International Research Institute
for Climate and Society
EARTH INSTITUTE | COLUMBIA UNIVERSITY

Introduction to the IRI Data Library

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ICTP Advanced School and Workshop on Subseasonal to Seasonal (S2S) Prediction and Application to Drought Prediction

Objectives:

- to get familiar with the organization of the Data Library
- to learn how to browse datasets and select different domains and periods
- to learn how to perform simple calculations
- to learn how to create maps and plots
- to learn how to download data files and images
- to introduce some relevant datasets and map rooms

IRI Data Library is…

Data repository

>400 datasets covering all aspects of climate-related characteristics

Data analysis tool

performs several simple and not so simple arithmetic operations (e.g. EOF analysis)

Data visualization tool

Time series, maps, cross-sections

Data download resource

Free access to several data formats such as text, binary, GIS-compatible, etc.

http://iridl.ldeo.columbia.edu

HOME PAGE

Climate Data Library

iridl.ldeo.columbia.edu

IRI/LDEO Climate Data Library

Language: english

IRI/LDEO Climate Data Library

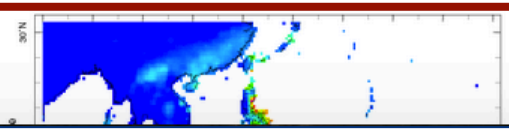
The IRI Data Library is a powerful and freely accessible online data repository and analysis tool that allows a user to view, analyze, and download hundreds of terabytes of climate-related data through a standard web browser.

It is a powerful tool that offers the following capabilities at no cost to the user:

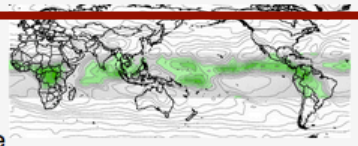
- access any number of datasets;
- create analyses of data ranging from simple averaging to more advanced EOF analyses using the Ingrid Data Analysis Language;
- monitor present climate conditions with maps and analyses in the Maproom;
- create visual representations of data, including animations;
- download data in a variety of commonly-used formats, including GIS-compatible formats.

Latest from our What's New blog

GPCC FDP Version 7 Gridded Precipitation



IRI Climate and Society Map Room



The climate and society maproom is a collection of maps and other figures that monitor climate and societal conditions at present and in the recent past. The maps and figures can be manipulated and are linked to the original data. Even if you are primarily interested in data rather than figures, this is a good place to see which datasets are particularly useful for monitoring current conditions.

Data by Source

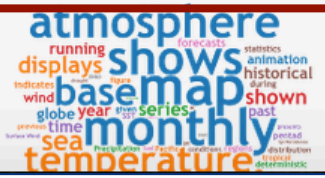
Datasets organized by source, i.e. creator and/or provider.

Data By Category

Selected Datasets for particular topics

Dataset and Map Room Browser

Find datasets and maps organized by many characteristics and keywords



HOME PAGE - CONTINUED

Climate Data Library

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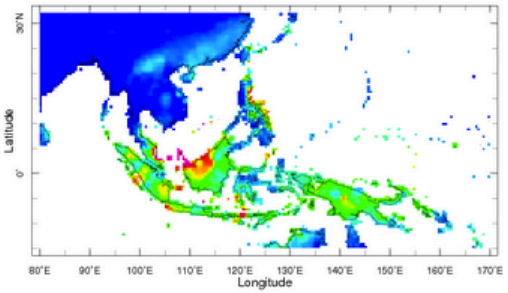
Search

Latest from our What's New blog

GPCC FDP Version 7 Gridded Precipitation



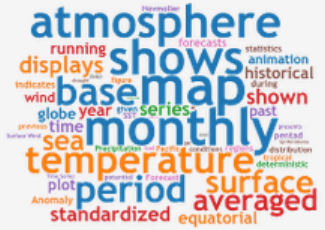
Dec 2013

Version 7 of the Global Precipitation Climatology Centre (GPCC) Full Data Product (FDP) global gridded land surface analysis of monthly precipitation and station counts was recently added to the IRI Data Library. The data are monthly values from January 1901 to December 2013 at three spatial resolutions, 0.5°, 1.0°, and 2.5° lat/lon.

new version *global* *precipitation* *monthly* *dataset*
2015-11-04 15:57:42 GMT

Dataset and Map Room Browser

Find datasets and maps organized by many characteristics and keywords



Navigating Through the IRI Data Library: A Tutorial

The goal of this tutorial is to introduce you to the structure of the Data Library and the many ways to navigate through it.

Statistical Techniques in the Data Library: A Tutorial

Statistical techniques are essential tools for analyzing large datasets; this statistics tutorial thus covers essential skills for many data library users.

Function Index

Index for functions that can be used to analyze data within the Data Library.

Help Resources

The Help Resources include basic and statistics tutorials, function documentation, and other resources to help you get the

Structure of the datasets

-primary organization
    -dataset
    -dataset
        -variables
    -dataset
        -variables
    -dataset
        -variables

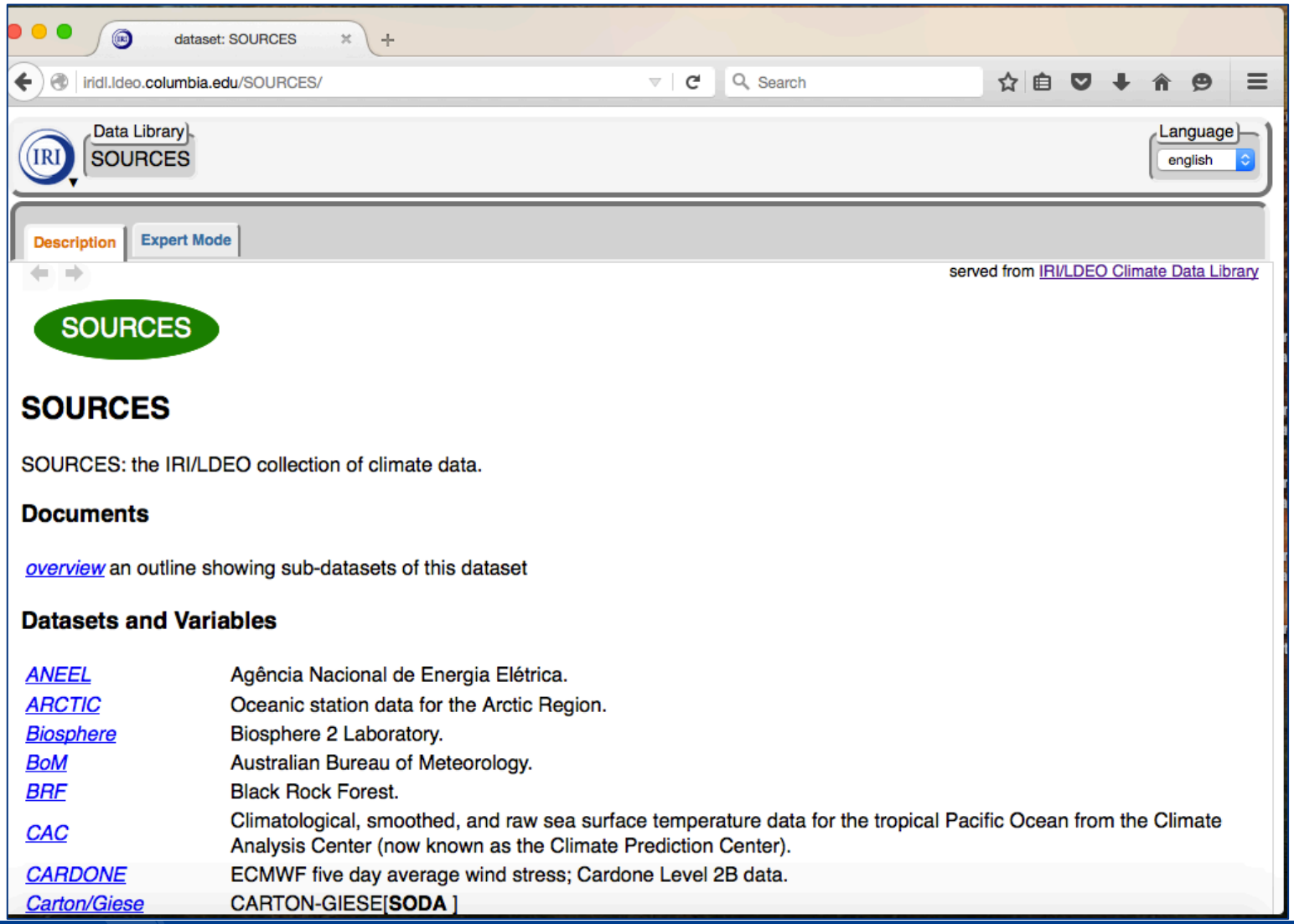
-primary organization
    ⋮

EXAMPLE: browsing by source

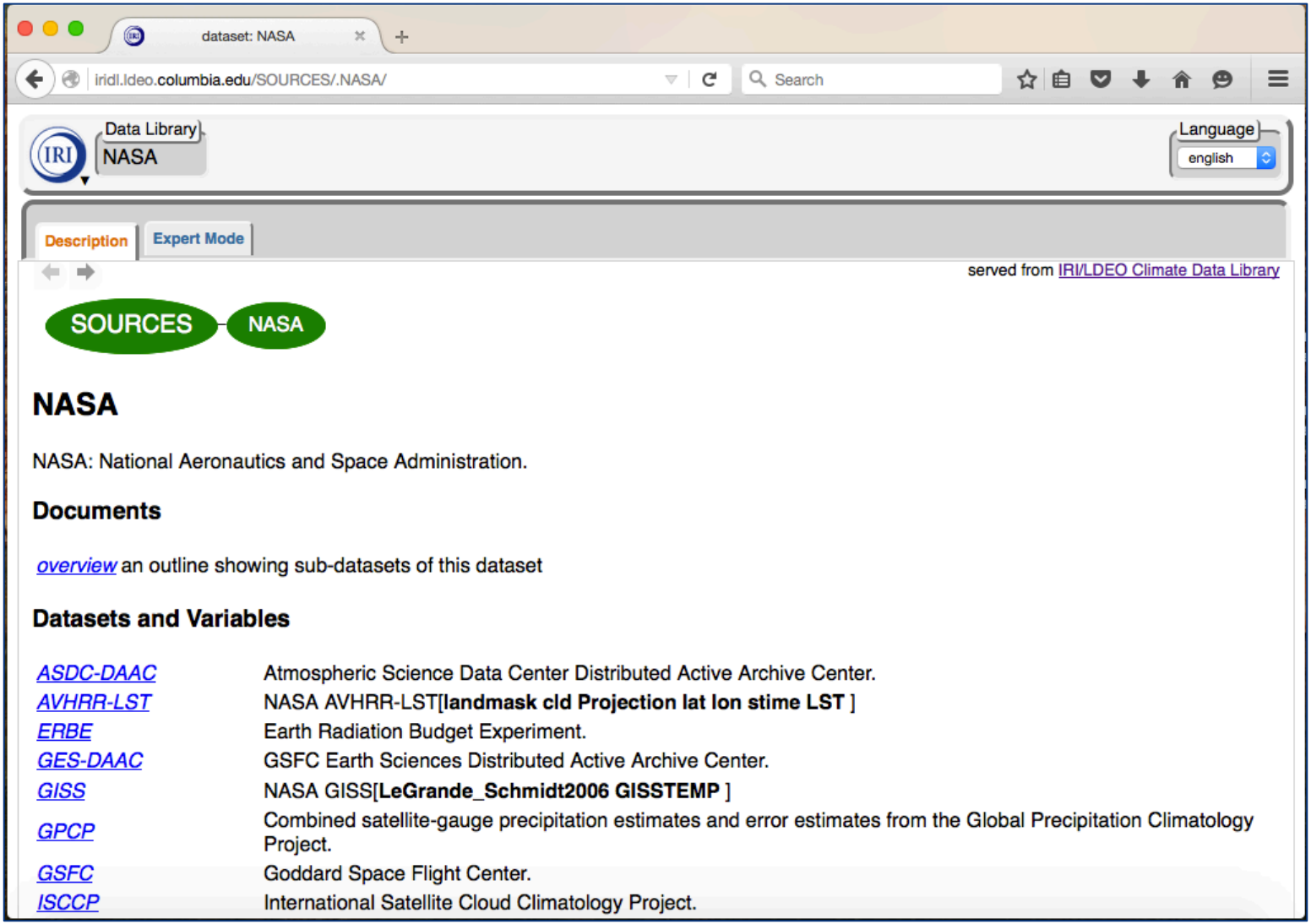
-NASA
    - ASDC-DAAC
        - variables
    - AVHHR-LST
        - variables
    - ERBE (Earth Radiation Budget Experiment)
        - Datasets by instrument
            - variables
    - GISS
        - LeGrande_Schmidt2006 (authors)
    - GPCP (Global Precipitation Climatology Project)
        - Datasets by version
        - Datasets by instrument
            - variables

-OTHER SOURCE

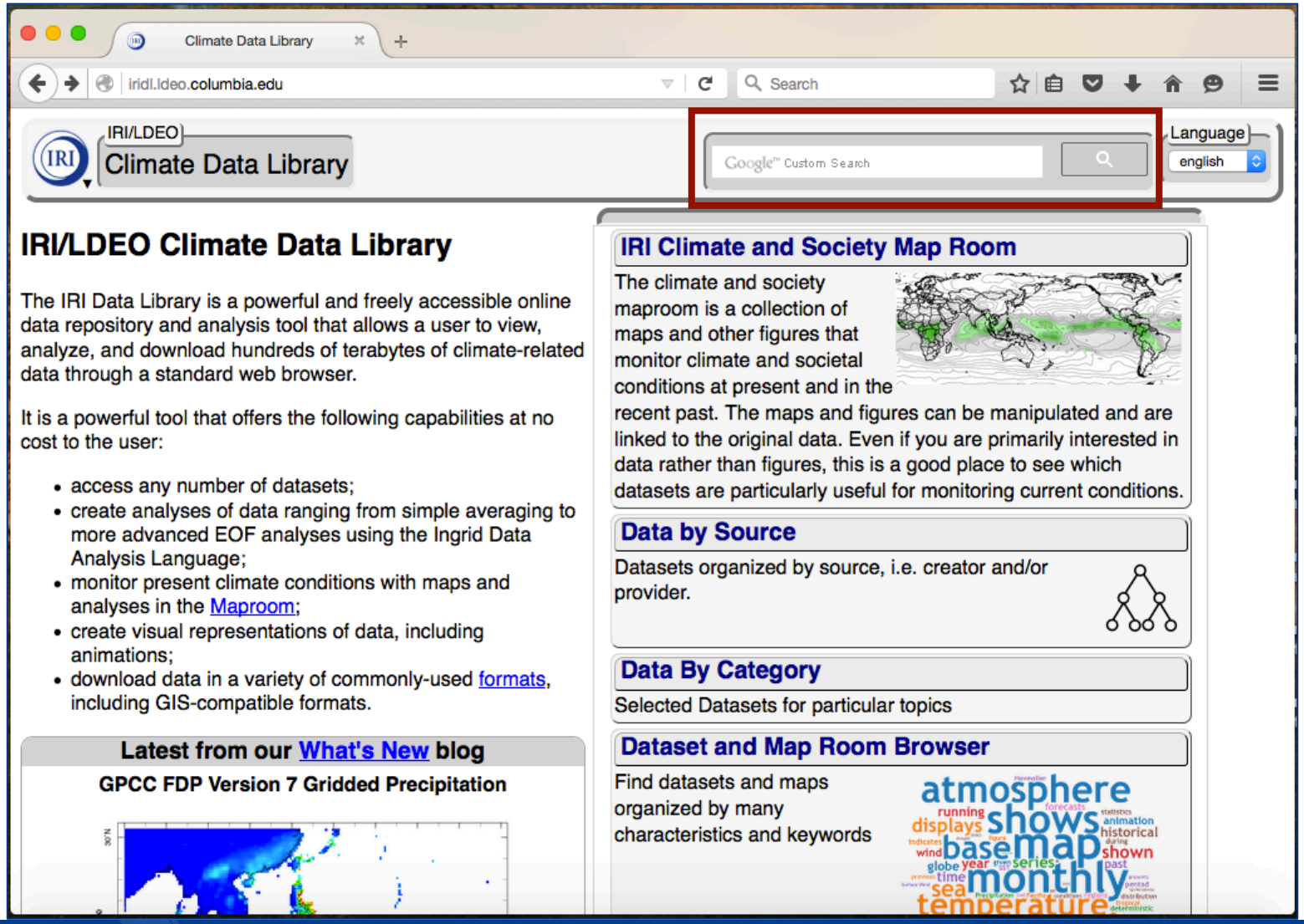
By source


dataset: SOURCES
iridl.ldeo.columbia.edu/SOURCES/
Search
Data Library
SOURCES
Language
english
Description
Expert Mode
served from IRI/LDEO Climate Data Library
SOURCES
SOURCES
SOURCES: the IRI/LDEO collection of climate data.
Documents
overview an outline showing sub-datasets of this dataset
Datasets and Variables
ANEEL Agência Nacional de Energia Elétrica.
ARCTIC Oceanic station data for the Arctic Region.
Biosphere Biosphere 2 Laboratory.
BoM Australian Bureau of Meteorology.
BRF Black Rock Forest.
CAC Climatological, smoothed, and raw sea surface temperature data for the tropical Pacific Ocean from the Climate Analysis Center (now known as the Climate Prediction Center).
CARDONE ECMWF five day average wind stress; Cardone Level 2B data.
Carton/Giese CARTON-GIESE[SODA]

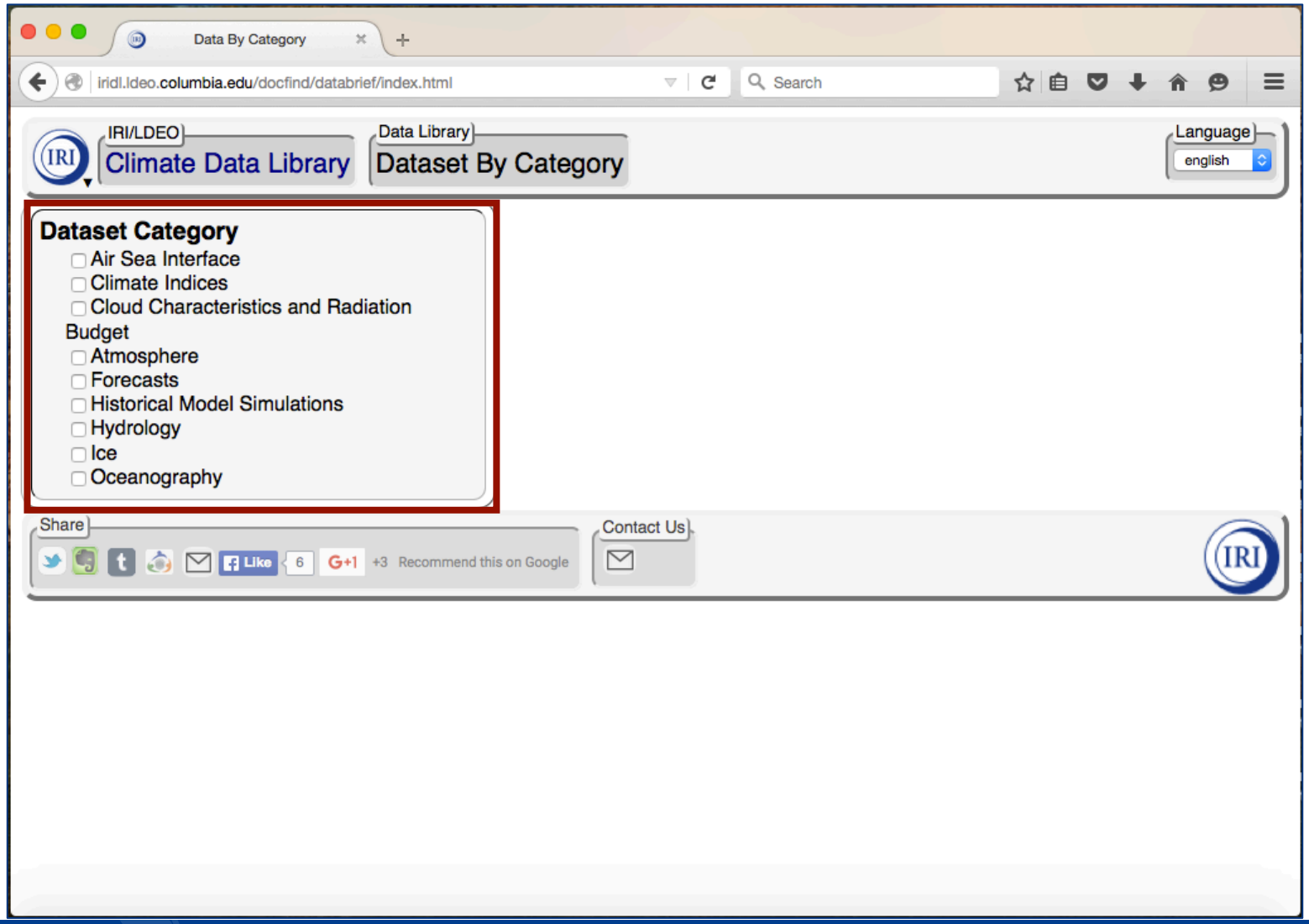
By source


dataset: NASA
iridl.ldeo.columbia.edu/SOURCES/.NASA/
Search
Data Library
NASA
Language
english
Description
Expert Mode
served from IRI/LDEO Climate Data Library
SOURCES
NASA
NASA
NASA: National Aeronautics and Space Administration.
Documents
overview an outline showing sub-datasets of this dataset
Datasets and Variables
ASDC-DAAC Atmospheric Science Data Center Distributed Active Archive Center.
AVHRR-LST NASA AVHRR-LST[landmask cld Projection lat lon stime LST]
ERBE Earth Radiation Budget Experiment.
GES-DAAC GSFC Earth Sciences Distributed Active Archive Center.
GISS NASA GISS[LeGrande_Schmidt2006 GISSTEMP]
GPCP Combined satellite-gauge precipitation estimates and error estimates from the Global Precipitation Climatology Project.
GSFC Goddard Space Flight Center.
ISCCP International Satellite Cloud Climatology Project.

Search engine



By category

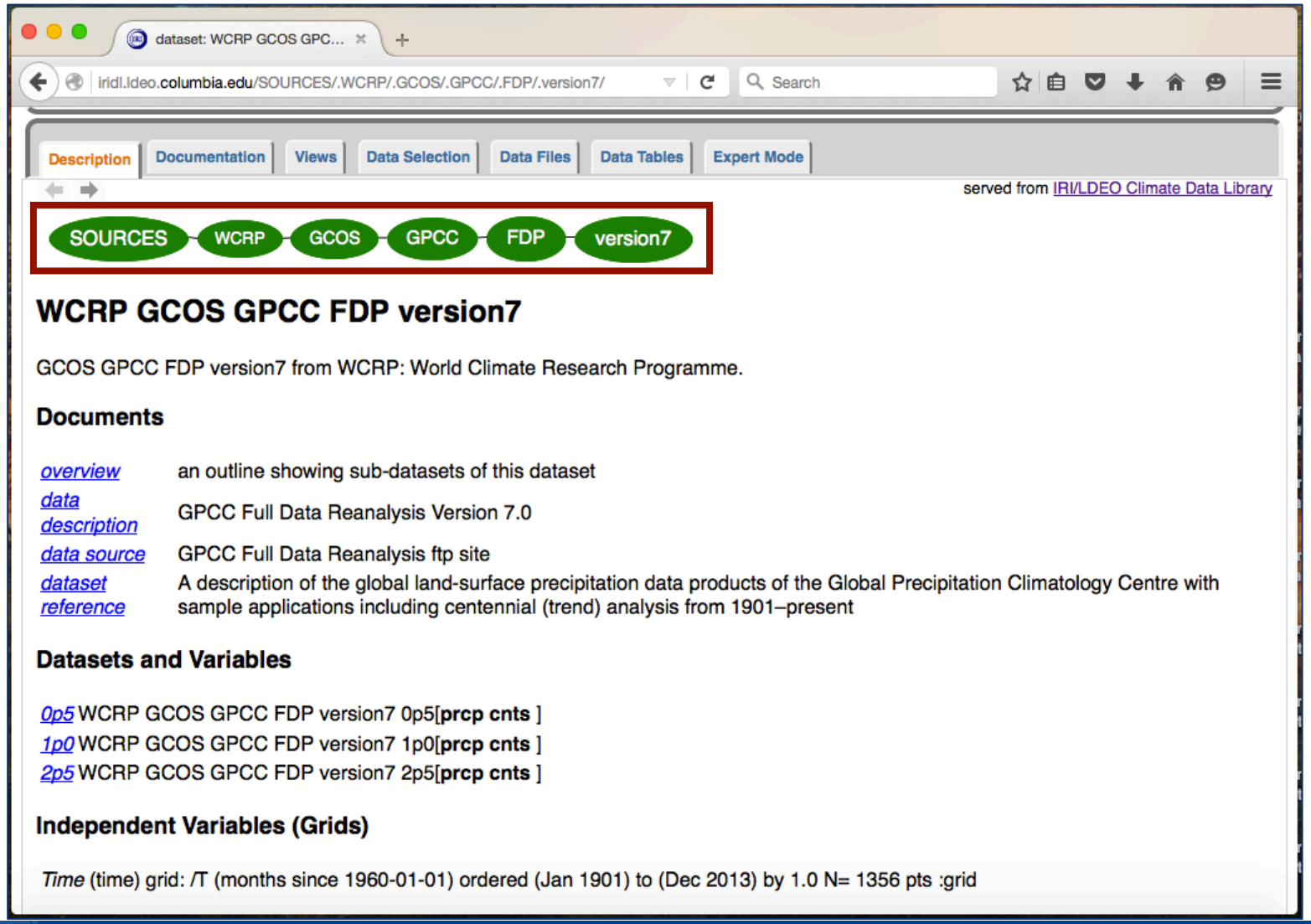

Data By Category
iridl.ldeo.columbia.edu/docfind/databrief/index.html
Search
IRI/LDEO
Climate Data Library
Data Library
Dataset By Category
Language
english
Dataset Category
Air Sea Interface
Climate Indices
Cloud Characteristics and Radiation
Budget
Atmosphere
Forecasts
Historical Model Simulations
Hydrology
Ice
Oceanography
Share
Like
6
G+1
+3
Recommend this on Google
Contact Us
IRI

