Oak Ridge National Laboratory
National Center for Computational Sciences

The Earth System Grid Federation User Interface

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ESGF
Earth System Grid Federation

OAK RIDGE
National Laboratory

Motivation

- **Motivation**
  - **Functions as the user interface of the new ESGF P2P infrastructure**
  - **Interacts with esgf-idp, esgf-orp, esgf-security, and the esgf-node manager for user authentication**
  - **Utilizes metadata records ingested into Apache Solr using the esgf-search tool**
  - **Supports search functionalities for both model and observational datasets**
  - **Supports dataset search by text, facet, geospatial and temporal ranges**

Design

- **Design**
  - **Simple, customizable Java Spring Web application**
  - **Interacts with the Solr back end through proxy**
  - **Built on *JQuery* framework for better user interaction and experience**
  - **Views based on the javascript-based *ajax-solr* MVC library**

Look and Feel: Homepage

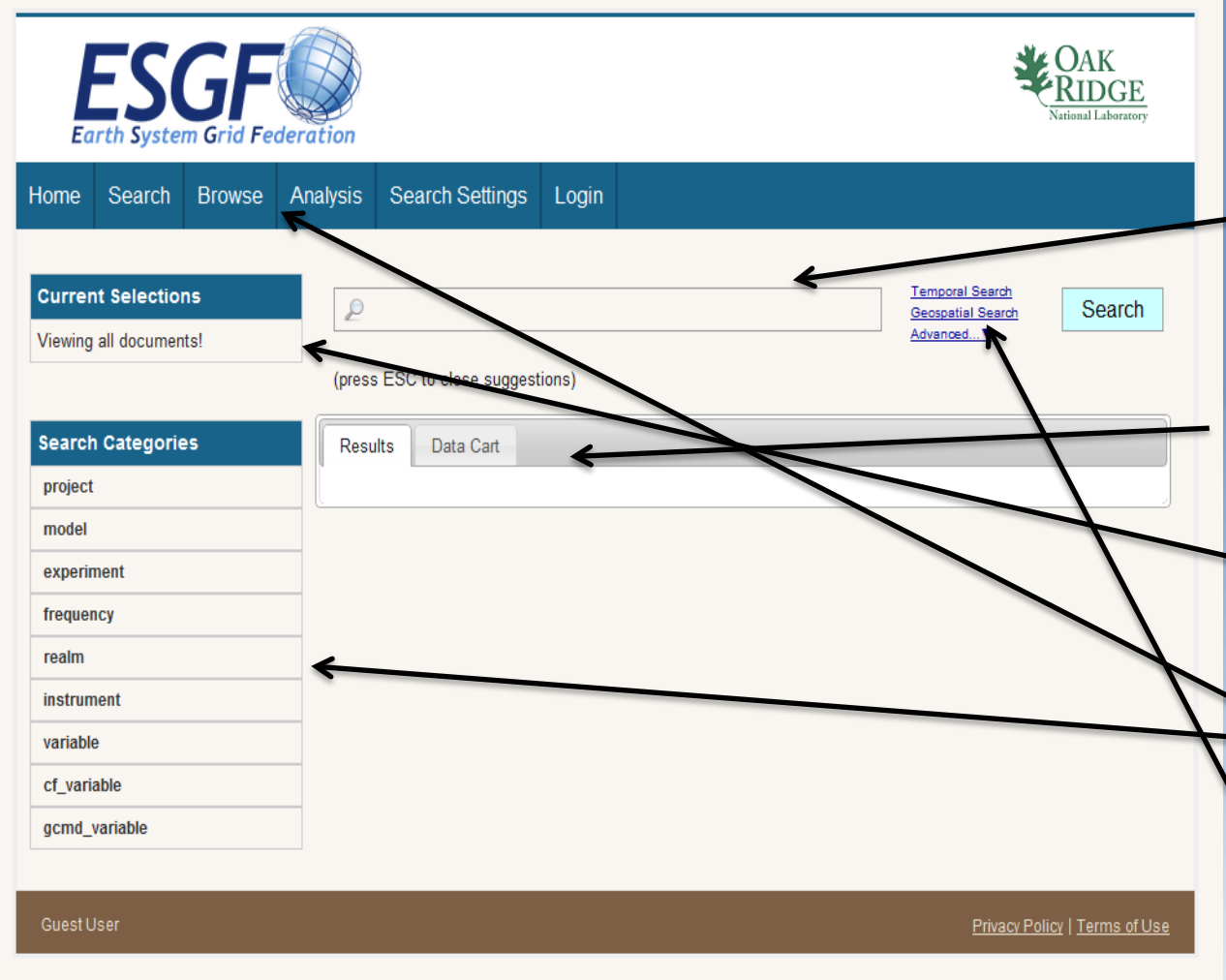
Login and navigation

Customizable logos and text

Links to related resources

Perform quick text searches

Look and Feel: Search page



***Features*:**

Text-based search (with AutoComplete)

