NEWNET at the University of Alaska Fairbanks

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http://www.ims.uaf.edu/NEWNET

Introduction

Arctic areas of Alaska are especially vulnerable to nuclear accidents releasing radioactivity into the atmosphere within the circumpolar north. Atmospheric fallout and the resultant bioconcentration in the lichen-caribou-human food chain are of great concern for those living a subsistence lifestyle. A project, Neighborhood Environmental Watch Network (NEWNET), was initiated to provide an opportunity for Alaska Native undergraduate college students to participate in environmental monitoring, research, and communication of the results through the American Indian Science and Engineering Society (AISES) at the University of Alaska Fairbanks.

Wily Splain helps install a NEWNET station in Barrow.

Why Monitor Radiation in Alaska?

Long-term meteorological and radiation observations will provide a baseline against which any major changes in atmospheric conditions and radioactivity can be detected. For example, the former Soviet Union has many old and outdated nuclear facilities still in operation. The Bilibino nuclear plant is the closest plant to Alaska and poses a potential threat to atmospheric radiation. NEWNET stations gather real time data and would detect any increase in background radiation levels should an accident occur.

NEWNET

NEWNET is a network of meteorological and radiological monitoring stations, central data storage, and processing systems. Data products are wind direction and speed, ambient air temperature, atmospheric pressure, humidity, and ionizing gamma radiation.

Access to the data can be gained via the Internet or through an onsite readout located on the Data Collection Platform. NEWNET stations in Alaska are located in Fairbanks, Seward, Nome, Point Hope, Barrow, and Kotzebue. The URL for NEWNET is http://newnet.lanl.gov.

AISES

The American Indian Science & Engineering Society is a private, non-profit organization which nurtures building of community by bridging science and technology with traditional Native values. Through its educational programs, AISES provides opportunities for Alaska Natives and American Indians to pursue studies in science, engineering, technology and other academic areas. These graduates will be able to assume roles in which Native leaders manage and develop their lands and resources. The URL for the AISES website is http://www.aises.org. The URL for the UAF chapter of AISES is http://www.uaf.edu/aises. The NEWNET program was accepted as an official AISES project.

AISES students gather outside the UAF Museum next to NEWNET tower after installation.

Station Maintenance

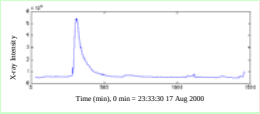
Local community members, as well as students, participate in sensor rotations, which occur each summer on the NEWNET towers in Alaska. Students attend station manager training during the summer. Students are involved with other faculty and staff on research related to power systems and communication for autonomous data collection in the arctic. Portable stations are used in remote sites for gamma radiation data collection.

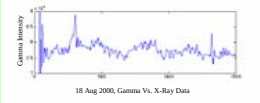
NEWNET Station Manager Training 2001 given by Larry Sanders and Orville Hart (LANL). Trainees were from ADEC, UAF, and Aleutian-Pribilof Islands Association.

Current Projects

Ionizing Radiation Source Analysis

Data products include fifteen-minute averages throughout the day as well as more frequent intervals (5 seconds). The latter are screened for anomalous values, which may reflect high radiation from natural events. The project introduces AISES students to modern techniques of computer-assisted data processing useful in other areas of research interests. Data are currently compared to long and short wave X-rays.





Loda Griffeth (Student Intern) and Dr. Vikas Sonwalkar (Professor of Electrical Engineering) compare data obtained from the Fairbanks NEWNET station with a possible ionizing radiation source.

Outreach

The purpose of outreach is to provide information and opportunities for students of all ages, their educational institutions, and their surrounding communities about environmental safety, monitoring, and radiation.

•Each year, UAF holds a Science Potpourri so that local children can experience hands on science. Students presented common sources, the electromagnetic spectrum, and other radiation information. For fun, Geiger counters and common radioactive items, such as rocks, food, and household items, were available for children to measure their radiation content.

•Another goal of NEWNET is to help rural colleges immerse Native Alaskans into fields of science and leadership roles in environmental involvement. Recently, two students met with the Illisagvik College President and Dean of Science to discuss opening a chapter of AISES at their school.

•Youths are often eager to learn about current issues, and are a source of future leaders and scientists. Students hope to speak at local high schools about NEWNET and the benefits of higher education.

Student interns, Adrienne Orr and Loda Griffeth, turned the electromagnetic spectrum into a work of art. Their painted version of the spectrum was displayed during the Science Potpourri and was inspired by a book titled 'Radiation and Life' by Eric Hall.

Technical Presentations

Students throughout the school year give technical presentations. These presentations not only help students network, but also give them an opportunity for research and presentations of projects to the scientific community. Technical presentations include posters, slideshows, and pamphlets.

International Nuclear Safety Program

The focus of the International Nuclear Safety Program (INSP) at PNNL is on improving safety at international nuclear power facilities and reducing or eliminating nuclear materials produced at those facilities. Students will work with PNNL in providing information on Russian nuclear power plants and work being done under the INSP in Russia.

Student Internships

The NEWNET program supported through the Battelle-Pacific Northwest National Laboratory (PNNL) provided many AISES students with opportunities to develop skills in science and engineering. Students have held intern positions at UAF, through the Institute of Marine Science (IMS), and at the Los Alamos National Laboratory (LANL) in Los Alamos, New Mexico. Plans are underway to develop new internship opportunities at PNNL.

Lichen Radionuclide Baseline Research

The purpose of this gamma radiation monitoring project is to determine current concentrations of various radionuclides in lichens, which is a food source for caribou. The data will be compared to previous published data to follow any changes in radionuclide levels in lichens and to determine caribou bioaccumulation.

Loda Griffeth collects lichen and soil samples along the Seward Highway.

Website

A NEWNET website is considered a very important product by the students to deliver information to both the general public and professional organizations, and also a convenient way to document NEWNET activities. The URL for this website is http://www.ims.uaf.edu/NEWNET.

Home page of the UAF NEWNET website.

References:

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http://www.aises.org

http://www.ims.uaf.edu/NEWNET

Participants:

- School of Fisheries and Ocean Sciences, UAF
  Institute of Marine Science
- Rural Student Services, UAF
- Department of Electrical Engineering, UAF
- Alaska Department of Environmental Conservation
- Los Alamos National Laboratory

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