IASOA Observations

Spring 2013 issue

Working at the Tiksi Observatory

By Ludmila Volkova,
translated by Andrey Grachev

Many Arctic observatories are staffed by seasonal and rotating staff. At stations like TIksi and Barrow that are close to settlements there are often long-term personnel who work for decades supporting the daily work of the stations. Ludmila Volkova (left) is one of many young technical specialists who have come to the Tiksi station over the years, but she is on track to be one of the rare ones that will be staying. Below is an excerpt of an interview she did with a Russian journal.

Q: Where did you live before Tiksi?
A: I was born in the Tyva Republic (Russia, Siberia), Tandinsky district, in the small wonderful settlement Kyzyl-Aryg.

Q: Why did you come to Tiksi?
A: After school, I went to Irkutsk Hydrometeorological College. I graduated from the college and got a job in Tiksi.

Q: Do you love Tiksi?
A: I love Tiksi only during summer :-) In summer I like to pick mushrooms, berries, and I like fishing with my husband.

Q: Please describe your work
A: I work as a hydrometeorology technician at [the] Polyarka site. I am an observer of weather. The purpose and objective of our work is accurate observations and sending telegram to weather forecasters at the right time.

Q: What is the most difficult aspect of your work?
A: Most difficult for me [is] to work during winter because the winter is very dark and I'm afraid of strong winds.

Q: What was the most remarkable or funny [experience you have had] in your work?
A: The most remarkable thing in my job is that I meet very interesting people, and when I saw the aurora for the first time. It was funny when I first went to work from home in a snowstorm; wind carried me away and pinned [me] to a nearby container. I somehow crawled back to my house.

Q: What do you remember about the meeting with Putin?
A: On the meeting with Putin, I remember the fact that we [had] been waiting [for] him for [a] long time. It was very interesting, I never thought I'd see him so close and [get] greeted by the President of Russian Federation. I remember his interest about the polar station.

Q: What are your dreams?
A: I dream at this point to travel with my family at least [on] a short journey. In general, I dream to fly in space :-)

New Observations and Infrastructure from St. Nord, Greenland

By Henrik Skov, Aarhus University, Denmark

One of the major challenges facing the world today is the impending climate change driven by anthropogenic greenhouse gas emissions. In the Arctic, global warming has already had strong impacts on ice caps, sea-ice cover and ecosystems, with severe consequences for local communities, industries and international politics. These effects are likely to further increase during the next century with strong feedback effects on the rest of the world. A science-based understanding of the Arctic system is critical for assessing the magnitude of the environmental change and its consequences locally, regionally and globally.

The primary factors limiting research in the High Arctic are the lack of access and the lack of well-equipped modern research infrastructure. It is thus of critical strategic importance to establish new state-of-the-art research and monitoring facilities in the High Arctic. Establishment of an advanced scientific station at Station Nord (Figure 1) will provide the scientific community with hitherto unavailable possibilities for pushing the frontiers of Arctic research and acquiring new knowledge that otherwise would be impossible to obtain. Modern research demands highly specialized equipment and facilities, which will be made available through the new infrastructure.

Figure 1. Station Nord, Greenland is the latest contributor to the IASOA constellation of pan-Arctic observatories. It will contribute atmospheric chemistry measurements in a key location, surrounded by perennial sea ice. New infrastructure will also support a range of campaign science. Look for St. Nord contributions in IASOA's new data portal (p.2).

Atmospheric pollutants have been measured at Station Nord almost continuously since 1990. This makes the record from Station Nord one of the longest time series of air pollution measurements in the Arctic. The location was selected because it is the place where the largest anthropogenic signal is observed with a strong and clear seasonal variation. Furthermore, Station Nord is located on a peninsula and surrounded by perennial sea-ice. The sea north of North Greenland is extremely interesting because the multiyear ice is predicted to persist for the longest period of time. This makes Station Nord an ideal location for studying climate interaction involving Arctic haze, consisting of high levels of pollution that lead (among other phenomena) to reduced visibility and special processes occurring at the interface between the cryosphere and the atmosphere.

Station Nord is located in the world's largest national park and provides access to a number of animal species that are hard to approach in other areas of Greenland. This offers a unique opportunity to conduct a wide range of ecological and eco-toxicological studies at the polynyas and open leads present in the perennial sea ice which serve as habitat for a series of large sea mammals. There are also large colonies of nesting polar birds in the vicinity of Station Nord which so far have only been studied superficially. Finally, several pristine lakes are located close to the station, where neither the food webs nor the sediments have been studied and which will provide important information of the connection between climate, pollution load and biodiversity, and changes in the ecosystem processes.