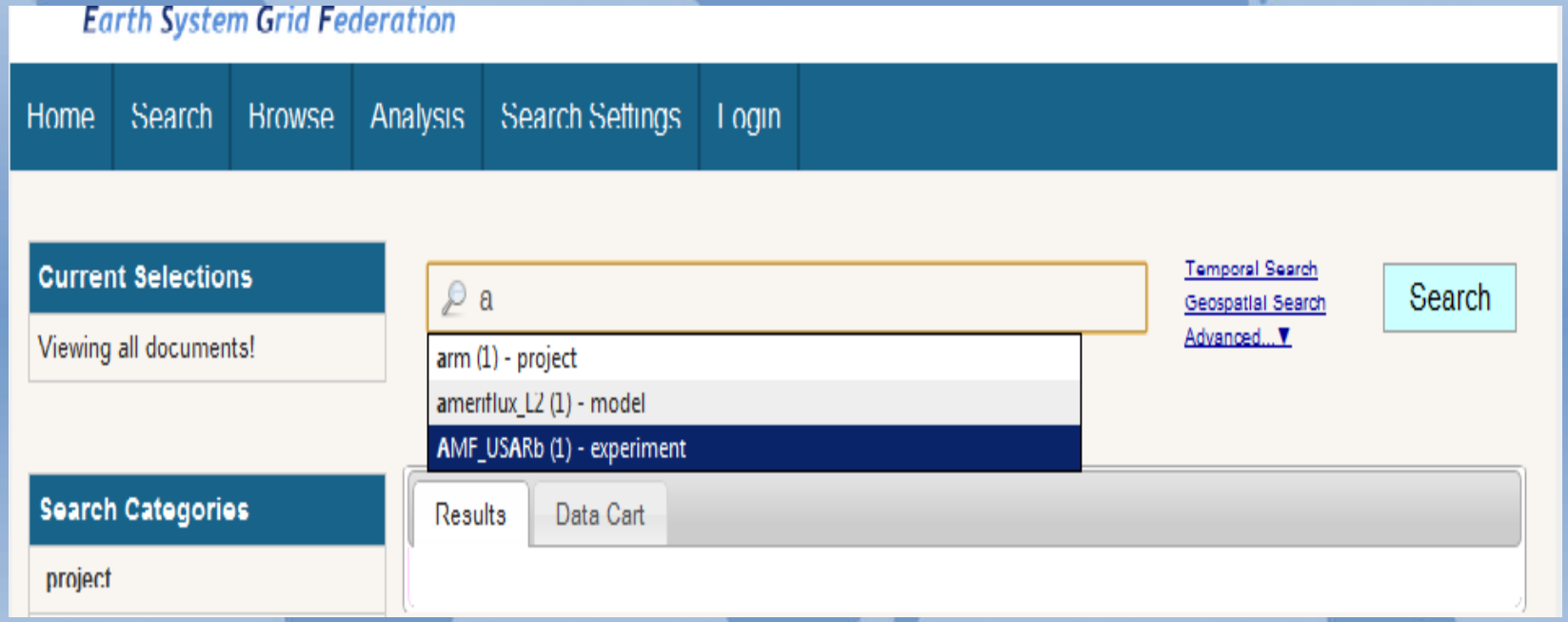
Results/DataCart Section

Current search status ("breadcrumbs")

Faceted Search

Geospatial/Temporal Search

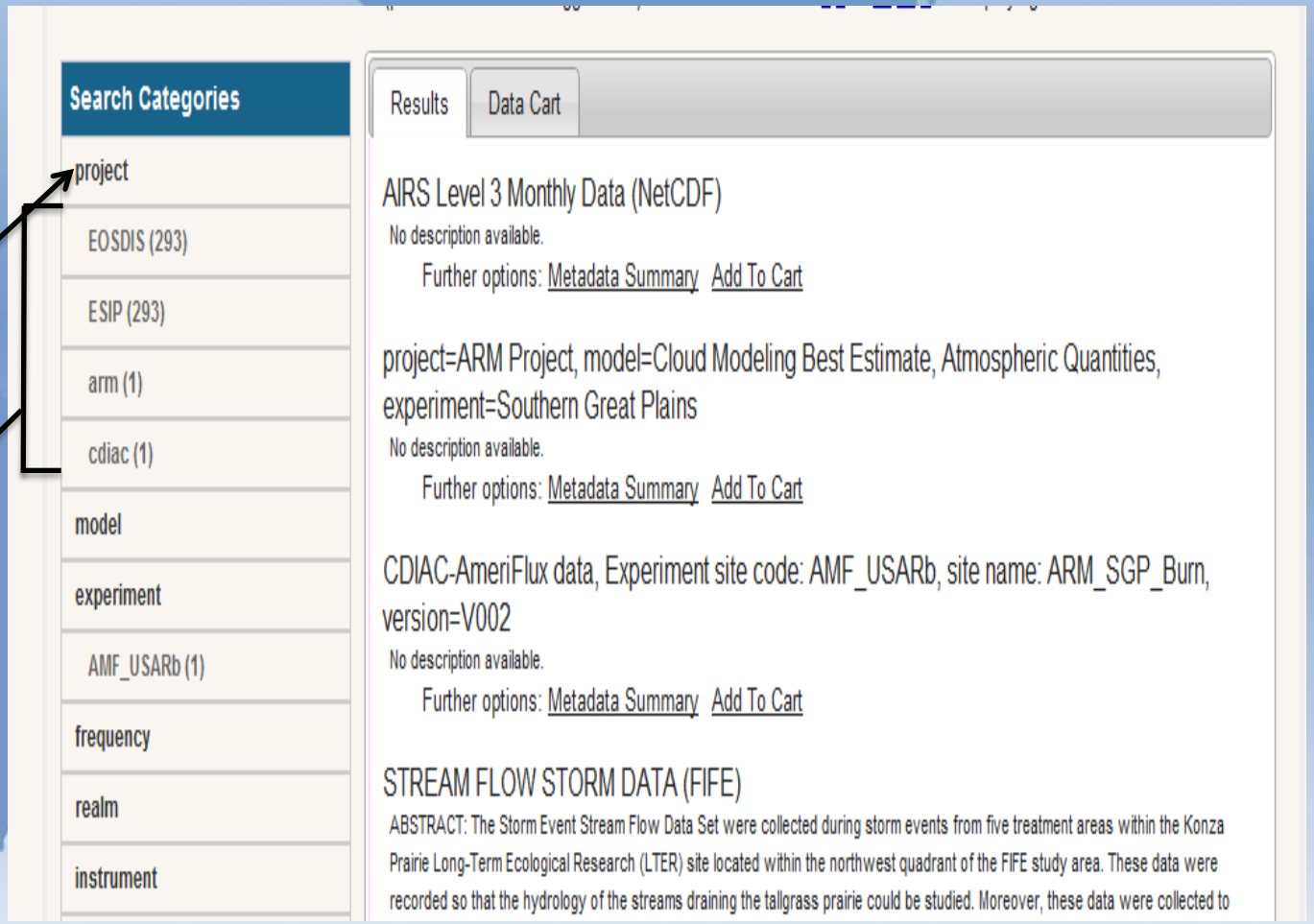
Text Search



- **Solr free text search support ('ANDs')**
- **Autocomplete feature**
  - **AJAX based component that searches solr for fields that begin with the reg exp entered**