Datasets page content and structure

Source bar: navigational information

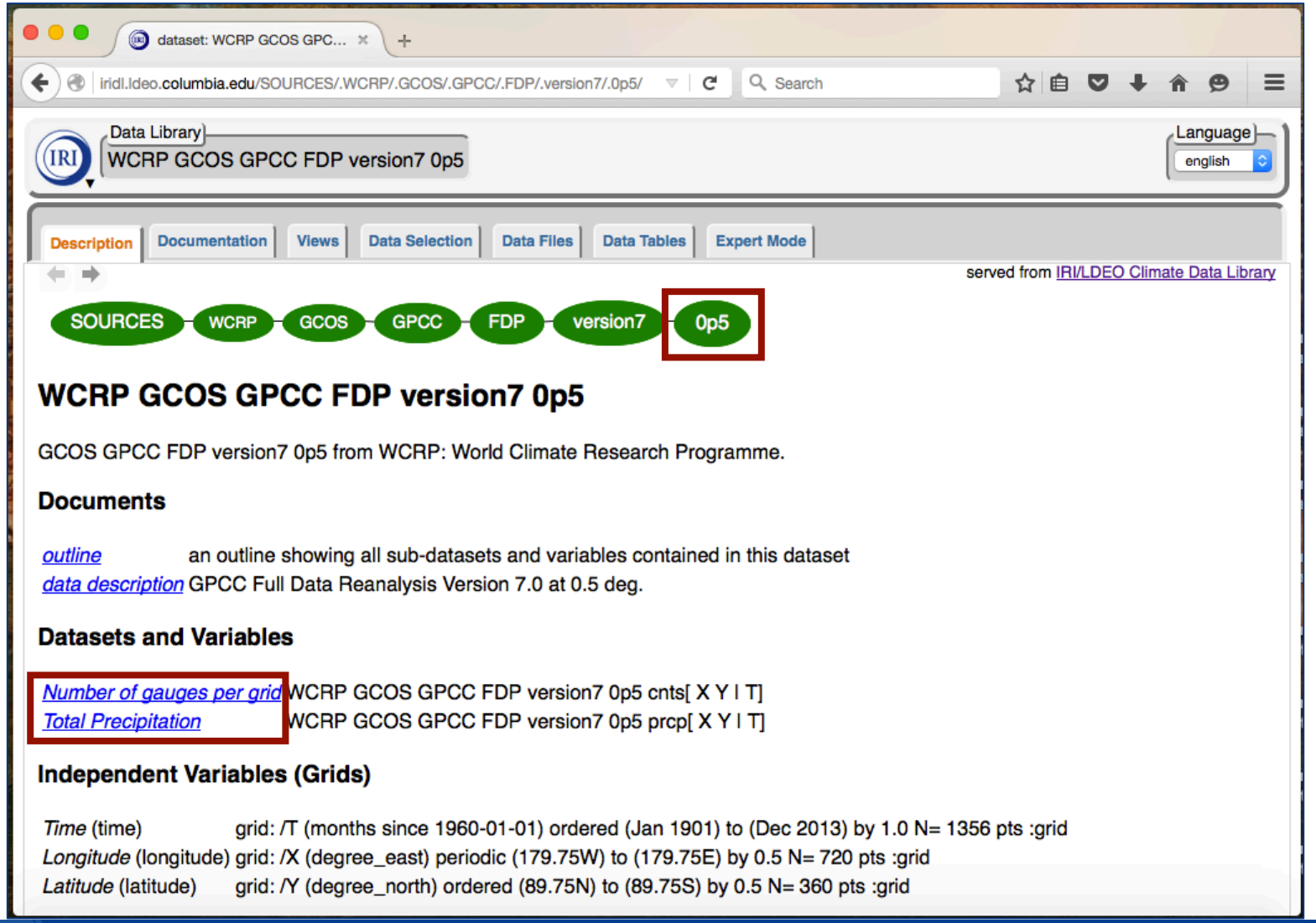
dataset information

variables



Datasets page content and structure

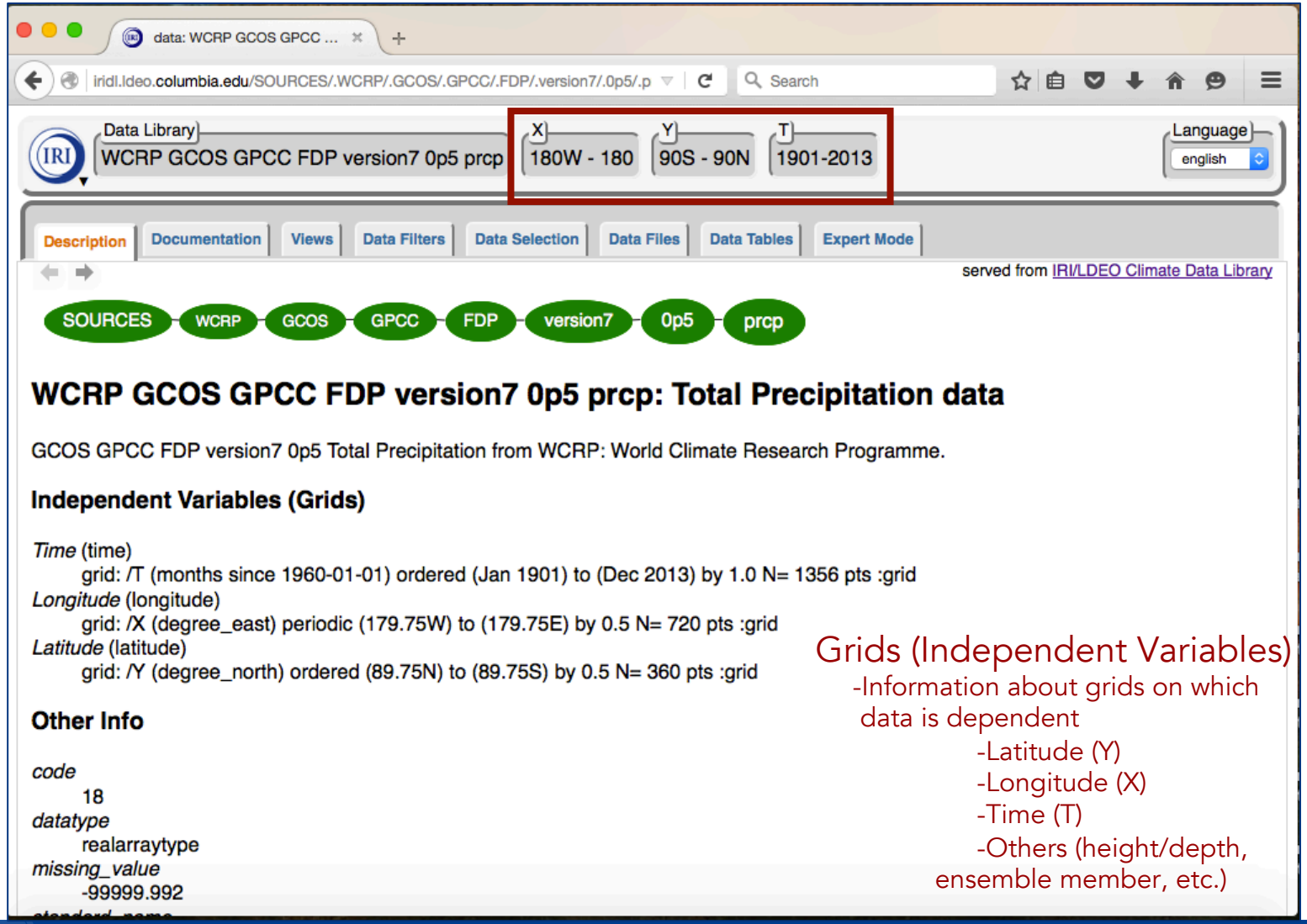
secondary variables



Datasets page content and structure

Spatial and temporal domains

Grid information



Grids (Independent Variables)

-Information about grids on which data is dependent

-Latitude (Y)

-Longitude (X)

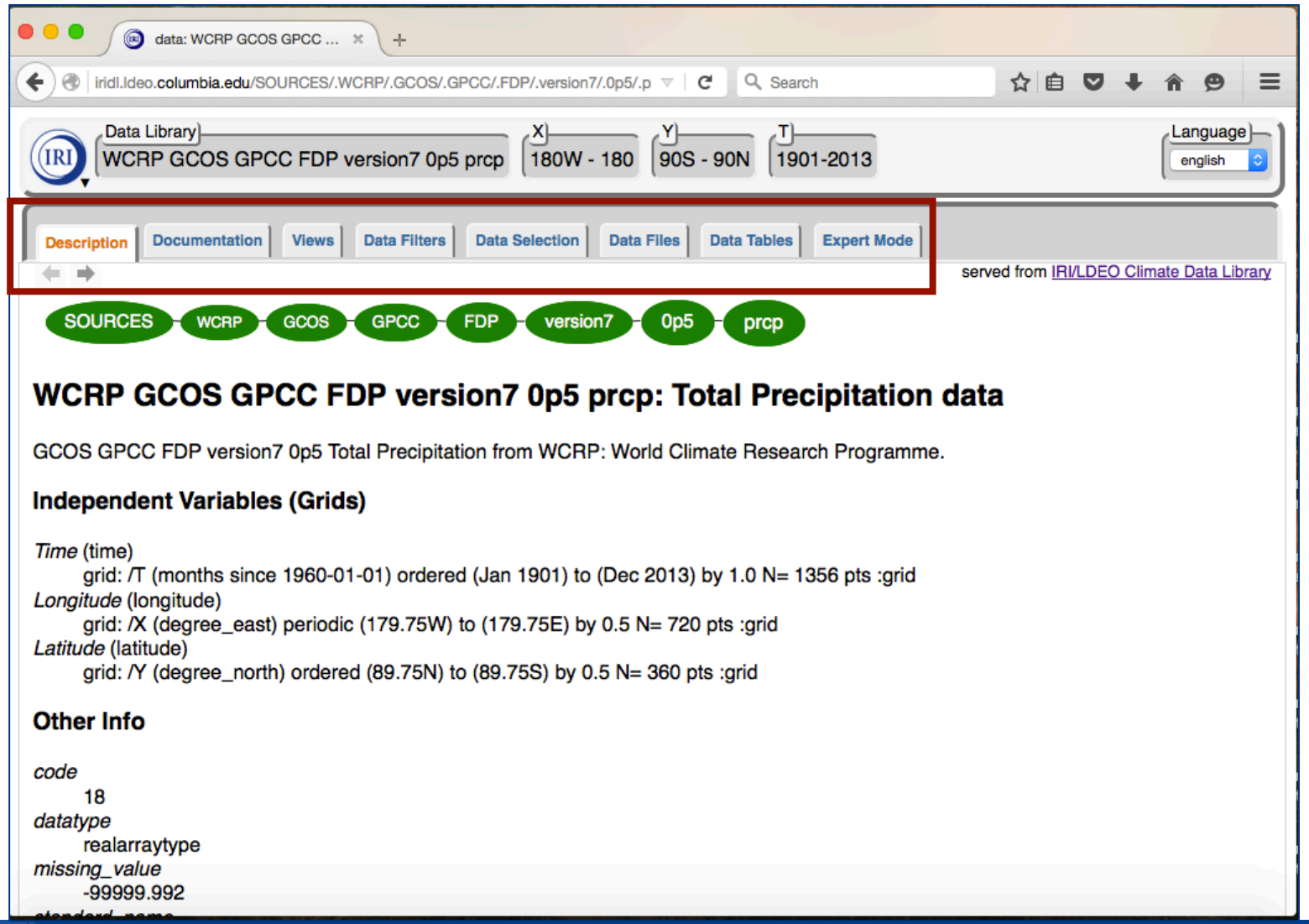
-Time (T)

-Others (height/depth, ensemble member, etc.)

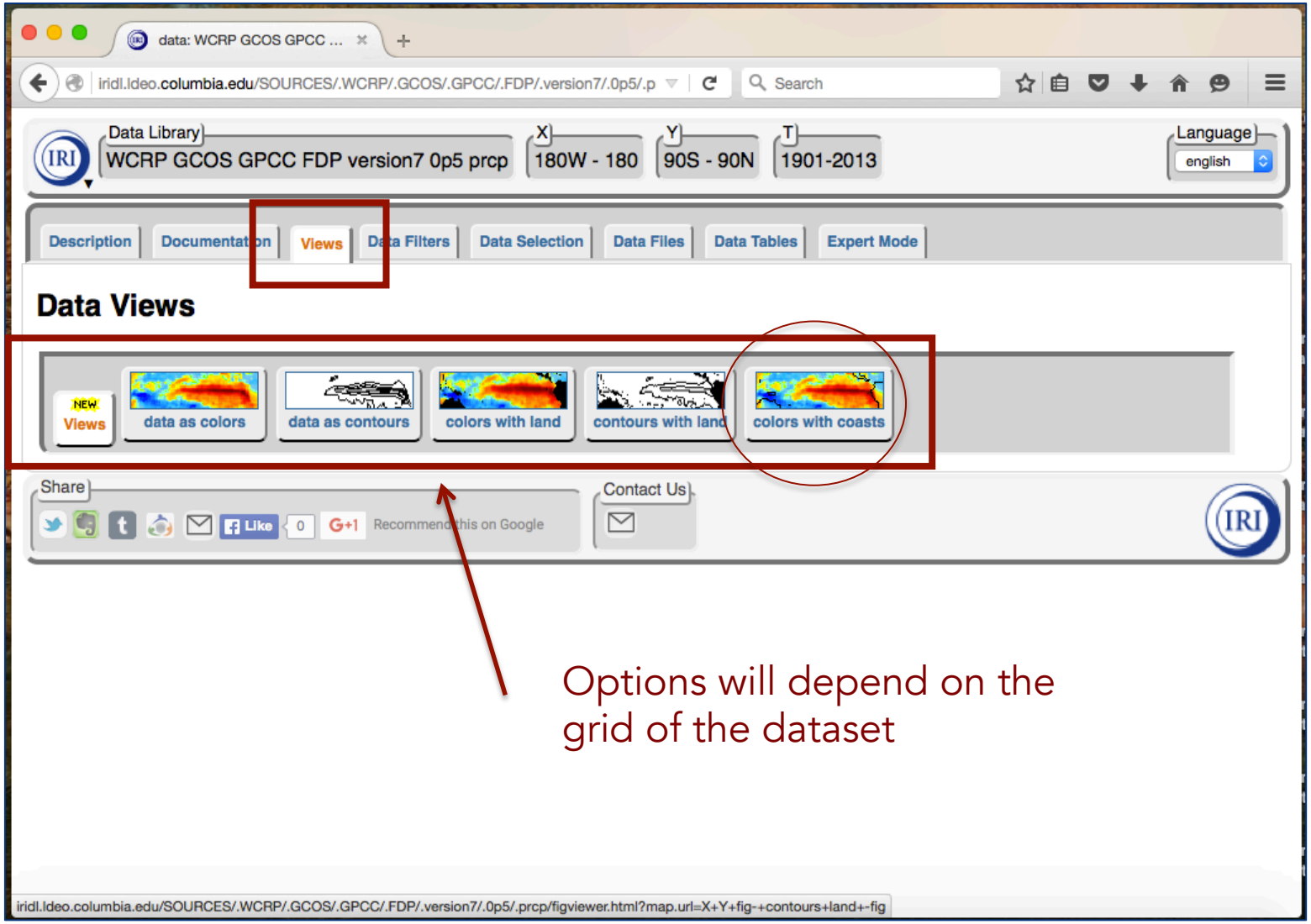
Datasets page content and structure

Functions tab

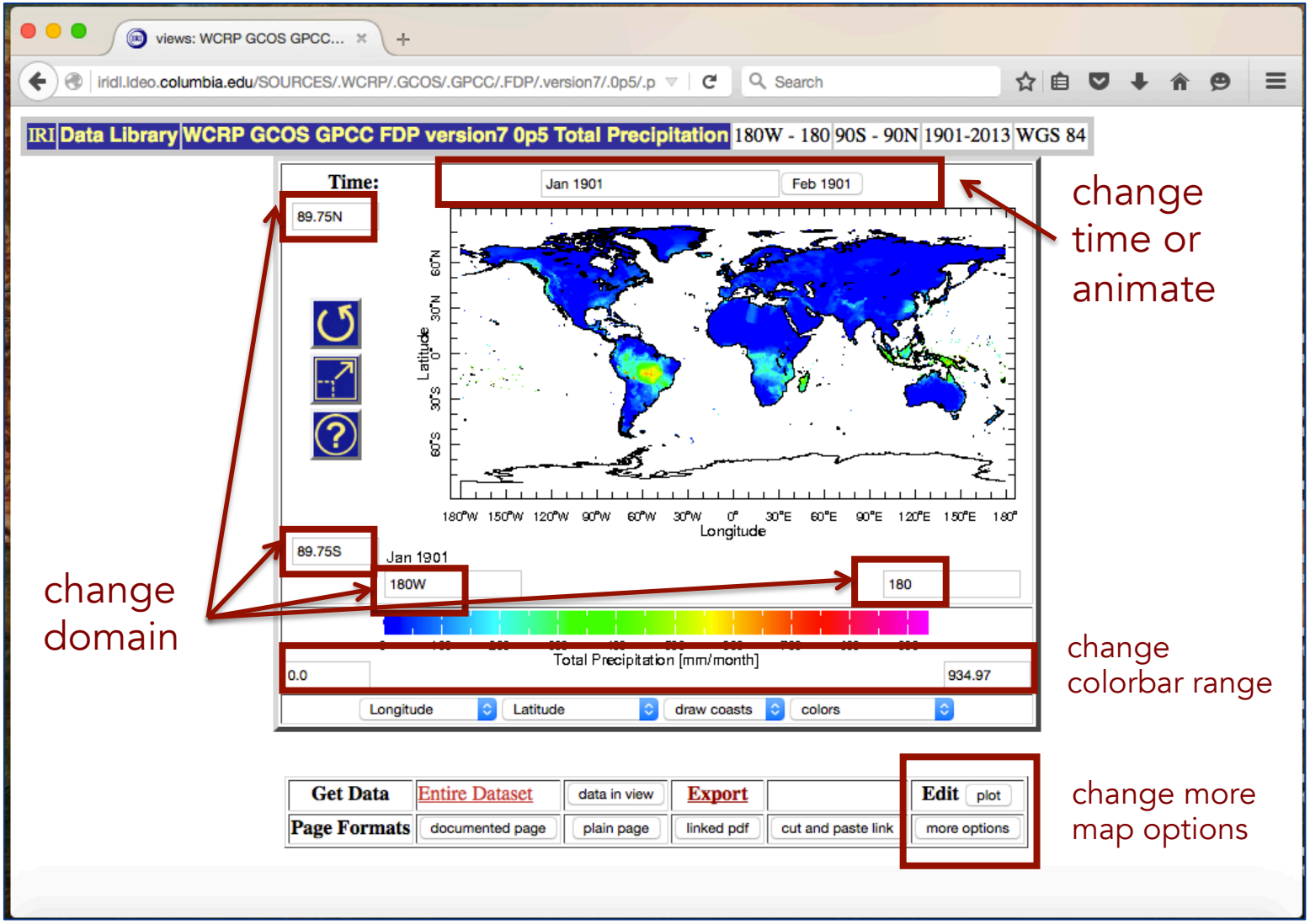
- documentation
- manipulation
- visualization
- download



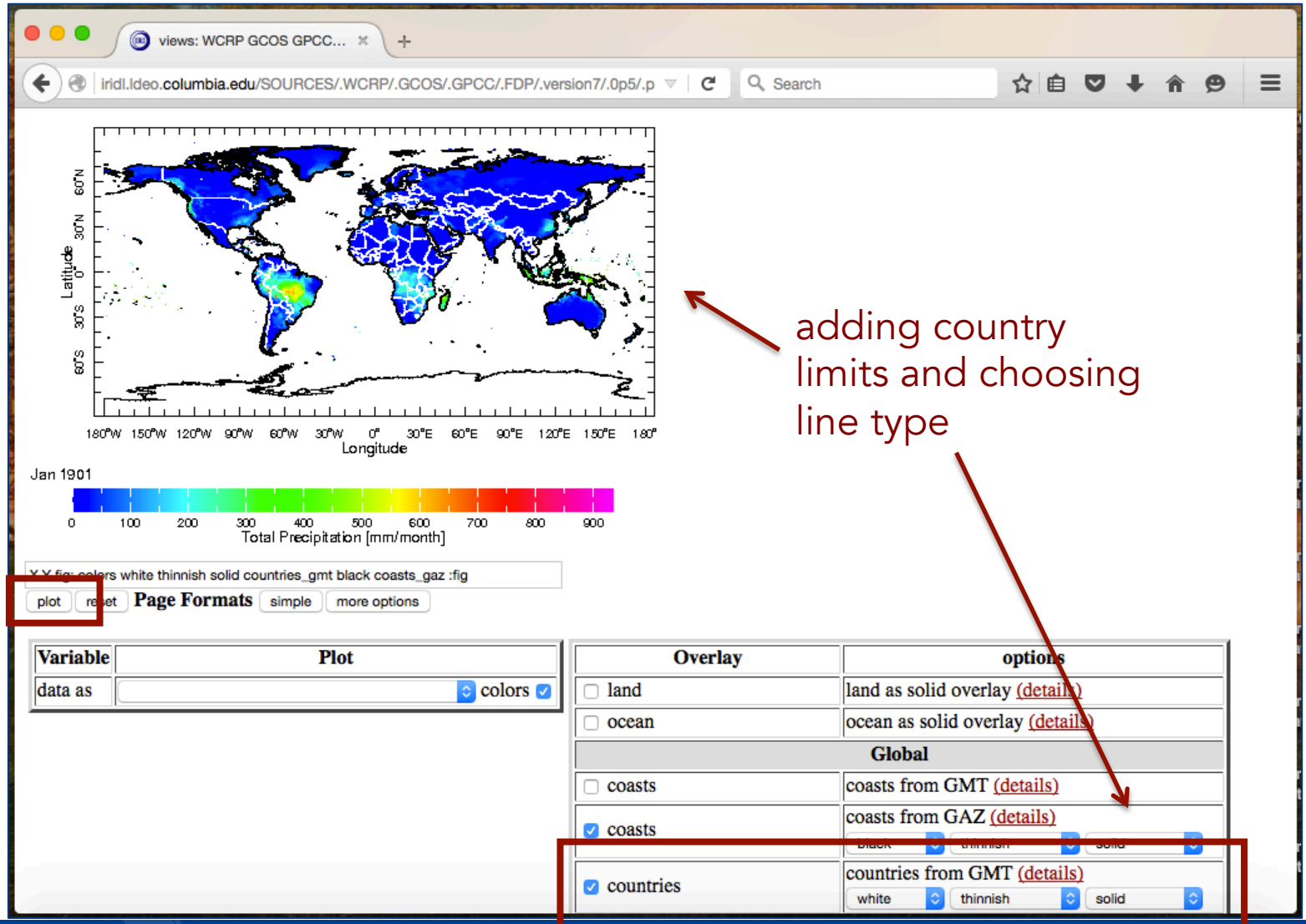
Visualizing data



Visualizing data

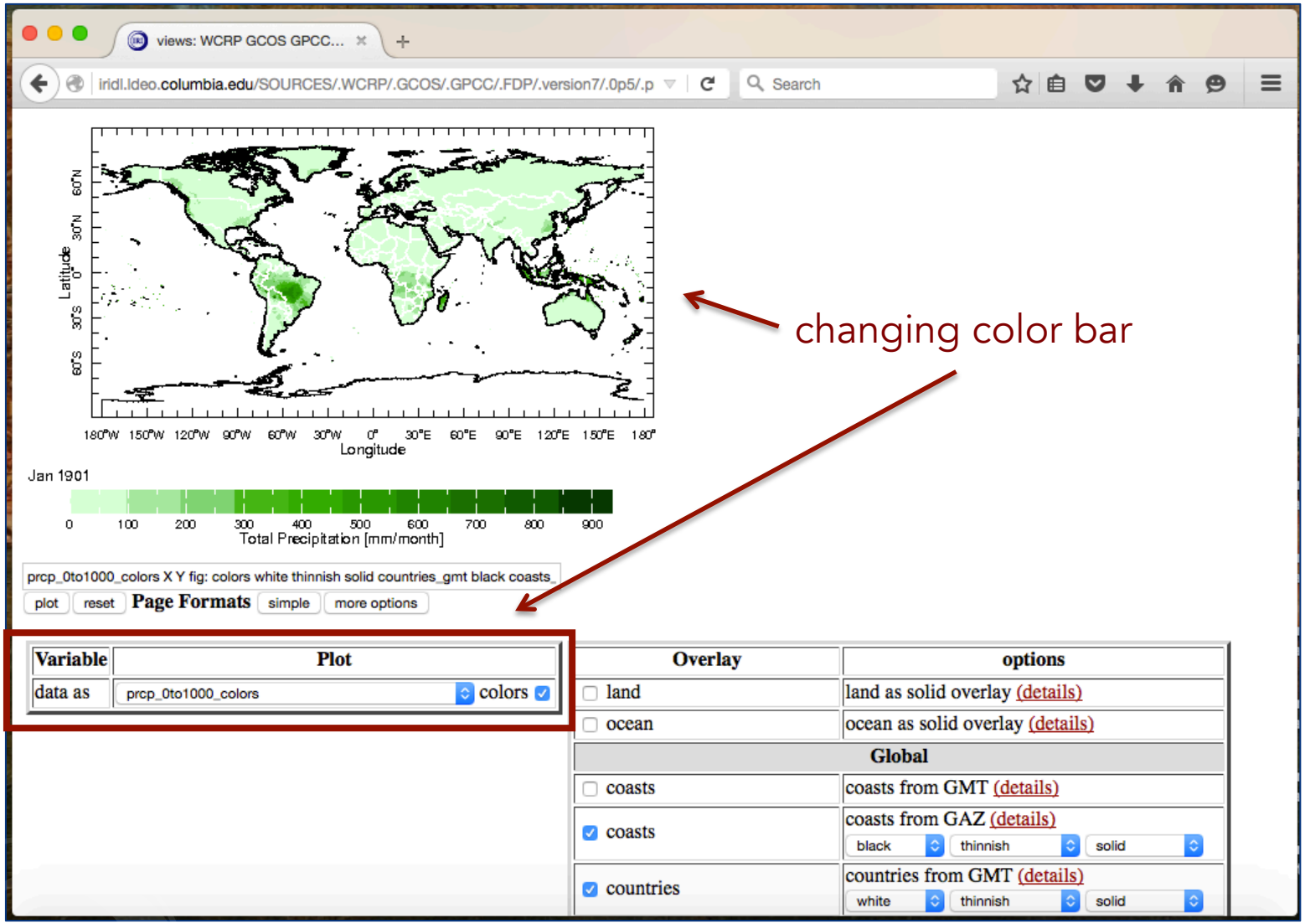


Visualizing data



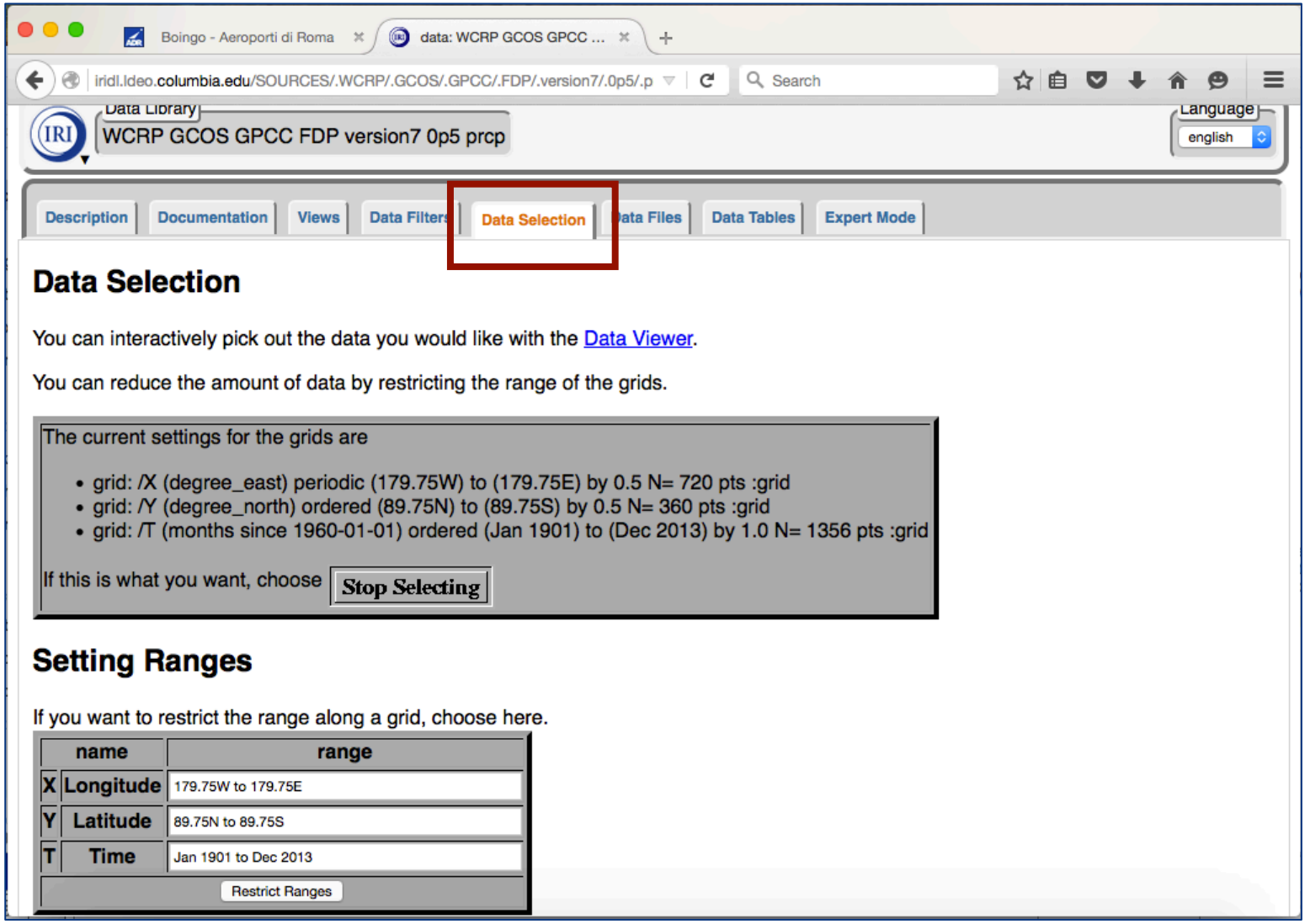
adding country limits and choosing line type

