

THE UNAAMI DATA COLLECTION: WEB ACCESS TO TIME SERIES QUANTIFYING ARCTIC CHANGE

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1. BACKGROUND

The U.S. Arctic Research Commission's document "Report on Goals and Priorities for Arctic Research" (1999) states that: *"The Arctic remains one of the least explored, studied and understood places on earth... Change in the Arctic may play a substantial role in climate change throughout the globe... Global change, particularly climate change, may have its most pronounced effects in the Arctic."*

Dramatic changes are affecting the Arctic. Ice thickness has decreased almost 40% at certain locations since the 1970s and ice extent has decreased by 4% per decade in summer. Warming in April 2001 of 3°C above normal in the 1990s extending from the Bering Sea across Alaska and into the Canadian Arctic are responsible for these reduced ice extents. Impacts are felt by disruption of native community activities and dramatic changes in seal, whale and polar bear populations. Arctic changes are impacting midlatitudes through changes in sea level pressure associated with the Arctic Oscillation (AO) teleconnection pattern. However, not all changes are occurring simultaneously in different geographic regions or variables.

The Study of Environmental Arctic Change (SEARCH) has been conceived as a broad interdisciplinary, multiscale program with a core aim of understanding these Arctic changes and their relationship to hemispheric phenomena. In the 2001 Science Plan (2001), SEARCH highlights the importance of recent changes in the Arctic on mid-latitude climate impacts, and identifies the complex suite of interrelated pan-Arctic changes by the name "Unaami," based on the Yup'ik word for "tomorrow."

2. THE UNAAMI DATA COLLECTION

The Unaami Data Collection is a carefully selected, diverse set of over 75 multi-disciplinary time series which quantify complex, interrelated, pan-Arctic changes. This unique collection of Arctic change time series includes good geographic coverage of the northern polar regions across diverse disciplines, including fisheries, biological,

terrestrial, oceanic, sea ice, atmospheric and climate index data, from 1970 to the present. This time period includes the major atmospheric change noted near 1989. Basic physical meteorological and oceanographic data and impact data such as fisheries, marine mammals, ozone and plant changes are included. For example, fur seals and beluga whales are thought to be indicator species in the Western Arctic. Examples of physical variables are pressure at the North Pole, the Arctic Oscillation and North Atlantic Oscillation pressure indices, sea ice extent in 5 sub-basins, snow cover and cloud amount in different subregions, surface and upper air temperatures at selected observing stations, and ice and ocean transports through the Bering and Fram Straits. Many of these datasets are being obtained through personal contact with their originators or owners.

The web site "Unaami Data Collection: Quantifying Arctic Change" makes this unique collection of carefully selected diverse Arctic time series, and our analyses of these time series, easily and freely available to the scientific research community (Fig. 1).

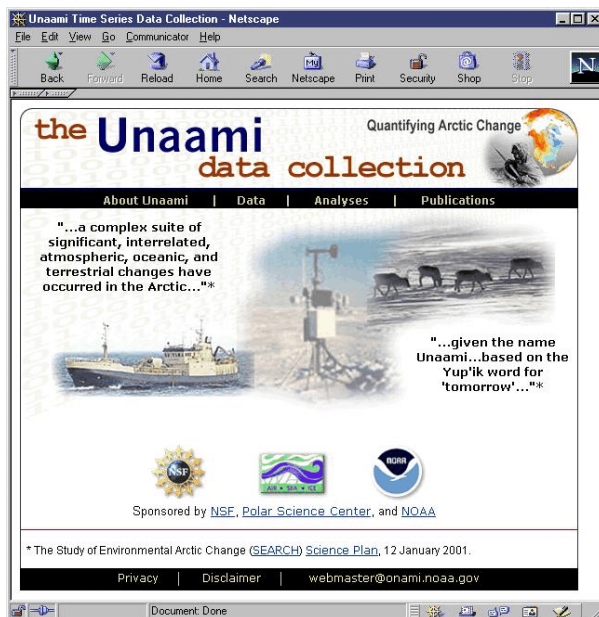


Fig. 1. The Unaami Data Collection home page.