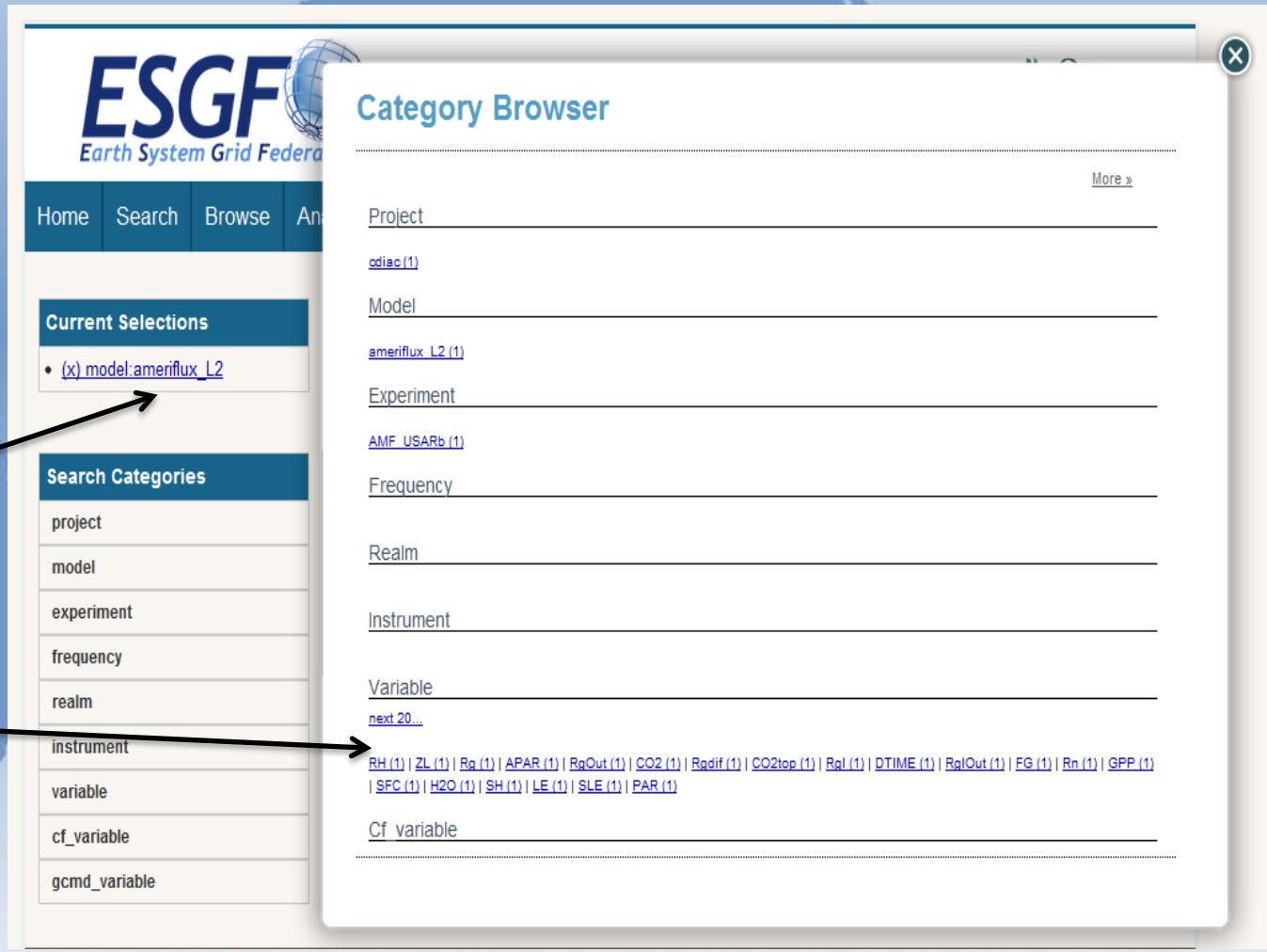
Faceted Search - Sidebar

- **Expandable accordion style menu**
  - Selection of top level field expands the menu
  - Facet values are displayed with their counts
- ***These are all simple server calls to Solr!***



