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DRINET –an Online Drought Research and Collaboration Environment

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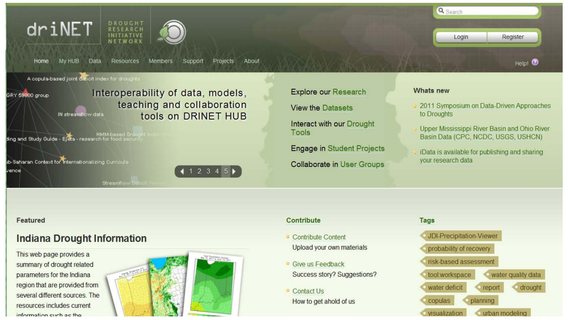
Our Mission

DRINET is a research environment for collecting and disseminating local to regional scale drought information while interoperating with other resources and tools. The disseminated information via the DRINET will be based on a comprehensive evaluation of causal factors for short and long term droughts, as well as on a standardization of data formats and collection practices. It thus lays the foundation for investigating and providing improved drought risk and trigger indicators.



Why DRINET

The DRINET project will engage diverse stakeholders to collect, publish drought related information and build community acceptance of local and regional data collection/compilation processes and data formats. To-date, many gaps hamper efforts at forecasting droughts and mitigating their impact. This work will foster increased communication and cross-synthesis of data for diverse applications. Consequently, DRINET will be able to provide a solid basis for drought assessment. Further, it will serve the purpose of an educational tool, and draw on visualization capabilities to better explain, for example, the role of precipitation and stream flow patterns on droughts.

DRINET is also home for researchers, students to publish their own models and tools, datasets, analysis, visualization, training and educational materials for studying droughts. Tools published at the web site can be run from a web browser.

DRINET and HUBzero Platform

HUBzero is a web portal technology developed at Purdue University. It is built atop the Joomla content management system. HUBzero has grown to empower over 150,000 users across dozens of portals spanning the spectrum of the research community.

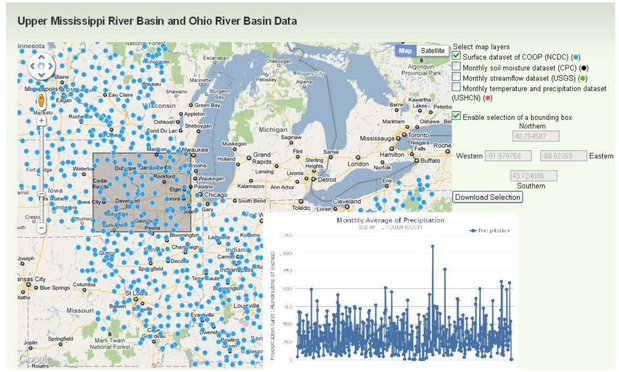
DRINET is developed using the HUBzero platform. Many important features of the HUBzero infrastructure are critical to the vision of community building and stakeholder services, including content contribution and sharing, collaboration and online meeting environment, groups, wikis, discussion forums, blogs, and usage data tracking. It provides a powerful platform for engaging the broad user community to contribute data and tools to the hub environment and share among each other.

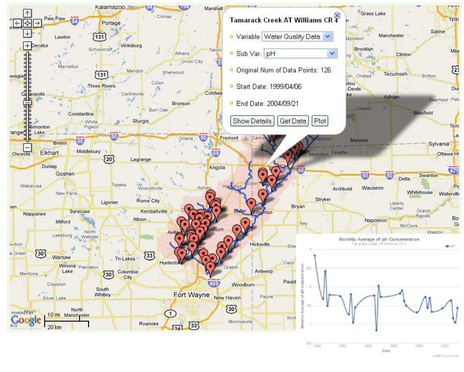
Our portal development effort focuses on the specification, programming and integration of application services and data standardization/management modules.

Environmental Data for Drought Research

A number of commonly used environmental datasets have been integrated into DRINET and available for easy access using map based GIS interfaces and dynamic visualization tools.

