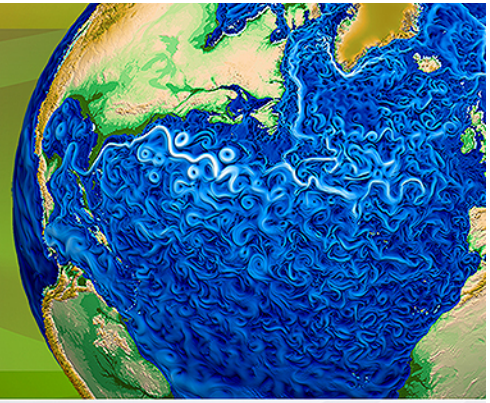
ACME
Accelerated Climate Modeling for Energy



Workflow Group

Plenary Tutorial:

Framework and Tools for Supporting Model Integrations and Offline Analysis

U.S. DEPARTMENT OF ENERGY

Overview

- Process Flow
  - Task Leads: Ben Mayer and Kerstin Kleese-Van Dam
- Data Management
  - Task Leads = Sasha Ames and Rachana Ananthakrishnan
- Diagnostics & Metrics
  - Task Leads = Jeff Painter and Brian Smith
- UV-CDAT
  - Task Leads = Charles Doutriaux and Aashish Chaudhary
- User Interface
  - Task Lead = Matthew Harris

Task Leads = Ben Mayer and Kerstin Kleese-Van Dam

Process Flow

Overview of Current Data Management

- Model Run Setup
- Run Management
- Many sites
  - Model runs
  - Resource availability
- Post-Process
  - Transfer
  - ESGF Publish
  - Interpolation
  - Diagnostics
  - Archive to HPSS
- Data Logistics

Model Configuration

- Required to **Enable proper testing of scientific question**
- Query collaborators for output fields
- Configuring Input files, model parameters and output fields
- Perform 5 day run
  - Check for ability to run
- Perform 25 day run
  - Check outputs are as expected

Run Management

- Typical time to complete production run 6-9 months;
  - time = money
- Need to be **constantly running model** or progressing towards running to **minimize time to solution**
- Status reports are generated to track progress

DOE Computing Diversity

- DOE sites have specific strengths (compute, disk, archival storage)
- We can and do leverage these unique capabilities
- It does introduce complexities with data location and security/accounts

Data Transfer

- Allows for leveraging multi-site strengths
- ESNet and Globus enable high speed transfers

ESGF Publication

- Allows organized and searchable data distribution to collaborators across sites
- Publishing of v0.1 data in progress (See Dean's Talk)

Interpolation

- **Functional Requirement** to compare models and observations or intermodel (v0 to v1),and intermediate step between climatolgies and diagnostics
- Performing several types of interpolation
  - Converting resolutions (higher -> bilinear, lower -> conservative remapping)
  - Native grid to lat/lon

Diagnostic Analysis

- Required to diagnose how case is progressing and evaluating model output
- We are using both UV-CDAT and NCL based diagnostic tools to examine case progress
- Creating new diagnostics framework using UV-CDAT to integrate into larger workflow
- Atmosphere and Land diagnostics are almost complete

Archive Generated Output

- Ability to, at a later date, perform analysis or recreate a case configuration
  - Long term availability
- Use HPSS for increased reliability over disk
  - Two copy or RAIT for even higher reliability
  - Also cost effectiveness
  - Automatically Computed CRC for bit error detection

Capability Summary

- Proper Configuration to test Hypothesis
- Simulation Progress and Status Reports
- Take best advantage of resources
  - Globus Transfers
  - ESGF Publications
- Critical functions for ability to compare and evaluate how model is progressing
- Provide final output and configuration information for later analysis via archiving

Data Logistics

Production Compute

Disk

Network drain
In practice 550Mbps
(70MB/s)
Can happen constantly

HPSS Archive

Analysis of Entire Case

Disk

Need 1-5TB

Model 6hr Run Request
per day (on average)
5 hour of run per 6 hr of
request
~1hour of writing
10s to 100MB/s