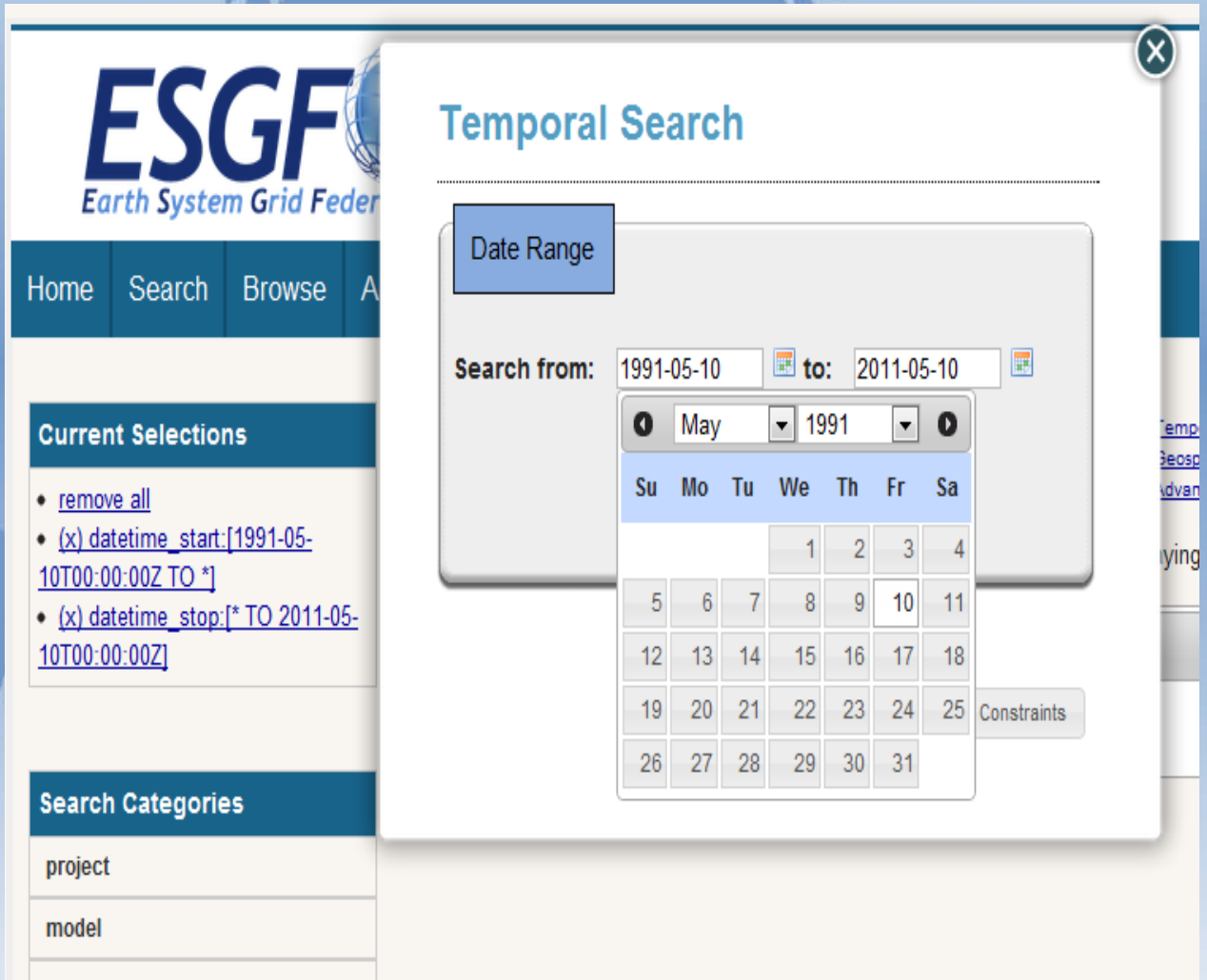
Faceted Search – Browser

- Overlay shows *ALL* top level facet categories and values
- Facet selections are displayed and can be removed in current selections
- Available facet values and counts are updated as selections are made



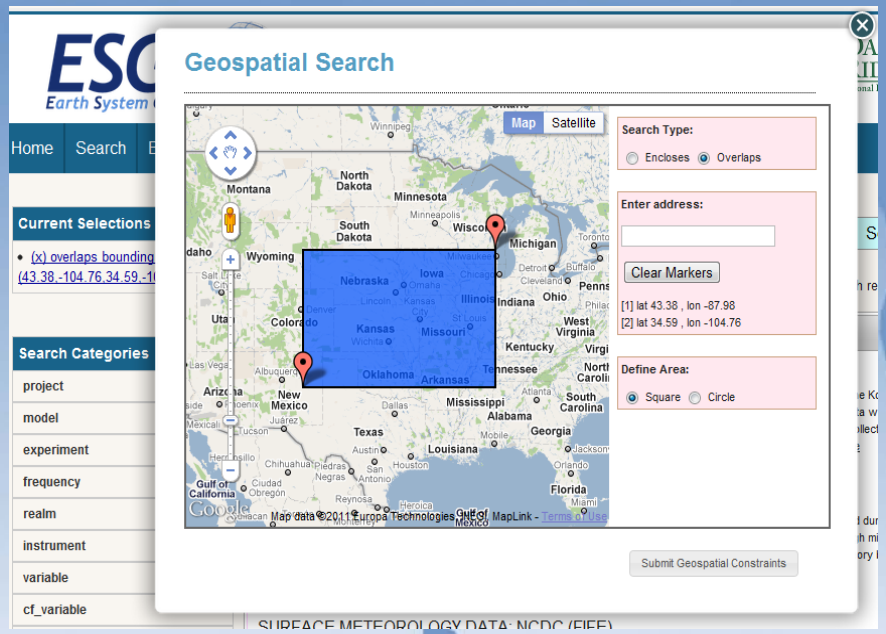
Temporal Search

- Overlay display for selection of records over a range of dates
- Dates can be entered by text or via datepicker
- Date Range selections are displayed in and can be removed from current selections

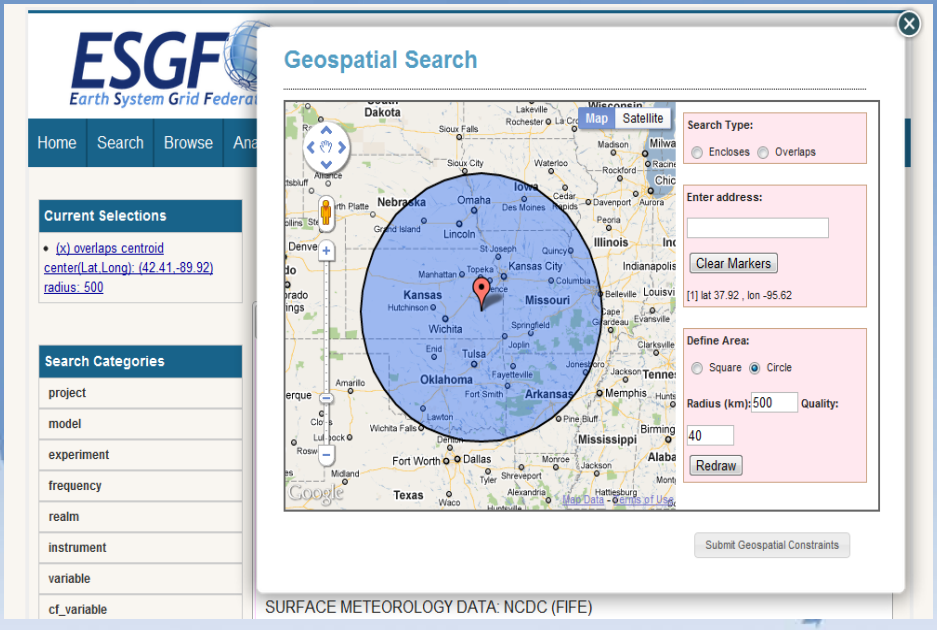


Geospatial Search

- **Overlay map (Google Maps) display for selection of records over a range of latitudes longitudes**
  - **Users choose markers on a map for boundaries**
  - **Ranges are defined as a *bounding box* or with center/radius (*centroid*)**
  - **Searches may be enclosing or overlapping**