Visualizing data

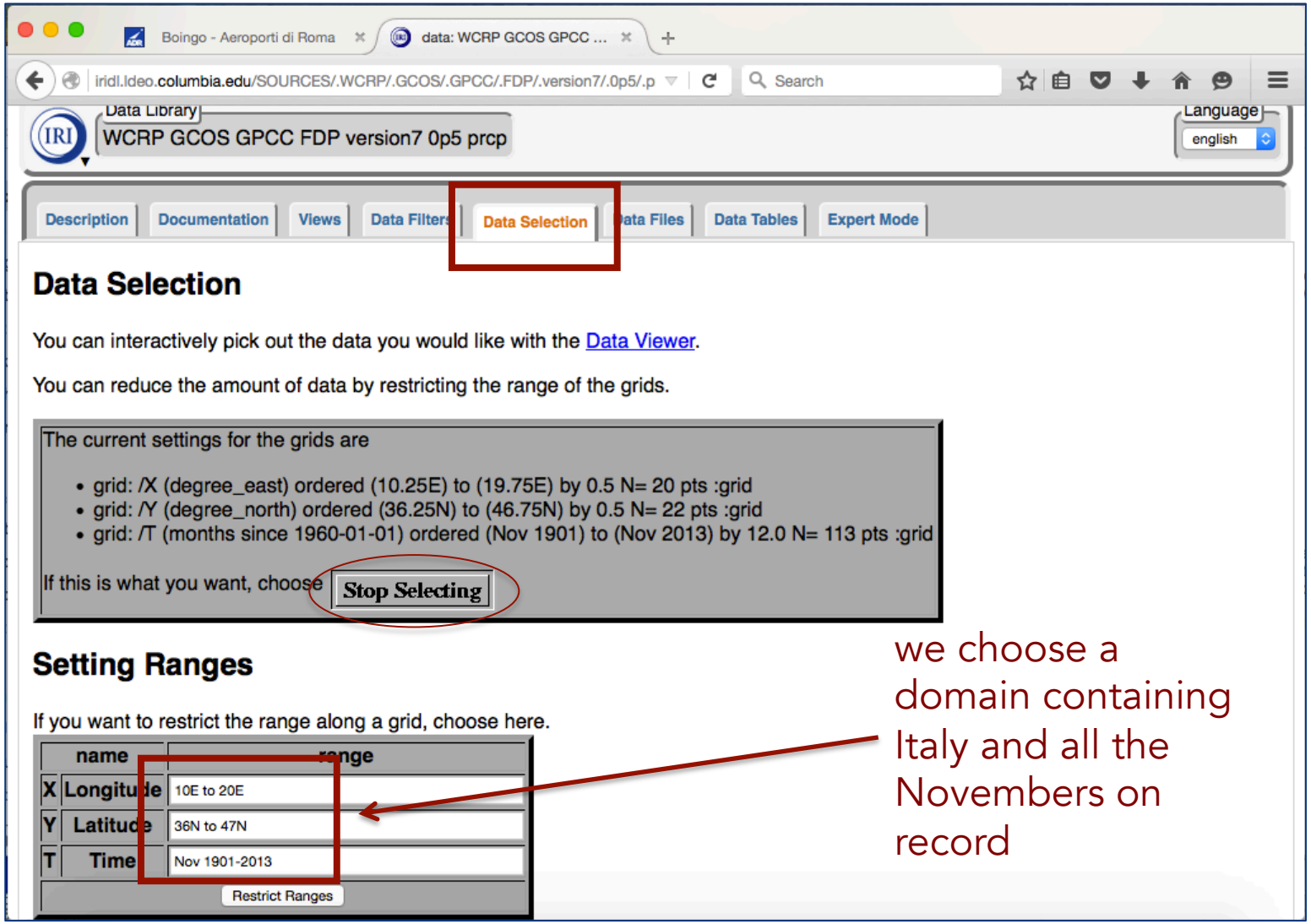


changing color bar

Data selection interface

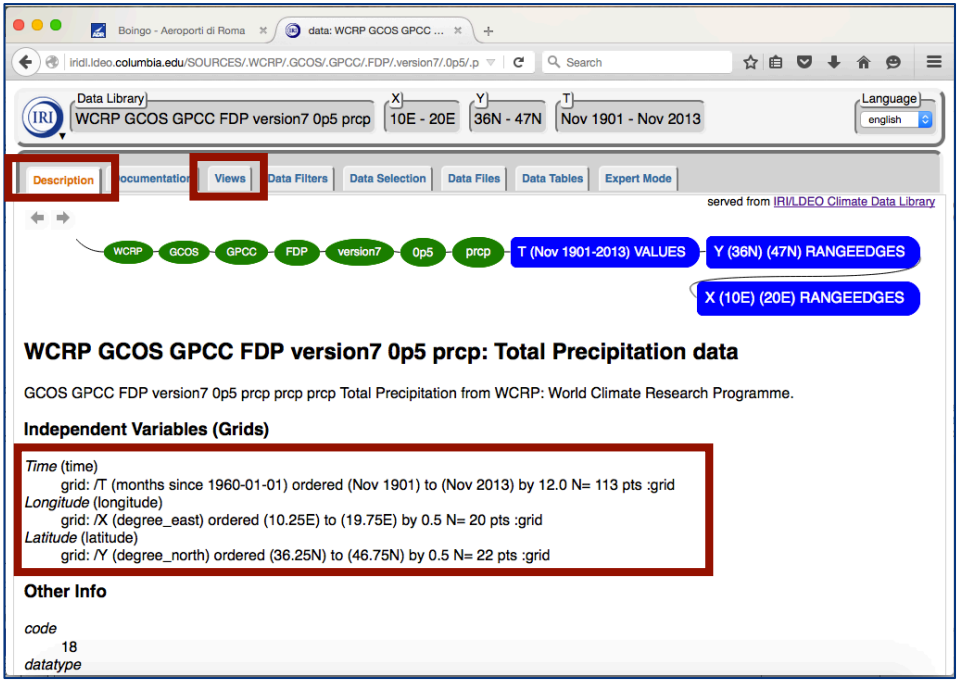


Data selection interface

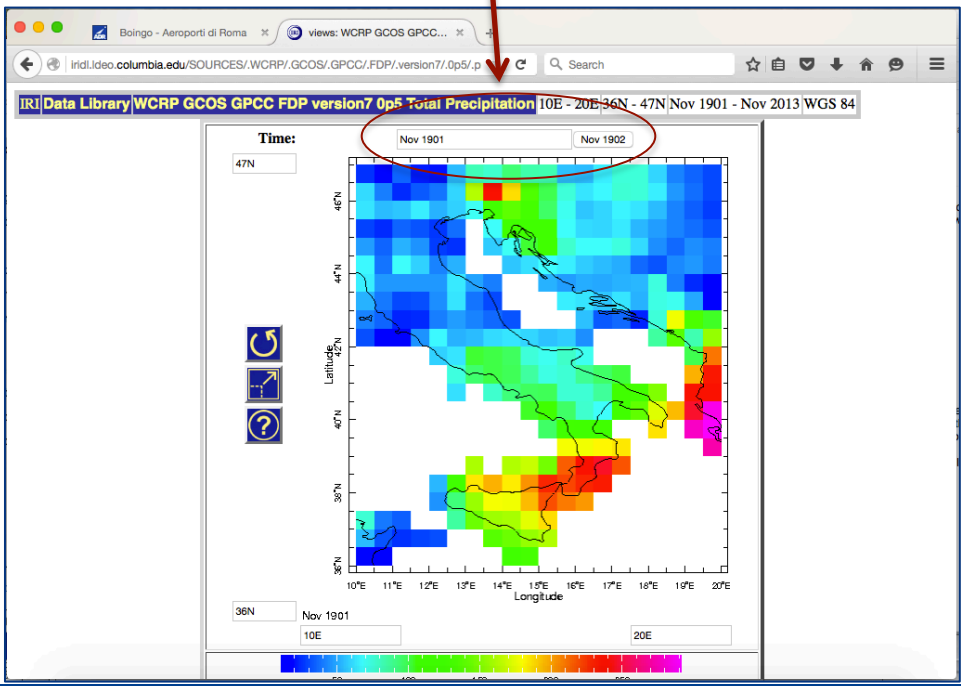


we choose a domain containing Italy and all the Novembers on record

Data selection interface

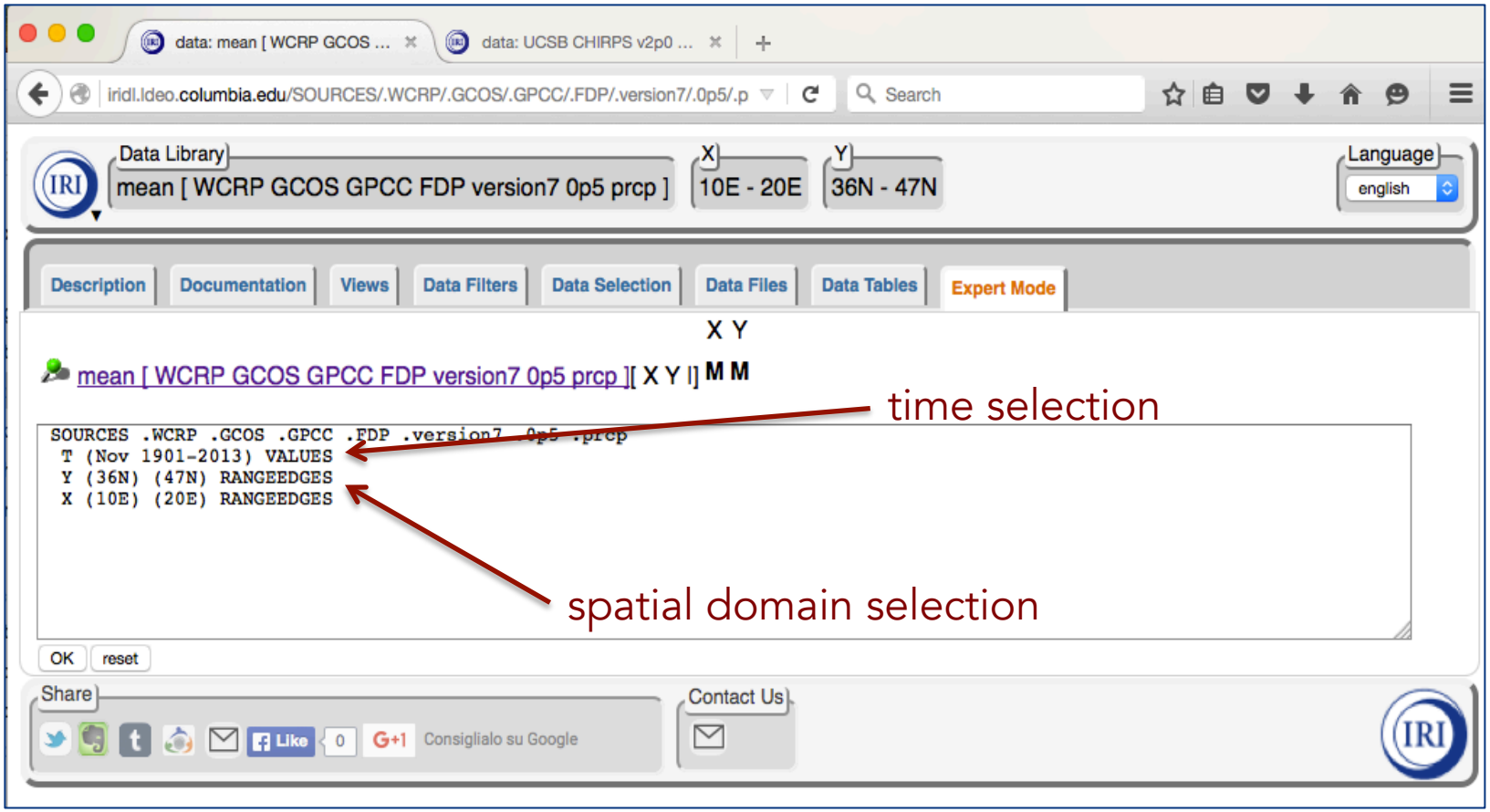


We can loop through the November fields

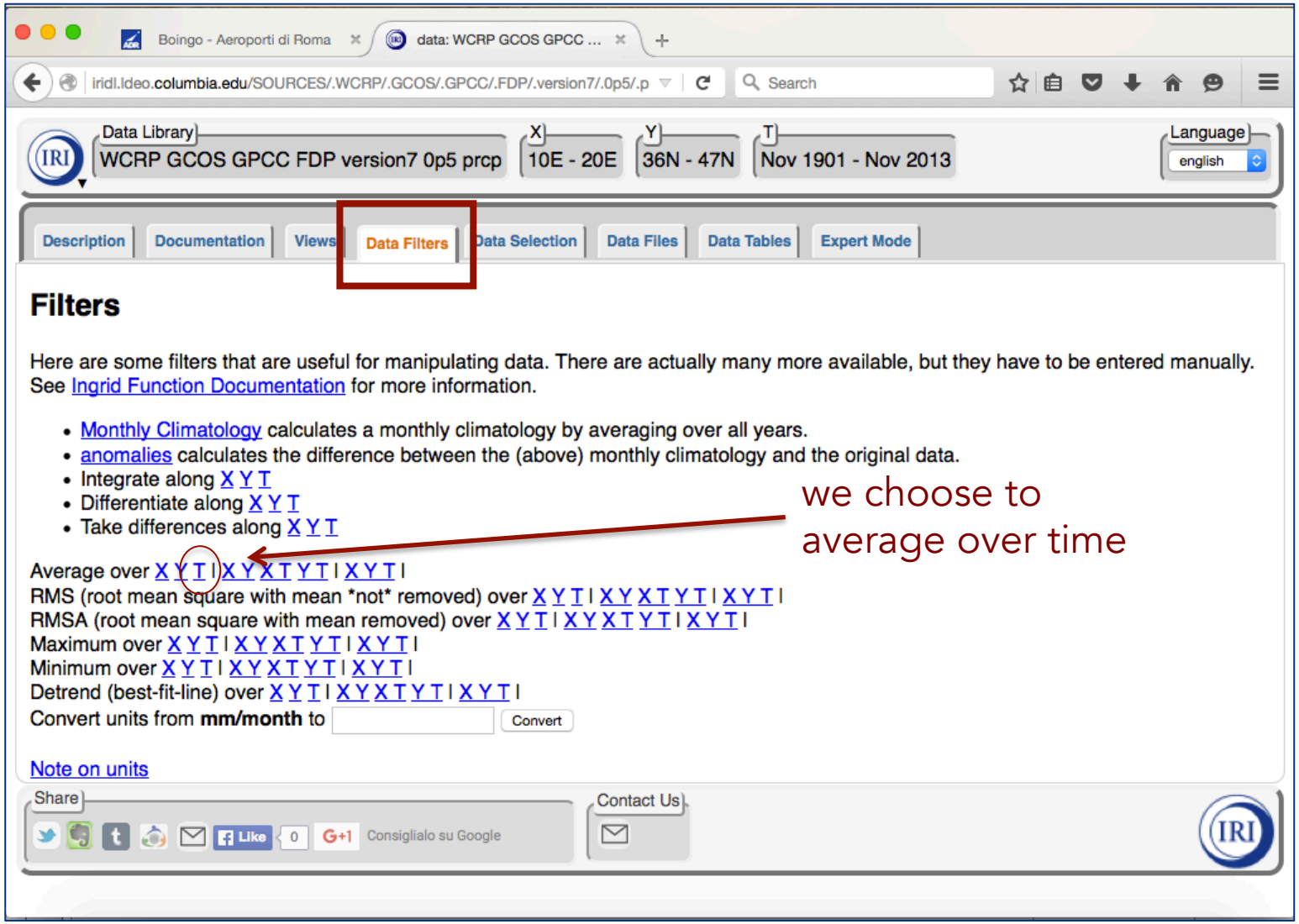


Data selection seen in expert mode

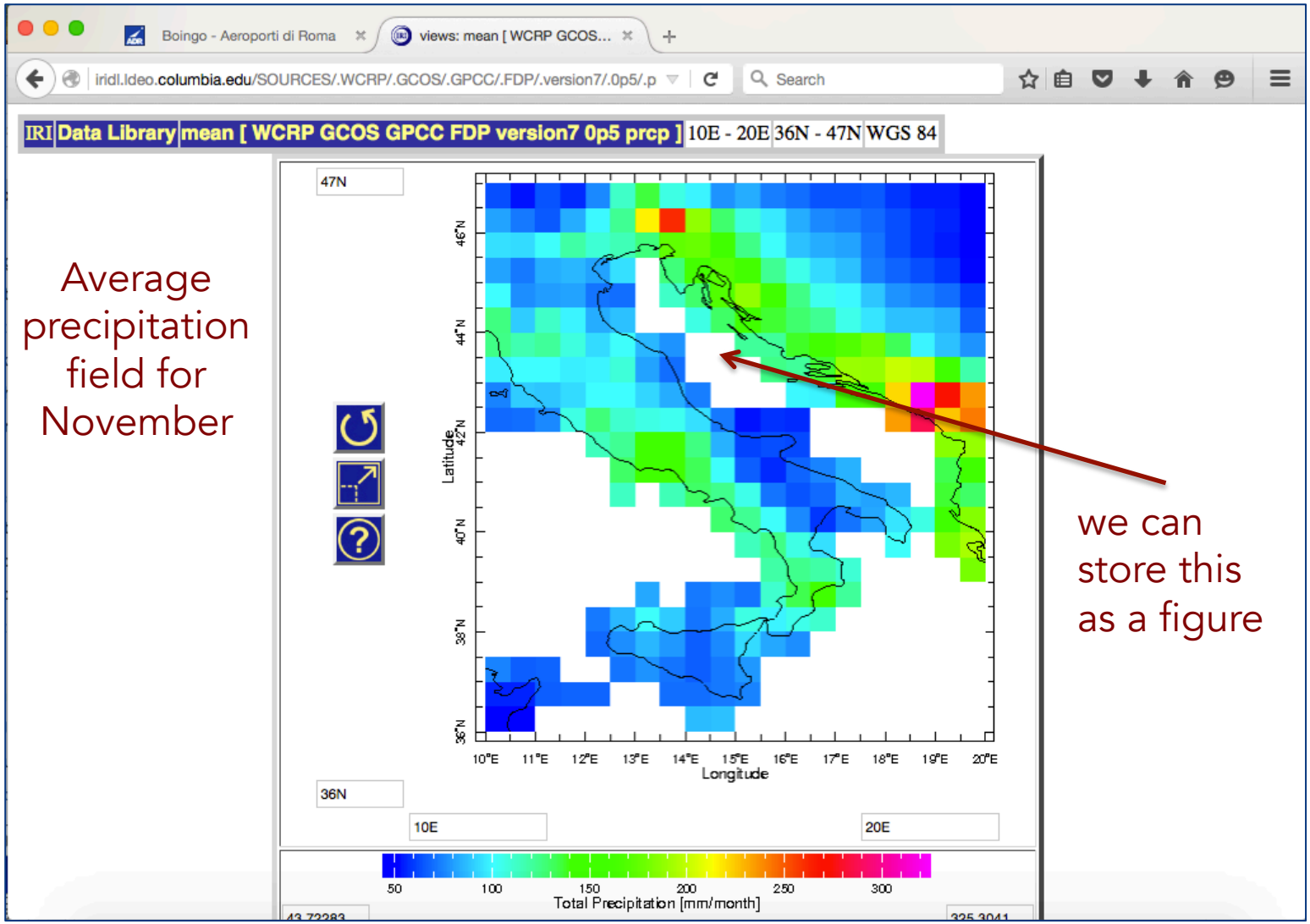
Ingrid is the programming language used by the Data Library, which can be introduced and edited in the DL Expert Mode



Data filters



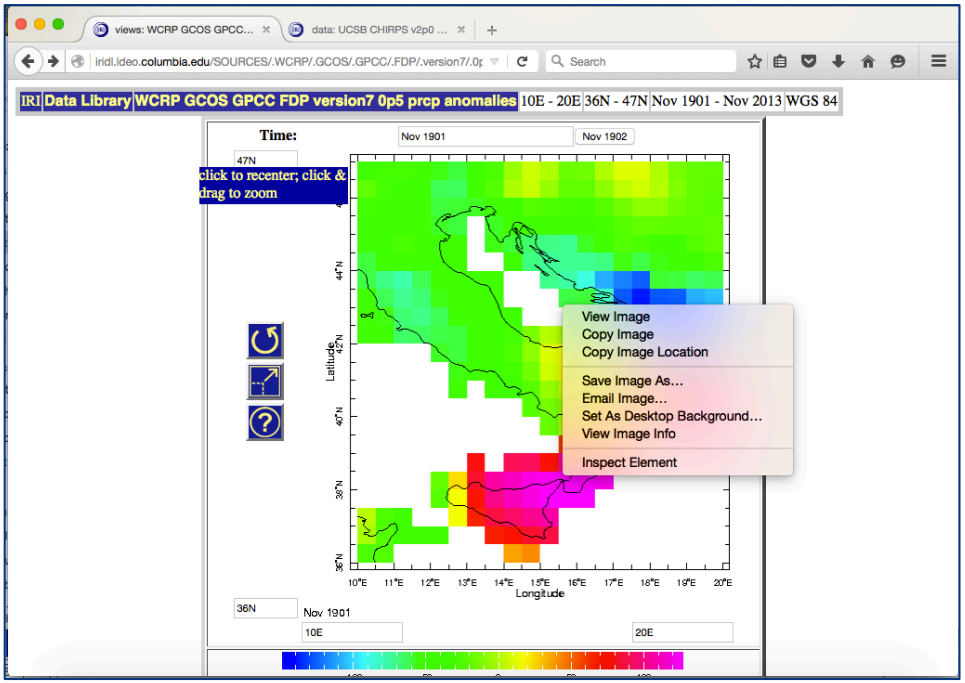
Data filters



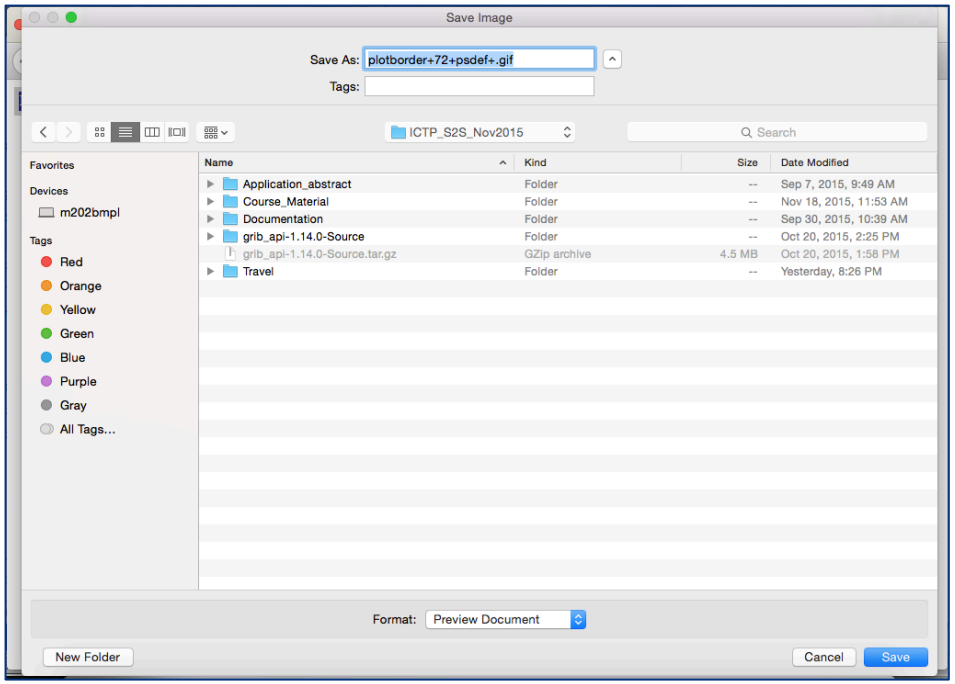
Average precipitation field for November

