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Mapping with *SIKU - The Indigenous Knowledge App* for environmental data access, land safety, and knowledge sharing across the North.

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Abstract:

Inuit and Indigenous Peoples across the Canadian Arctic, Greenland, Alaska and beyond are accessing and using Earth Observation (EO) data through SIKU: the Indigenous Knowledge App, a platform available as iOS/Android apps and on the web (www.siku.org), with more than 34,000 users. SIKU is created by The Arctic Eider Society, an Indigenous-led charity, and is designed to be accessible: it is available in multiple Indigenous languages, uses icons and a user-friendly design, and works offline and in low-bandwidth regions. The platform is first and foremost for Indigenous harvesters, providing services for tracking trips and harvests, making decisions about data privacy and stewardship, and accessing EO, map, and weather data. SIKU also provides services for Indigenous-led environmental monitoring and research projects, with data stewarded to SIKU "projects" exportable in multiple spatial formats. Through SIKU, Indigenous peoples are successfully using language, cartographic techniques, and digital technologies for "Indigenous mapping" (defined as "cartographic knowledge and maps made *by* or *for* Indigenous peoples" by Hirt, 2022), to access, create and share geospatial information. SIKU's map services include the ability to view and contribute in-situ Indigenous observations made through the SIKU app, as well as access to a custom Base Map and up-to-date multispectral and radar satellite missions. Together, these services are an important component of northern Indigenous community members' travel planning, environmental monitoring, and knowledge communication.

The SIKU Base Map brings together numerous data sources including topographic and hydrographic data (official Canadian and US charts, community-collected soundings, contours, and depths), datasets that are typically displayed separately due to challenges in creating topobathy surfaces (NOAA 2007), and using new approaches to dataset integration that communicate shoreline uncertainty where source datasets are mismatched. It supports more than 60k Indigenous place names and lands, helping to promote and re-establish Indigenous languages and cultural connections to traditional lands and waters (Cole and Hart, 2021). The SIKU basemap's cartographic style choices are made carefully to support the platform users' needs and values (Kent, 2009), with a decolonial design that instead prioritizes information identified as important by Indigenous land users. Other "maps" on SIKU include near real-time

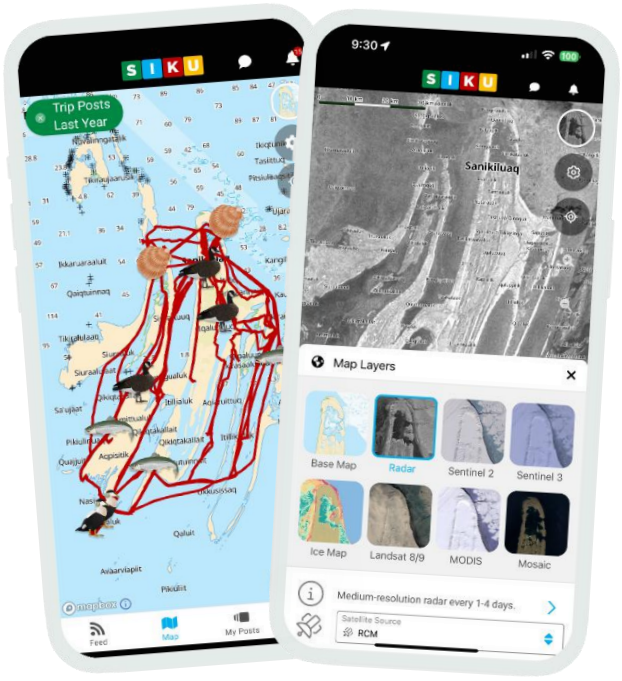

Figure 1. The SIKU Base Map with user-created trips and posts (left) and the map options (right).

satellite image mosaics, with radar (Sentinel-1 and RCM; most popular), Sentinel-2, LANDSAT 8/9, MODIS, and Sentinel-3, and the SIKU Ice Map. The SIKU Ice Map provides up-to-date sea ice information in an easily interpreted format, combining Indigenous expertise through ice observations, made by users during their travels, with ice charts and satellite radar. Designed to support on-ice travel, the SIKU Ice Map also shows ice roughness in areas of thick first-year landfast ice, and we are working towards showing dangerous open water areas within the landfast ice through deep learning-based object detection. All SIKU maps also support the ability for SIKU users to add their own data to the maps via "posts" and "trips" created through the SIKU app.

The development and success of SIKU reflects a trend for travel information service providers to increasingly tailored and demand-driven services (Haavisto et al, 2020). SIKU's maps are tailored by and for Indigenous harvesters across Canada and the International North, showing environmental indicators relevant to the travel conditions that Inuit and Indigenous people are experiencing, alongside a suite of other tools that enhance situational awareness. SIKU is becoming a well-used map and travel information service provider by addressing gaps in services supporting safe travel (Bishop, 2025; Lamers et al, 2024), by providing Indigenous users with ways to access information about weather, and marine forecasts, but in particular by providing Indigenous-designed tools so that users can choose how they want to share their Indigenous knowledge with one another.

References

Bishop, B., Paquette, E., Carter, N., Ljubicic, G., Oliver, E.C.J., Aporta, C., 2025. Inuit uses of weather, water, ice and climate indicators to assess travel safety in Arctic Canada, Alaska, and Greenland: a scoping review. FACETS. https://doi.org/10.1139/facets-2024-0107

Cole, D.G., and Hart, E.R., 2021. The importance of Indigenous Cartography and toponymy to historical land tenure and contributions to Euro/American/Canadian cartography. ISPRS Int. J. Geo-Inf, 10(6), 397; https://doi.org/10.3390/ijgi10060397

Hirt, I., 2022. Indigenous mapping: reclaiming territories, decolonizing knowledge. In: The Politics of Mapping. Debarbieux, B., Hirt, I. (Ed.). Hoboken ; London: ISTE Group ; Wiley. pp. 155-185. doi: 10.1002/9781119986751.ch7

Haavisto, R., Lamers, M., Thoman, R., Liggett, D., Carrasco, J., Dawson, J., Ljubicic, G., Stewart, E., 2020. Mapping weather, water, ice and climate (WWIC) information providers in Polar Regions: who are they and who do they serve? Polar Geography. pp:120-138. https://doi.org/10.1080/1088937X.2019.1707320

Kent, A., 2009. Topographic maps: methodological approaches for analyzing cartographic style. Journal of Map & Geography Libraries, 5(2), pp. 131-156. https://doi.org/10.1080/15420350903001187

Lamers, M., Ljubicic, G., Thoman, R., Carrasco, J., Dawson, J., Heinrich, V., J., Jeuring, J., Liggett, D., and Stewart, E., 2024. Tailored investments needed to support weather, water, ice and climates services in the Polar Regions. Bulletin of the American Meteorological Society, March; E645–E650. https://doi.org/10.1175/BAMS-D-23-0159.1.

NOAA, 2007. Topographic and bathymetric data considerations: datums, datum conversion techniques, and data integration, part II of a roadmap to a seamless topobathy surface. Technical Report, NOAA/CSC/20718-PUB. URL: https://coast.noaa.gov/data/digitalcoast/pdf/topo-bathy-data-considerations.pdf