Bounding Box



Centroid

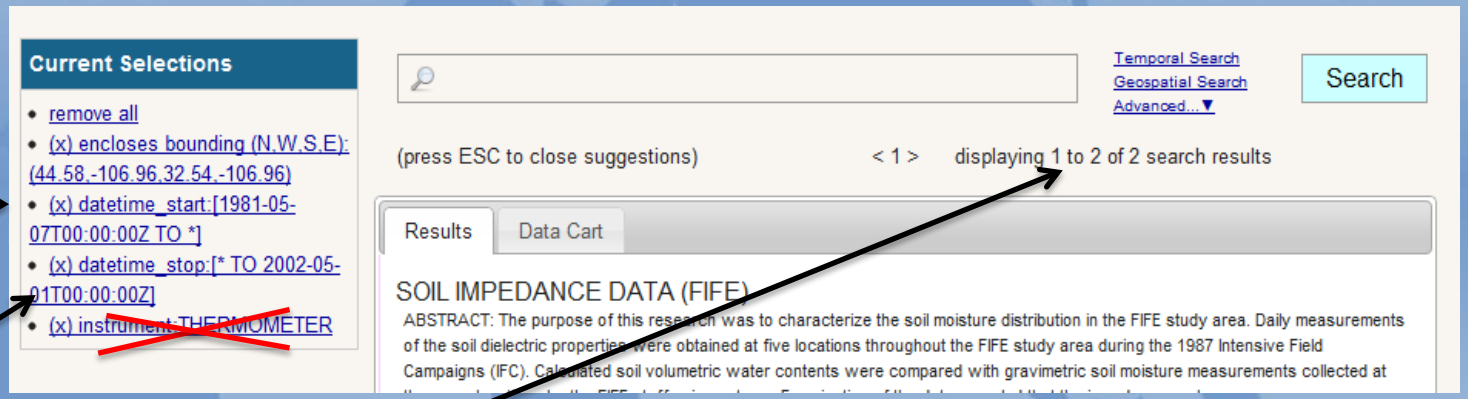
Current Search Selection

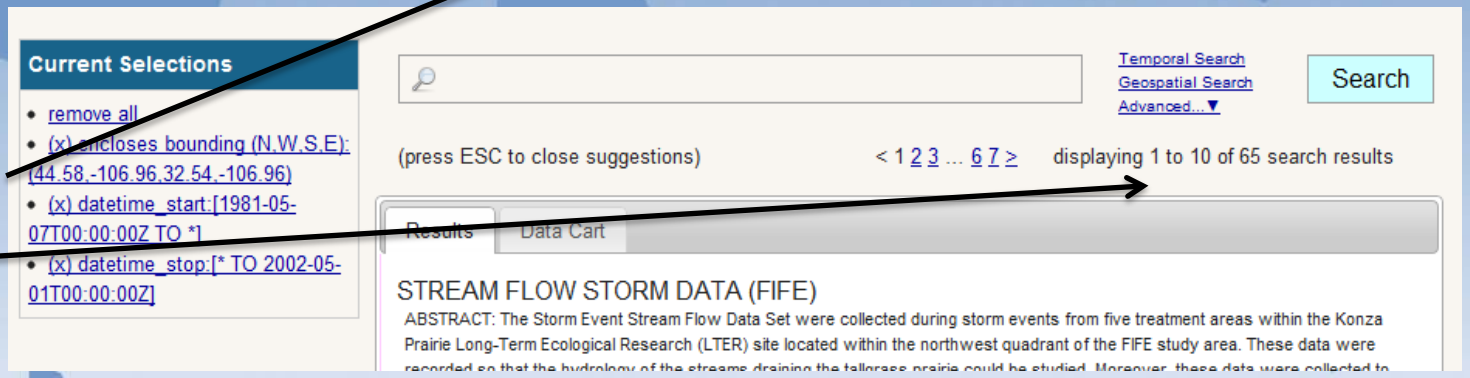
- **Current state of search constraints selections are displayed in the "current selections" box**
- **Allows user to view a "breadcrumb" trail of previous constraints of the search**

Dynamic Display Window

Selections may be added (by search) or removed (by clicking on that constraint) at any time

Search results are updated as constraints change





Search Results/Data Cart

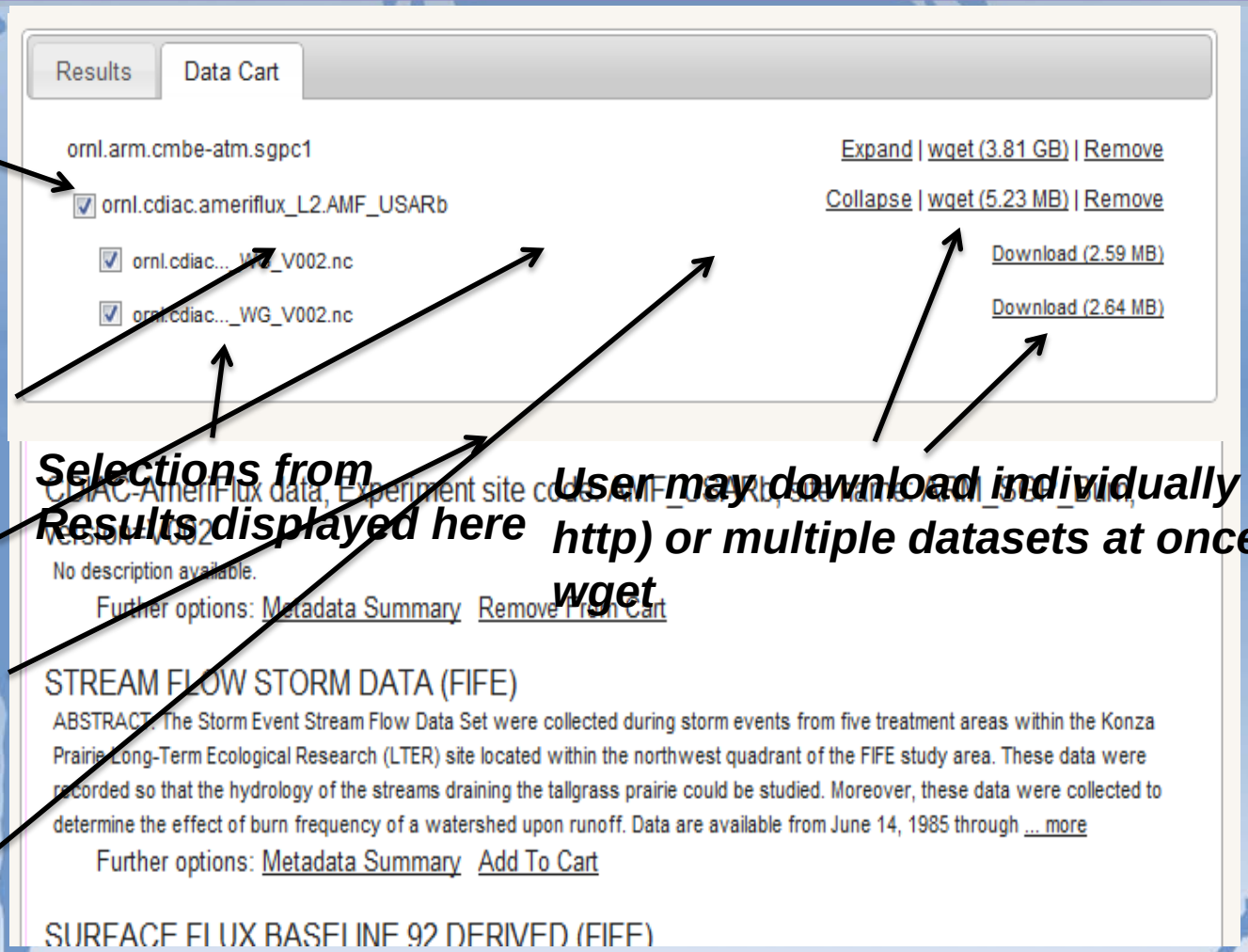
Dataset Title & Brief Descriptions (if any)

