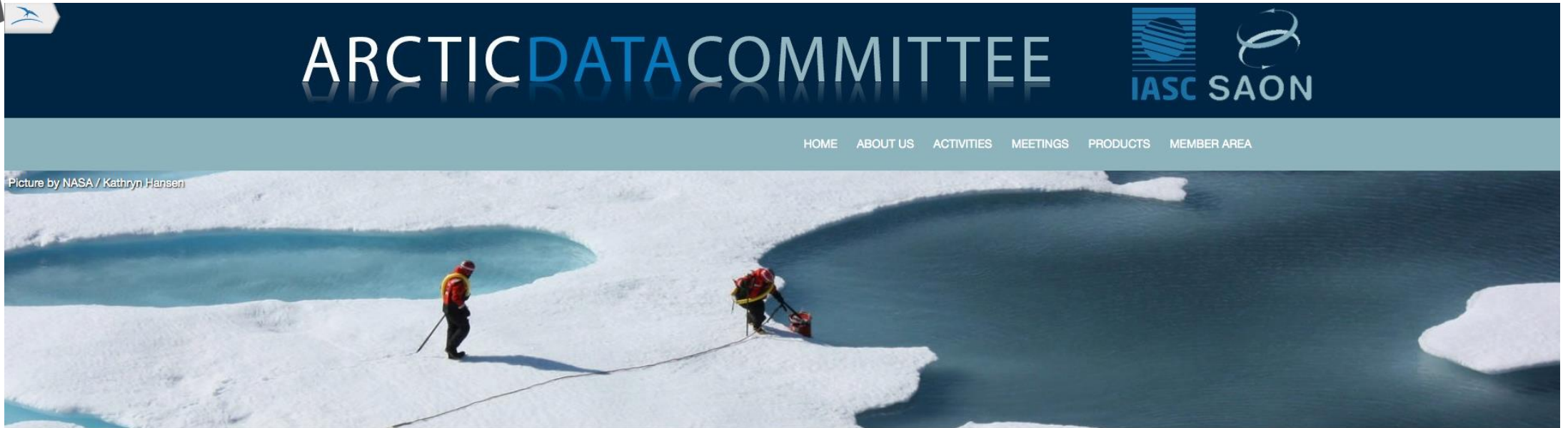


Sustaining Arctic Observing Networks (SAON): Vision and Mandate

“SAON’s intent as an open initiative is to unite Arctic and non-Arctic countries, Indigenous Peoples, academia, industry and other key organizations (e.g. WMO, GEO) in support of a systematic network [of observations and data systems] through structured facilitation”

- Created as a joint body of the Arctic Council and the International Arctic Science Committee (IASC) under the Nuuk Declaration (2011);
- Arctic Observing Summit called upon SAON to “Coordinate the implementation of a pan-Arctic observing system with regional and global observing initiatives...” (2016)
- Recognized by the Arctic Science Ministerial process as a critical capacity for “moving from design to implementation of the Arctic observing system.” (2018)

SAON's Arctic Data Committee



ADC News & Events

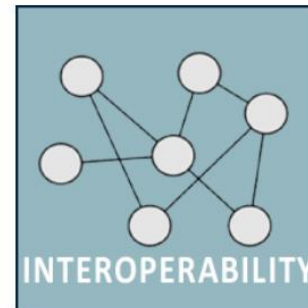
Polar to Global Online Interoperability
and Data Sharing Workshop/Hackathon
5th November 2020
6 Oct 2020

Polar to Global Online Interoperability
and Data Sharing Workshop/Hackathon
2nd September 2020. Outcome
21 Sep 2020

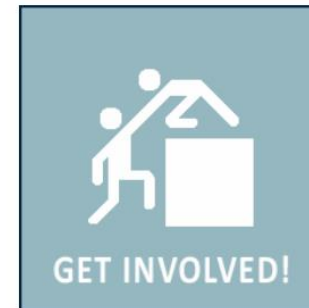
Polar to Global Online Interoperability
and Data Sharing Workshop/Hackathon
2nd September 2020
30 Jul 2020



Arctic Data



Interoperability



Get Involved!

Why do we need SAON-ROADS?

