

THE INTEGRATED DATA VIEWER (IDV) – A DISCIPLINE AGNOSTIC TOOL FOR GEOSCIENCE EXPLORATION

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1. INTRODUCTION

Unidata has been developing the Integrated Data Viewer (IDV) as a general purpose tool for displaying and analyzing geo-scientific datasets. The freely available, Java™-based reference application is easily installed on most computer platforms. While the reference application's interface is geared toward atmospheric science, the underlying framework is discipline agnostic. Data only needs to be geo-referenced to be displayed in the IDV. Because of this, the IDV is being used in oceanographic, hydrologic and geophysical disciplines, as well as atmospheric science. Some users are accessing and displaying their data in the reference application while others are creating customized versions that meet the needs of their users.

2. DATA INTEGRATION

Application data integration is one of the more difficult processes in analysis and visualization. Data comes in a wide range of formats and even when they are in the same format, understanding the underlying semantics of the data is difficult unless conventions and standards are followed. The IDV relies on netCDF for Java's Common Data Model (CDM) interface layer to provide seamless access to a variety of formats and conventions. For example, model data in GRIB, GRIB2, netCDF (including staggered grids from WRF and ROMS models) is supported through this interface. The underlying VisAD data model enables the IDV to easily combine multidisciplinary data from local and remote sources in the same interface. The IDV supports several GIS formats including shapefiles, GeoTIFF and data from WMS servers.

In many cases, users can ingest their own data to the IDV by using one of several well-defined netCDF formats, or through the existing ASCII text interface. Because many geoscience datasets are stored in netCDF files, this is a popular mechanism for data ingest. In many cases, data from different disciplines fit into a

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common structure. For example, meteorological station observations, aircraft waypoints and earthquake locations are all instances of point observations. Using the CDM point observation netCDF structure enables users to view these in the IDV using common tools.

3. EXAMPLES

3.1 GEOPHYSICS

UNAVCO used the IDV framework to create a customized application to meet the needs of the solid earth science community. The GEON-IDV extensions include displays of GPS vectors earth stain from station measurements, earthquake locations in 3D with depth (Fig 1), seismic ray paths in 3D, and earthquake focal mechanisms.

3.2 OCEANOGRAPHY

The oceanographic community has long used netCDF as a storage format for their diverse datasets. This allows for easy integration of the data into the IDV. The IDV is being used to display ocean model output (Fig. 2) as well as other oceanographic data sets.

3.3 PLANETARY SCIENCE

The IDV supports an interface for geo-registering images stored in GIF, JPEG, PNG and TIFF formats. The IDV supports display of planetary scale images on a set of collaborative displays. By linking these different views, comparisons can be made between features observed on the surface of these worlds (Fig. 3).

4. WEB SITES

Unidata Integrated Data Viewer:

<http://www.unidata.ucar.edu/software/idv>

GEON-IDV:

http://geon.unavco.org/unavco/IDV_for_GEON.html

VisAD

<http://www.ssec.wisc.edu/~billh/visad.html>

5. REFERENCES

Caron, J, E. Davis, Y. Ho, R. Kambic, 2006: Unidata's THREDDS Data Server, *Proceedings Preprints, 20th Intl Conf. on IIPS for Meteorology, Oceanography and Hydrology*

Hibbard, W., C. Rueden, S. Emmerson, T. Rink, D. Glowacki, T. Whittaker, D. Murray, D. Fulker, and J. Anderson, 2005: Java distributed components for numerical visualization in VisAD. *Communications of the ACM*, 48(3), 98-104.

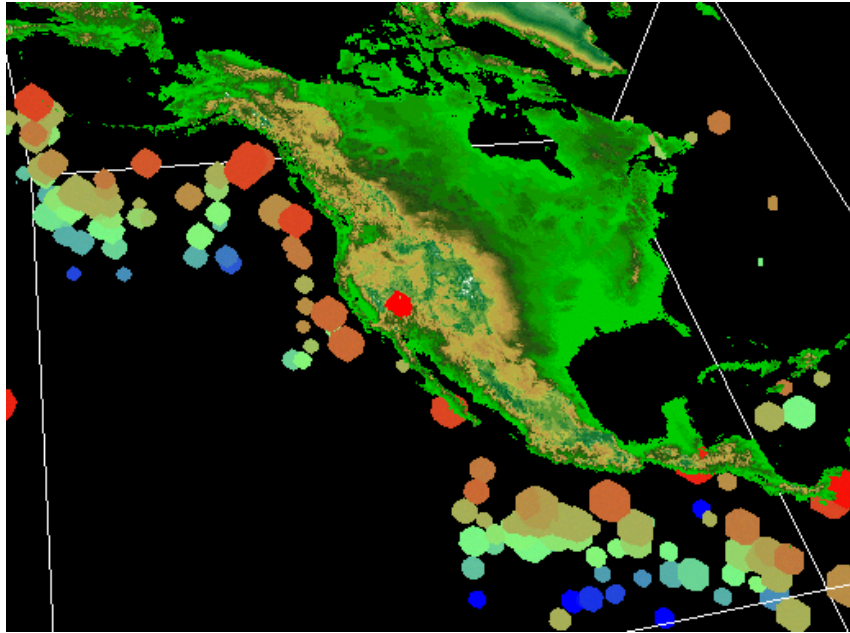


Figure 1 Earthquakes (> 4.0 magnitude) displayed in 3D, colored by depth and sized by magnitude with surface topography for reference

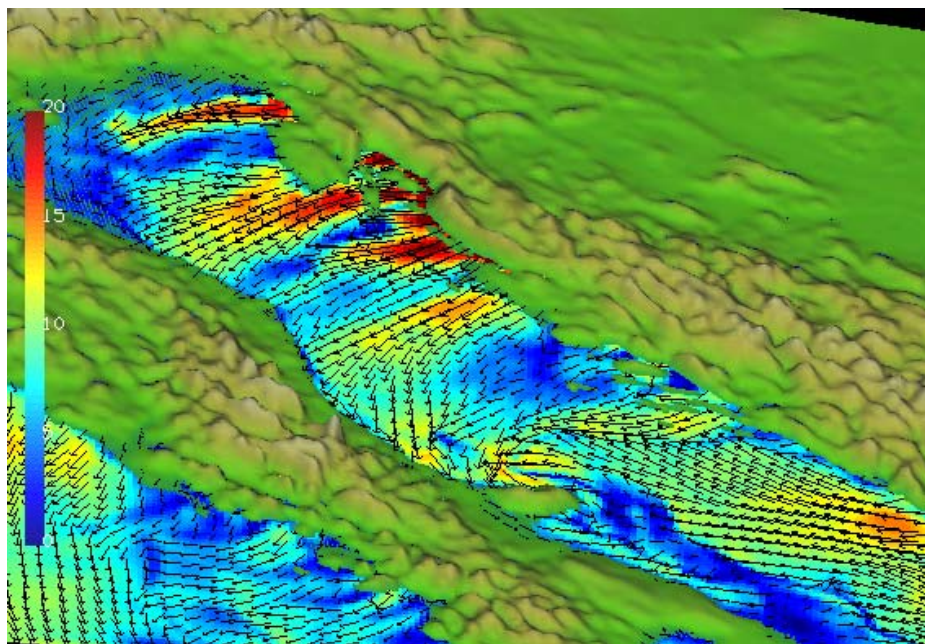


Figure 2 Bora winds over the Adriatic from COAMPS reanalysis (courtesy R. Signell, USGS)

Figure 3: Four views of Mars images in collaborative displays