Very large storage
Tens of PB to ExaB
200 MB/s
Nearly Constant

Maximum Case size
currently 130TB
Need ~150TB
Single Node of compute

Task Leads = Sasha Ames and Rachana Ananthakrishnan

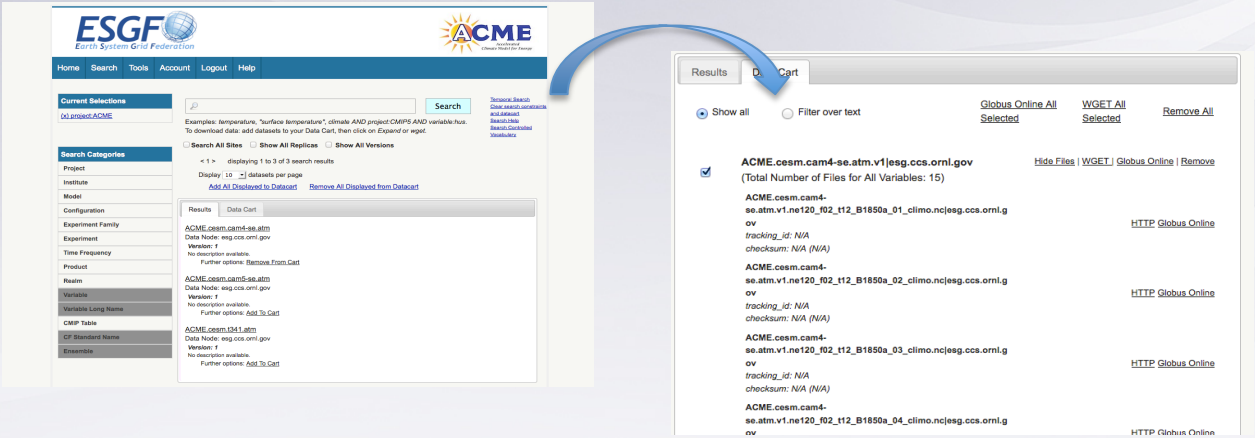
Data Management

ACME Data Publication to ESGF

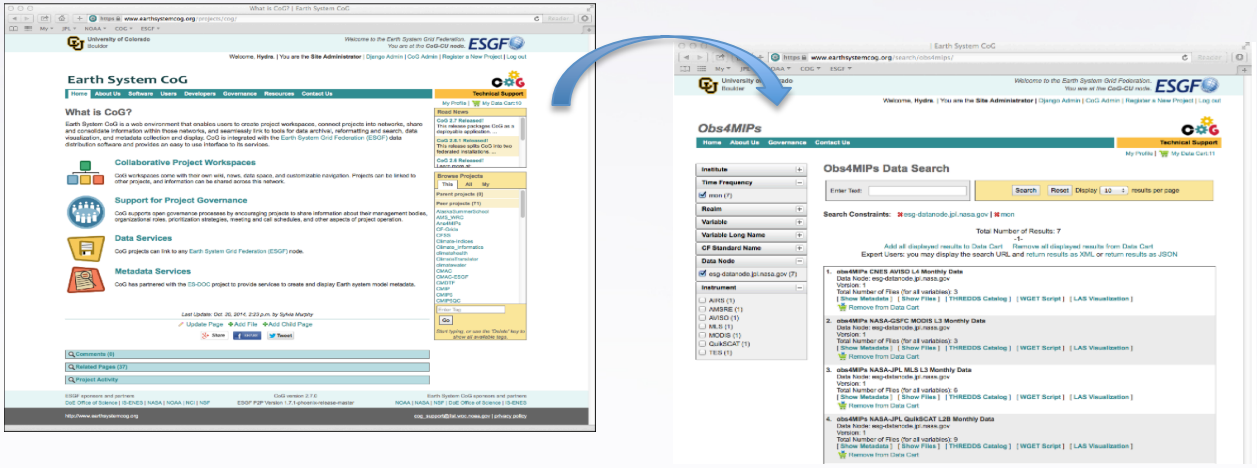
- The ESGF enterprise system is a framework for the management, dissemination and analysis of model output and observational data (http://esgf.llnl.gov)
  - Over 40 projects use ESGF (CMIP5, CORDEX, etc.)
  - Tens of PBs of data archived (ACME ➔ 20 datasets, ~50TB)
  - Easily accessible via http or Globus
- We're publishing model output and climo data sets now
  - Goal to integrate automated publication with managed workflow
- ESGF nodes online at LLNL, ORNL, LANL, ANL, PNNL
  - NERSC coming soon
  - ANL upgrades coming soon
- Need to publish?
  - Now: contact publication "Liaisons" for ACME
  - Future: use Publication Service web user interface
  - Know where your data is located and values for search categories
- Usage tutorial
  - https://acme-climate.atlassian.net/wiki/display/WORKFLOW/Development+of+documentation+to+access+data+on+ESGF