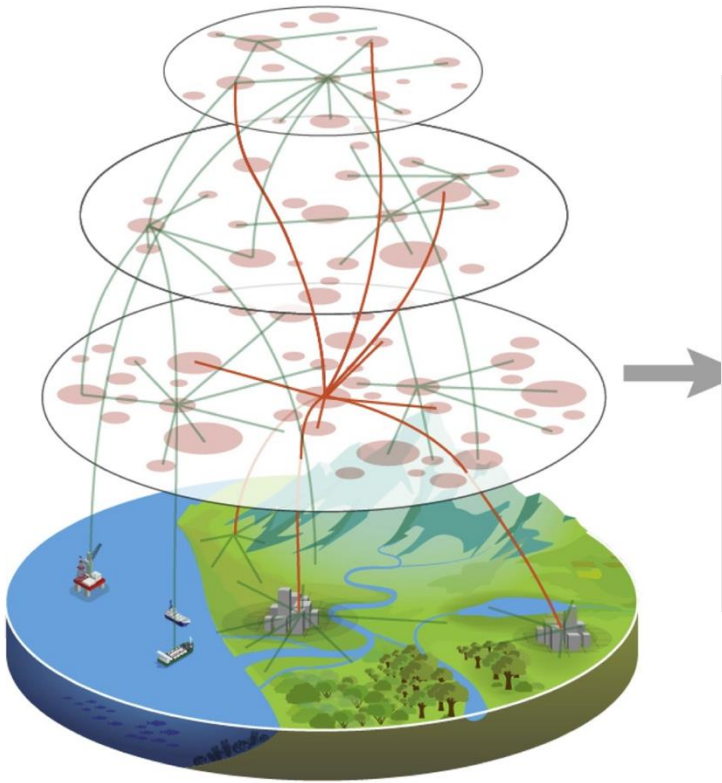
- The pace, extent and magnitude of Arctic changes are unprecedented
- Observations inform actions in the face of these changes
- Systemic challenges (planning, engagement, deployments) at the Global, Regional and Local scale impede progress



Challenge: Arctic Authority Diffusion

Polycentric Governance: Many centers of **authority** interacting coherently for a **common governance goal**.

SIOS is no stranger to polycentric governance!



— Polycentric system — Relationships of power ● Centers of authority

“The black box of power in polycentric environmental governance”
Morrison et al. (2019)

Why do we need SAON-ROADS?

- The pace, extent and magnitude of Arctic changes are unprecedented
- Observations inform actions in the face of these changes
- Systemic challenges (planning, engagement, deployments) at the Global, Regional and Local scale impede progress
- SAON has been given a mandate to facilitate – ROADS is the tool.





ROADS emerged from SAON's Strategic Plan

GOAL 1: Create a roadmap to a well-integrated Arctic Observing System;

GOAL 2: Promote free and ethically open access to all Arctic observational data; and

GOAL 3: Ensure the sustainability of Arctic observing.



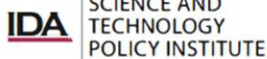
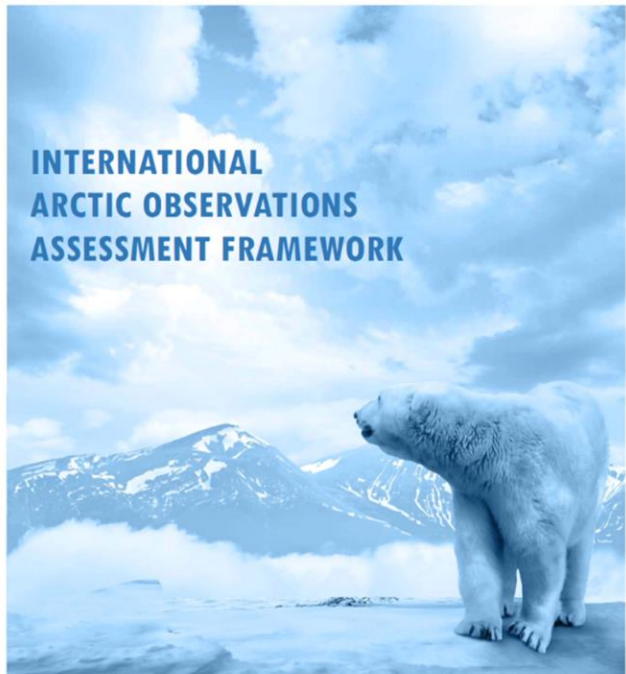


ROADS Guiding Principles (polycentric!)