The infrastructure will consist of one stationary and two mobile sub-units. The sub-units may be operated together or independently. The stationary Base Station located at Station Nord will contain accommodation facilities, an atmospheric observatory, well-equipped laboratories for chemical, biological and geological analyses and plenty of storage room. The Mobile Station will make it possible to perform short-term in-situ investigations and campaigns at substantial distances away from the Base station. The Air Station includes unmanned air vehicles (UAVs) and ground based remote sensors that will make it possible to study vertical profiles of the atmosphere to an altitude of a few kilometers, and to make aerial observations of snow, sea-ice and the landscape.

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Coming Soon… IASOA's New Data Access Portal

By Sandy Starkweather

After months of research, design and development, supported jointly by the U.S. National Science Foundation (NSF) and the U.S. National Oceanic and Atmospheric Administration (NOAA), the revised IASOA website and Data Access Portal is nearing readiness for launch (Figure 1). This portal will provide a succinct and informative snapshot of cross-site data inventories as well as expedited access and advanced documentation for more than one thousand datasets. Look for public access to the new website in July 2013.

Redesign efforts for the Data-at-a-Glance access portal have included:

1. Establishing a structured, hierarchal list of available measurements;
2. Adopting ISO-19115-2 standard for dataset documentation (i.e. metadata);
3. Identifying existing partners and resources for interoperable and relevant metadata from Global Atmospheric Watch (GAW), Global Cryosphere Watch (GCW), U.S. Department of Energy (DOE) ARM program, AERONet, CRN, ACADIS and more.

Category	Abisko	Alert	Barrow	Cherskii	Eureka	Ny-Aalesund	Pallas-Sodankyla	Station Nord	Summit	Tiksi
Aerosol	●		●		●	●	●			●
Physical, Optical	●		●		●	●	●			●
Atmospheric State					●				●	●
Surface Meteorology					●					●
Upper Air State									●	
Cloud Properties										●
Macrophysical										●
Cryosphere					●					●
Snow					●					●
Greenhouse Gas			●							
CO2			●							
HCFCs			●							
Ozone			●						●	●
Total Column Ozone			●							
Vertical Ozone Profile									●	
Surface Ozone										●
Radiometric		●			●		●			●
Longwave Broadband		●			●					●
Shortwave Broadband		●			●		●			●
Surface Properties					●					●
Surface Flux					●					●
Surface/Subsurface State					●					●

Figure 1. The new access portal is being incrementally populated with existing and soon-to-be authored metadata. This view shows the first twenty metadata records, which were created using the IASOA metadata authoring tool. Hundreds of compatible entries will be harvested automatically from source like GAW.

We anticipate that this effort will collate access to more than one thousand IASOA-relevant dataset records in a single, convenient, measurement vocabulary-driven summary. Each record will emphasize expeditious data access, file format information and relevant data quality and processing documentation (Figure 2). Thanks to the tutelage of Ted Habermann, Anna Milan and John Kozimor of the U.S. NOAA/NESDIS/NGDC team, were able to quickly advance our understanding of metadata best practices. We would also like to acknowledge Jörg Klausen at GAWSIS for striving to maximize interoperability between IASOA and GAW datasets for our beta launch. We anticipate working closely with data managers from DOE-ARM, ACADIS and CANDAC on similar efforts. We would also like to thank our developer, Chris Kreutzer, for his outstanding effort on the portal.

Alert BSRN Archive Data

Measurements in this dataset:
- Longwave broadband downwelling irradiance
- Longwave broadband upwelling irradiance
- Shortwave broadband diffuse downwelling irradiance
- Shortwave broadband direct normal irradiance
- Shortwave broadband total downwelling irradiance
- Shortwave broadband total upwelling irradiance

Take me to the data

Date Range: 2004-08 to 2011-12

Data Contact: David Halliwell | David.Halliwell@ec.gc.ca |

Navigation Tips | Format Info | Full Metadata Record

Figure 2. Search results from Data-at-a-Glance lead uses to a list of standardized data documentation, including expedited access to the original datasets, information on file formats and data processing.

For beta version demonstrations, look for us at Arctic Science Summit Week (Abstract: A_4375) in Krakow, Poland and the Arctic Observing Summit in Vancouver, Canada. Your feedback is extremely important to us.