Quick view of metadata values in an overlay window

Add dataset to the data cart

Remove dataset from the data cart

Open LAS tools UI



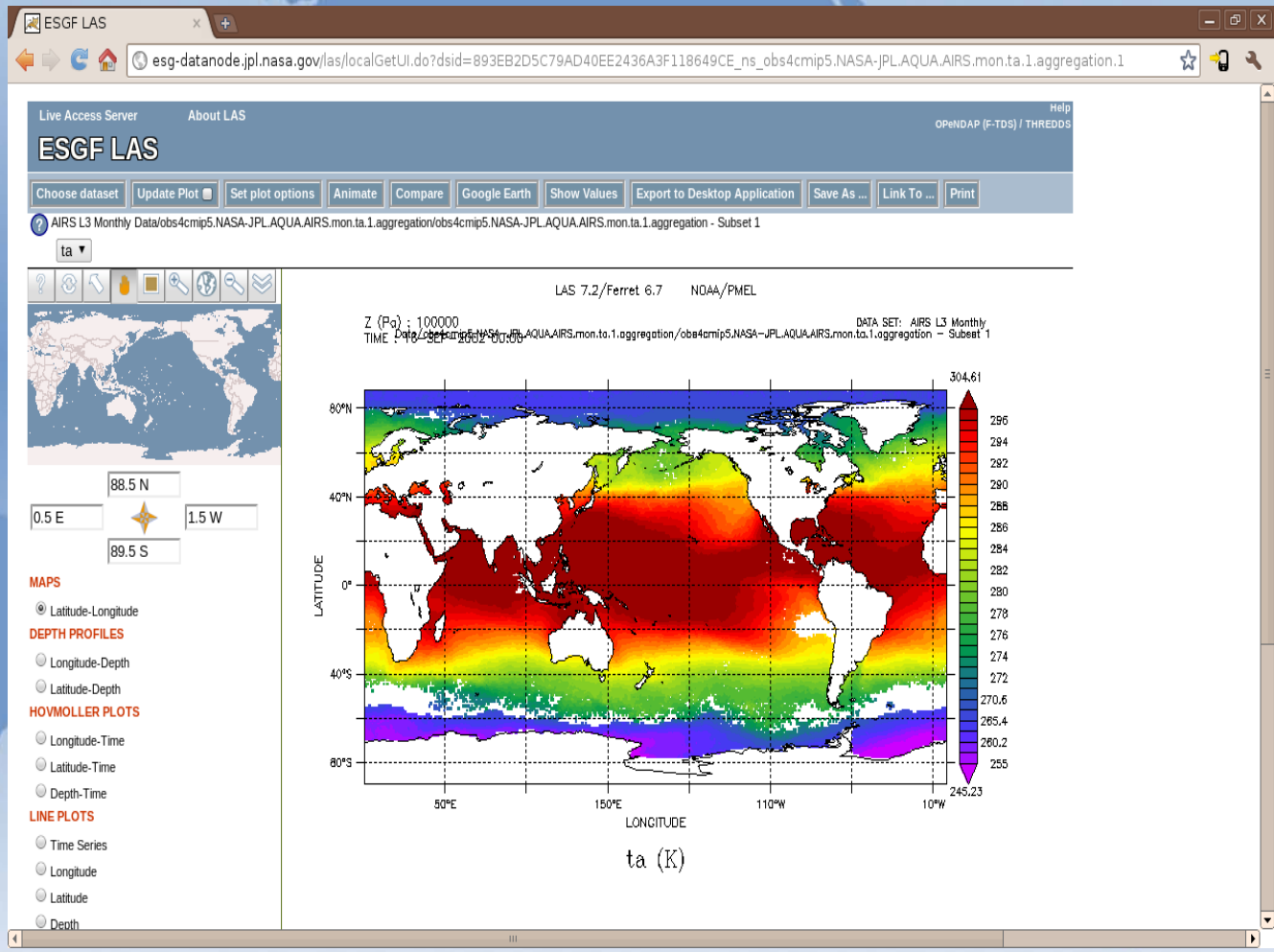
Selections from Results displayed here

User may download individually (via http) or multiple datasets at once via wget

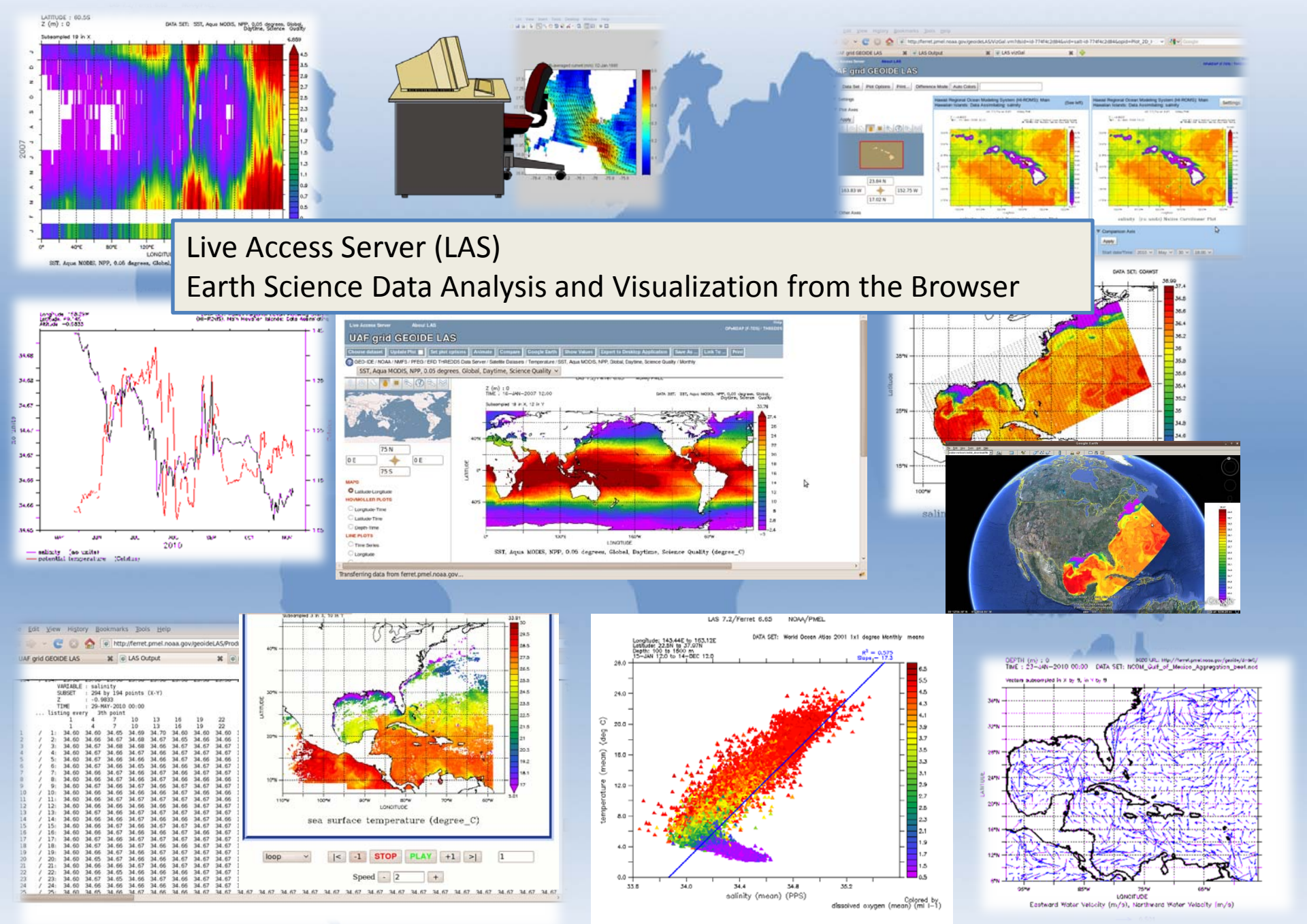