- Indigenous Peoples' equitable partnership and funding for their active participation is critical to ROADS;
- All aspects of the ROADS process should support broadly shared benefit from the observing and data systems;
- The ROADS process should complement and integrate the current planning approaches used by existing networks (regional to global), activities and projects;
- ROADS should support stepwise development through a flexible and evolving structure that allows grassroots identification of foci.



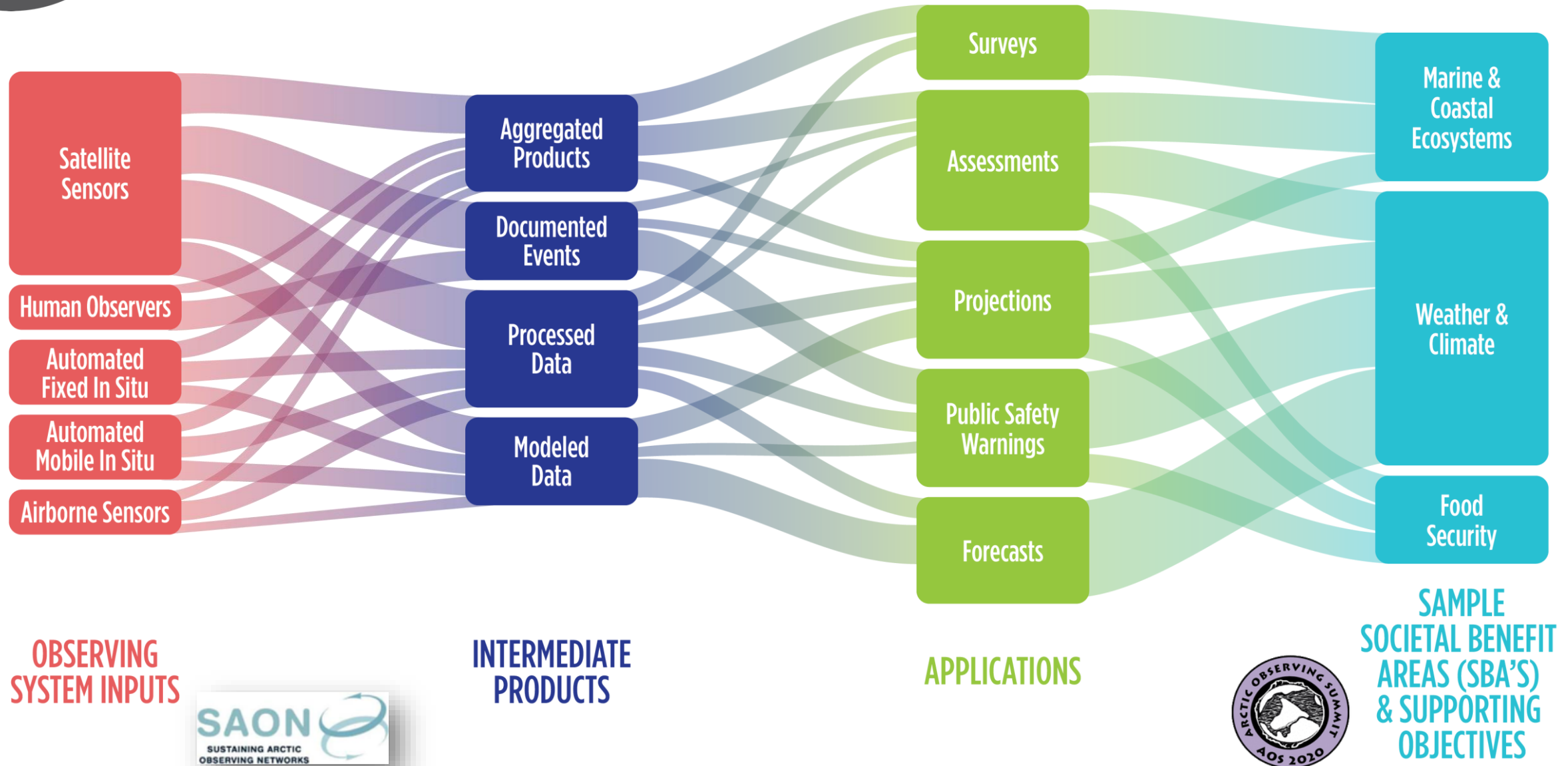
SAON's Arctic Societal Benefit Areas (2017)



