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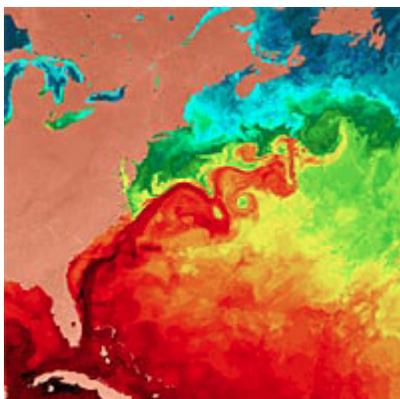
## Virtual Data Center [1]

by Rachel Hauser  
Published in 1998

Prompted by supercomputer obsolescence and rapidly advancing desktop technology, members of the NASA's Earth Observing System 1994 Independent Architectural Study discussed ways of meeting researchers' new technology needs. Menas Kafatos, director of the Center for Earth Observing and Space Research (CEOSR), teamed with the Goddard Distributive Active Archive Center (DAAC) and the Center for Oceans, Land, Atmosphere studies (COLA) to create the Virtual Domain Application Data Center (VDADC), which allows users to test drive data on the web before committing to data download.

The Virtual Domain Application Data Center (VDADC) allows users to test drive data on the Web before committing to data download.

Feedback



East coast of North America (Image courtesy of MODIS)

"We implemented the virtual data center just as the Internet was beginning to take off. Our idea was to serve researchers involved in seasonal to interannual climate studies, as well as other scientists, by providing tailored data sets designed for easy access to interdisciplinary Earth science. Users create browse images on-the-fly from the data and view them on-line immediately. They could also produce statistical summaries, such as a time series or standard deviations from particular data sets. So the VDADC is, in a way, human-assisted data mining," said Kafatos.

The VDADC mimics the thought sequence that occurs when designing a research question. The user first chooses relevant variables, such as atmospheric temperature and precipitation, over the geographic area of study. Then, using the VDADC tools, he or she can generate an image that shows the relations between the selected parameters. Not only does this offer a pictorial sense of how Earth system components interact, it helps the user determine whether it is worth time downloading a complete data set.

"Some scientists know exactly which data sets they need, but many of our users are Ph.D. students who employ the VDADC to become more familiar with existing data sets. By using our tools and playing with the data, they begin to understand and appreciate the richness of Earth system science. For example, one could begin by looking at sea surface temperatures then proceed to correlating them with vegetation growth patterns. Visualizing the relationships makes it possible to begin asking primitive science questions," explained Kafatos.

The goal of a VDADC session is to provide users with enough information with just a few clicks of a mouse to

determine how a particular data set works. Currently the VDADC consists of a series of single entry pages and sufficient data to begin the exploration process. Although CEOSR has a limited data archive, the strength of the VDADC system is in providing data visualization combined with easy access to archives housing the complete data sets.

Designed as a prototype for a more refined data distribution system, operated in partnership by the three institutions, and serving all skill levels of those involved in seasonal to interannual climate studies, the VDADC premise is being improved for wide scale scientific use. CEOSR, along with the Goddard DAAC, COLA, and experts at several universities, has successfully proposed to become a member of NASA's Earth Science Information Partner (ESIPs) Federation.



Forest fires burning wildly in Florida, as seen from space (Image courtesy of MODIS)

Feedback

Based on the VDADC prototype, the Federation is constructing an Internet site that will allow users to log in, then identify and access many comprehensive Earth science data streams. Initial analyses may be generated on-the-fly combining the capacities of analytical and Internet tools, after which users will have the option of obtaining the larger data set, said Kafatos.

Compared with the VDADC prototype, the full-scale version has raised key data set access issues for the site's architects.

"With the original VDADC the method by which users obtain data is very straightforward. Everything is available on the user's computer screen. The ESIPs' full-scale system is, of course, more complex. Compared with the casual users that come to the VDADC now, a greater number of scientists will be 'tire-kicking' the system and trying to retrieve data sets."

Whatever the difficulties, Kafatos is confident of the outcome, given the partnerships at work. "With the DAAC and COLA, we have a powerful alliance because each institution holds a variety of data sets and are themselves information technologists," he said.

## Related Link(s):

- [Virtual Domain Application Data Center](#) [2]

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[1] <https://earthdata.nasa.gov/featured-stories/featured-research/virtual-data-center>

[2] <http://www.ceosr.gmu.edu/vdadc2.html>