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Station Updates

Summit

Just a few weeks away from opening Summit Station for the summer season (April 21), we look forward to another busy year with a mix of both campaign and ongoing science activities. Several exciting campaign efforts this year include:

- A collaborative project to study the production and retention of cosmogenic carbon-14 in polar firn (PI, Vas Petrenko). This project will aim to understand the production and retention of cosmic ray-produced carbon-14 in the entire firn column at Summit. To do this, the research team will undertake 14C measurements on firn air, firn matrix as well as solid ice slightly below full pore close-off.
- Two different studies to will test autonomous roving platforms. The first to deploy is the Greenland Rover (GROVER; PI, HP Marshall), as a platform for autonomous radar measurements of stratigraphy. GROVER has been designed and developed over the past three years as an over snow autonomous robot for radar measurements in the polar regions. The second to deploy is the Cool Robot (PI, Laura Ray), which will be used to investigate the effectiveness of using an autonomous roving platform for science applications. While at Summit Station it will collect data on snow-surface characteristics and elevations as ground truth for satellite data, and air samples to assess spatial and temporal variations in atmospheric chemistry near the snow surface.
- The Joint Science and Education (JSEP) program will return to Summit Station in July. The program provides a great opportunity for exposing high school students to polar sciences. We anticipate beneficial collaborative opportunities as the Dartmouth Polar Environmental Change IGERT field program will overlap at Summit with JSEP.

Summit's Mobile Science Facility is featured on the cover of the February 2013 issue of the Bulletin of the American Meteorological Society.

Tiksi

Tiksi Flux Tower in February, 2013.

Late in February the AARI and NOAA team made a routine site visit to the Tiksi field station to repair and improve the instrument installations. It was a challenging time to travel in many ways. In September, the Tiksi airport was suddenly closed by the Russian military without notice leaving Tiksi cut off from the outside world. After a few months, the local provincial Polar Airlines took heroic steps to restore normal twice a week service to Tiksi by flying passengers to Ust K'uiga by plane and then completing the trip with Mi-8 helicopters. North Eastern Russia has been experiencing unusually cold temperatures this winter and upon arrival in Tiksi the temperatures were below -50 C. The people of Tiksi (including all station personnel) have had the additional hardship of a failed heating distribution system throughout the town. Many apartments have dropped to ambient outside temperatures causing people to move in with friends and neighbors whose apartments are staying just above freezing level. In some cases people have developed innovative wood burning heating solutions. The electrical system of Tiksi has not been able to support the use of electrical heaters through the town and there have been periods of rolling black outs. Needless to say, there is no hot or cold running water, and until the ice roads allowed delivery of goods by truck, the town was experiencing serious shortages of all goods. On the bright side, Yakutsk now has a wonderful new modern airport with all amenities and while on site the Tiksi team ate like kings, feasting not only on the supplies that had just reached Tiksi, but also on the many varieties of local fish for which Tiksi is famous.

Despite these adversarial conditions, the Tiksi Observatory was running smoothly. The observatory has maintained a good electrical supply from the town supplemented with on-site generators. The amazing station personnel seemed to be cheerfully taking all hardships in stride and were industriously continuing with their work collecting meteorological data and operating the Tiksi observatory instrumentation. The AARI and NOAA staff made significant improvements in the on-site server and wireless communications networks including a wireless bridge to the meteorological tower which had a failing data line. Instrumentation that was restored to service included sonic anemometers, radiometers and data logger boxes that required internal heating. The ozone meter was assessed and calibrated, the aethelometer was reset and the flask sampling unit had new batteries installed. The AARI team continued their ongoing surveys of detailed characteristics of the ice over the Sogo Bay. Team leaders Alexander Makshtas and Taneil Uttal spent additional time in Yakutsk working with the Yakutsk Branch office of Roshydromet on the long term business plan. The first set of possible new partners are on the horizon with inquiries from research institutes in Japan and Germany under discussion.

The WMO Bulletins in 2013 are focusing on Celebrating the World Weather Watch at 50. One of articles in volume 62 highlights the international partnerships that made the Tiksi Hydrometeorological Observatory possible.

Pallas

Pallas will stay busy with science and long term monitoring this year. Over the summer a new optical fiber connection will be built to the Sammaltunturi GAW monitoring station. This will greatly improve the internet connection to the station as the data transfer capacity increases from 64 kB/s to 100 MB/s. Winter visits kept the station in tip top shape, and provided for some beautiful photo opportunities.

A snowmobile trail leading to the Sammaltunturi GAW monitoring station on top of the fell in the background (Photo: Jussi Paatero, FMI).