1. Disaster Preparedness
2. Environmental Quality
3. Food Security
4. Fundamental Understanding of Arctic Systems
5. Human Health
6. Infrastructure and Operations
7. Marine and Coastal Ecosystems and Processes
8. Natural Resources
9. Resilient Communities
10. Sociocultural Services
11. Terrestrial and Freshwater Ecosystems and Processes
12. Weather and Climate

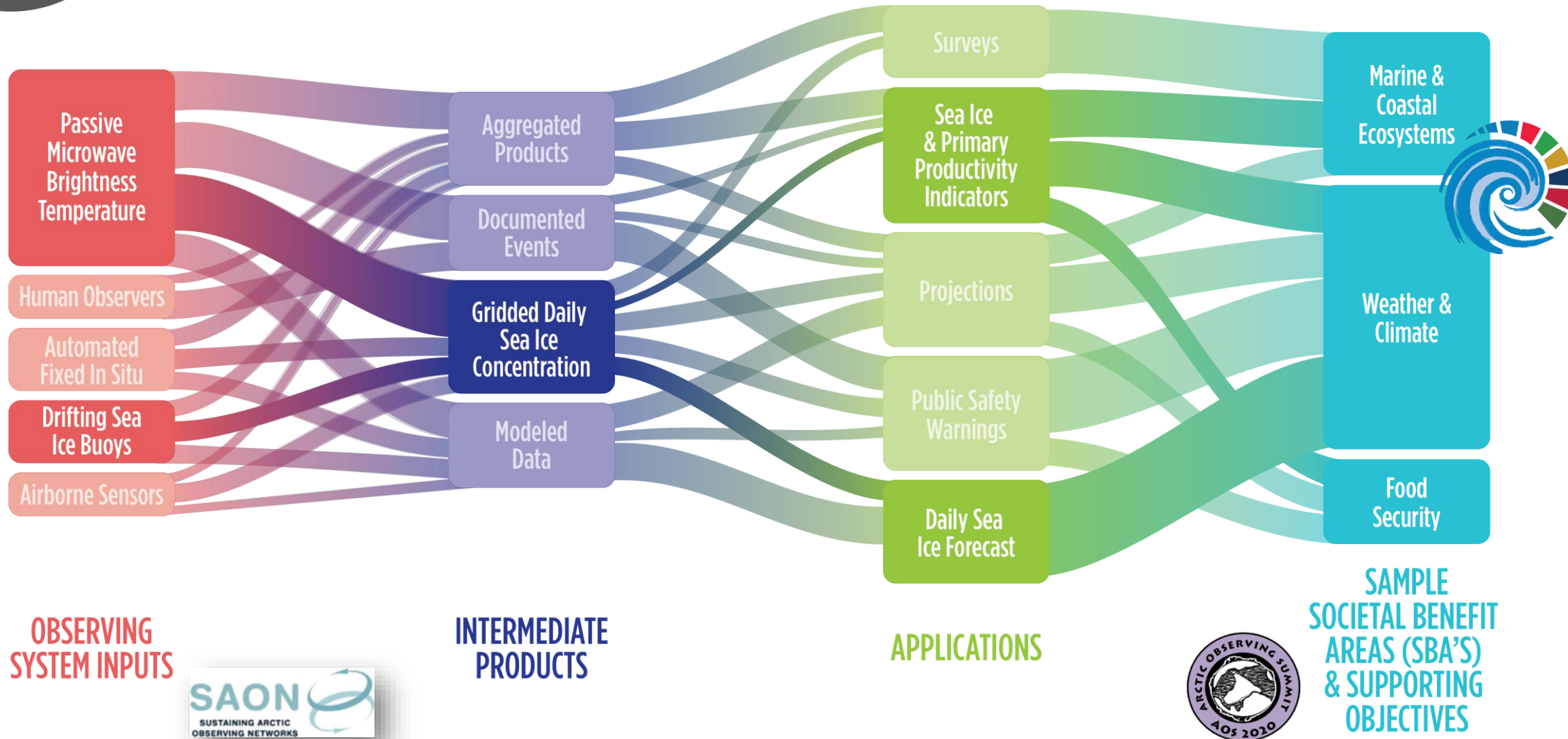


ROADS Benefit Assessment: Value Tree Analysis





ROADS Benefit Assessment: VTA Example

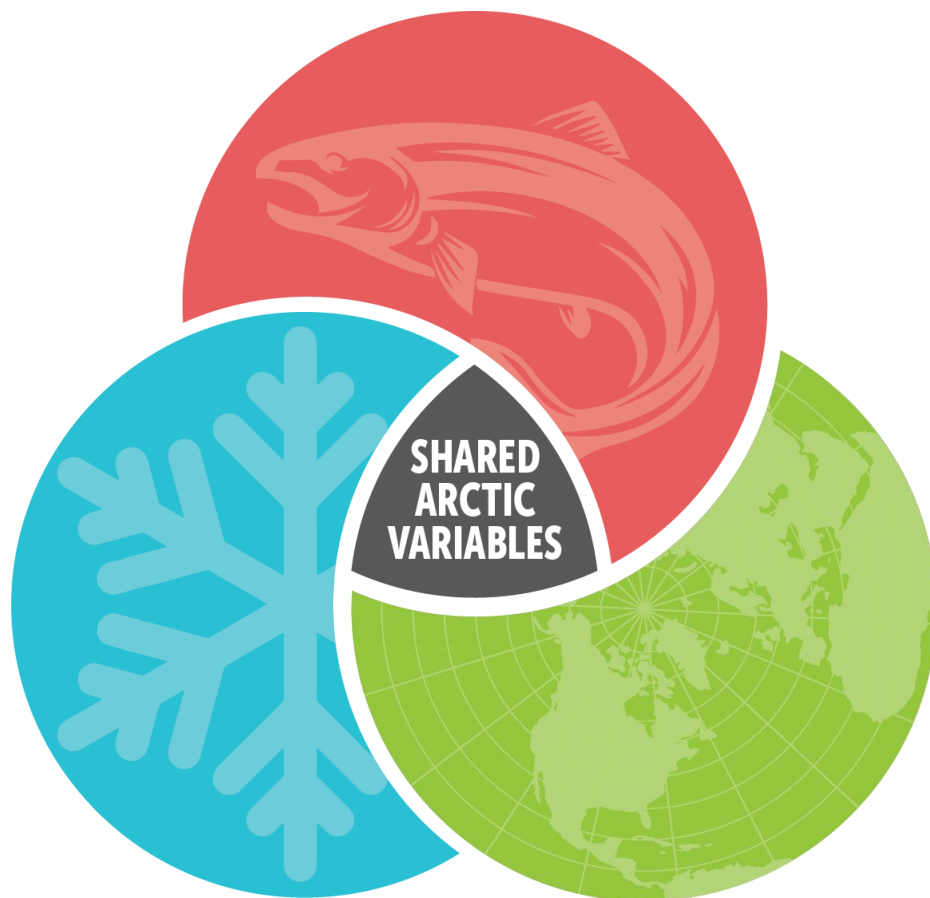