we can store this as a figure

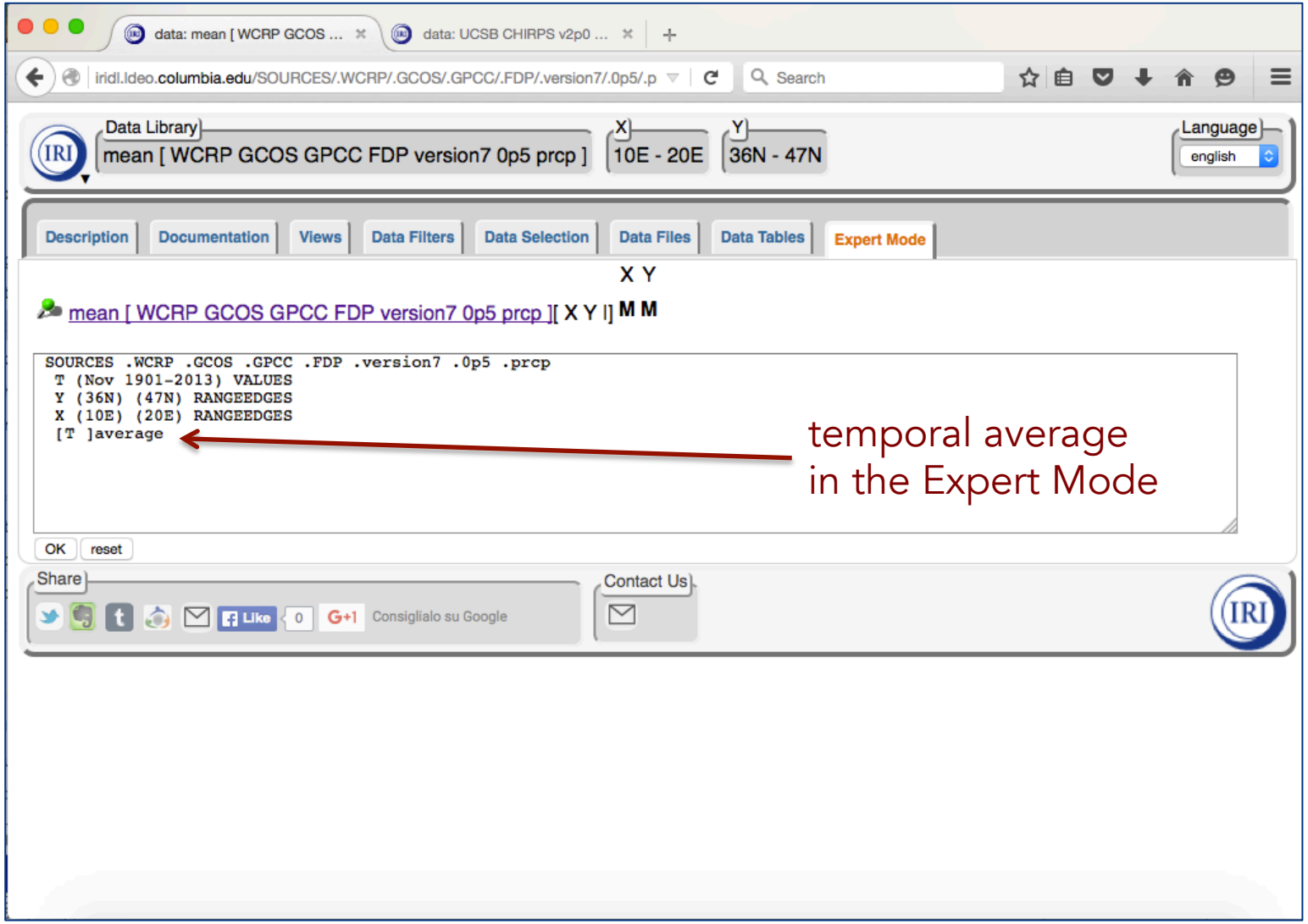
Saving figures



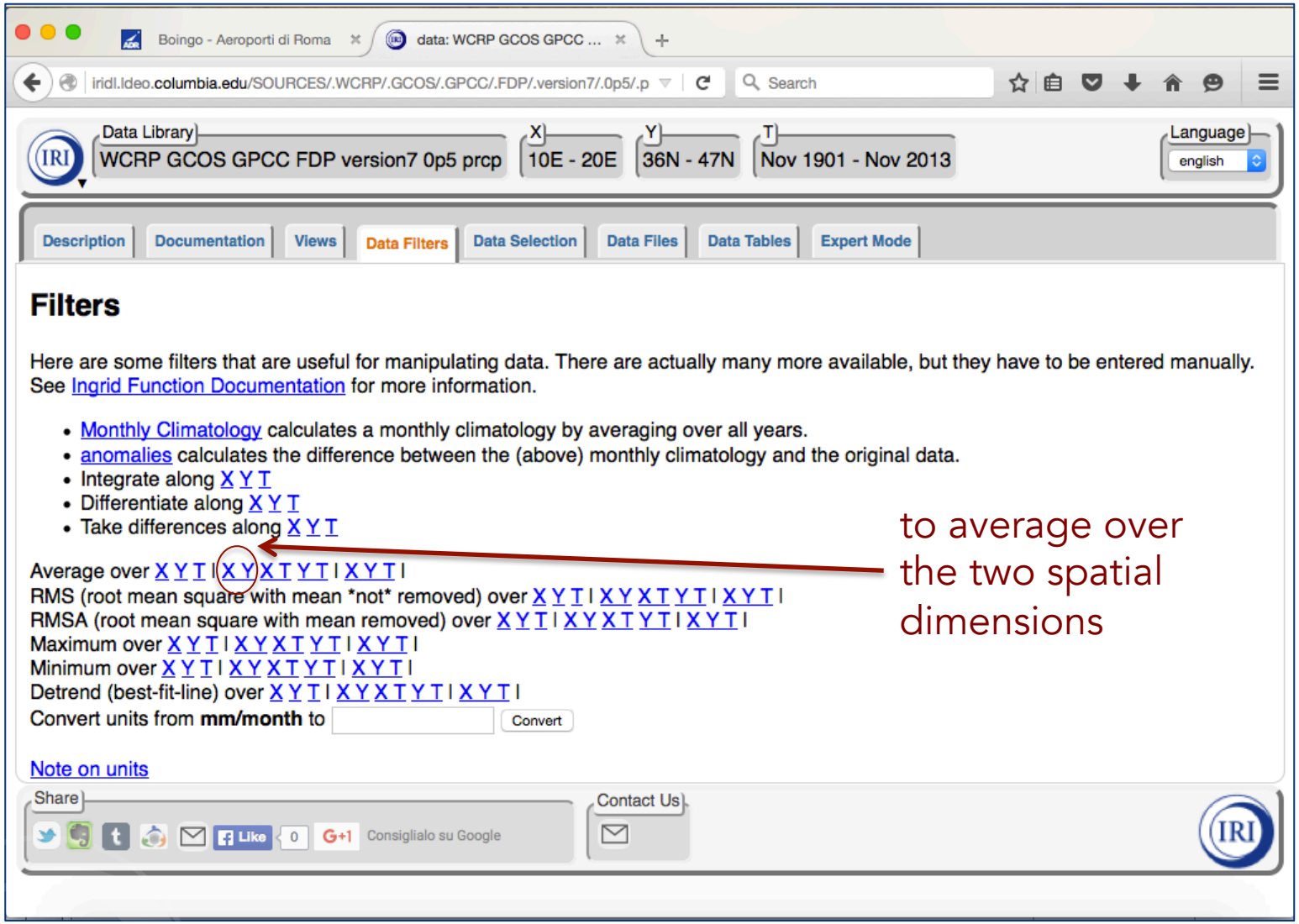
NOTE:
the colorbar needs
to be stored
independently



Data filters

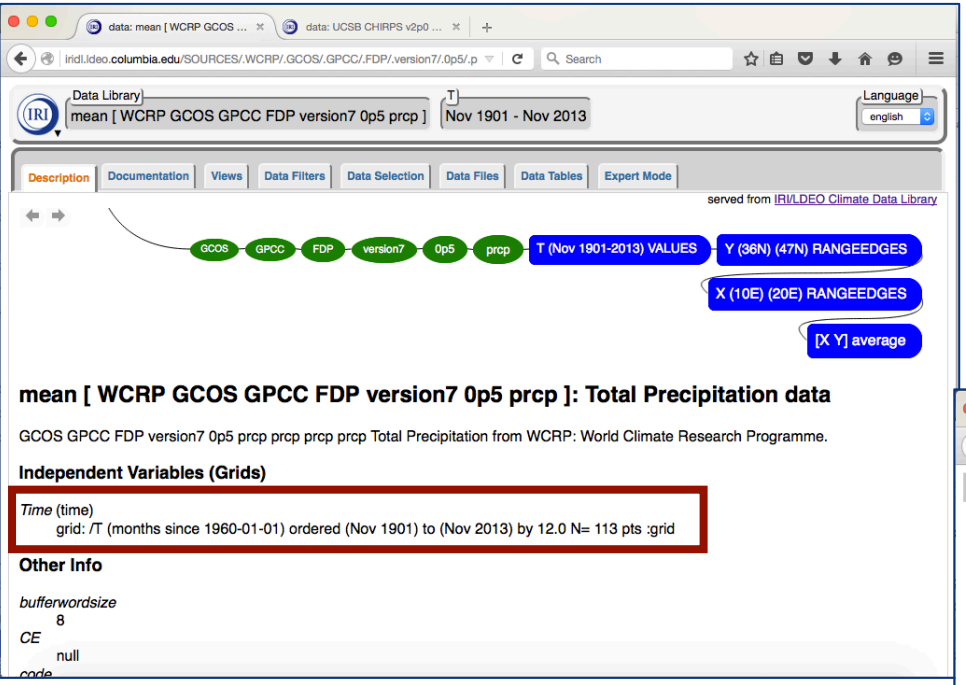


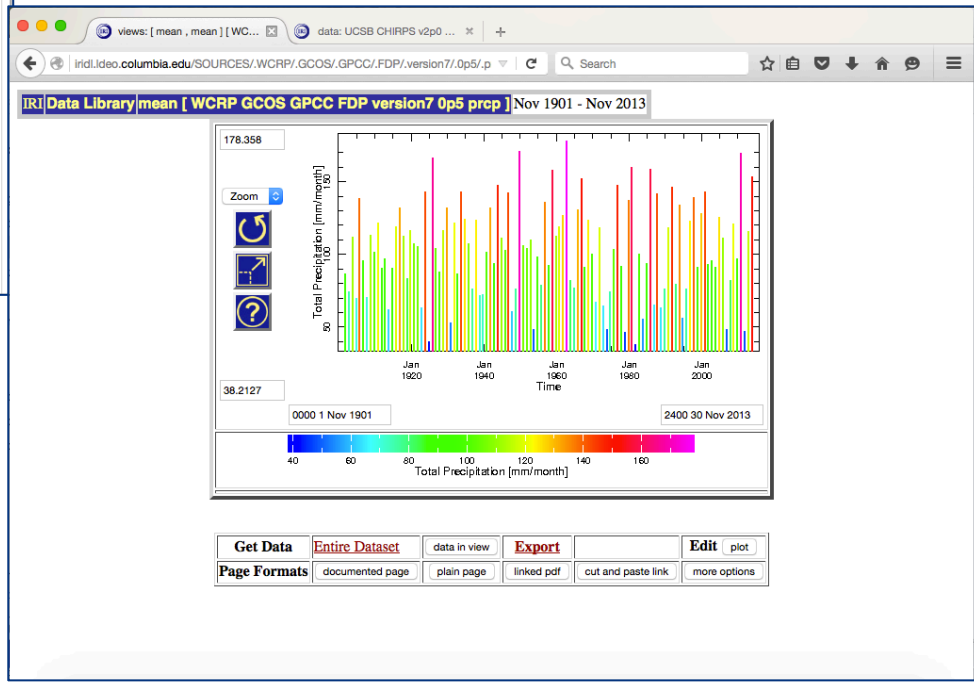
Data filters: averaging over space instead …



to average over the two spatial dimensions

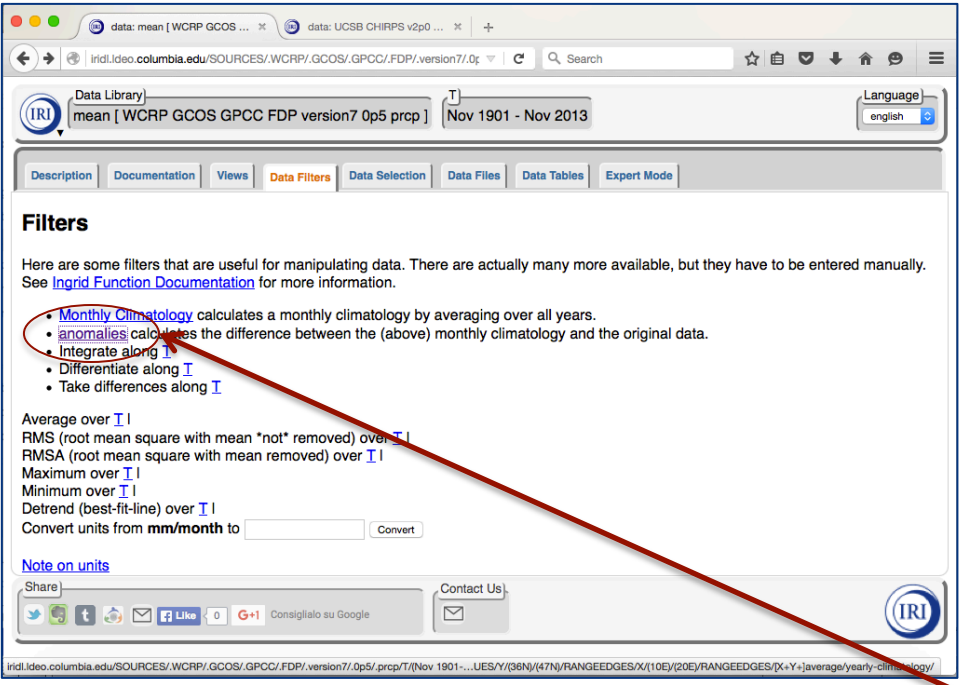
Data filters: averaging over space instead …