- Upper Mississippi River Basin and Ohio River Basin Data (from CPC, NCDC, USGS, and USHCN)
- St. Joseph Watershed Daily Water Quality Data (SJRWI)
- St. Joseph Watershed Daily Streamflow Data (USGS)
- Indiana Hourly Precipitation Data (NCDC)
- Indiana Daily Streamflow Data (USGS)
- Midwestern Precipitation and Temperature Average (Courtesy of the Oklahoma Climatologist Survey 2009)

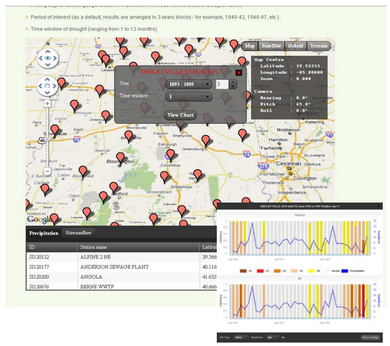


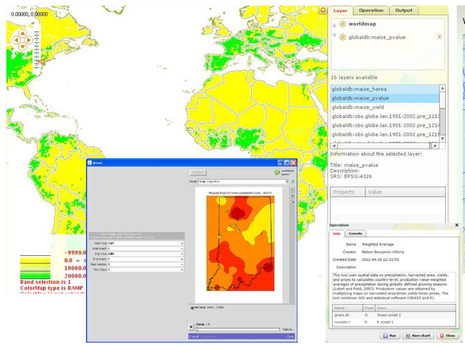


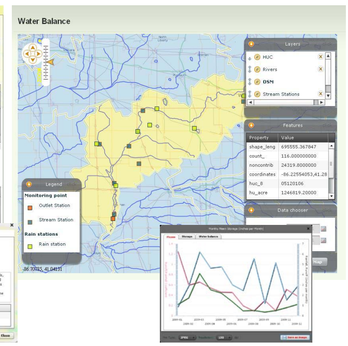
Online Drought Analysis Tools

DRINET enables users to directly run simulations and analysis using a number of online tools based on the research results of the project team.

- **Stream Deficit Viewer** (depicts drought state of streams in Indiana using Joint deficit Index (JDI). The viewer also shows the probability of recovering an existing drought state.)
- **HMM-based Drought Index Viewer** (probabilistically classifies given observation into five drought categories - Dry, Moderate, Severe, Extreme and Exceptional (D0-D4). The viewer creates a graph showing probabilistic classification of drought by HMM and discrete classification of drought by SPI.)
- **Water Deficit Viewer** (shows how much precipitation is required to recover from an existing drought and the probability of such recovery for a particular window for series of months.)
- **Water Balance Viewer** (dynamically fetches precipitation, streamflow and temperature data from NCDC and CUAHSI HIS for a selected HUC, calculates a geospatial model, and plots fluxes, storage and waterbalance parameters.)
- **JDI-Precipitation Viewer** (visualizes the Joint Deficit Index (JDI) using long-term monthly precipitation data for the upper Midwest US.)



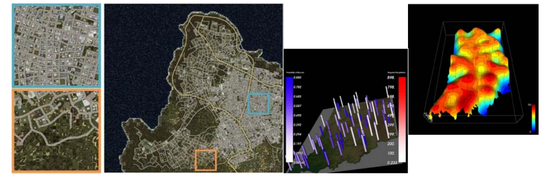




Teaching and Learning

DRINET has been used to support several classes at Purdue University. In CS 530 (Introduction to Scientific Visualization), students developed innovative visualization methods to analyze precipitation required for recovery probability of recovery from an existing drought for any given time point and prediction window.

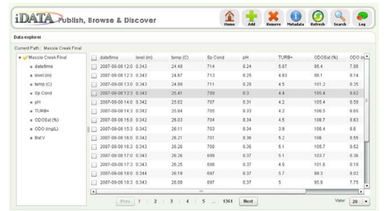
In AGRY 59800 (African Development Activities), the instructor used DRINET to interact with students and faculty at IV Tech Community College in Lafayette, Moi University in Eldoret, Kenya, and the University of Fort Hare in Alice, South Africa. The class examined agricultural, cultural, economic, environmental, and social aspects of sub-Saharan Africa with an emphasis on agricultural development activities in Kenya and South Africa.



iData – Publish, Browse and Discover

iData is a web based data management tool that allows drinet users to publish, manage and share their research data all by themselves

iData supports file based data collections and structured tabular data. It provides intuitive interfaces for creating a new data collection, uploading data, modifying/deleting data, browsing, searching, and downloading data. Data owners can easily share their data with other drinet users as well as tracking their usage.



Metadata for Interoperability

Directory Interchange Format (DIF) is used to describe the regional scale drought data on DRINET to allow data fusion and reuse across multiple application domains. DIF is a community-accepted metadata schema for earth science data and is compatible with ISO 19115 and CSDGM standards.

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