Integrating goals, coordination

Regionally-identified Science & Decision Making Needs

Regionally-led priorities driven by scientific understanding of the Arctic System and the specific decision-making needs from cascading changes within the Arctic System.



Indigenous-led Benefit Identification

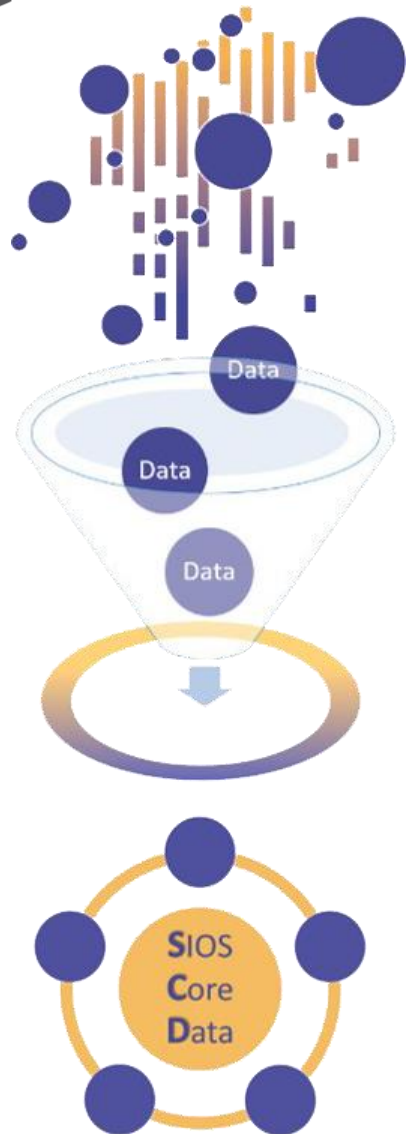
A critical capacity for assuring that the outcomes of ROADS and its implementation are relevant to Arctic communities and the outcomes are well-linked to culturally-informed decision making.

