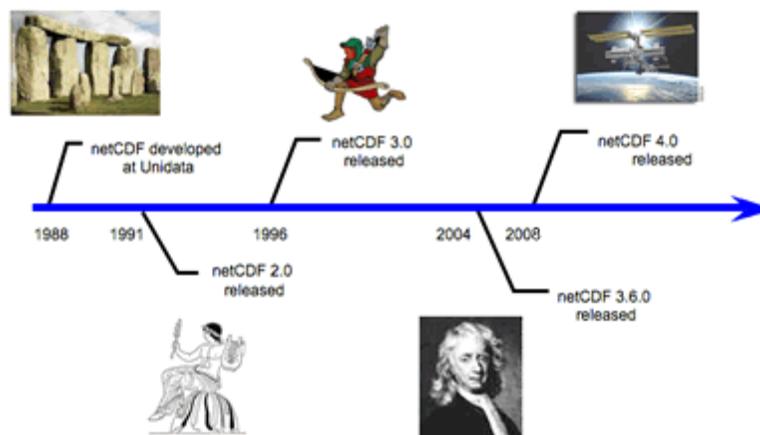


New and noteworthy events in netCDF development

Historical Timeline of netCDF Development



Following examination by 20 reviewers, NASA's [Earth Science Data Systems Standards Process Group](#) has concluded that netCDF classic should be adopted as a recommended standard.

A major strength of netCDF classic, according to the reviewers, was that it has fostered data interoperability and exchange through its self-describing file format, platform independent architecture, and robust access methods. Additionally, its overall file format and metadata attributes were simple enough to be easily understood and applied yet robust enough to describe and store multidimensional data of different types in the same file.

"NetCDF classic model" refers to the original and simpler of two netCDF data models. The other is the "enhanced model", which includes new features in netCDF-4 for representing complex data types. "NetCDF classic format" refers to the original and simplest of four netCDF format variants. The others are 64-bit-offset format (for larger datasets), netCDF-4 classic model format (for backward program compatibility with new performance features, such as compression), and netCDF-4 format (for all features of the

enhanced model). The enhanced model (also referred to as the netCDF-4 data model) was introduced in netCDF-4 as an extension of the classic model that adds more powerful forms of data representation and data types at the expense of some additional complexity. Although data represented with the classic model can also be represented using the enhanced model, datasets that use features of the enhanced model, such as user-defined nested data types, cannot be represented with the classic model. Use of added features of the enhanced model requires that data be stored in the netCDF-4 format.

The classic format was the only format for netCDF data created between 1989 and 2004 by various versions of the reference software from Unidata. In 2004, the 64-bit offset format variant was introduced for creation of and access to much larger files. The reference software, available for C-based and Java-based programs, supports use of the same APIs for accessing classic files, 64-bit offset files, or netCDF-4 classic model files, so programs reading the files do not have to depend on which format is used.

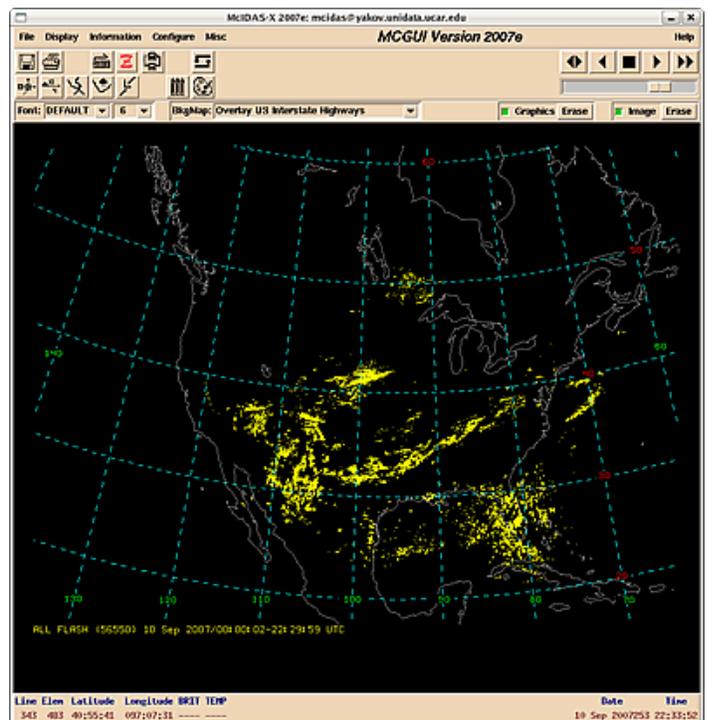
There are other indications of netCDF's continuing importance to the community. One is that developers recently responded to their 1000th netCDF support question, since starting to use the current support system three years ago. Another is the recent adoption of netCDF-4 and CF metadata by NOAA NESDIS as the standard intermediate file format for new satellite products from the Center for Satellite Applications and Research operational systems and from the NOAA Office of Satellite Data Processing and Distribution.

