



G · A · B · B · S
geospatial data analysis building blocks

Enabling scientists, students and educators to create and share interactive tools and models for processing, analyzing and visualizing geospatial data

2015 PROJECT OVERVIEW

This DIBBs implementation project will develop geospatial data analysis building blocks (GABBs) as a core part of the HUBzero Scientific Collaboration Platform to enable researchers and educators to create and share geospatial data sets and modeling tools. The project will build upon geospatial capabilities that have been developed by IT experts and validated by the science community and bring such capabilities to the masses so that any domain scientist and other non-specialist can develop and deploy geospatial applications with graphical user interfaces on the web.

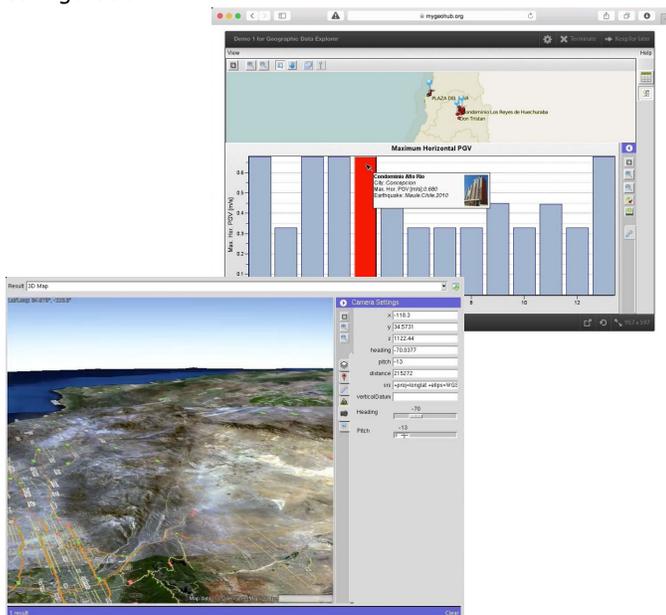
This project will enable any user to build and publish geospatial datasets and modeling and analysis tools on a HUBzero hub. The datasets supported will include vector and raster image data, as well as files and spreadsheet data. A user may invoke models or analysis from a relevant dataset. Model output data can be published from within an online tool. The result will be a simplified workflow from running simulations to publishing the result.

The project will produce GABBs software components, i.e., building blocks, as part of the future HUBzero open source releases or add-on packages. The deliverables include:

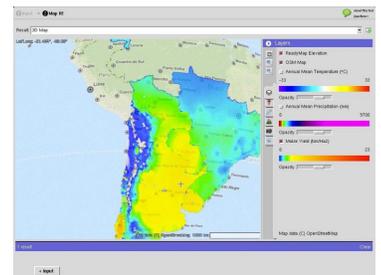
- A set of "data space" tools and web services for managing and sharing data, including geospatial data and regular files/spreadsheets
- Extended RAPPTURE Toolkit Application Program Interfaces (APIs) to support the creation of geospatial mapping, image processing, visualization, and data/metadata access and sharing tools
- Scientific use cases of modeling, data analysis and visualization to demonstrate the general applicability of the GABBs software
- Dissemination of results through HUBzero open source releases and at scientific conferences, workshops and proceedings

MAPPING & VISUALIZATION TOOLKIT

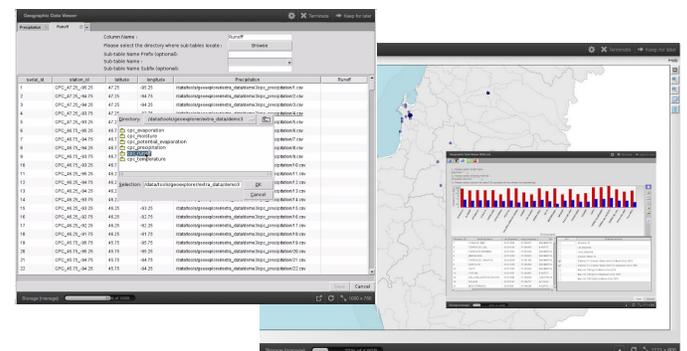
The GeoExplorer tool provides a way of exploring tabular data on a map, with associated plots and pictures. The tool is configurable, and researchers can save their particular configuration as part of a published dataset, so that when other users view the data, they see the customized configuration.



Our mapping capabilities are being integrated into HUBzero's Rapture toolkit. Rapture provides different types of input and output controls that researchers can use to build their own applications. Here is a simple input panel with a couple of "choice" and "boolean" controls, and an output panel with a map. The map shows three different datasets computed from a crop simulation model.



