Unidata Community Equipment Awards
Final report

Equipment to enhance the capacity to process and disseminate value-added weather data at Purdue University

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Introduction

In April 2004, Purdue University entered into a unique partnership with the NOAA National Weather Service (NWS) to become one of three top-level distributors of WSR-88D Level II radar data. As a top-level distributor, Purdue accepts a real-time feed from all WSR-88Ds via Unidata's Local Data Manager (LDM) software, and then makes the Level II data available to any interested user on a cost-recovery basis, without restriction on its use. This service helps enhance the availability and dissemination of NWS data, in accordance with the National Research Council's 'Fair Weather' recommendations.

Purdue's involvement in this program is possible because of a strong alliance between the Department of Earth and Atmospheric Sciences (EAS) and the central Purdue Information Technology organization (ITaP), and also because a significant allocation of internal funds for computer hardware and personnel support. To date, our main obligation has been to provide a stable stream of data to three "downstream" university partners. However, consistent with Purdue's teaching and engagement mission, we are now also seeking ways to disseminate the data to other users, and also to make more effective use of it locally.

For the purpose of providing broad weather data access (internal and external to Purdue), the EAS departmental weather-data server in 2005–a Dell Optiplex GX260, with a single 2.8 GHz processor and 1 GB memory–was simply inadequate. Hence, our Unidata Community Equipment request was for new computer hardware to ingest, process, and disseminate weather data, particularly Level II radar data.

Purchased Equipment

Upon securing matching funds from Purdue, we were able to purchase a Dell PowerEdge 2850, configured with dual Intel Xeon 3.6 GHz processors and 4 GB memory. This included a 4×300GB RAID 5, dramatically enhancing our capacity for local, short-term data storage. For example, we now have the capability to receive the full suite of Level III radar products, the CONDUIT model feed, and high-resolution satellite images from the NIMAGE data feed. It also allows for the possibility of receiving other data that might become available in the next few years.

Pilot project

Enabled with our new computer hardware, we conducted a weather-data dissemination pilot project. Our idea was to enlist the help of EAS students and find ways to add value to weather radar images that could be served to the community. The main participants were senior-level students in the *Weather Analysis and Forecasting* course. The agreed-upon task for the forecast/briefing team of the day was to identify a radar-observed feature of interest, and then write a short narrative to accompany the relevant images. The narratives, which were meant to be appropriate for the non-meteorologist, typically contained descriptions of storm type and structure, bright bands, ground clutter, etc., and also attempted to relate these to other meteorological conditions, as possible. A simple, menu-driven and web-based form was developed by our LDM manager, Ben Cotton, for this project. With this form, the team was able to choose any WSR-88D site, elevation angle, and field, and have the corresponding image generated by a GEMPAK script. An example of one team's narrative is shown below.

This pilot project served as a unique educational experience for Purdue EAS students, affording them: invaluable experience in relating their growing knowledge of atmospheric science to the non-meteorologist; ample opportunity to hone their written communication skills; and the sense of responsibility that comes with the commitment to deliver a product in a timely manner. We hope to continue this project, and are now working with the EAS outreach coordinator to identify middle and high schools that can provide feedback.

Purdue University Educational Radar Images

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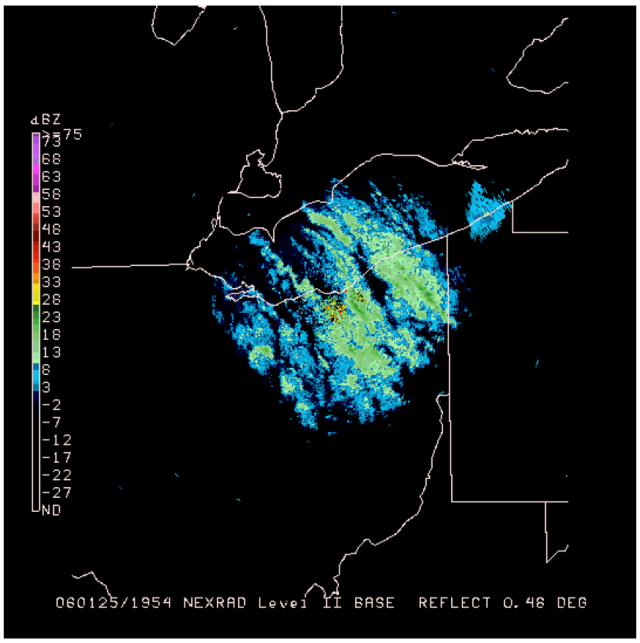

What we see from this image from the Cleveland radar is a prime example of lake-effect snow. Cold northwest winds from the back side of the low blowing across the (relatively) warm lake result in cloud development and snowfall. The snow forms bands parallel to the wind fields. This is seen not only here in Cleveland, but also in other areas of the Great Lakes, including Michigan, New York, and even north central Indiana.

The area of yellows and reds are not snow, but energy reflected by things such as buildings, pollutants, and insects. Meteorologists call this ground clutter.

Additional benefits of new equipment

The traditional needs of weather data in EAS classrooms have and will continue to benefit from the new weather-data server. The server now provides EAS faculty with the capacity to fully integrate the Unidata stream into all laboratory courses and into appropriate research projects.