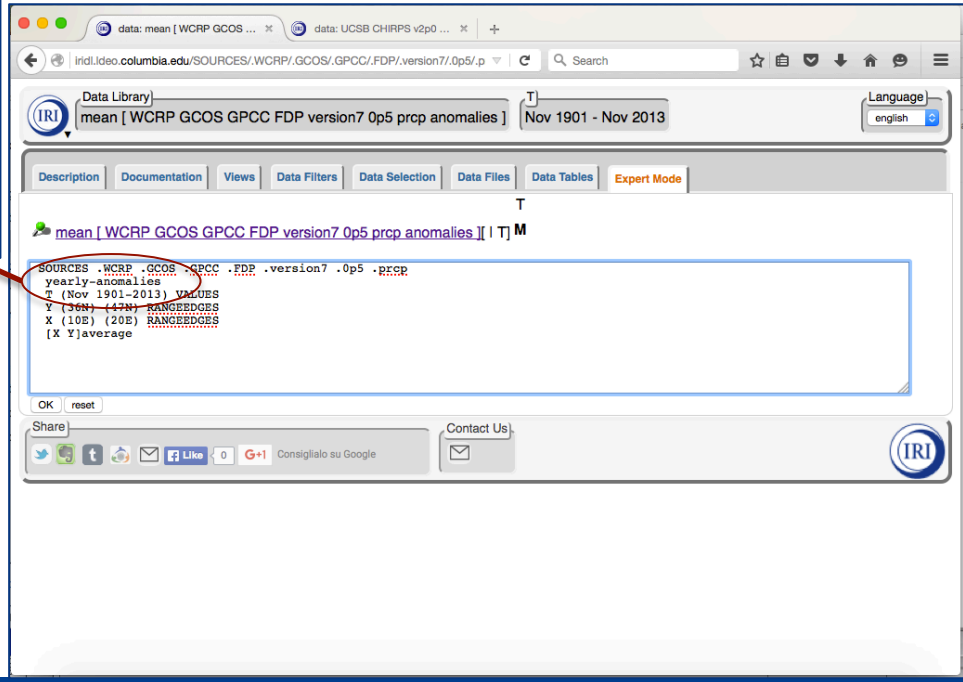




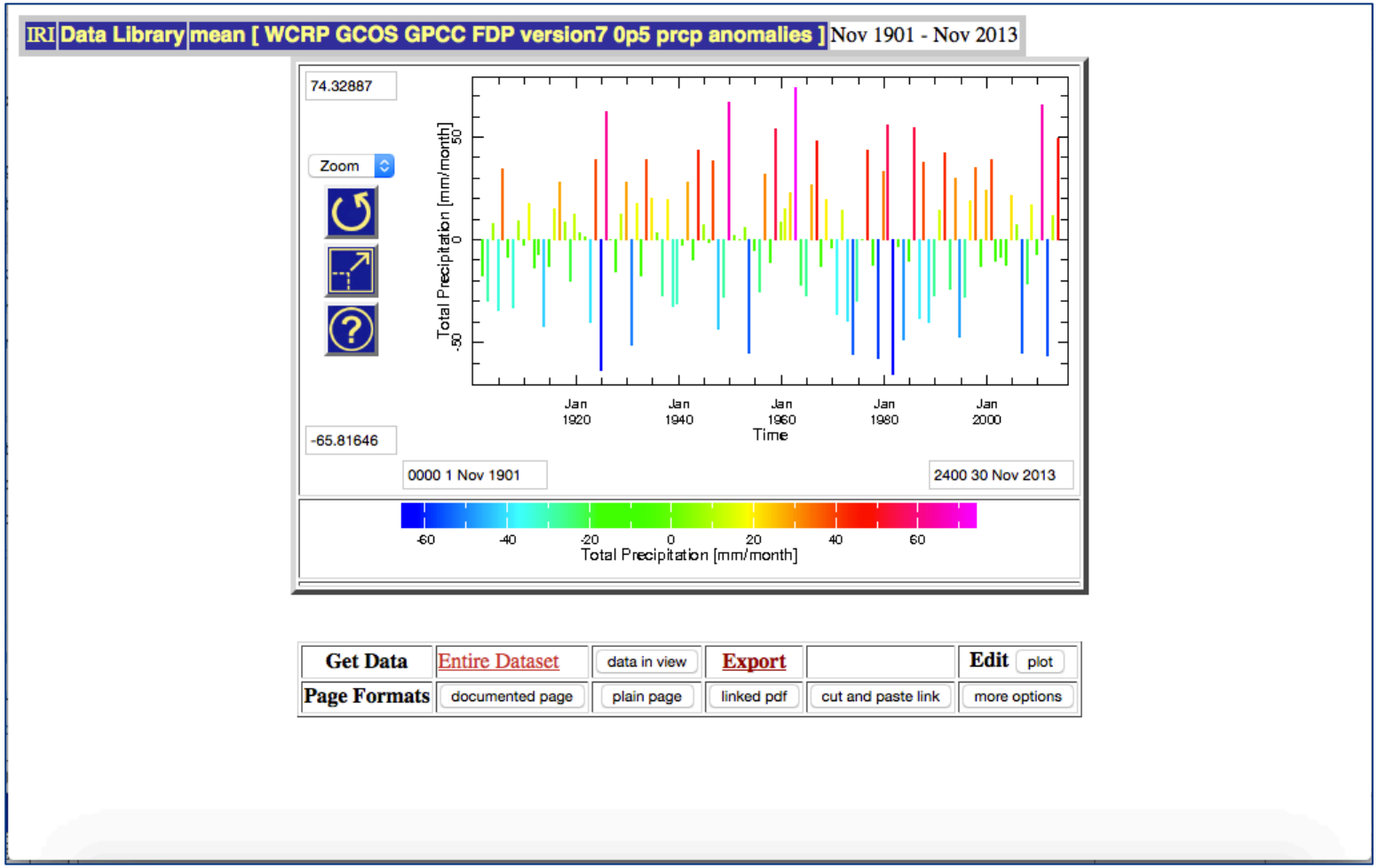
temporal evolution

Data filters: anomalies

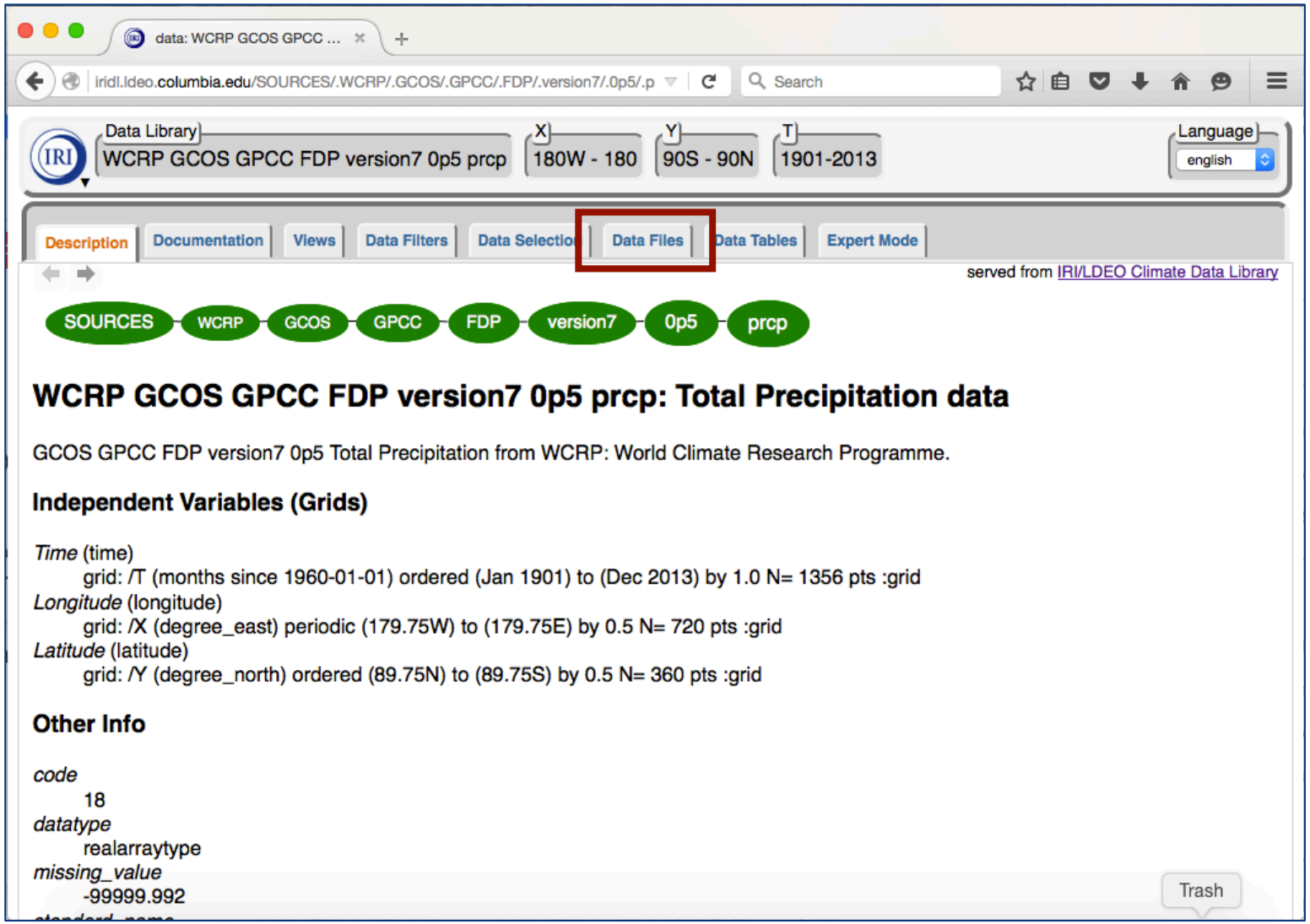




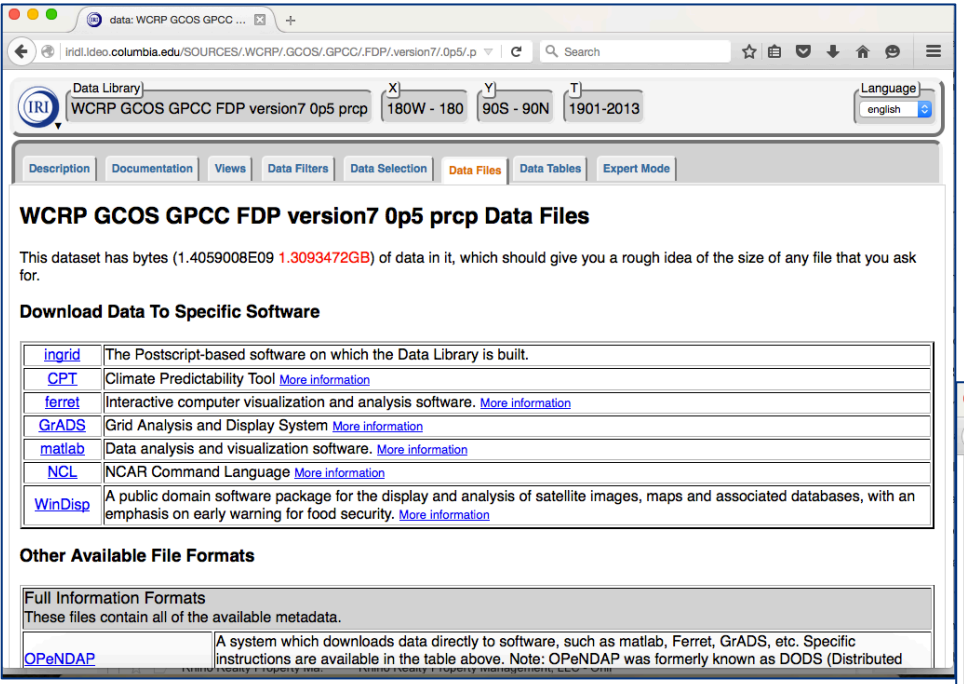
Data filters: anomalies



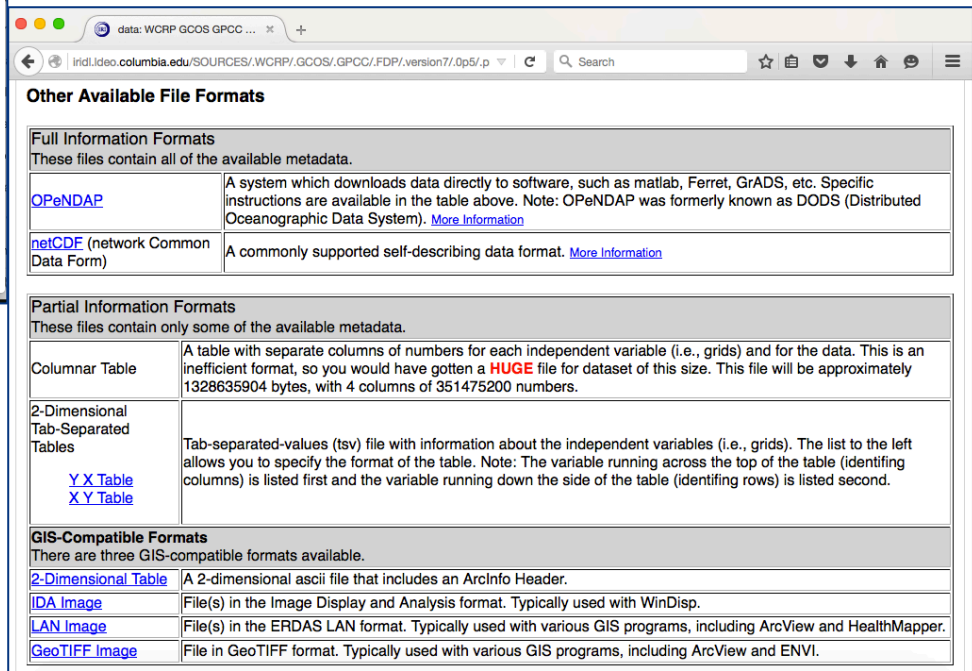
Data files: downloading options



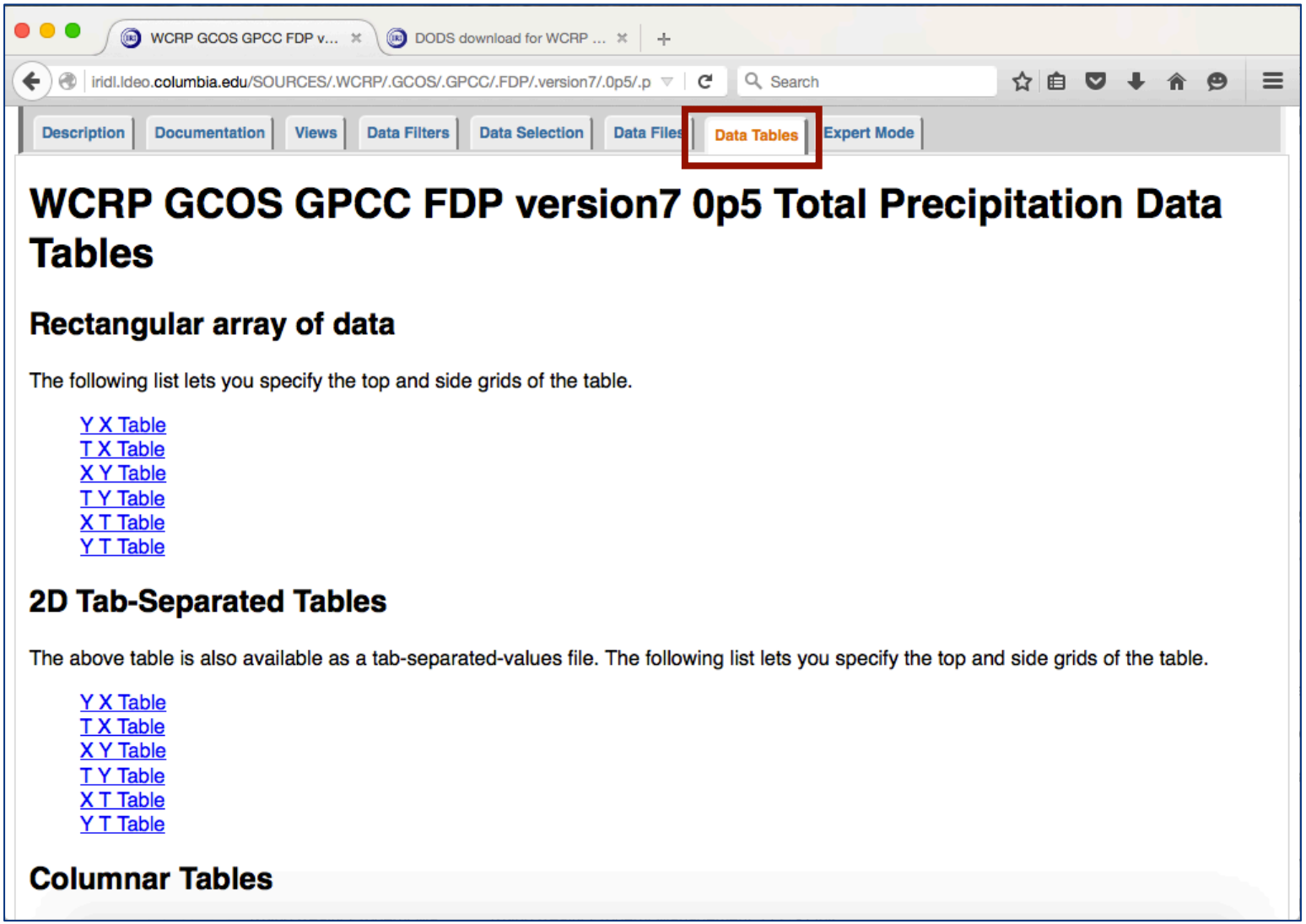
Data files: downloading options



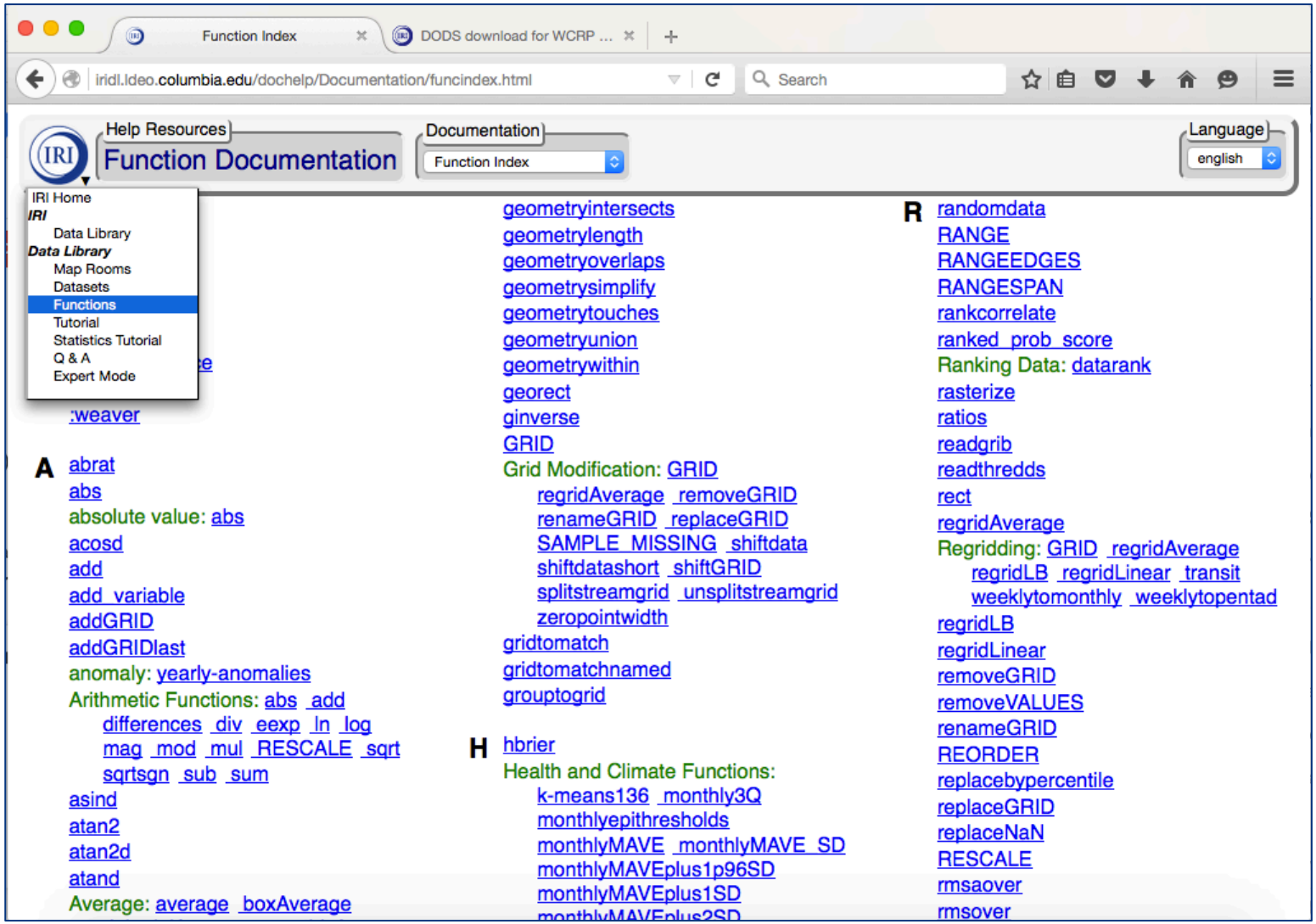
There are several formats available and compatibility with different analysis packages to input data directly



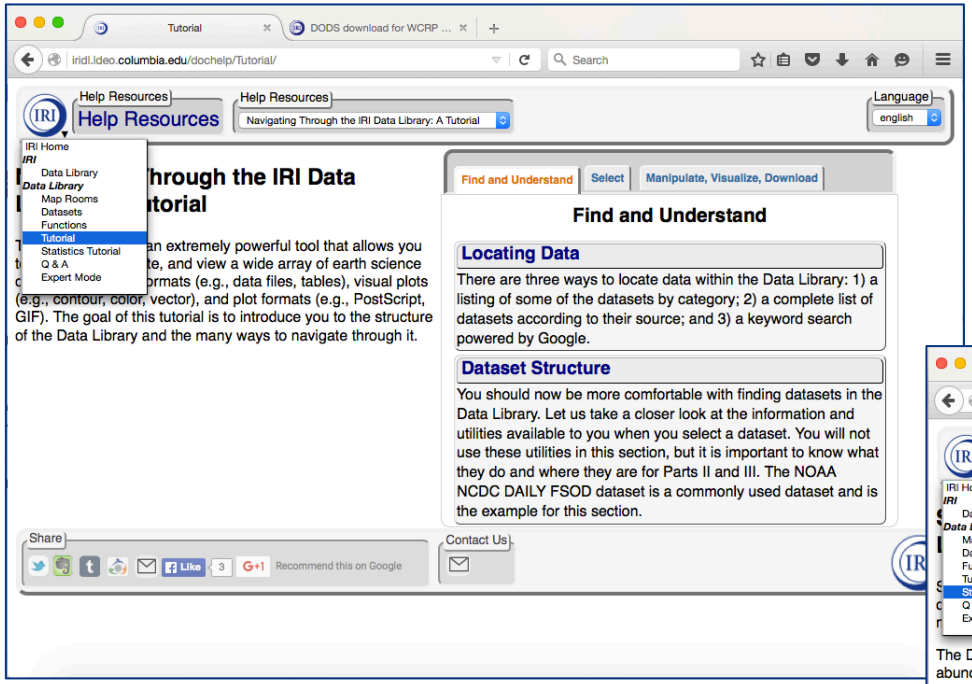
Data files: downloading options

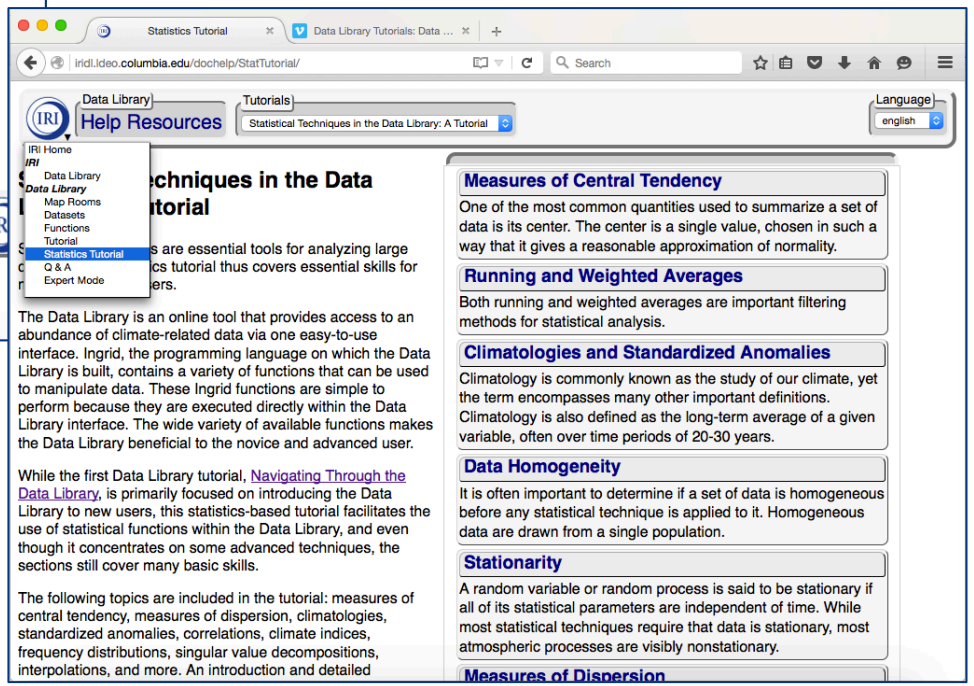


Ingrid functions index

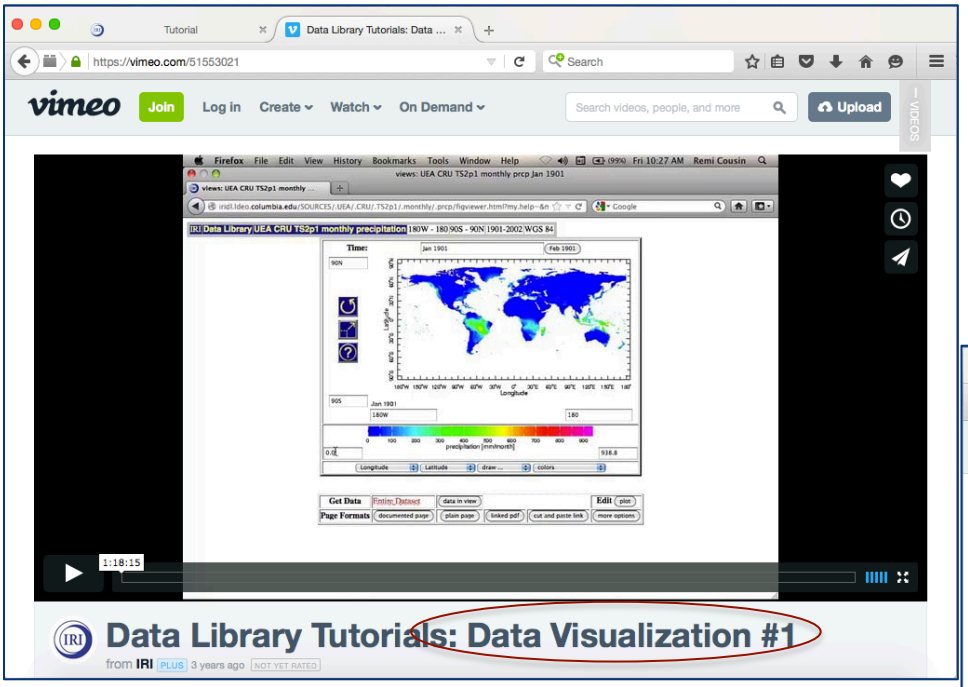


Online tutorials

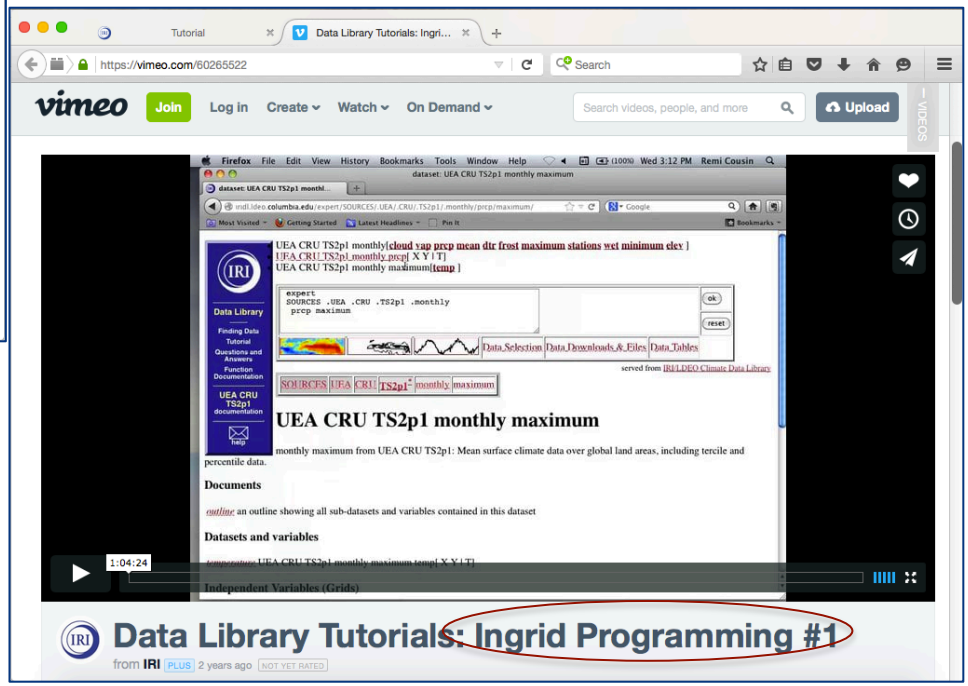




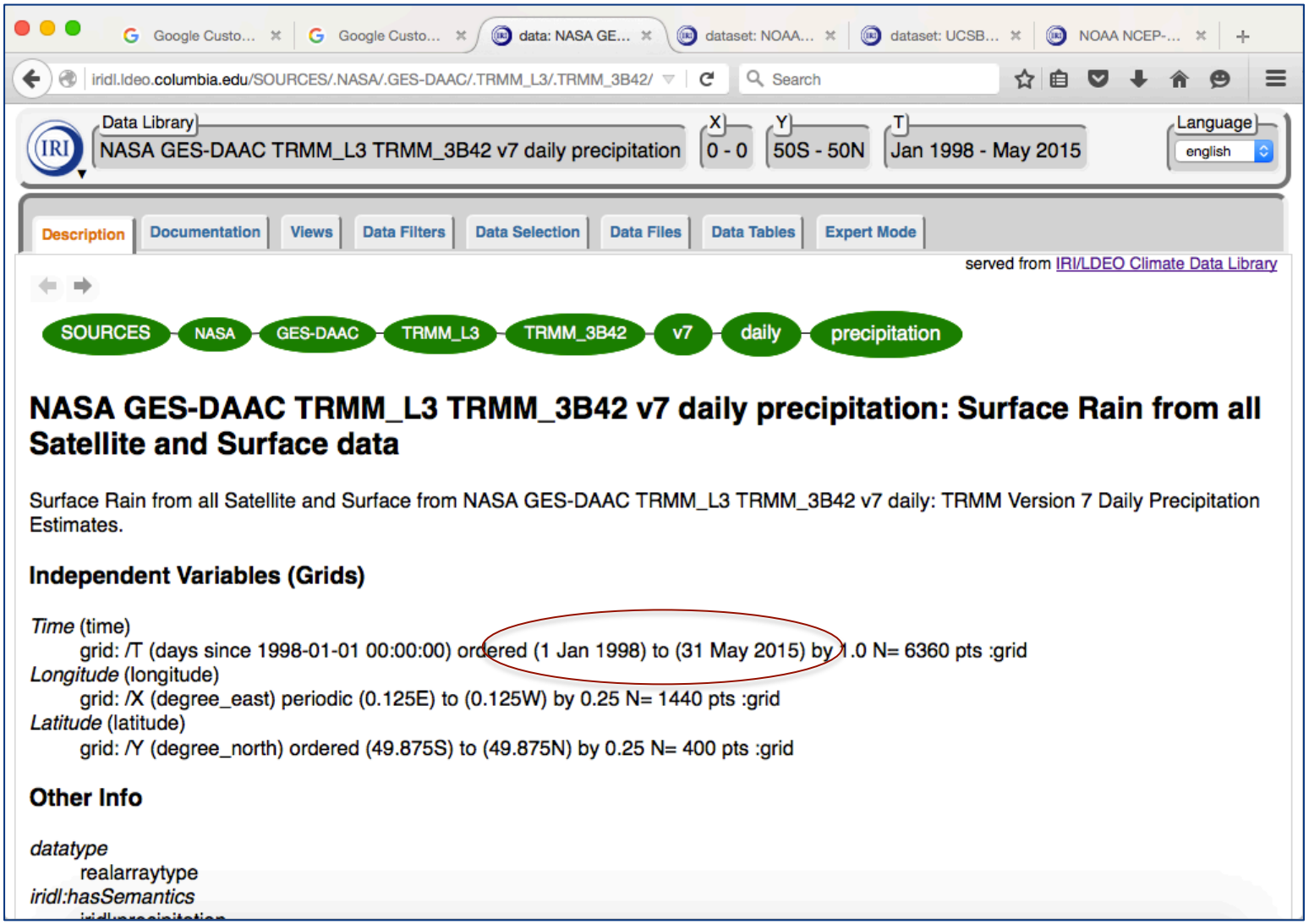
Online tutorials: Vimeo training sessions



http://vimeo.com/iri

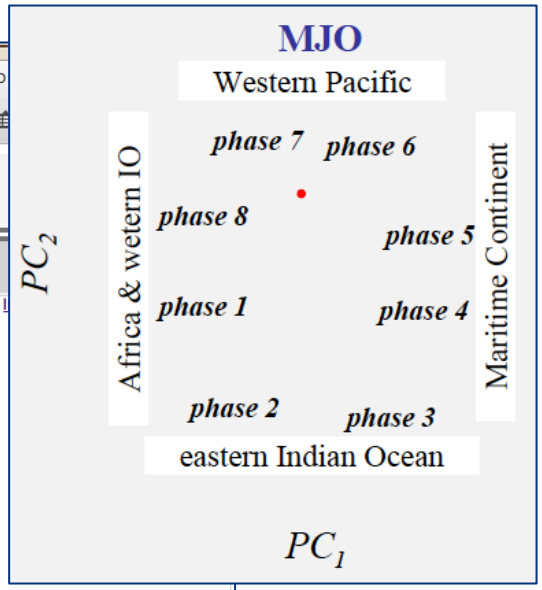


Relevant datasets: daily data



Examples: phase composites (courtesy of Andrew Robertson)

CASE 1: MJO phase composites



S2S, Realtime, Instantaneo... | ECMWF real-time examples... | dataset: Models NMME CM... | data: home mbell APCC BS... | dataset: BoM MJO

iridl.ldeo.columbia.edu/SOURCES/.BoM/.MJO/.RMM/

Search

Data Library
BoM MJO RMM

Description | Views | Data Selection | Data Files | Data Tables | Expert Mode

served from I

SOURCES > BoM > MJO > RMM

BoM MJO RMM

BoM MJO RMM: Real-time Multivariate MJO Index (with components of interannual variability removed).

Documents

outline	an outline showing all sub-datasets and variables contained in this dataset
data source	Text file of RMM1 and RMM2 values for 1974 to present (BoM)
summary from BoM	Madden-Julian Oscillation (MJO)
Wheeler and Hendon (2004) Monthly Weather Review article	An All-Season Real-Time Multivariate MJO Index: Development of an Index for Monitoring and Prediction

Datasets and Variables

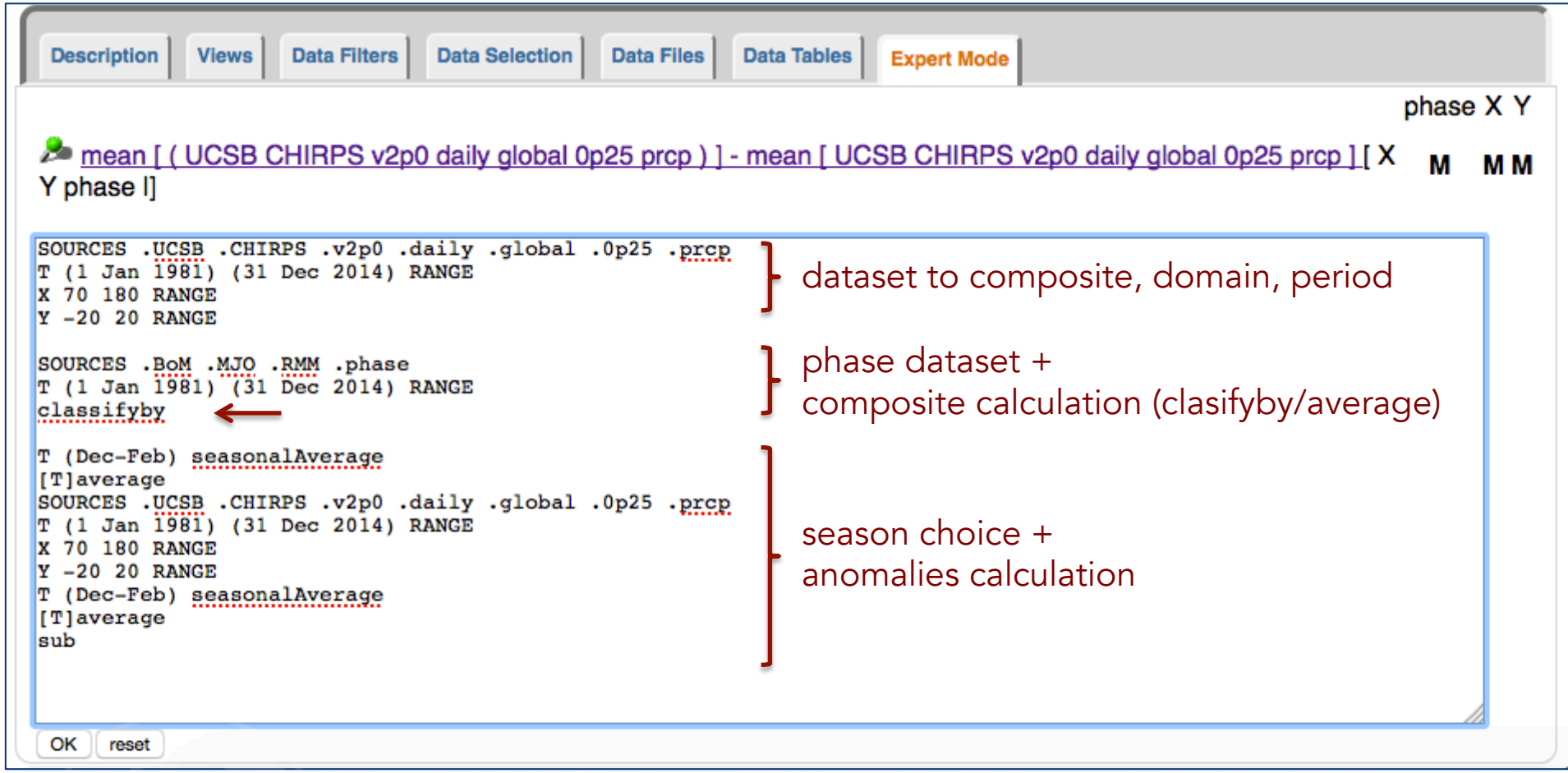
amplitude	BoM MJO RMM amplitude[T]
phase	BoM MJO RMM phase[T]
RMM1	BoM MJO RMM RMM1[T]
RMM2	BoM MJO RMM RMM2[T]

MJO 8-phase classification – Wheeler & Hendon (2004)

Independent Variables (Grids)

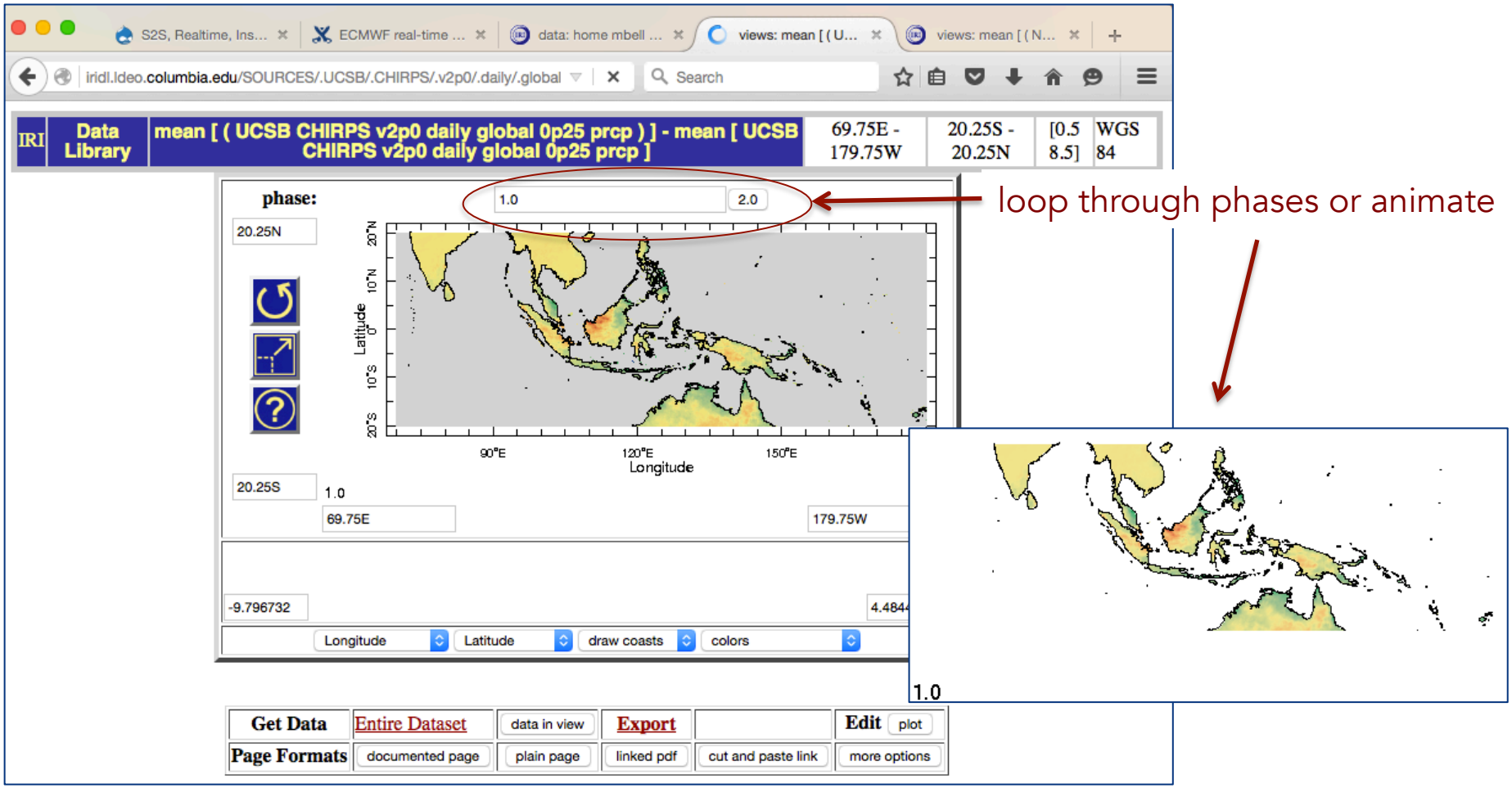
Examples: phase composites (courtesy of Andrew Robertson)

