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1. INTRODUCTION

Unidata's Integrated Data Viewer (IDV) is a freely available Java™-based tool that can be used for analysis and visualization of multidimensional geoscience data sets. The IDV allows users to slice and probe these data sets and is a useful tool for interactively exploring the Earth System.

One of the problems facing Earth System educators is locating data resources that can be used to explain a particular natural phenomenon (e.g., El Nino). Even if the resources are located, having a tool that will work with a particular dataset can be problematic. The web-enabled features of the IDV (Murray, 2003) allow users to locate and work with distributed Earth System resources indexed in digital libraries.

2. CATALOGS OF DATA RESOURCES

Digital libraries are indexing links to Earth System data resources, including real-time and archived data sets. Through the framework developed by the NSDL-funded Thematic Real-time Environmental Distributed Data Services (THREDDS) project (Domenico, 2002), the IDV can access and display these data resources. Just as the World Wide Web and digital-library technologies have simplified the process of publishing and accessing multimedia documents, THREDDS provides the needed infrastructure for publishing and accessing scientific data in a similarly convenient fashion. THREDDS embodies a network of thematic servers providing educators and students coherent access to a large collection of data (data web). At the heart of the THREDDS framework are metadata catalogs used by data providers to describe and publish their datasets. These catalogs provide discovery and usage metadata and can be indexed by a digital library like the Digital Library for Earth System Education (DLESE) (<http://www.dlese.org>). Using the metadata catalogs, the IDV provides users with options of selecting entire data sets, or just small subsets of data.

3. USING THE CATALOGS IN THE IDV

The integrated nature of the IDV allows users to

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bring in data from multiple servers through a variety of protocols and combine them into a single display. An IDV user can use the digital library search capabilities to locate relevant datasets on THREDDS servers and load references to those datasets into the application. They can then selectively load in all or portions of the datasets and create displays or manipulate the data. It provides a powerful mechanism for using real-time and historical data in a classroom setting.

In addition to data resources, a digital library can include references to web-based (HTML) curriculum materials. These materials can contain links that automatically start the IDV with a particular configuration. For example, an educator may want to control the types of displays that are available to the students as they progress through an inquiry-based curriculum. In the early portion of the curriculum, the educator may want to introduce the concept of contour lines and have that be the only type of display available to the student. As the student progresses through the curriculum, additional types of controls can be introduced to provide displays of color-filled contours, probes and 3D isosurfaces. Links within the HTML documents can point to custom Java Network Launching Protocol (JNLP) files that specify different configurations of the IDV applicable to each lesson. The configurations can include references to specific datasets as well as the types of displays that the student can work with.

4. SUMMARY

Unidata's Integrated Data Viewer is a powerful visualization and analysis tool that is freely available to the geoscience community. It includes features that allow it to work with datasets and curriculum materials that are indexed in digital libraries.

5. REFERENCES

- Domenico, B., J. Caron, E. Davis, R. Kambic and S. Nativi, 2002: Thematic Real-time Environmental Distributed Data Services (THREDDS): Incorporating Interactive Analysis Tools into NSDL, *J. Digital Information*, 2(4).
- Murray, D., J. McWhirter, S. Wier, S. Emmerson, 2003: The Integrated Data Viewer: a Web-enabled application for scientific analysis and visualization. In prep for *19th Intl Conf. on IIPS for Meteorology, Oceanography and Hydrology*.