Essential Variables of Global Networks

High-capacity partnerships that link the Arctic and the ROADS process to the global system and interests.



SIOS Core Data Variable Definitions



How can SIOS CORE data definitions support ROADS and community alignment?

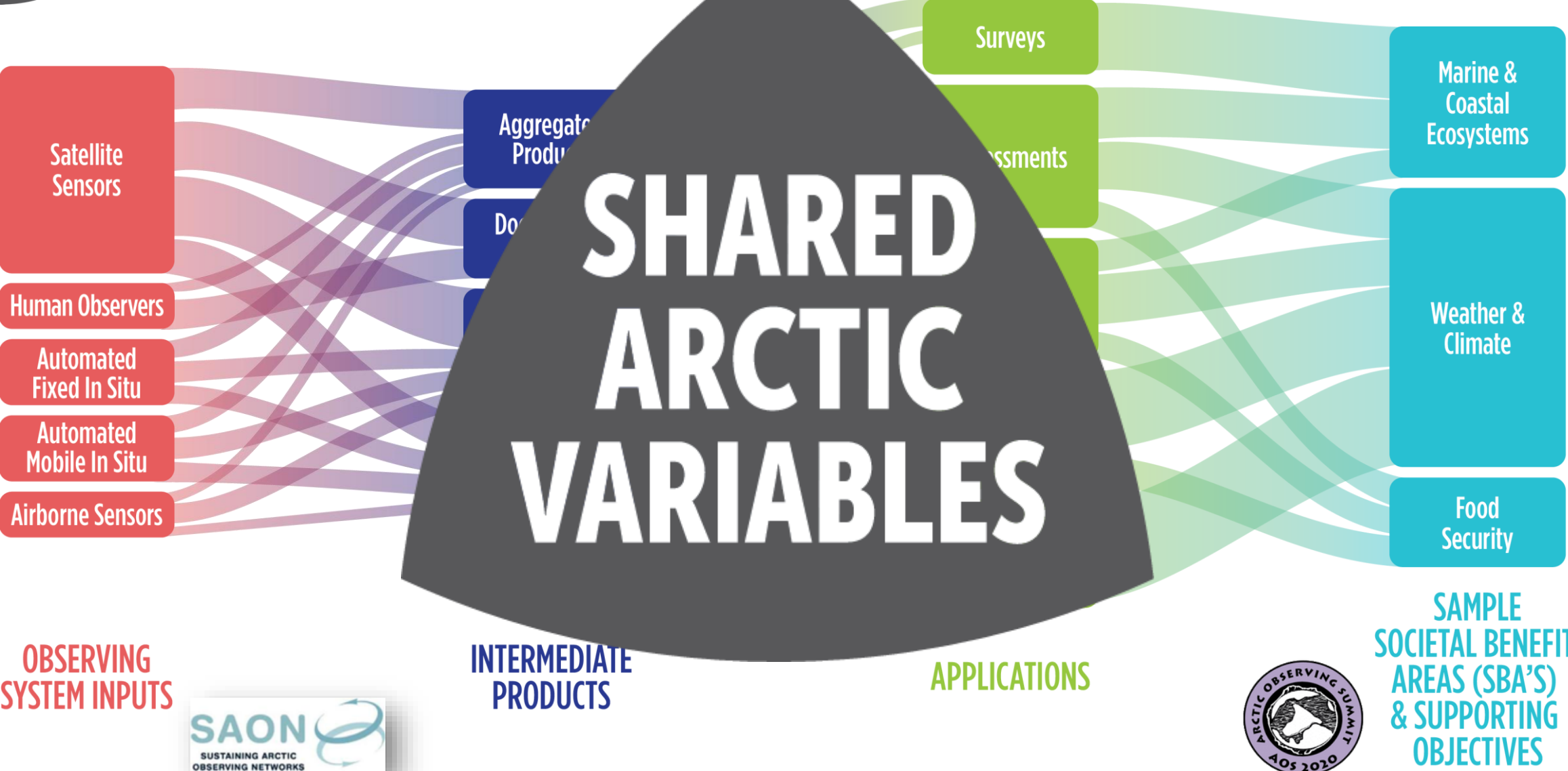
List of the SIOS Core Data (SCD) and its references to Essential Climate Variables (Global Climate Observing System GCOS) and to Global Change Master Directory (GCMD) Keywords.