CASE 1: Madden-Julian Oscillation (MJO) phase composites



Examples: phase composites (courtesy of Andrew Robertson)

CASE 1: MJO phase composites



Examples: phase composites (courtesy of Andrew Robertson)

CASE 1: MJO phase composites – phase evolution at a grid point

Description | Views | Data Filters | Data Selection | Data Files | Data Tables | Expert Mode

phase X Y

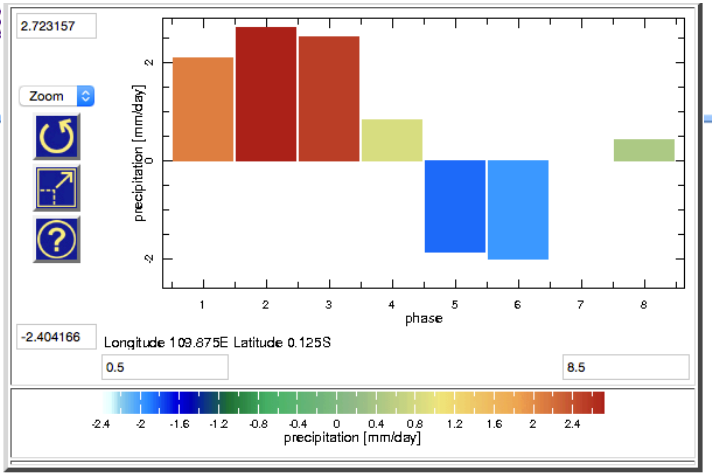
mean [(UCSB CHIRPS v2p0 daily global 0p25 prcp)] - mean [UCS

Y phase I]

M M

```
SOURCES .UCSB .CHIRPS .v2p0 .daily .global .0p25 .prcp
T (1 Jan 1981) (31 Dec 2014) RANGE
X 70 180 RANGE
Y -20 20 RANGE
SOURCES .BoM .MJO .RMM .phase
T (1 Jan 1981) (31 Dec 2014) RANGE
classifyby
T (Dec-Feb) seasonalAverage
[T]average
SOURCES .UCSB .CHIRPS .v2p0 .daily .global .0p25 .prcp
T (1 Jan 1981) (31 Dec 2014) RANGE
X 70 180 RANGE
Y -20 20 RANGE
T (Dec-Feb) seasonalAverage
[T]average
sub

X (110) VALUE
Y (0) VALUE
```

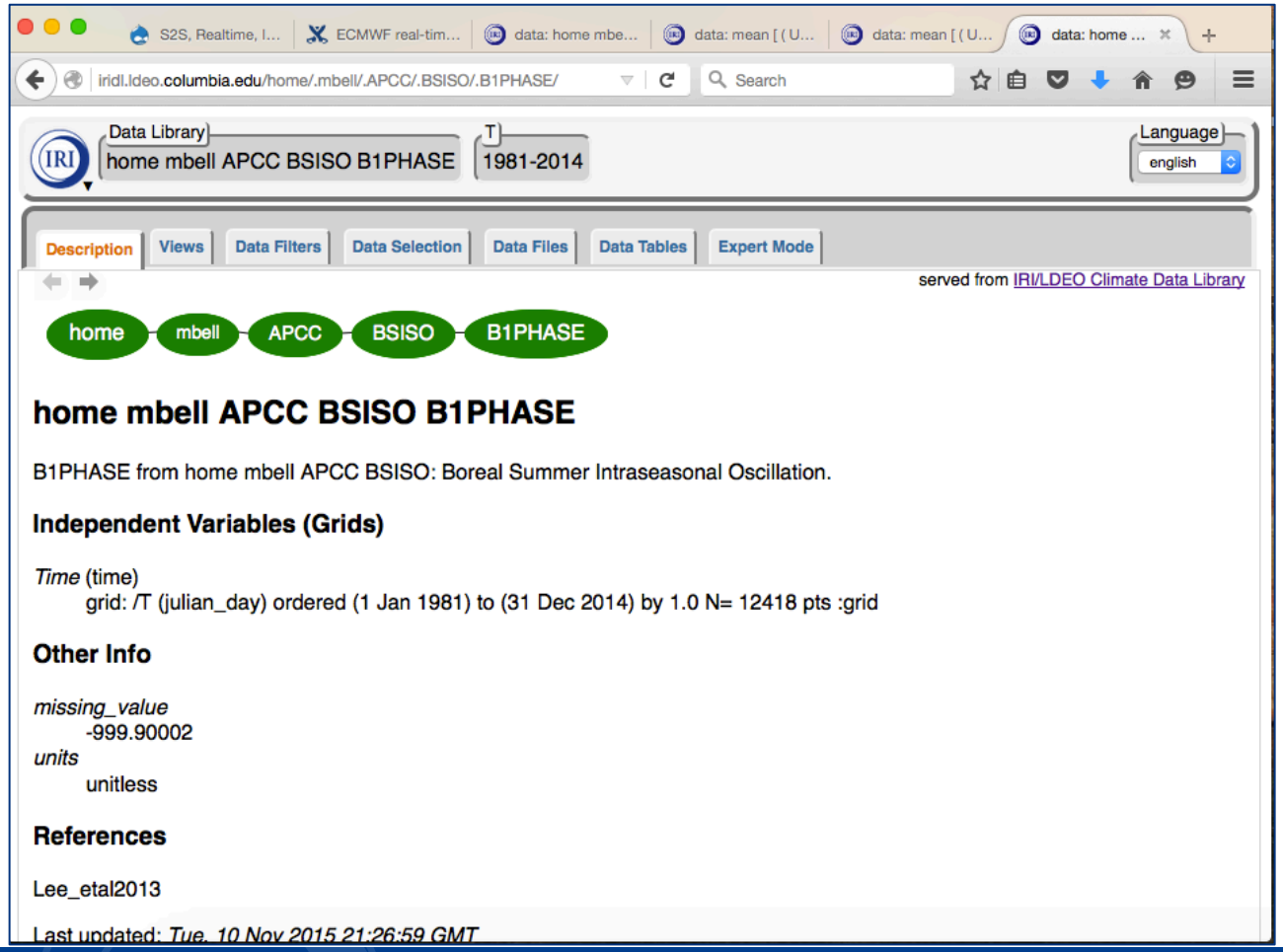


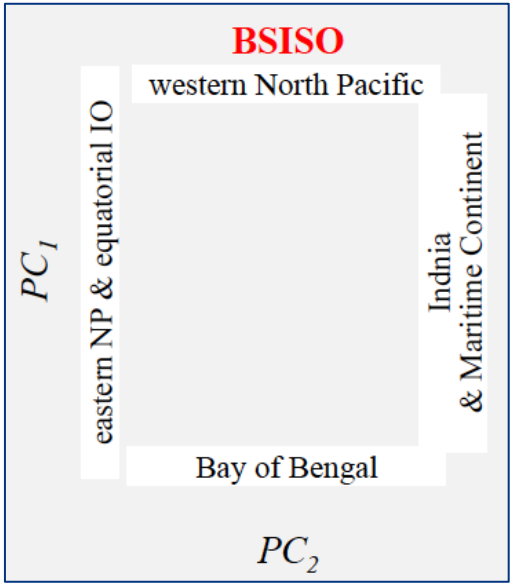
coordinates for a point over land (Borneo)

OK | reset

Examples: phase composites (courtesy of Andrew Robertson)

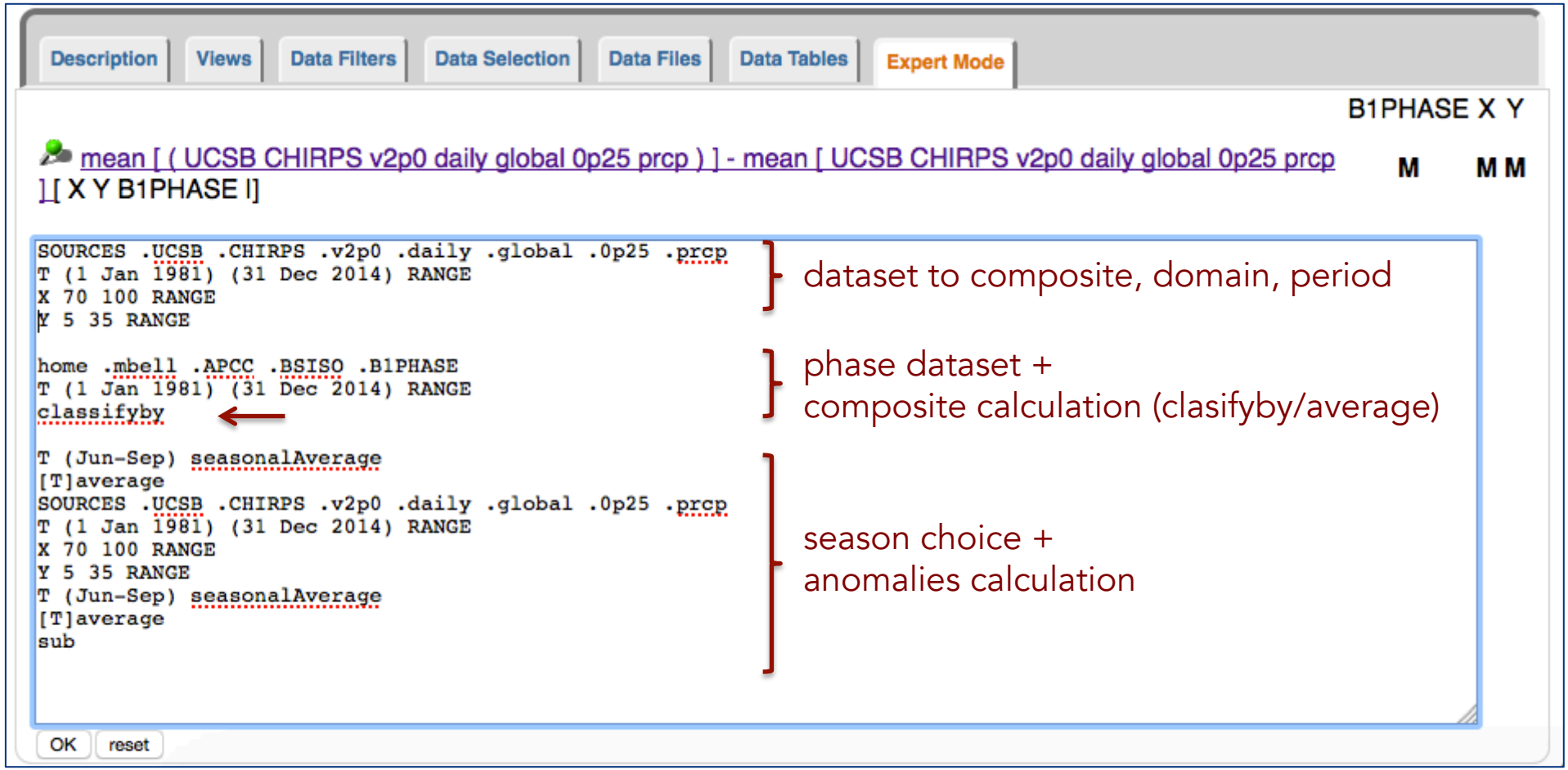
CASE 2: boreal summer intraseasonal oscillation (BSISO) phase composites





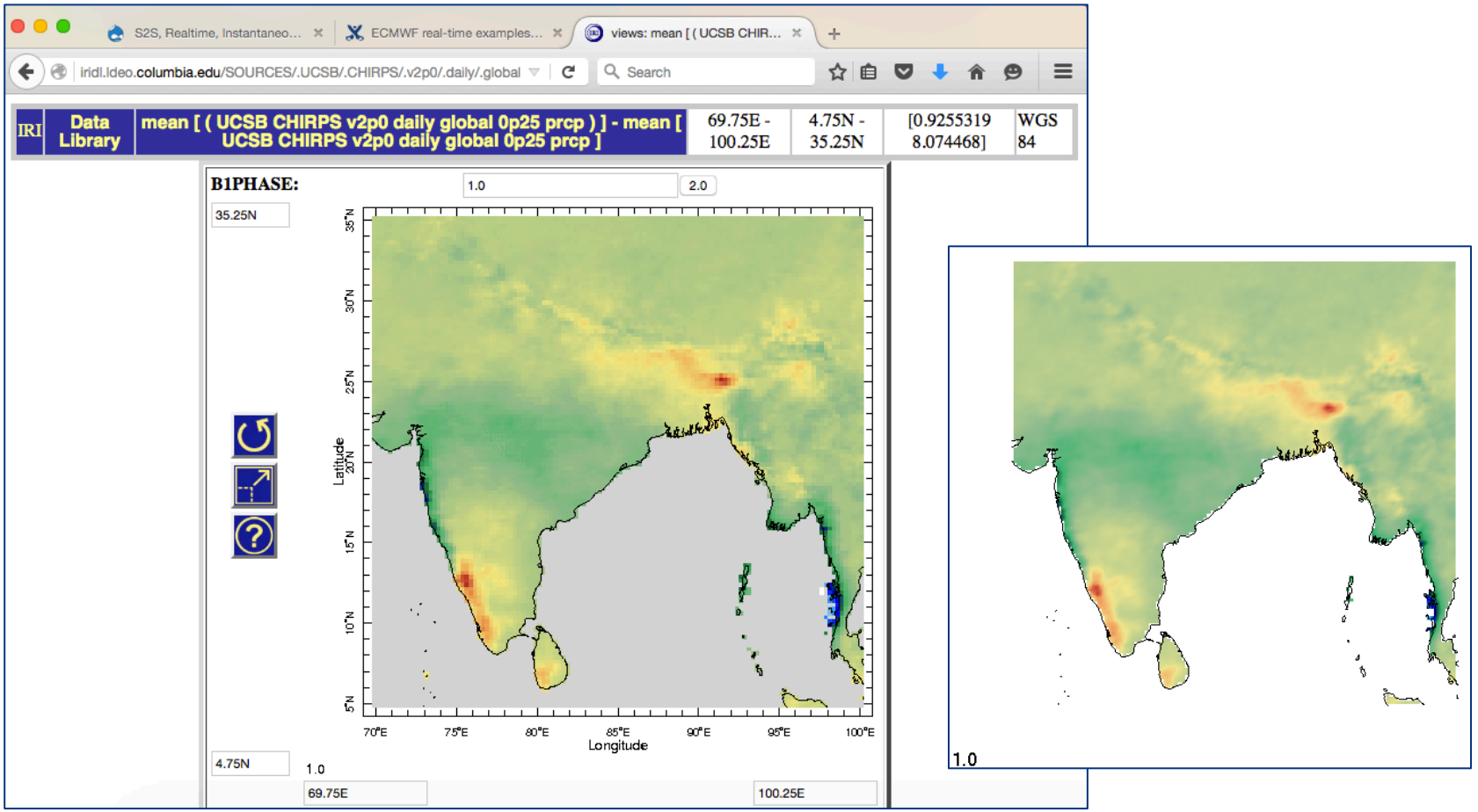
Examples: phase composites (courtesy of Andrew Robertson)

CASE 2: BSISO phase composites

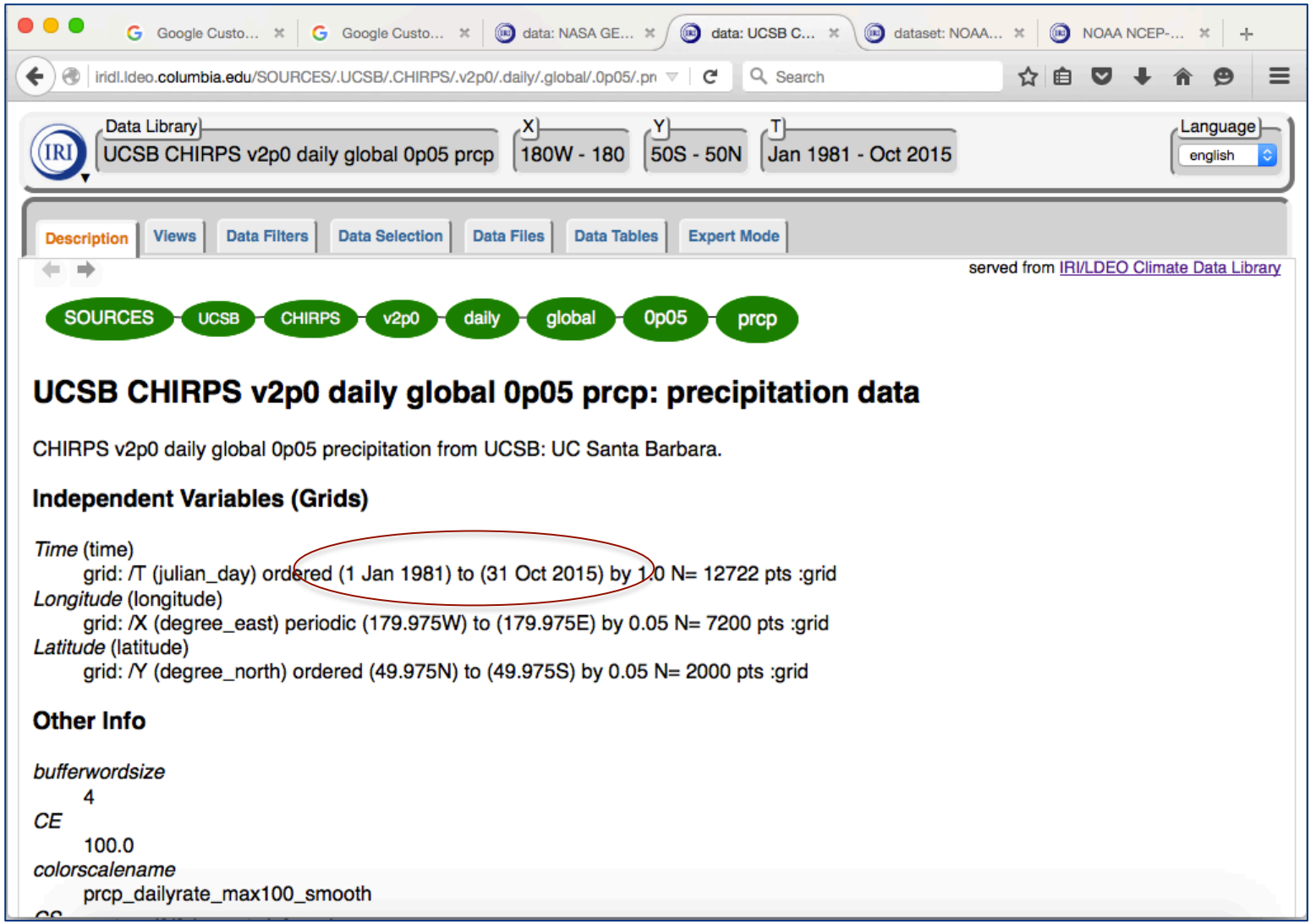


Examples: phase composites (courtesy of Andrew Robertson)