Earth System Grid Federation (ESGF)

- ESGF Web Front End (Current)

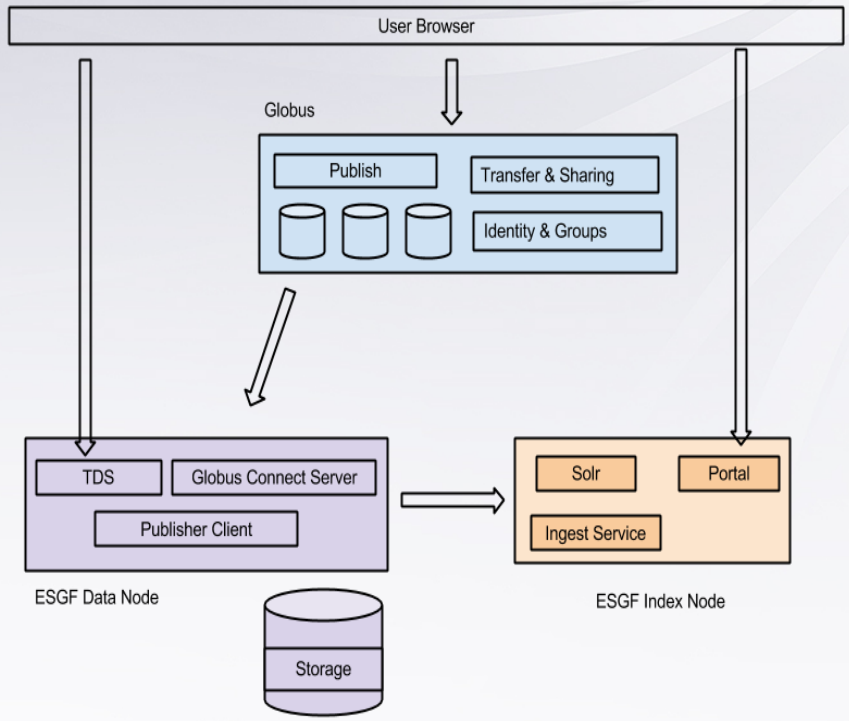


- ESGF CoG (Improved front end released now. Officially released in Sept. 2015)