SIOS Core Data	GCOS hierarchical structure <i>Domain / Subdomain / Observed Variables</i>	GCMD hierarchical structure <i>Term / Variable_Level_1 / Variable_Level_2</i>	GCOS Definition	GCMD Definition
SCD 1.1. WIND SPEED	ATMOSPHERE / SURFACE / SURFACE WIND SPEED	ATMOSPHERIC WINDS / SURFACE WINDS / WIND SPEED	Speed of air at a known height above the surface which is to be specified in the metadata (m/s).	Ratio of the distance covered by the air to the time taken to cover it. The instantaneous speed corresponds to the case of an infinitely small-time interval. The mean speed corresponds to the case of a finite time interval. It is one component of wind velocity, the other being wind direction).
SCD 1.2. WIND DIRECTION	ATMOSPHERE / SURFACE / SURFACE WIND DIRECTION	ATMOSPHERIC WINDS / SURFACE WINDS / WIND DIRECTION	Direction from which wind is blowing at a known height above the surface which is to be specified in the metadata (degree true)	The direction from which the wind is blowing.
SCD 1.3. AIR TEMPERATURE	ATMOSPHERE / SURFACE / TEMPERATURE (NEAR SURFACE)	ATMOSPHERIC TEMPERATURE / SURFACE TEMPERATURE / AIR TEMPERATURE	Air temperature at a known height above surface, with the height specified in the metadata (K)	The temperature indicated by a thermometer exposed to the air in a place sheltered from direct solar radiation.
SCD 1.4. NET RADIATION	ATMOSPHERE / SURFACE / ENERGY AND TEMPERATURE	ATMOSPHERIC RADIATION / NET RADIATION /		Net radiation refers to the difference between the downward and upward (total and terrestrial) radiation. The net flux of all radiations. Can also refer to the net solar radiation which is the difference between the solar radiations directed downwards and upwards.
SCD 1.5. SHORTWAVE RADIATION	ATMOSPHERE / SURFACE / SURFACE ERB SHORTWAVE	ATMOSPHERIC RADIATION / SHORTWAVE RADIATION /	Flux density of the solar radiation at the Earth's surface (W/m2)	Shortwave radiation is radiation at wavelengths shorter than 4 microns. Sometimes called the solar radiation. Usually radiation in the visible and near-infrared wavelengths.
SCD 1.6. LONGWAVE RADIATION	ATMOSPHERE / SURFACE / SURFACE ERB LONGWAVE	ATMOSPHERIC RADIATION / LONGWAVE RADIATION /	Flux density of radiation emitted by the gases, aerosols and clouds of the atmosphere to the Earth's surface (W/m2)	Longwave radiation is radiation with wavelengths longer than 4 micros. Also referred to as infrared radiation or terrestrial radiation.
SCD 1.7. 24 HOUR PRECIPITATION AMOUNT	ATMOSPHERE / SURFACE / ESTIMATES OF LIQUID AND SOLID PRECIPITATION	PRECIPITATION / PRECIPITATION AMOUNT / 24 HOUR PRECIPITATION AMOUNT	Integration of solid and liquid precipitation rate reaching the ground over several time intervals. The reference requirement refers to integration over 24h.	The amount of precipitation collected and measured at a weather observing site during a 24 hour period.
SCD 1.8. HUMIDITY	ATMOSPHERE / SURFACE / WATER VAPOUR (RELATIVE HUMIDITY - SURFACE)	ATMOSPHERIC WATER VAPOR / WATER VAPOR INDICATORS / HUMIDITY	Relative humidity at a known height above surface, with the height specified in the metadata. It is the ratio of the	Generally, some measure of the water vapor content of air.