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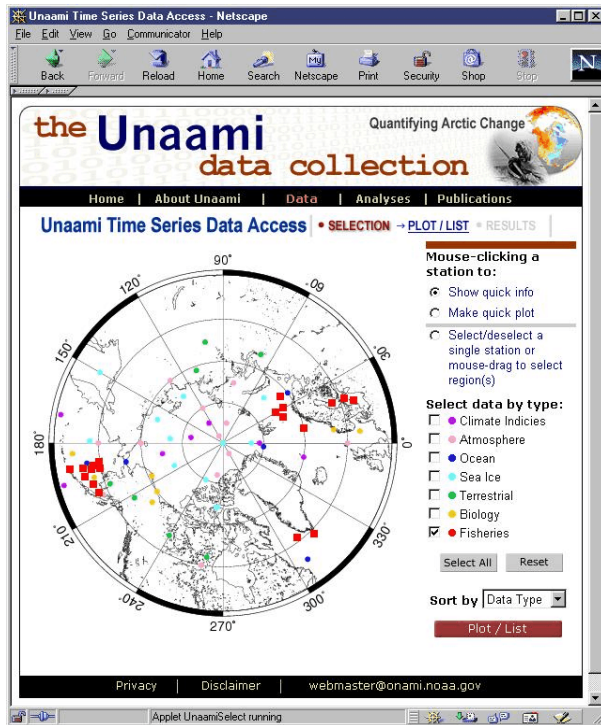


Fig. 2. Geographic coverage of the multi-disciplinary Unaami Data Collection.

3. WEB ACCESS TO THE UNAAMI DATA COLLECTION

The Web site for the Unaami Data Collection includes options for viewing time series locations on a map and selecting by data type and/or geographic region (Fig. 2). In Quick Info and Quick Plot modes, the user sees metadata or a quick time series plot by clicking on a station location. More sophisticated functions allow a user to sort selected time series by data type, region, start year, latitude, or longitude. Various other options include plotting and data downloading in ASCII or netCDF format. Unaami data management, web site design, development, and underlying databases and technology are the topic of a separate paper (Zhu, 2001).

Our objective is to make The Unaami Data Collection and subsequent analyses easily available to the professional and wider public community. Each time series is subjected to quality control, consistency checks, and converted into a single net CDF format. We provide metadata on the sources, references, contacts, and units, and make the data set, supporting documentation and metadata, and subsequent composite analyses available in a common netCDF data format on The Unaami Data Collection web site. The Unaami Data Collection will be made widely available as soon as our initial data selections and analyses are completed. This information does not now reside in a single location, nor is all of it publically available. We anticipate that hundreds of

scientists, as well as a broader community, will find value from access to this unique collection of time series.

The Unaami Data Collection is dynamic, and will be expanded to include new time series as they are discovered.

If you know of any time series that represents any aspect of Arctic change, please contact: James E. Overland, NOAA/Pacific Marine Environmental Laboratory, 7600 Sand Point Way NE, Seattle, WA 98115, Phone: 206-526-6795. E-mail: James.E.Overland@noaa.gov.

4. REFERENCES

2001 Science Plan for the Study of Environmental Arctic Change (SEARCH), Available on-line at http://psc.apl.washington.edu/search/SEARCH_Science_Plan.pdf.

Report on Goals and Priorities for Arctic Research, United States Arctic Research Commission, 1999. Available on-line at http://www.uaa.alaska.edu/enri/arc_web/goals.htm.

Zhu, Willa H., 2002, Technologies used for customized dynamic web access to a unique collection of arctic change time series. 18th International Conference on Interactive Information and Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology AMS, 13–17 January 2002, Orlando, FL (submitted).