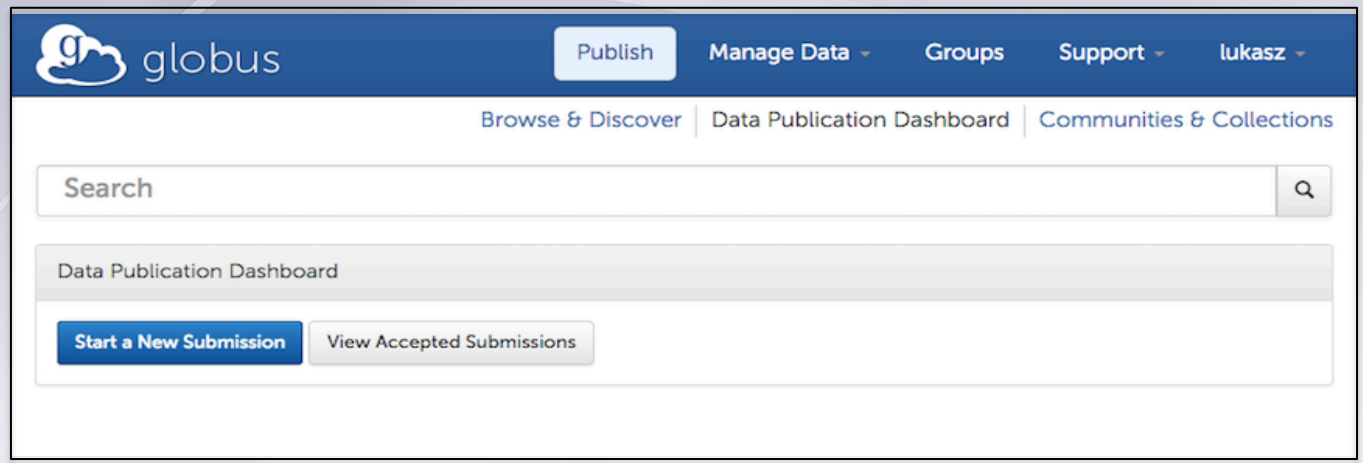


Publication as a Service

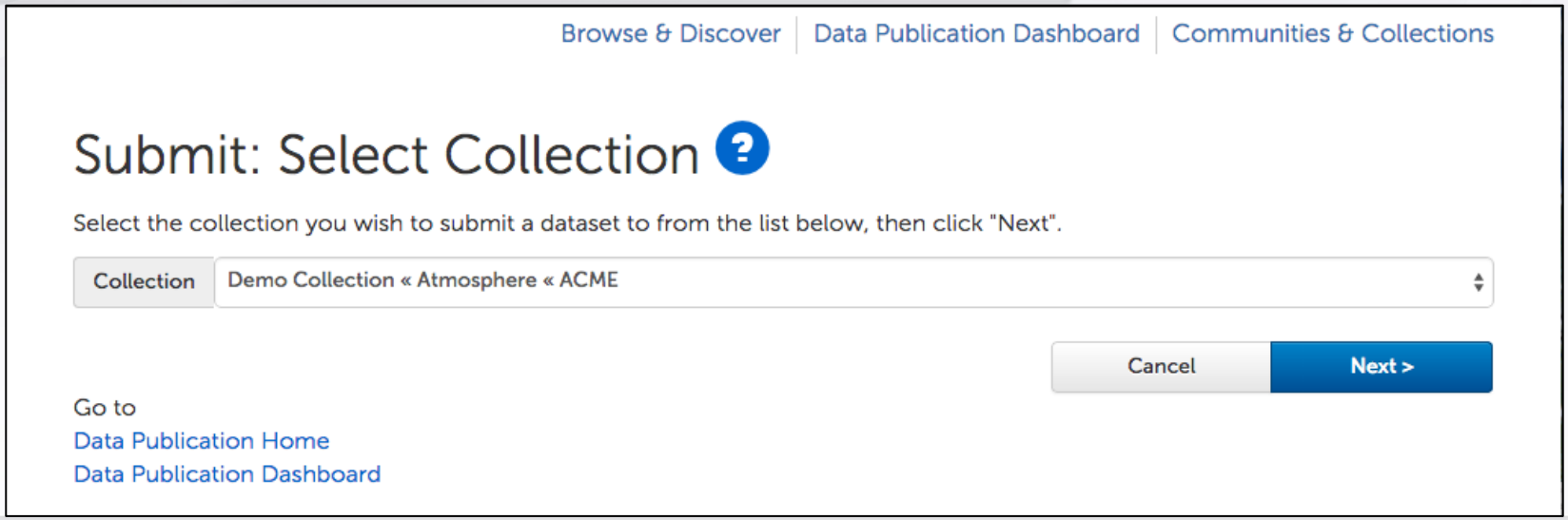
- Goals:
  - Simple interface for scientist to publish data
  - Managed publication process
    - User provides some input,
    - Submits publication task
    - Task managed by service
    - User notified on progress/errors
- Mappings:
  - Community: ACME
  - Sub-communities: Atmosphere, Land, etc
  - Collection: Case
  - Dataset: Run