Visualization with LAS

- **LAS opens with the first variable of the data set selected and the default plot type (lat/on map).**

- **From here the user can create any of the products available from LAS.**

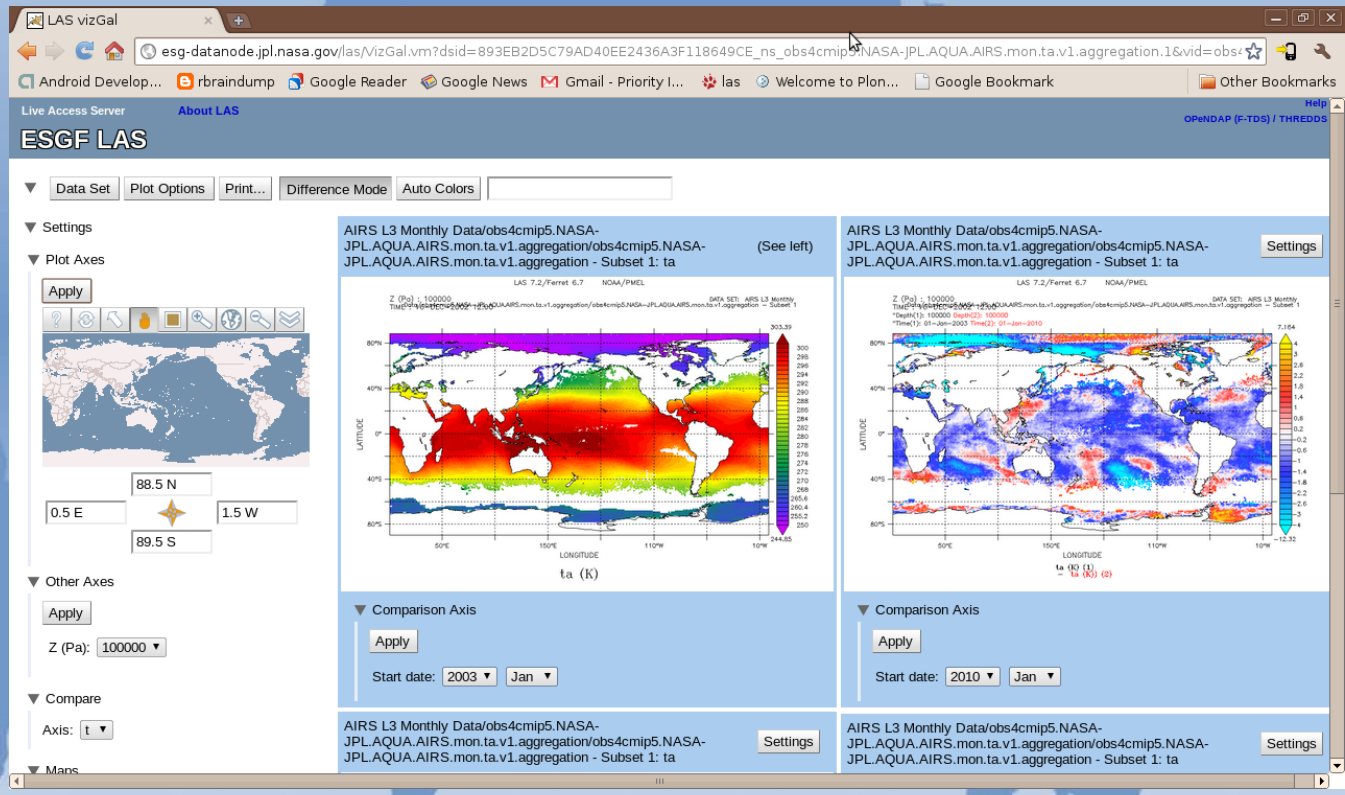


Live Access Server (LAS)
Earth Science Data Analysis and Visualization from the Browser