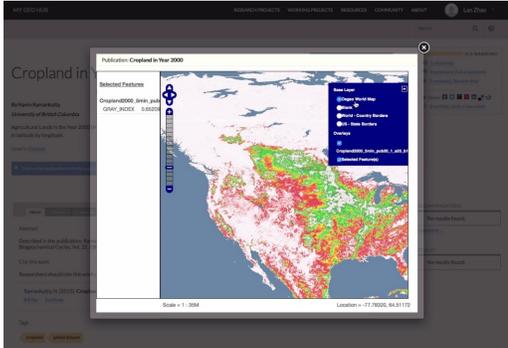
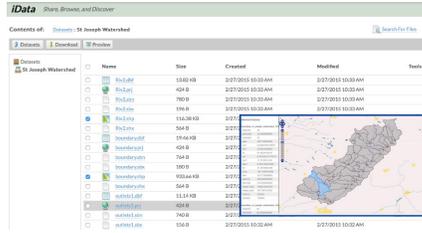
A scientist can upload a geo-referenced CSV data file, create a data viewer and deploy on MyGeoHUB without any programming.



We are experimenting with OSG Earth as a rendering engine for our mapping platform. OSG Earth creates projected (flat) maps, as well as geocentric maps as you would see in Google Earth.

DATA MANAGEMENT

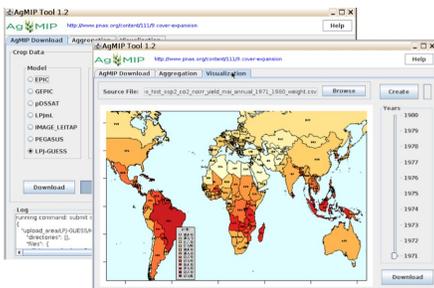
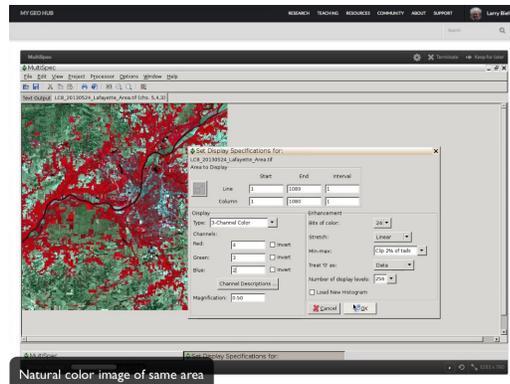
Scientists can make scientific data available to others by using the GABBS iData tool to upload, annotate, view and share. Users of iData can discover datasets by convenient search methods such as keywords or areas on a map, and they can also launch tools appropriate to the datasets.



MyGeoHUB users can publish raster data with preview and download functions. The HUBzero publication component is able to use a GABBS geo-visualization building block to provide interactive map preview capabilities for geospatial data.

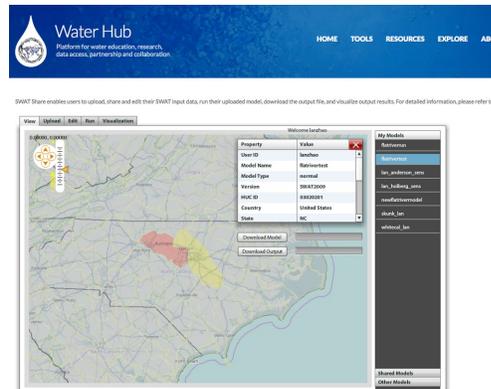
SCIENTIFIC APPLICATIONS & TOOLS

MultiSpec is a processing system for interactively analyzing geospatial images data such as those collected by satellite and aircraft sensors, biomedical images, etc. The intent is to allow MultiSpec to be used in workflows for image preview and verification, creating pictures which can be displayed in the geoviewers being developed by GABBS from integer and real data types of 8 to 64-bit data values.



The AgMIP Tool created by GEOSHARE provides a method to download, aggregate and visualize output from the AgMIP's Global Gridded Crop Modeling Initiative (Ag-GRID). This process is facilitated by integration with iData, allowing sharing of aggregation schemes and results.

SWATShare enables watershed modelers to import SWAT model input from iData, execute a model using the Trestles cluster as part of XSEDE, and publish the result back into iData together with automatically recorded metadata. Users can also import SWAT model output from iData into SWATShare for visualization and analysis.



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For more information, visit:
mygeohub.org/groups/gabbs



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