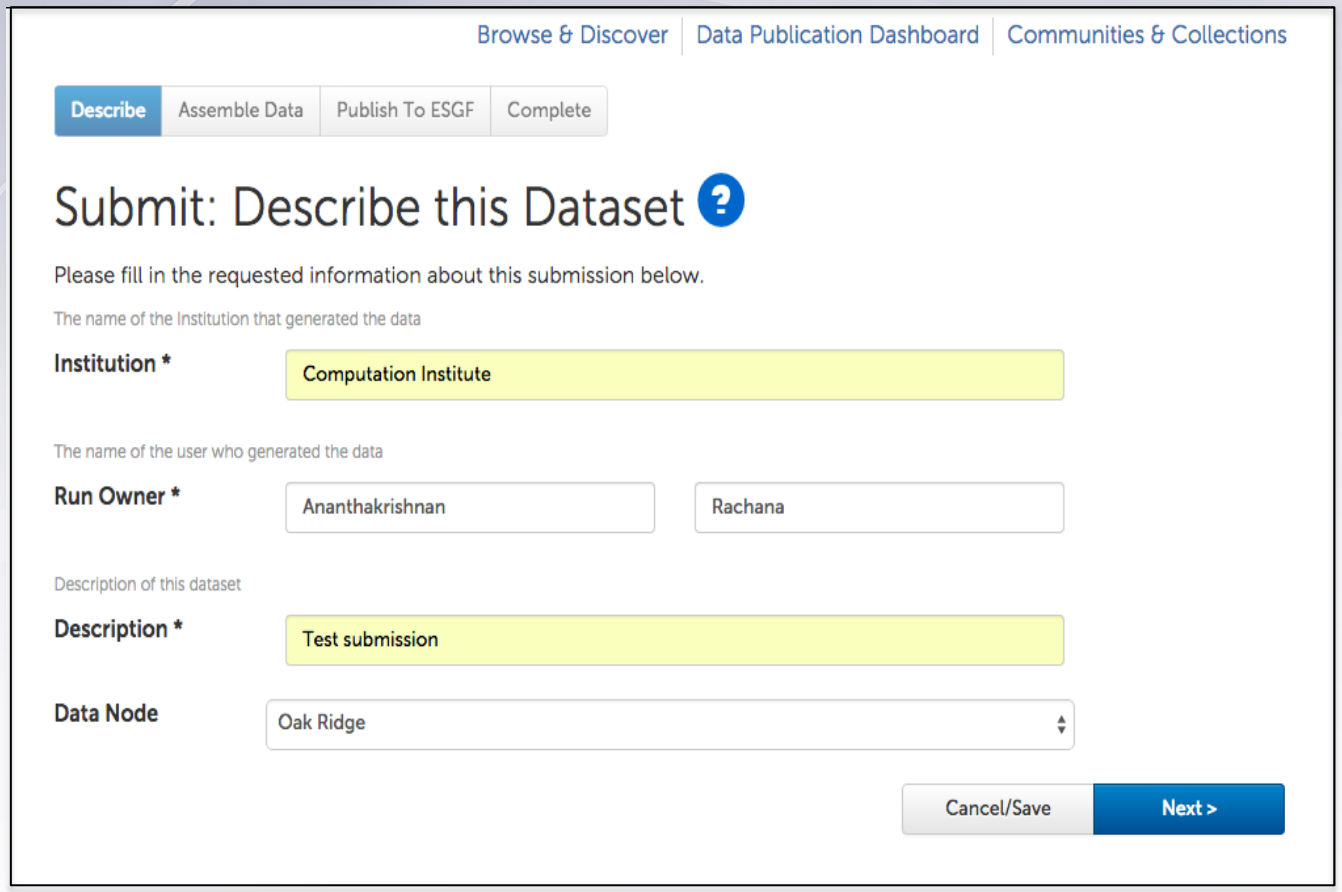
Choose a collection



A collection is created for each Case