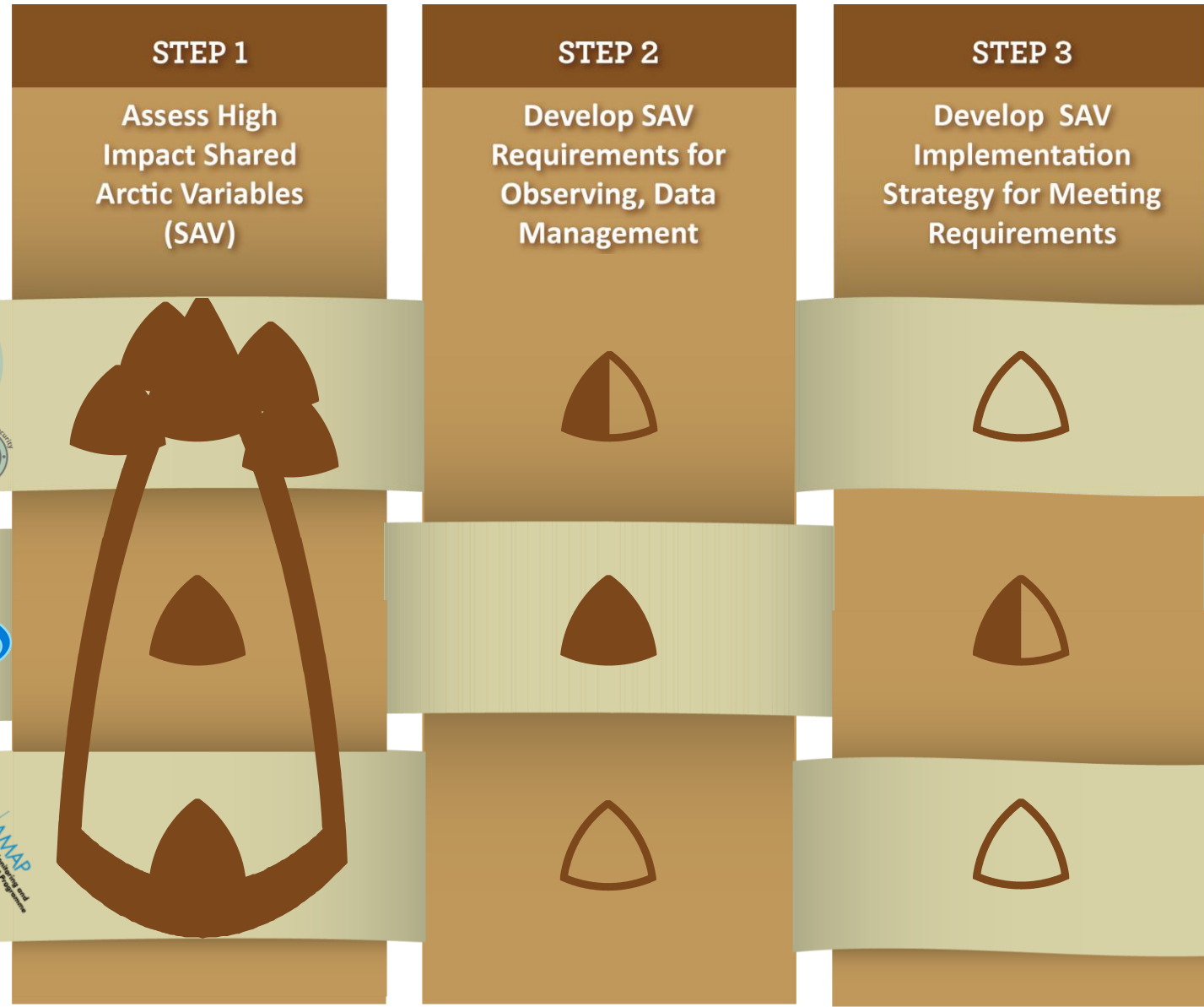


ROADS Benefit Assessment: Value Tree Analysis



INTEGRATED ADVISORY PROCESS

EXAMPLE FOCI FOR EXPERT PANELS

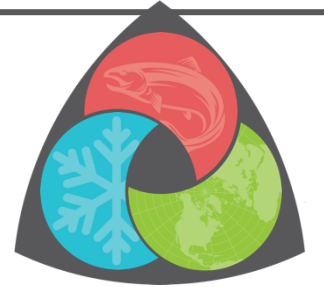


ROADS Advisory Panel will facilitate integration across Expert Panels at each step.

Step not started
 Step partially complete
 Step complete

Overcoming Authority Diffusion, Advancing Interoperability and Data Reuse

- Flexible planning tools that recognize polycentricism and drive meaningful convergence.
- Policy mandates that generate adequate authorities, and tools to get the organizations with those authorities to collaborate.
- Investments in cyberinfrastructure, facilitation and soft policy bodies to glue it together.
- On-going communication, engagement vehicles.



ARCTIC DATA COMMITTEE





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