Comparison with LAS vizGal

- **One of the most interesting products for ESG is the comparison interface that allows comparisons along an axis and between data sets.**



Future Enhancements

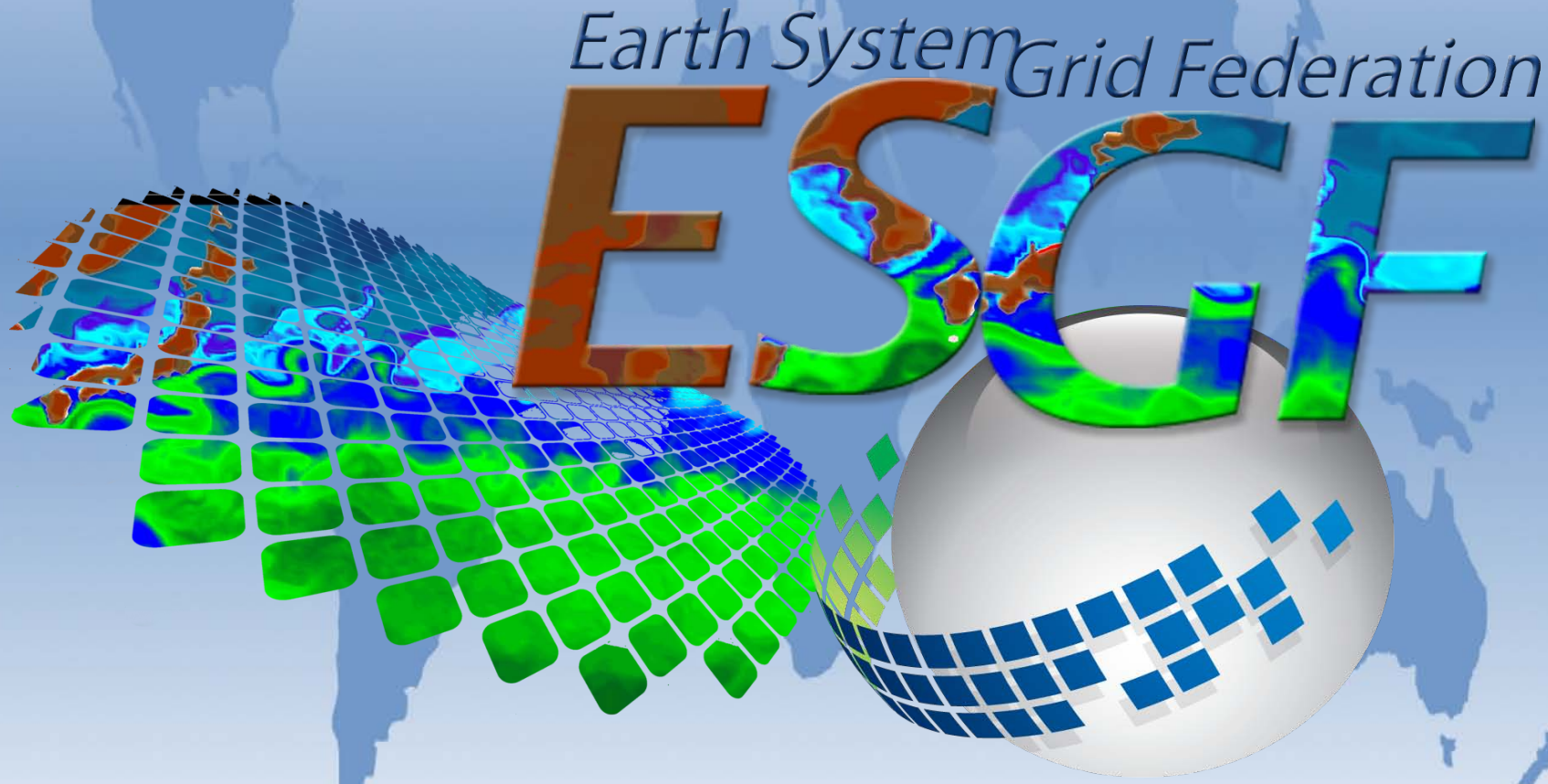
- Usability Tests/Feedback
- Retrieval of data subsets
  - Downloads via OpenDAP
- LAS vizGal for multiple datasets
- ESGF as a platform
  - Web2.0
  - Social Web / OpenGraph protocol
  - Annotation mechanisms
  - Publication citations using Mendeley
- Recommendations (“MoreLikeThis”)
- Boosting
- Semantic search

Demo

- **Short Demonstration (time permitting)**

- **Availability**
  - **Oak Ridge National Laboratory - http://bones.ccs.ornl.gov/esgf-web-fe**
  - **NASA JPL - http://esg-datanode.jpl.nasa.gov/esgf-web-fe/live**
  - **PCMDI - http://esg-test1.llnl.gov/esgf-web-fe/**

Questions?



Live Access Server (LAS)

- **"Visualize and Analyze" link sends user to *LAS UI***
- **LAS reads a URL query string that is extracted from TDS catalogs**
  - The location of the "home" server for a data set is encoded into the data set ID
- **LAS Servers are "confluence servers" - a single LAS can proxy UI Ajax requests for all the other LAS servers in the federation**
  - A product request for a particular data set is always sent to the LAS server where the data resides.
- **The LAS data selection widgets only display those data sets which came in on the request**
- **New selections require user to return to the ESGF UI.**