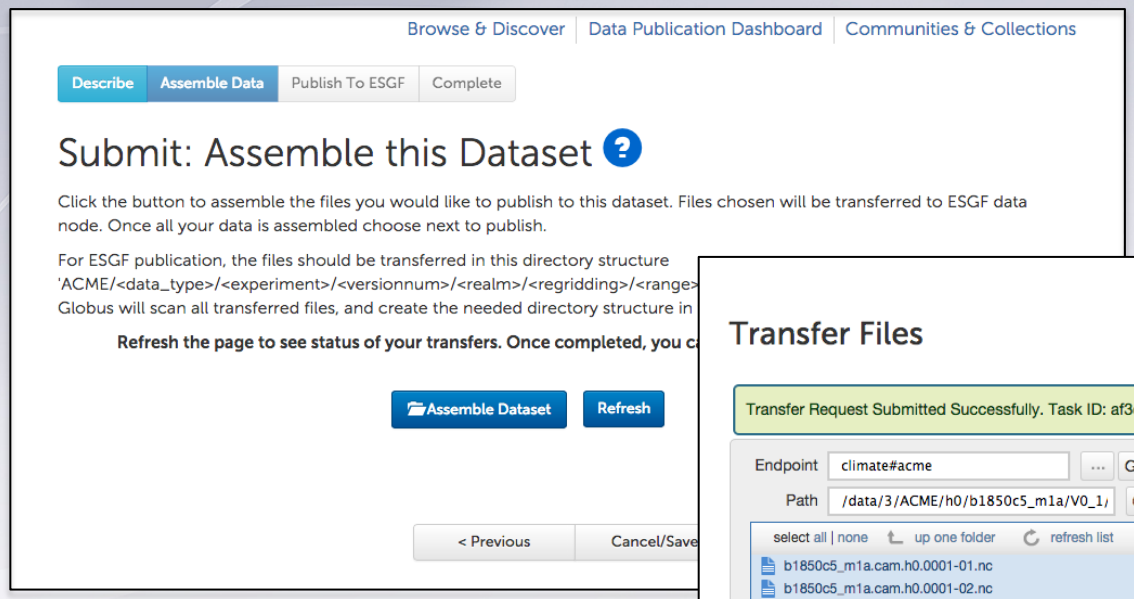
Add description

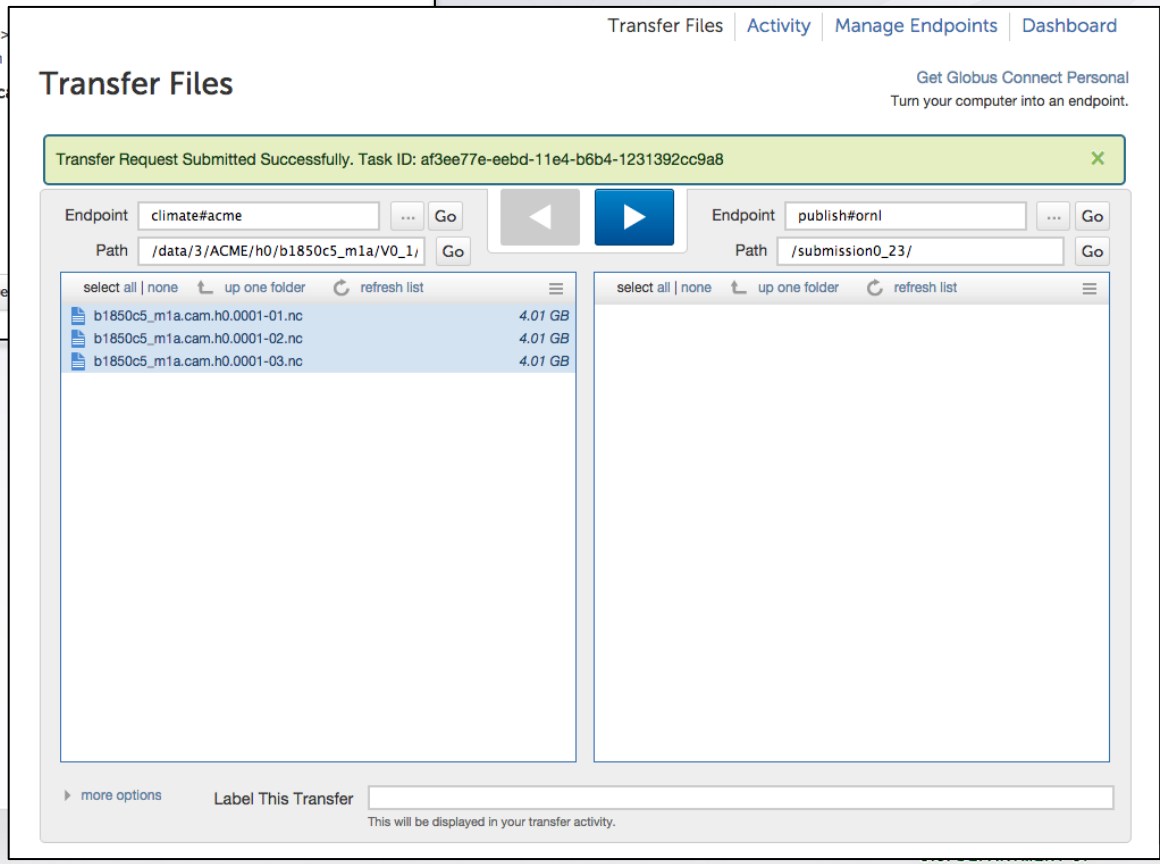


Metadata and ESGF node to store data