The Data Series: The National Lightning Detection Network (NLDN)

David Knight, University at Albany, SUNY, contributed significantly to this article. *Editor.*

The National Lightning Detection Network (NLDN) data became available to the Unidata community via the LDM/IDD in 1994. The Winter 1994 Unidata news letter [announced](#) its availability. At that time, SUNY Albany ran an LDM-5 server that was the primary distribution point for NLDN data.

Today NLDN's real time stats stand at 22 universities and 47 computers. The number and types of products available have remained remarkably constant through these 14 years.



The University at Albany, State University of New York, through a cooperative agreement with Vaisala, offers data from the National Lightning Detection Network (NLDN) to universities over the Internet. These data are available at no cost for education and research, under constraints established by Vaisala and SUNY-Albany and outlined in the agreement found at the end of this article.

NLDN data has wide potential use in atmospheric science and in science related research and education. The University at Albany is currently configured to make the data available to 104 universities. During winter and early spring not all Universities actively receive this data. On February 26, 2009, for example, there were 49 down stream sites. Use and interest in lightning data grows in the late spring and summer when lightning activity increases in the USA.

Lightning data is a natural augmentation of other real-time atmospheric data provided by Unidata. Lightning data can, for example, be overlaid with satellite imagery to depict regions of electrical activity. Research suggests that the polarity of the lightning may reflect the nature of the underlying precipitation processes. Likewise, data from the WSR-88 radar network can be combined with lightning data to provide additional insights into storm formation, propagation, microphysical processes, and intensity changes. Some people believe for example that there might be a relationship between lightning activity and tornado formation. NLDN data has been used to study convective activity in hurricanes and its role in storm intensification and track. One benefit of the NLDN data is that it is continuous in time and space within range of the network. This allows continuous monitoring and study of convective activity. Combining lightning data with conventional surface observations frequently provides information useful for analyzing and understanding the observations.

Even after making NLDN data freely available to other Unidata-affiliated universities for 14 years, we likely have only touched the surface on its role in education and research.

NLDN data packet contents

Field	Example
date [CCYYMMDD]	19930922
time [HH:MM:SS.msec]	10:22:33.334
latitude	47.33
longitude	-87.116 (west negative convention)
polarity/signal strength	-188.7
multiplicity	6
ellipse angle	174
semi-major axis	6.0
eccentricity	2.0
chi-square	1.0

Please note: The distribution and use of NLDN data is restricted: UAlbany makes the data available to Unidata-affiliated universities for research and educational purposes only. Institutions receiving the NLDN data via the IDD are explicitly prohibited from redistributing or making displays of the data available outside of their campus. Violation of these restrictions will result in loss of use of the data at offending sites and could jeopardize the availability of the data to the entire Unidata community. Commercial, government, and operational users must purchase the data directly from Vaisala.

News Briefs

Users Workshop



The next Unidata triennial users workshop is scheduled for 8-12 June 2009 in Boulder, Colorado. The theme is *Using Operational and Experimental Observations in Geoscience Education*. Six focus areas have been identified: Remote Sensing, Data Assimilation, Instrumentation, Climate and Air Quality, Field Experiments, and Emerging Technologies. The

workshop will feature a mix of hands-on labs with informative presentations as well as a few social events designed to allow participants to converse and get acquainted.

[An NSF Observational Facilities Users Workshop](#) hosted by NCAR's Earth Observing Lab immediately follows the Users Workshop. Follow the link above for more information about it, and there is more information about the Unidata workshop at this link: [2009 Users Workshop Homepage](#).

Social Networking

Along with its community, the Program Center is exploring potential uses of social networking in fulfilling its mission of providing "data, tools, and community leadership for enhanced Earth system science research." To many of you using social software is old hat. To others, it's a little new. Social networking and its use in community building and scientific collaboration is in its infancy, but we believe it provides an opportunity to leverage an exciting trend, especially with the new generation of Unidata community members. We also believe that it offers the potential for enhancing data and information sharing, and many staff members are participating on Facebook. See:

<http://www.facebook.com/home.php#/group.php?gid=30687541811>. In addition, Unidata has created a presence on [Twitter](#), and we will be using both of these venues for announcements, including that of the monthly [CommunitE-letter](#).

Iraqi Scientists Visit

Unidata Director, Mohan Ramamurthy, had the opportunity to meet briefly with three Iraqi scientists visiting Boulder from Iraq's Space Observatory and Simulation Research Center. This is the the first such group from Iraq to visit the U.S. in decades. See NCAR [Staff Notes](#). The Boulder visit was coordinated by Randolph "Stick" Ware, visiting scientist at MMM and chief scientist of the Boulder firm Radiometrics. Mohan assured the visitors that Unidata is open to collaboration with them and their colleagues in universities when the opportunity arises.