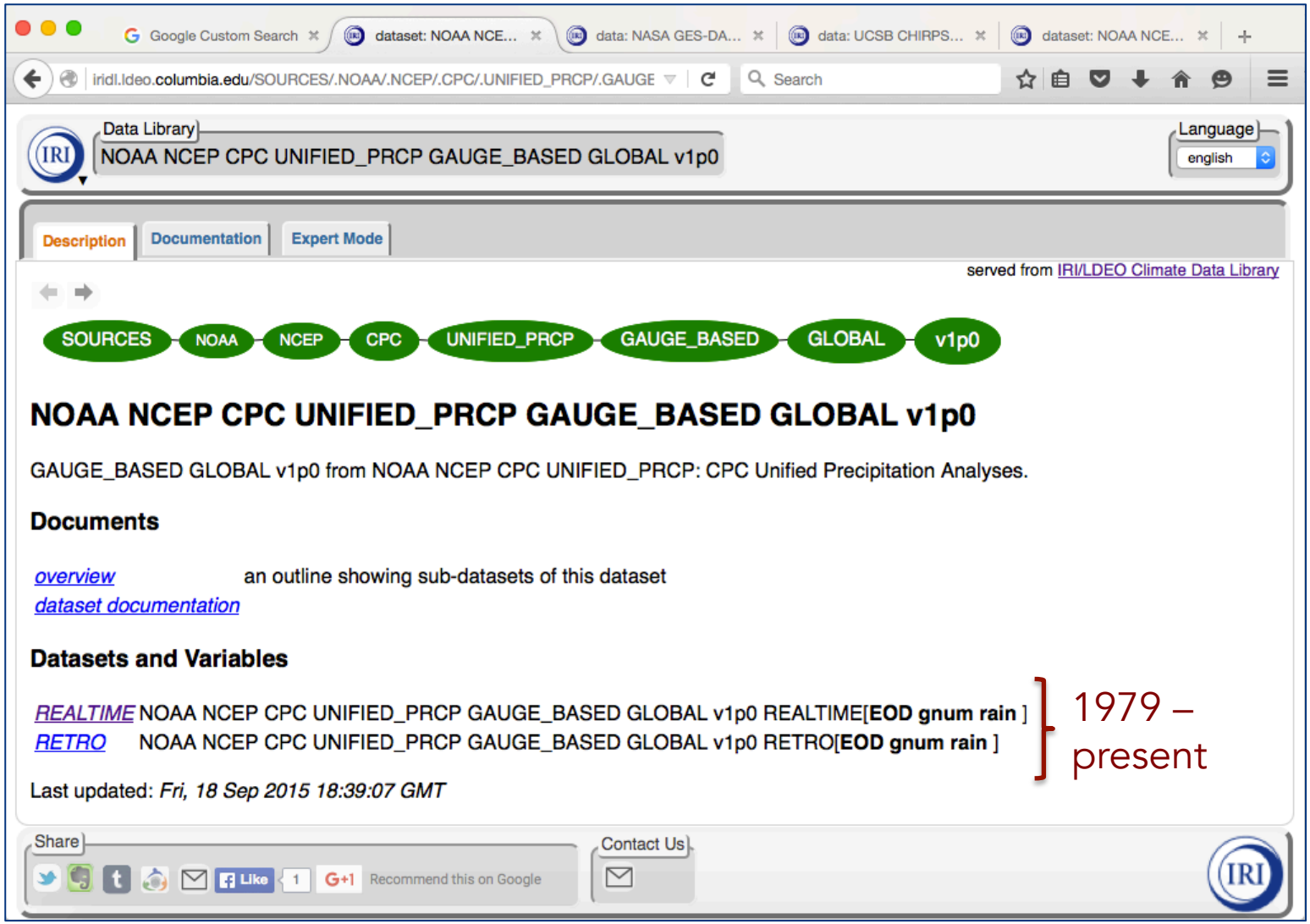
CASE 2: BSISO phase composites



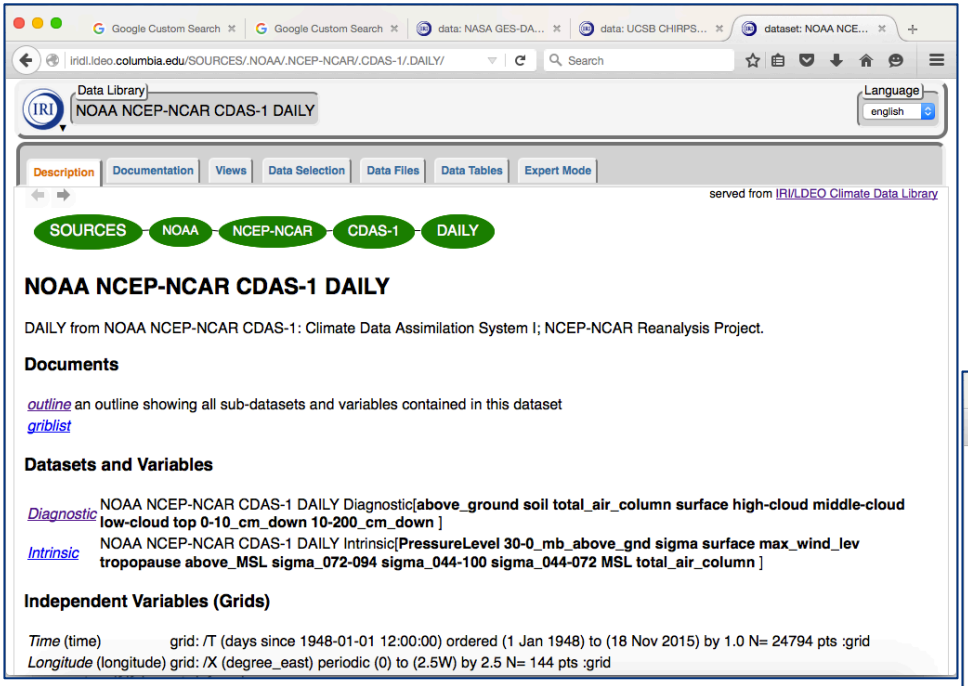
Relevant datasets: daily data

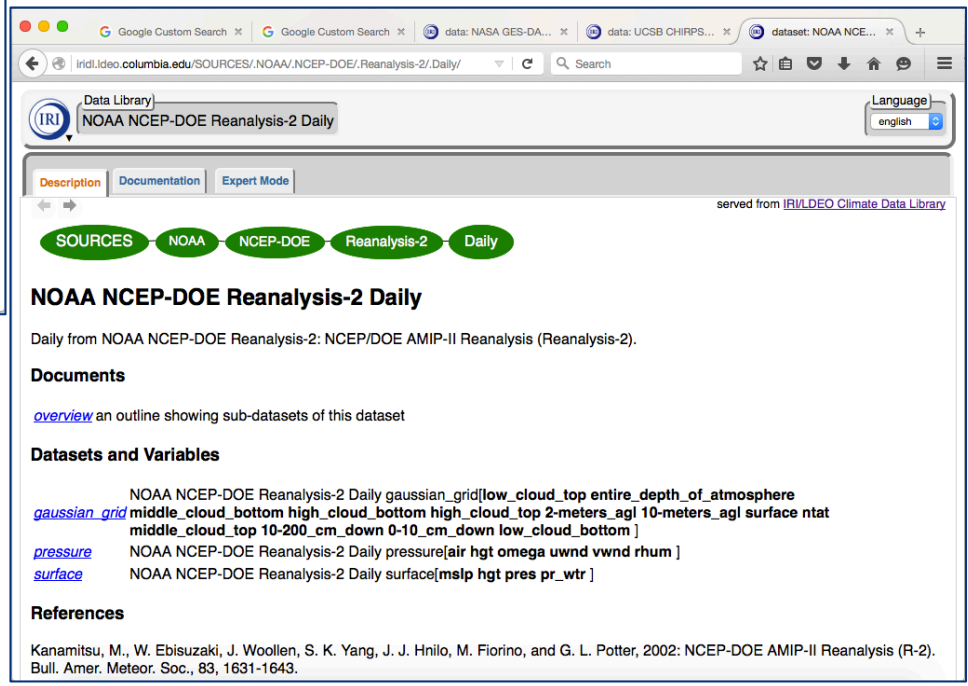


Relevant datasets: daily data

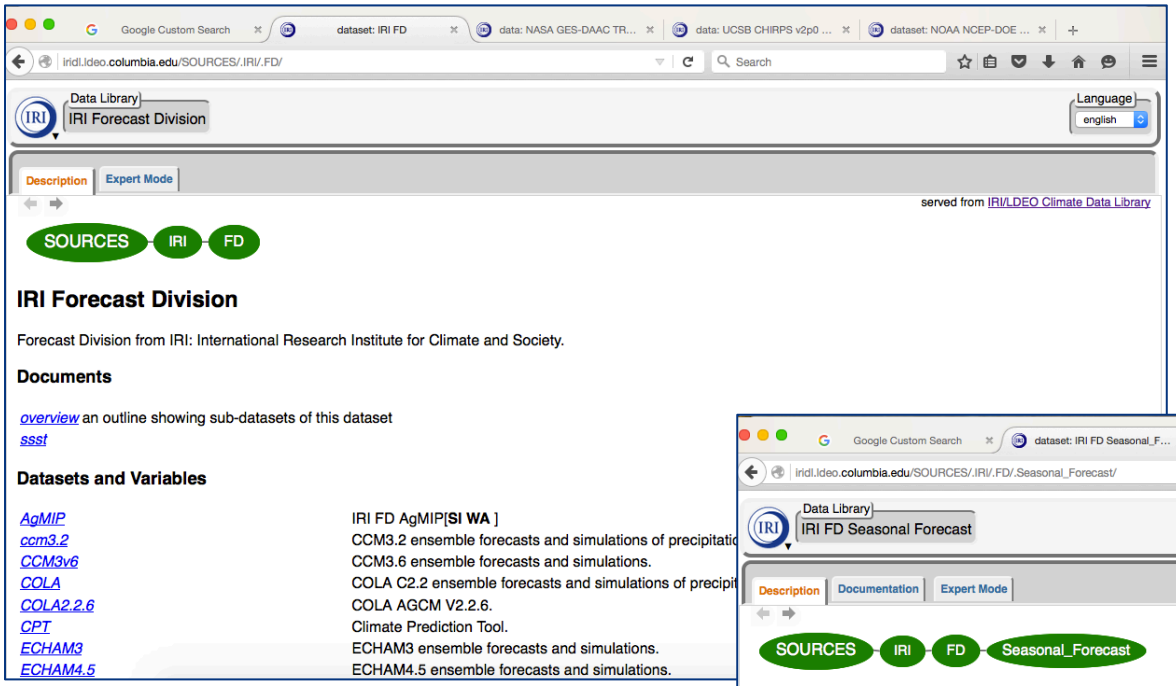


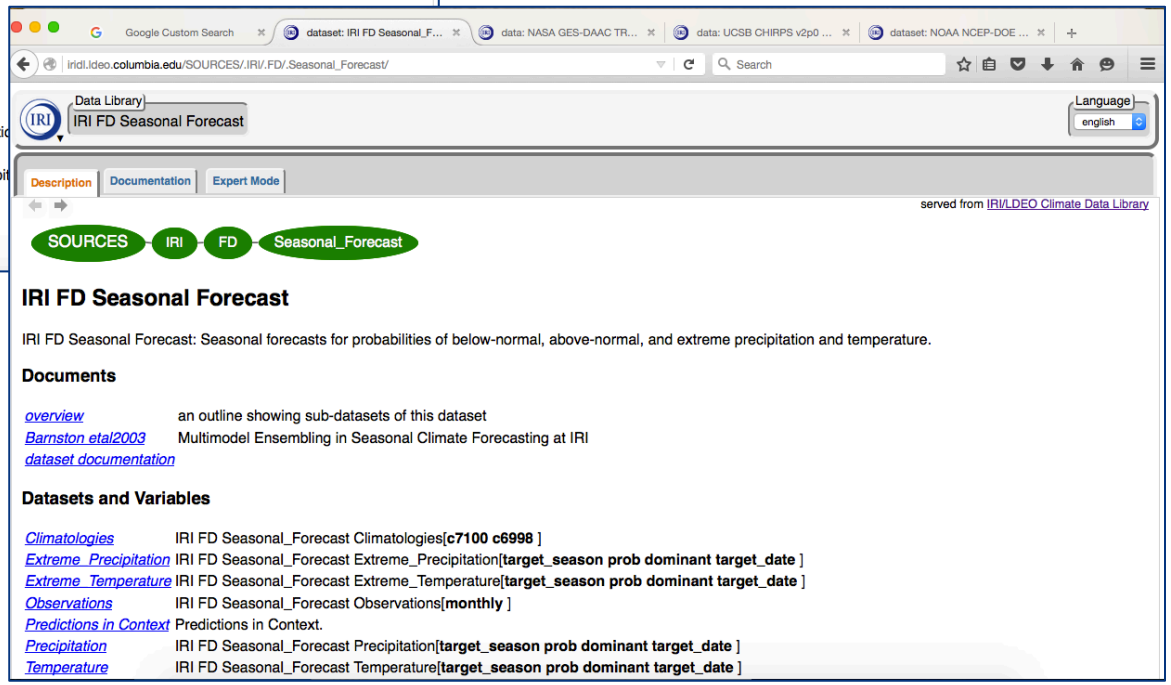
Relevant datasets: daily data



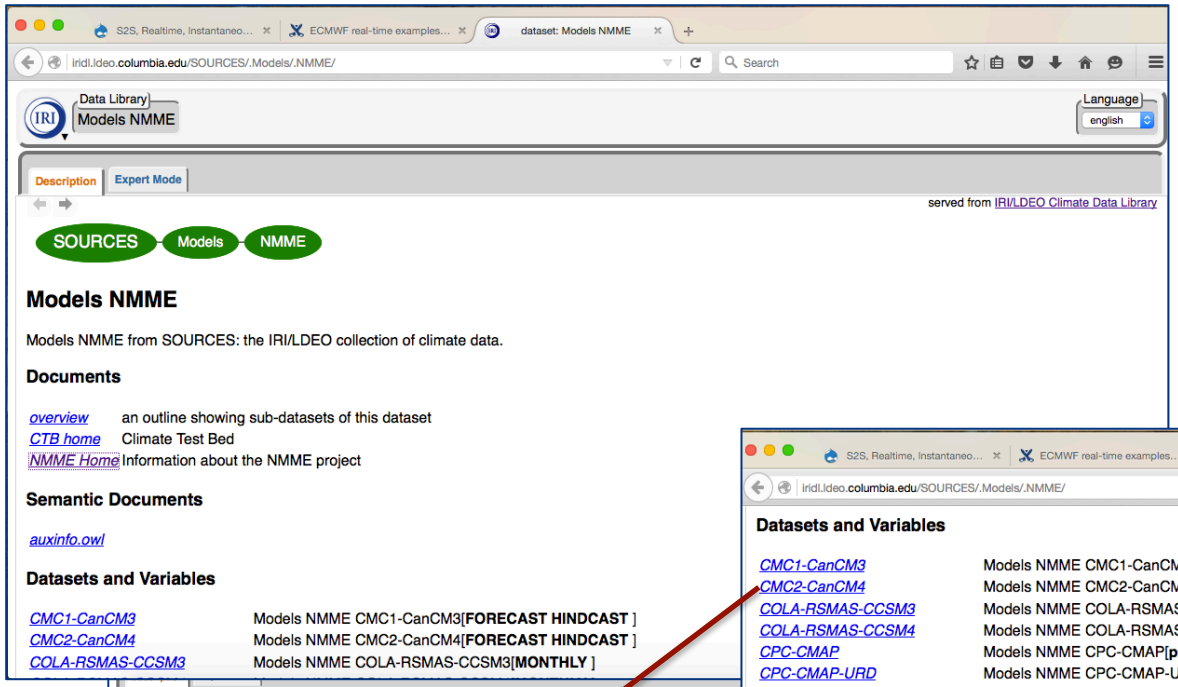


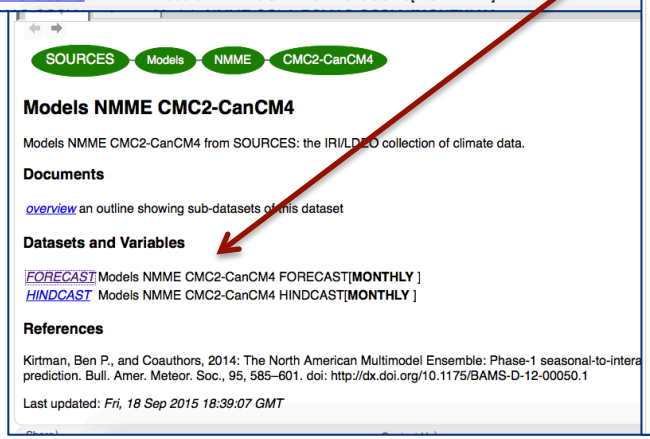
Relevant datasets: seasonal forecasts

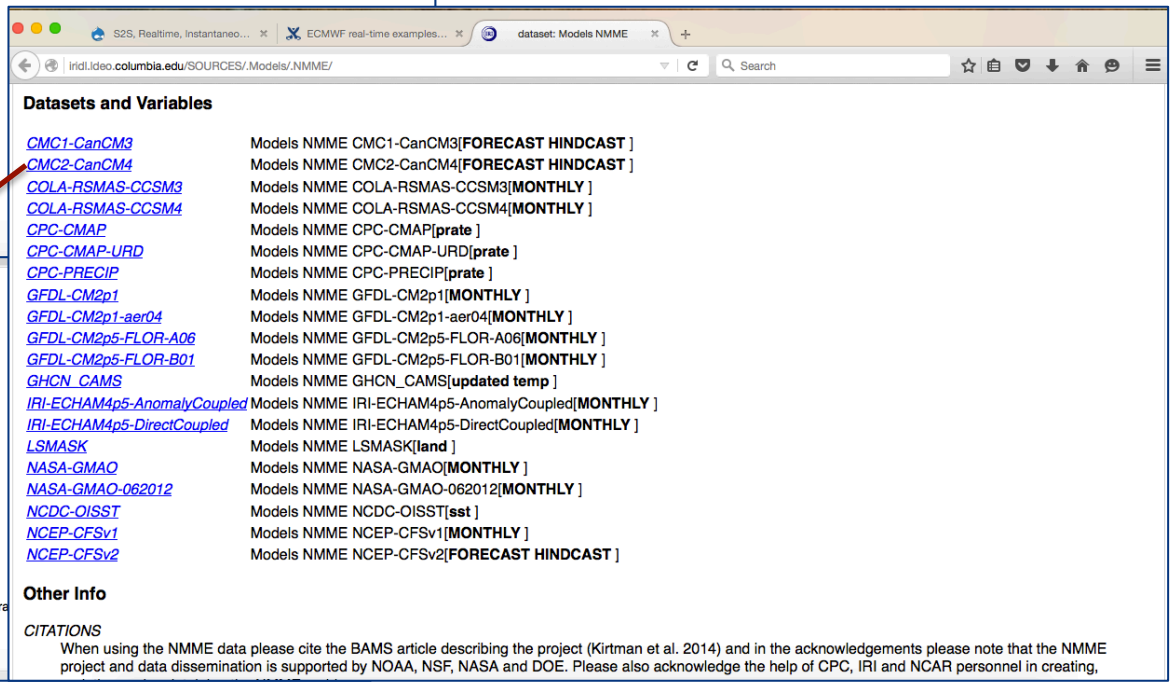




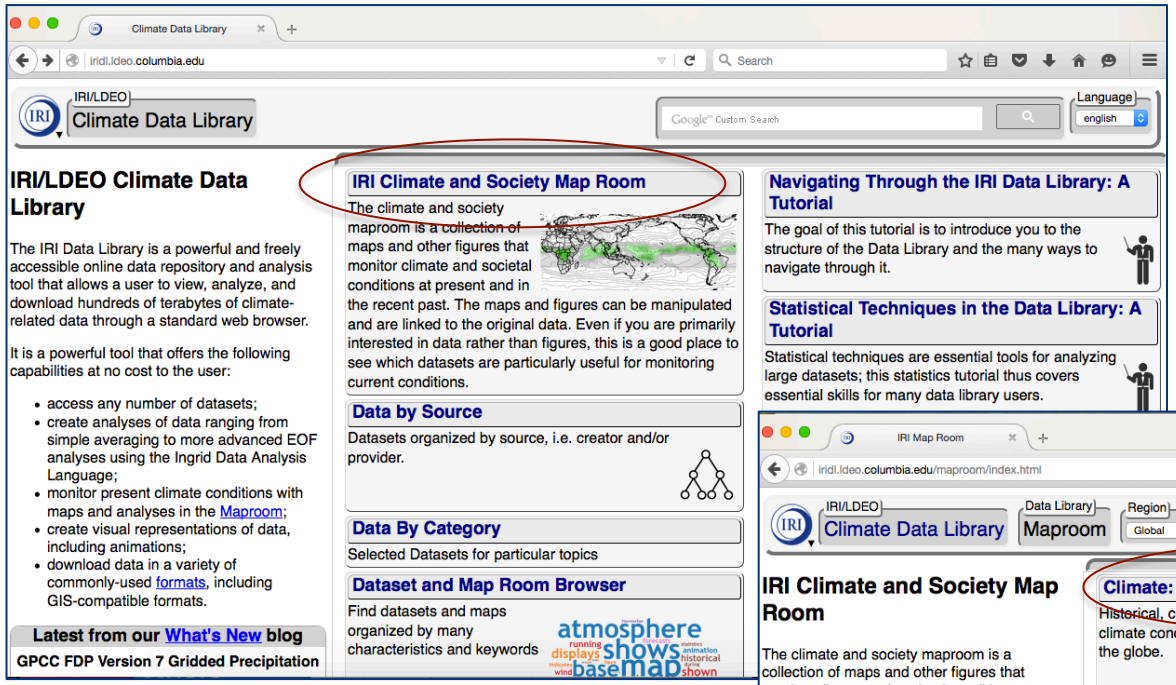
Relevant datasets: NMME seasonal forecasts

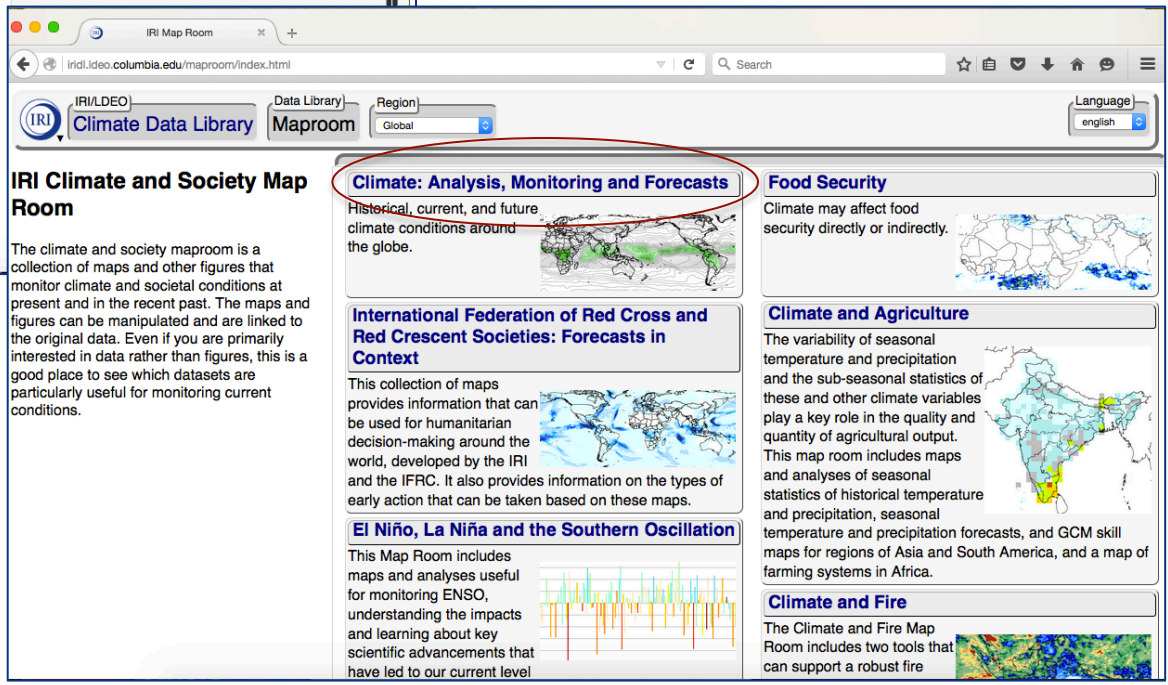




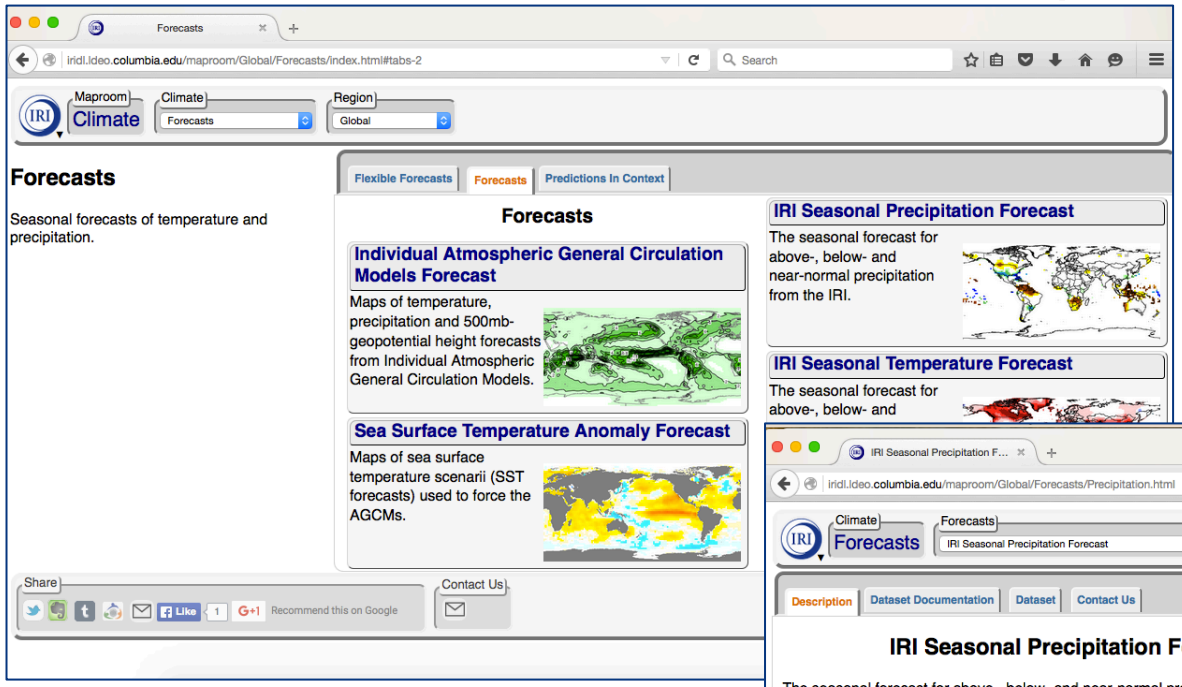


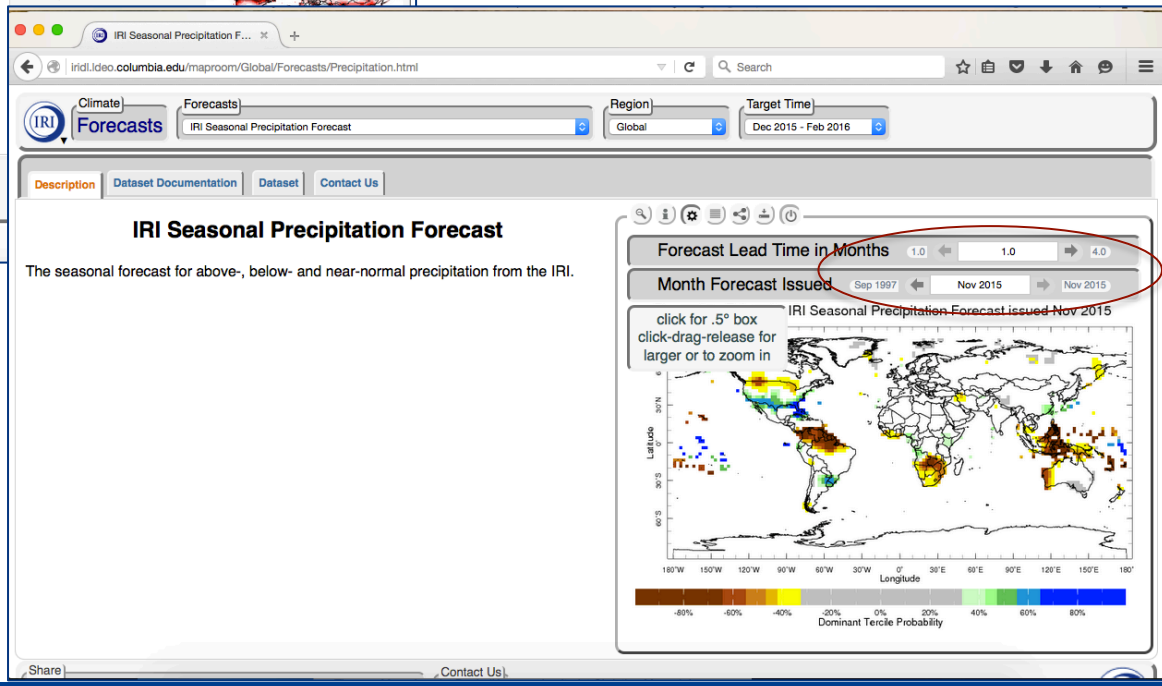
Relevant maprooms



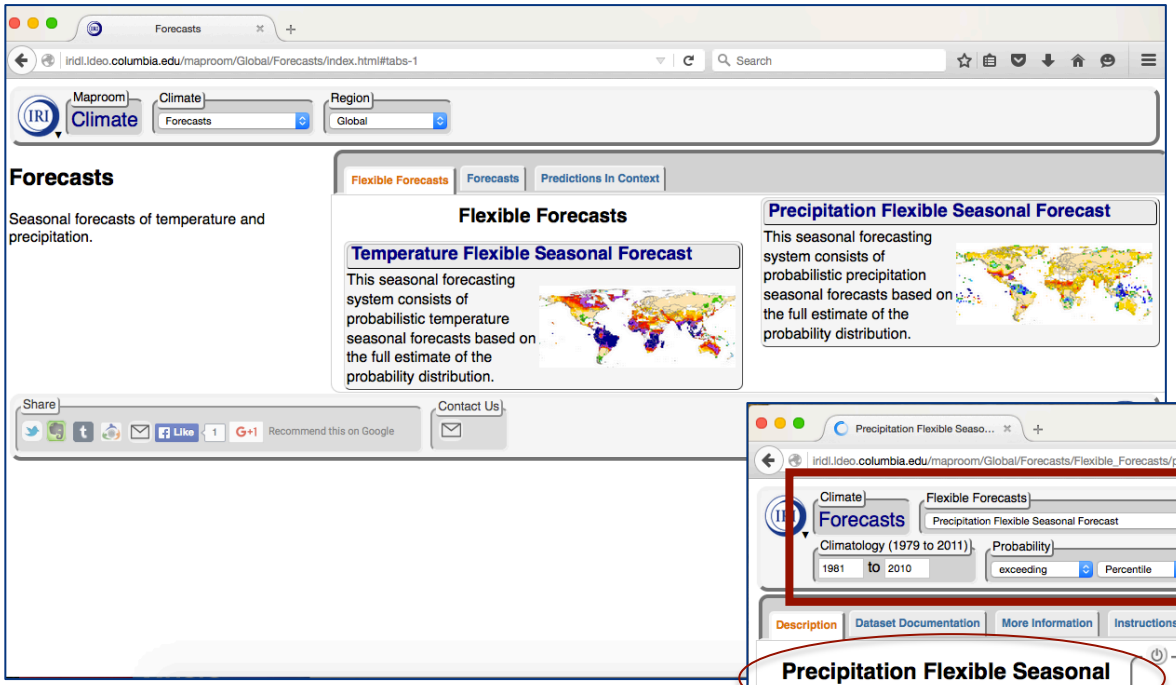


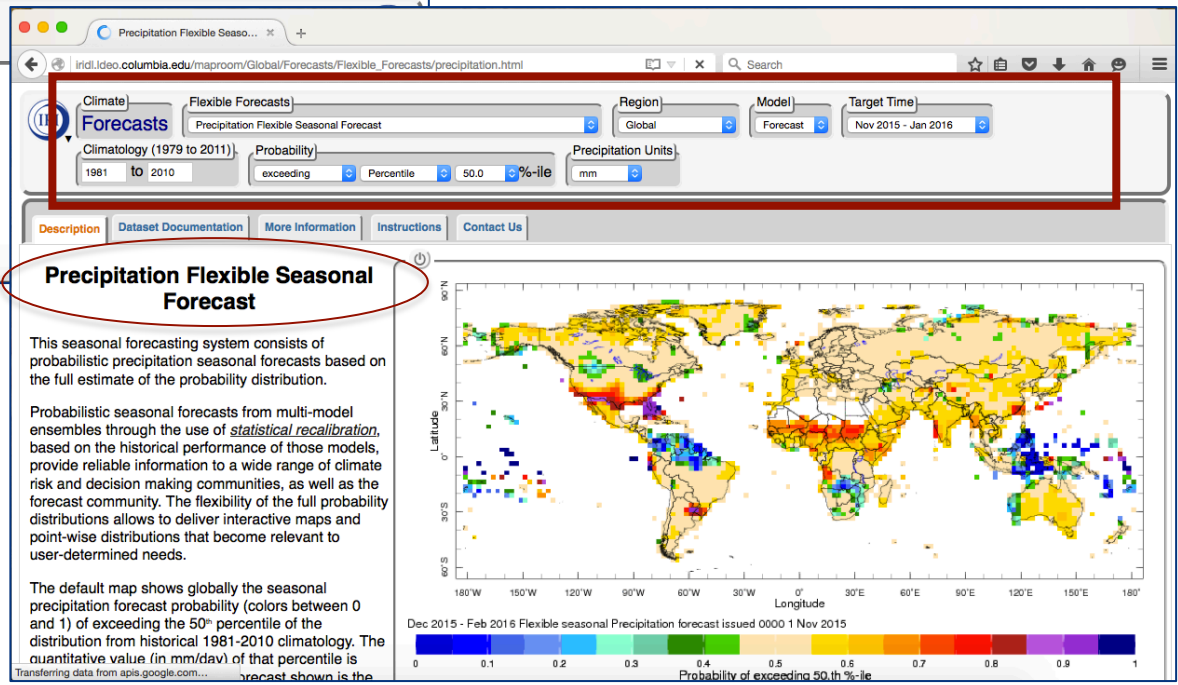
Relevant maprooms





Relevant maprooms





custom threshold and configurations

Relevant maprooms

IFRC Forecasts in Context

iridl.ldeo.columbia.edu/maproom/IFRC/index.html

Search

Data Library: Maproom | International Federation: Forecasts in Context | Region: Global | Language: english

International Federation of Red Cross and Red Crescent Societies

International Federation of Red Cross and Red Crescent Societies: Forecasts in Context

This collection of maps provides information that can be used for humanitarian decision-making around the world, developed by the IRI and the IFRC. It also provides information on the types of early action that can be taken based on these maps.

