



Using THREDDS in My World GIS™

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Project Overview

My World GIS™ is a geographic information system designed specifically for use in educational settings. Its intended audience is middle school through college geosciences and geography courses where investigations involving geographic data can support the learning goals of the course. My World is designed to meet the needs of students and teachers while keeping the constraints of educational settings in mind. It combines the power of a full-featured GIS environment with the support and structure required by novice users in an educational environment.

My World is being developed by GEODE (Geographic Data in Education) Initiative at Northwestern, drawing on more than a decade of research on the design of data visualization and analysis environments for inquiry-based learning in the geosciences. Currently we are engaged in an integrated program of user studies and software development to extend and improve the software.

The central mission of the THREDDS project is to provide students, educators and researchers a convenient, effective, and integrated technology to publish, contribute, find, and interact with data relating to the Earth system. The initial phase of THREDDS established a working prototype of the services and tools necessary to fulfill their mission. Currently, the THREDDS 2nd Generation project seeks to expand both the team of contributors and data collections while incorporating emerging standards and related data systems.

The THREDDS 2G grant is supporting the integration of THREDDS tools for accessing data over the Internet into My World. Because My World is the only full-featured GIS environment designed specifically for use in educational settings, it is a logical client for THREDDS. It also will serve as a testbed for exploring how to extend the THREDDS architecture to the full range of GIS data types (grids, polygons, polylines, and points) and file formats. Currently, My World is able to read THREDDS catalogs and access gridded data from remote servers taking advantage of THREDDS middleware to convert the data to a My World-compatible file format.

Accessing THREDDS Libraries

Import a layer from THREDDS Library into My World. This brings up a THREDDS catalog browser

A THREDDS Catalog Browser in My World.

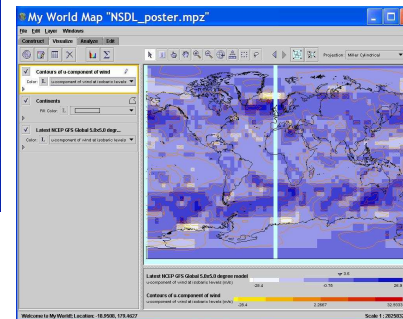
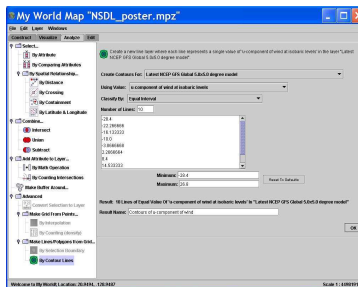
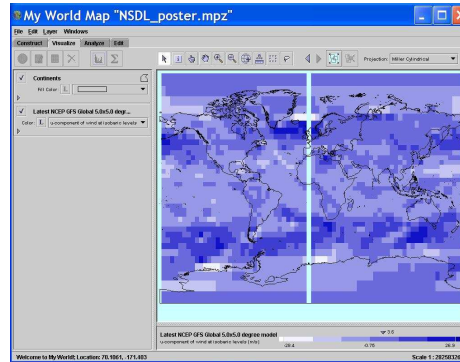
And multi-dimensional data sets

Because My World's layers are two-dimensional and THREDDS datasets can have as many as four dimensions, it was necessary to implement an interface for choosing a particular time and/or level from a dataset to view in My World, and to save that information along with the link to the dataset.

Two different grid set for the same data set.

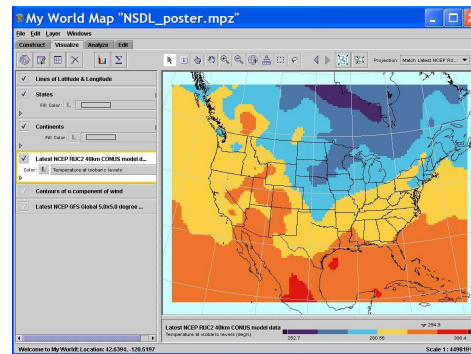
My World Interface

Currently My World GIS is capable of importing gridded data sets from THREDDS data catalogs, creating My World map layers from the "geogrid" data object that is part of the THREDDS standard. As GIS point, polygon, and polyline data types are added to the THREDDS standard, My World will be enhanced to create map layers from THREDDS-enabled servers containing files of those types.



A file from the NCEP GFS Global model, accessed through THREDDS from the Unidata IDD Model Data website.

My World has the ability to create contours from any numeric data field contained in the table.



Because much of the grid data in THREDDS catalogs is projected, it was necessary to add support for projected grid layers to My World. The projection has changed to match that of the new grid.

THREDDS 2G Accomplishments

From the perspective of the My World developers the incentive to integrate THREDDS technology into My World is to dramatically enlarge the amount of data that is available to My World users at relatively small cost in terms of development effort. My World users are now able to access gridded data through THREDDS catalogs without requiring any knowledge of the physical location or underlying data file format for that data.

- Participated in the DLESE data services workshop in May 2004, including presentations on pedagogical considerations in the use of geosciences data and demonstrations of the THREDDS-enhanced version of My World.

- Using the libraries provided by the THREDDS project, we added a dialog to My World for browsing THREDDS catalogs and selecting and opening datasets.

- To enable links to THREDDS layers to be saved on the local hard drive, we created a new My World file format that stores the URL for the layer that can be used to re-load the layer using the THREDDS tools.
- To enable curriculum writers to create documents that embed links to My World layers and maps, we built a new installer that registers My World file extensions with the operating system (MacOS X or Windows). This allows people to put links that will open THREDDS layers in web pages and other documents.

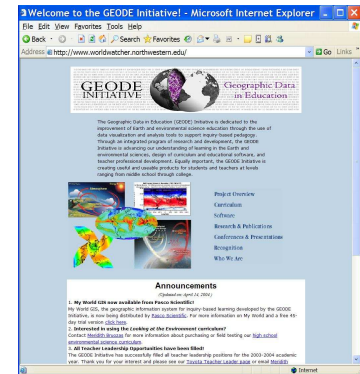
- We are currently upgrading to the THREDDS 1.0 specification and assisting in the definition of an API for accessing point, polygon, and polyline data using THREDDS.

This project has demonstrated the ease with which an existing Java client can be enhanced with THREDDS tools for accessing data from remote servers via THREDDS catalogs and THREDDS data conversion middleware.

GEODE Initiative

My World GIS is part of the GEODE Initiative at Northwestern University. The goal of the initiative is to improve Earth and environmental science education through the use of data visualization and analysis tools to support inquiry-based pedagogy.

In addition to My World, another software program named WorldWatcher was developed to display and analyze gridded (raster) geographic data. The GEODE Initiative is engaged in several curriculum development projects as well.



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