Click the tabs (top right) for links to the following useful maps:

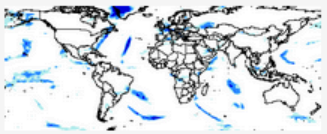
- **Six-Day forecasts:** These maps show where heavy rainfall is expected in the next six days, and how much rainfall is expected.
- **Three-Month Forecasts:** These maps show where large or small amounts of rainfall are expected in the next three months.
- **Past Conditions:** These maps show rainfall patterns that can be expected for El Nino, La Nina, and average years.

Six-Day Forecasts | Three-Month Forecasts | Past Conditions | Recent Climate Trends | Vulnerability Indicators

Six-Day Forecasts

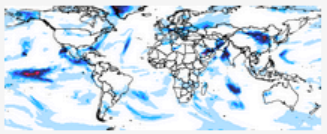
Where is exceptionally heavy rainfall expected?

This map shows places in the world that are forecasted to receive exceptionally heavy rainfall in the next six days relative to what is normal for their location.



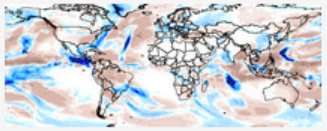
How does expected rainfall compare to normal rainfall for this month?

This map shows places in the world that are forecasted to receive over the next six days a large percentage of the rainfall that normally falls over this entire month in their location.



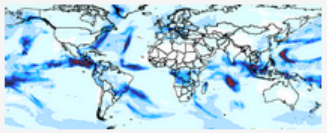
Where is it expected to be wetter than average?

This map shows where the total rain/snow over the next six days is expected to be more or less than what is average for this time of year.

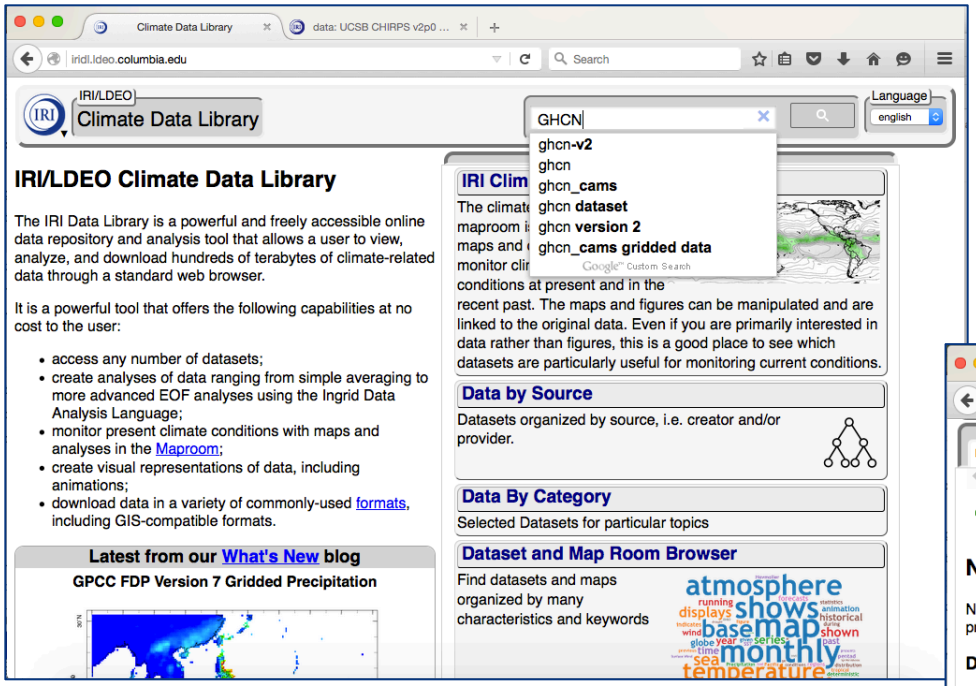


How much rain is expected?

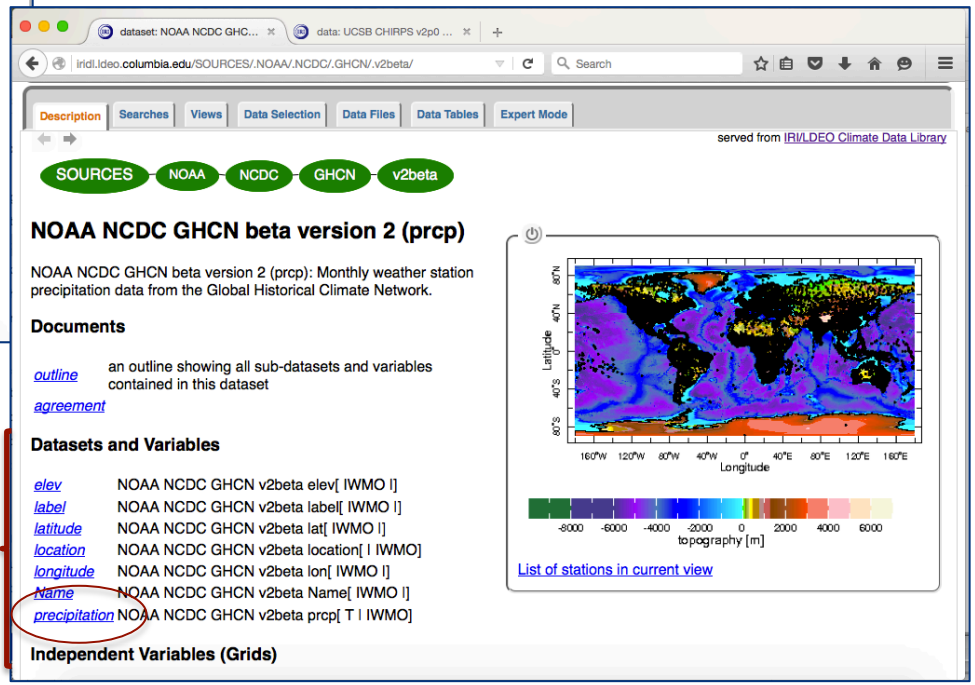
This map shows the total amount of rain or snow (in mm) that is expected to fall in the next 6 days.



ANNEX: Station datasets



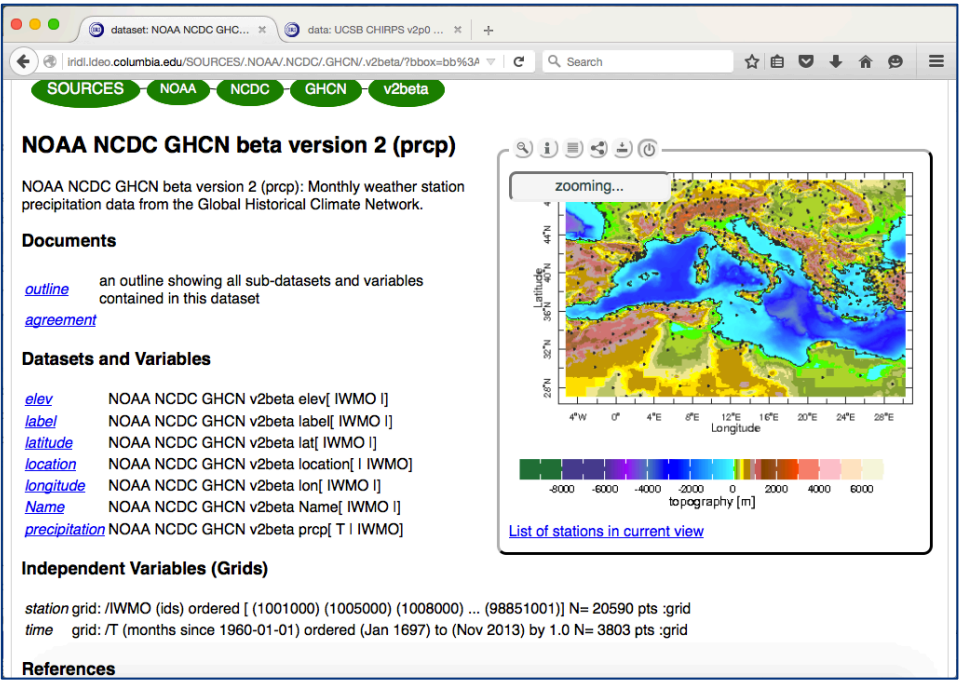
GHCN v2
global historical
climate network



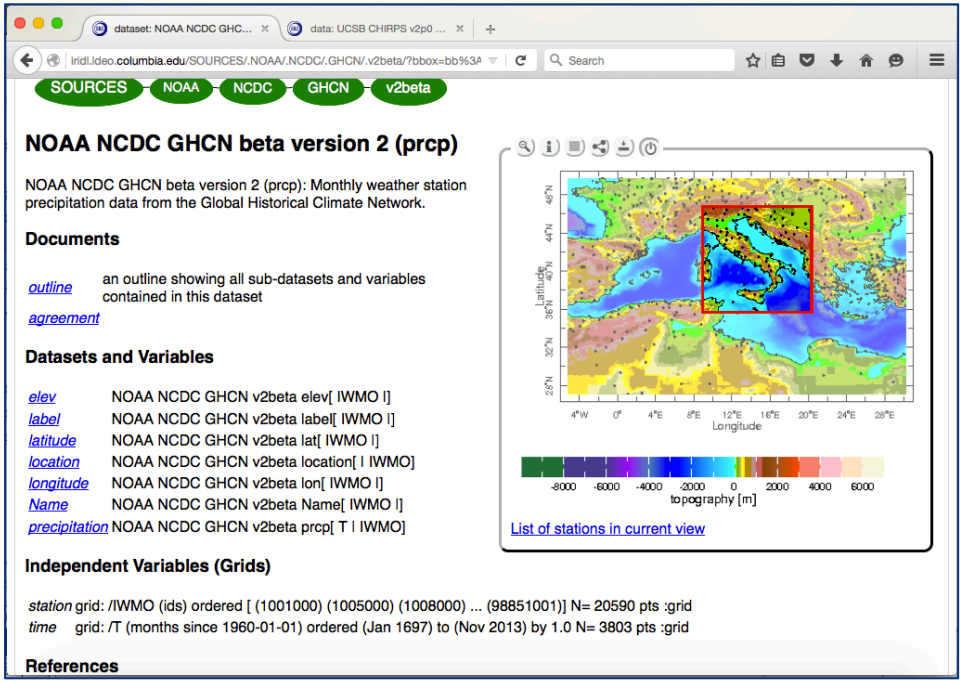
variables
(for each station)

Visualizing data: station datasets

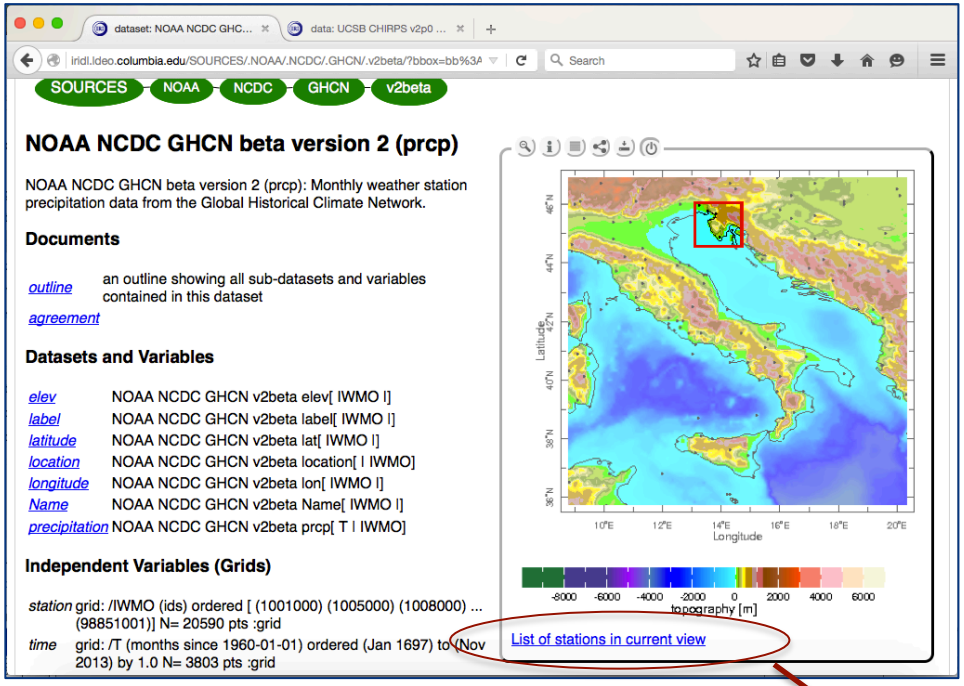
Visualizing data: station datasets



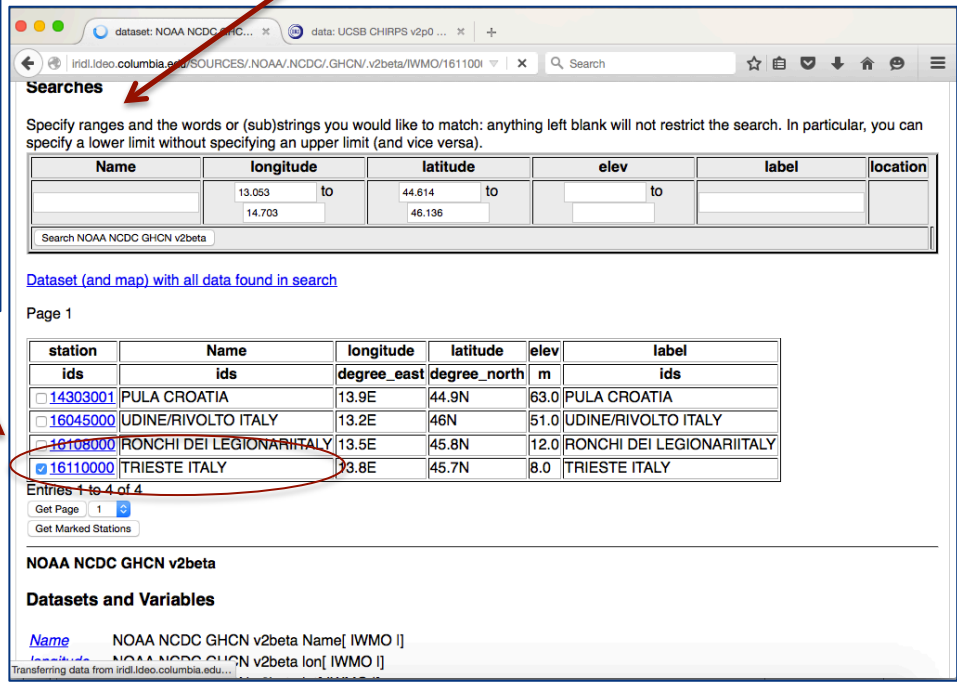
we use the mouse to zoom in on a domain



Station datasets: selecting stations

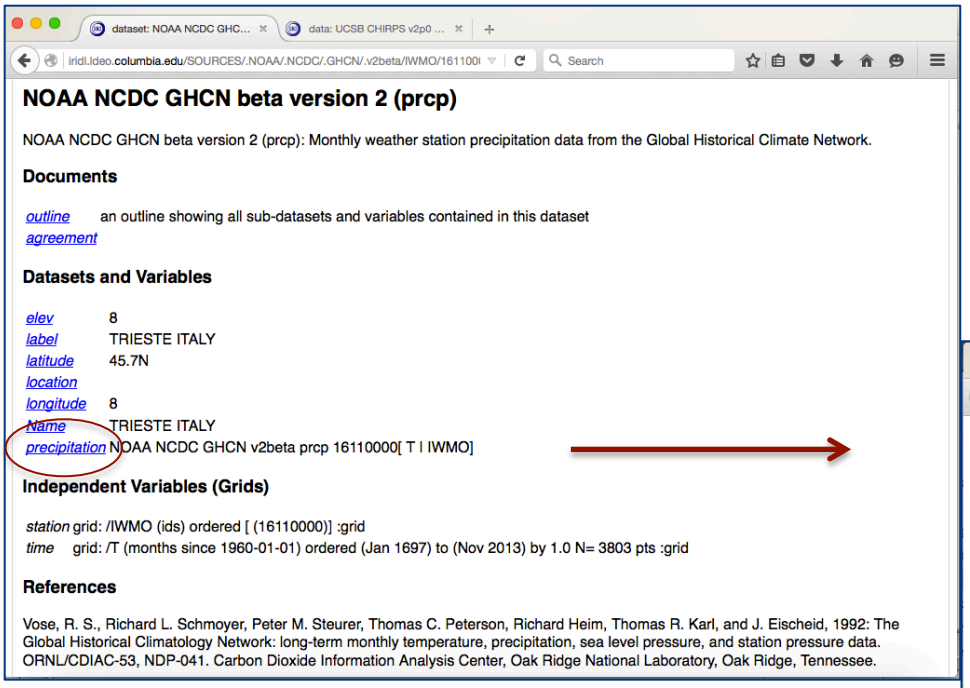


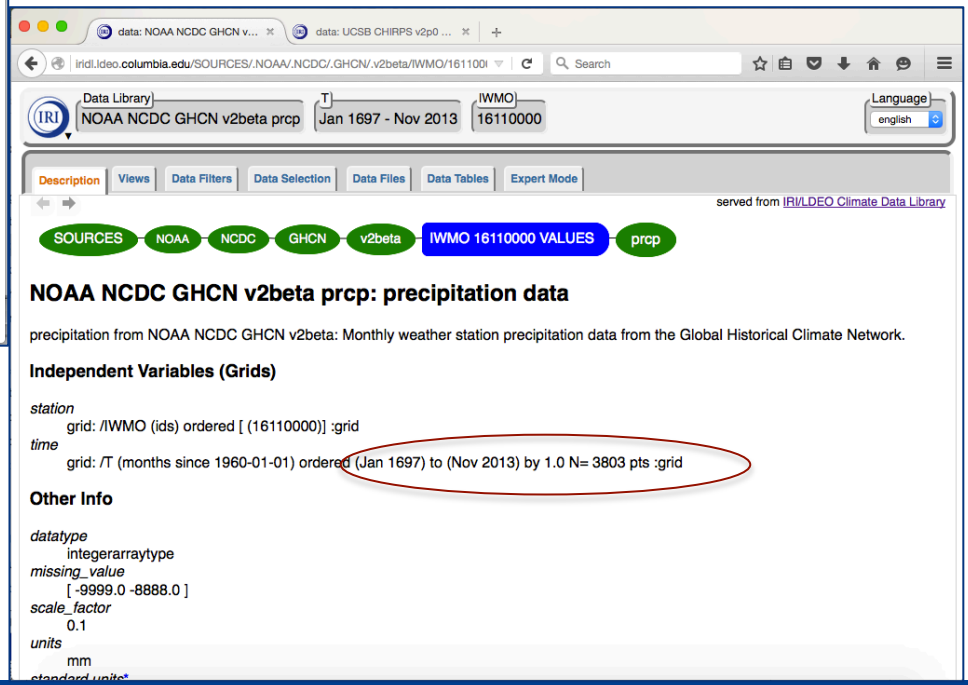
This dialogue box allows to search for stations according to the different variables (name, location, etc.)



we can list and then select the stations in the domain

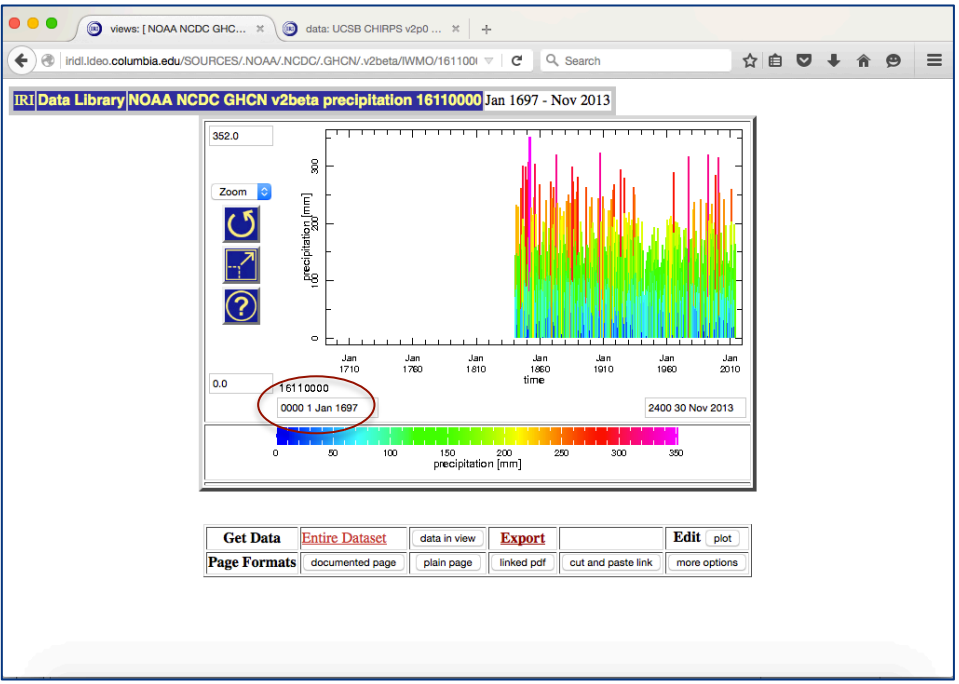
Visualizing data: station datasets



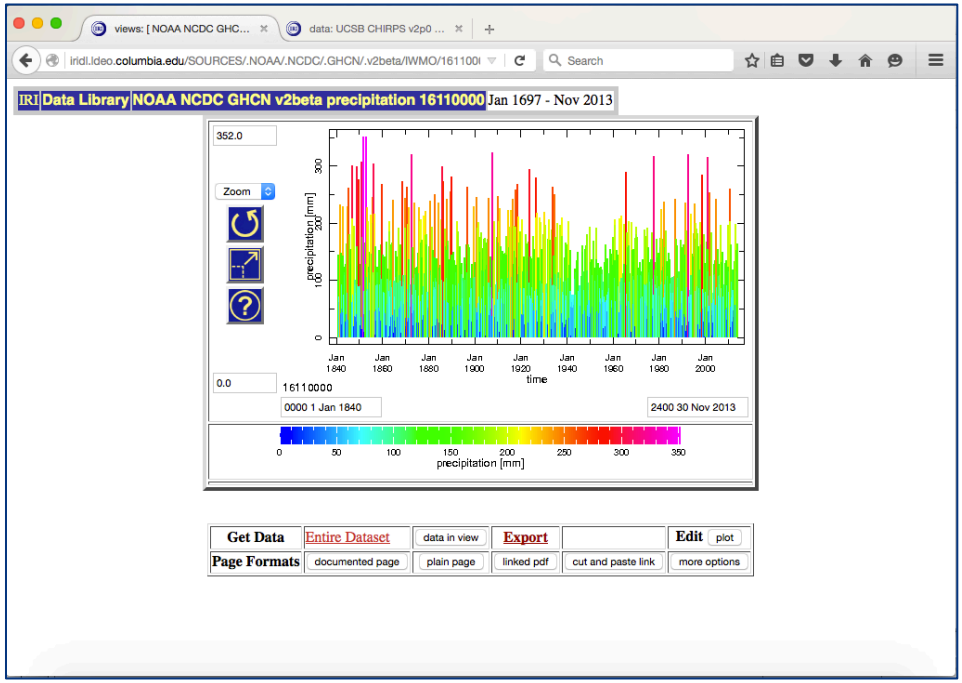


not all stations cover the complete period

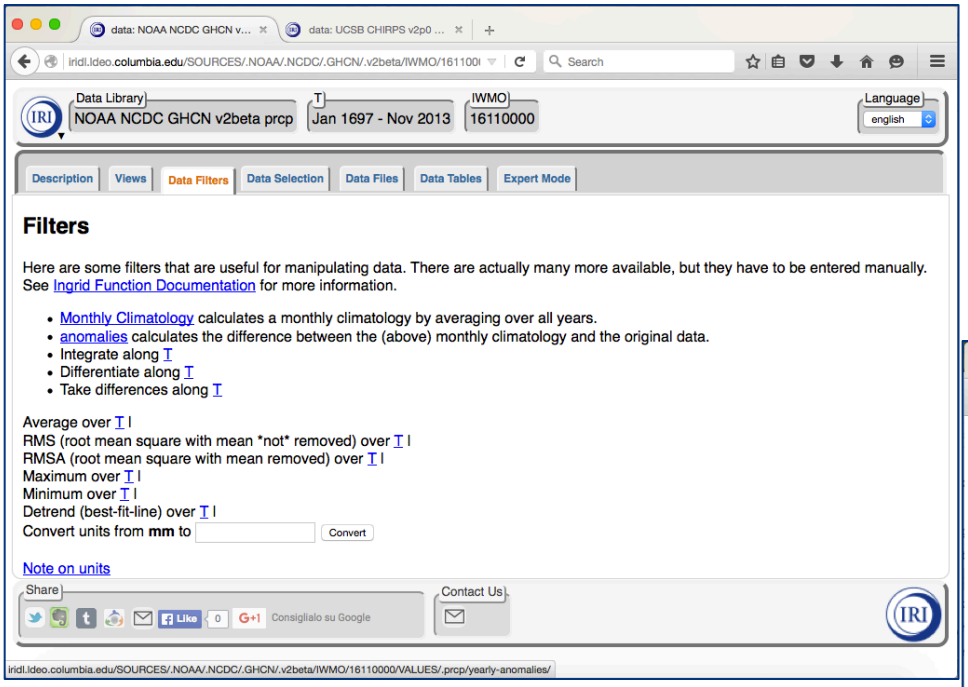
Visualizing data: station datasets

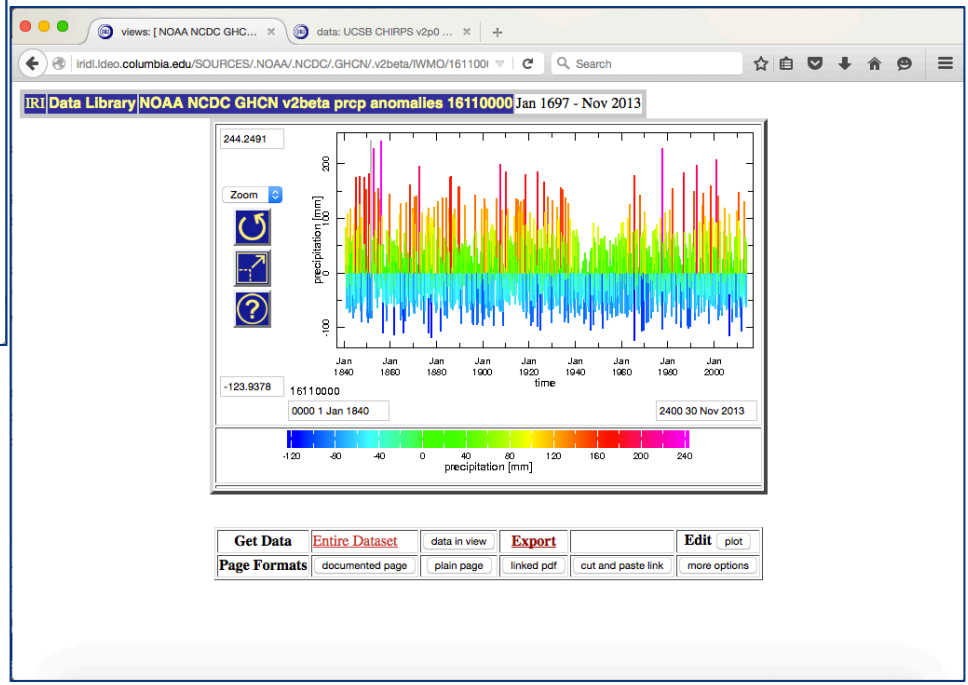


adjusting for the period start



Visualizing data: station datasets





we can also get the anomalies through the Data Filters