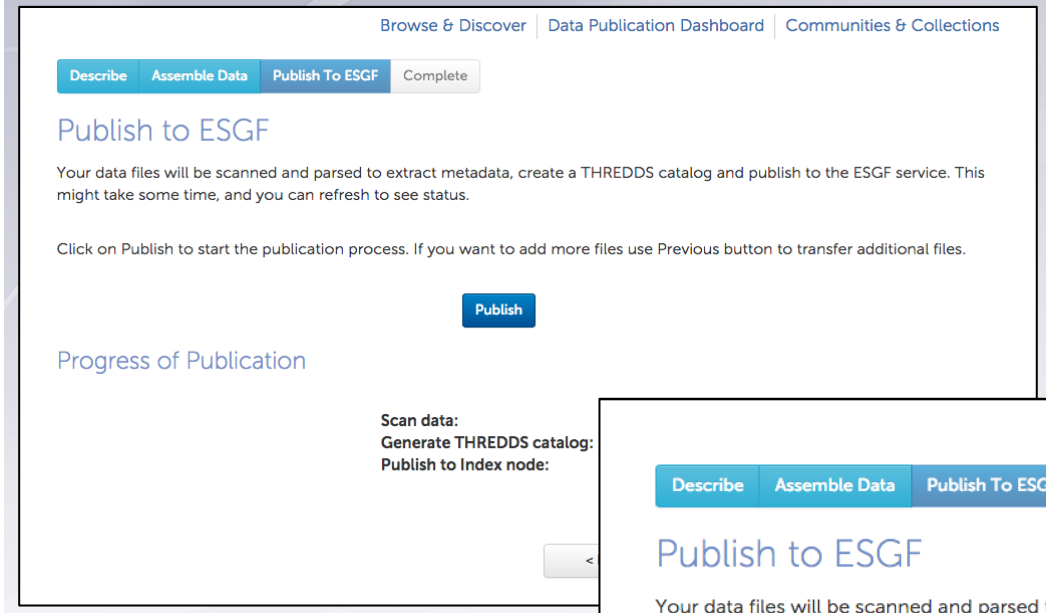
Assembles files to publish

Identify files to publish and transfer to ESGF data node

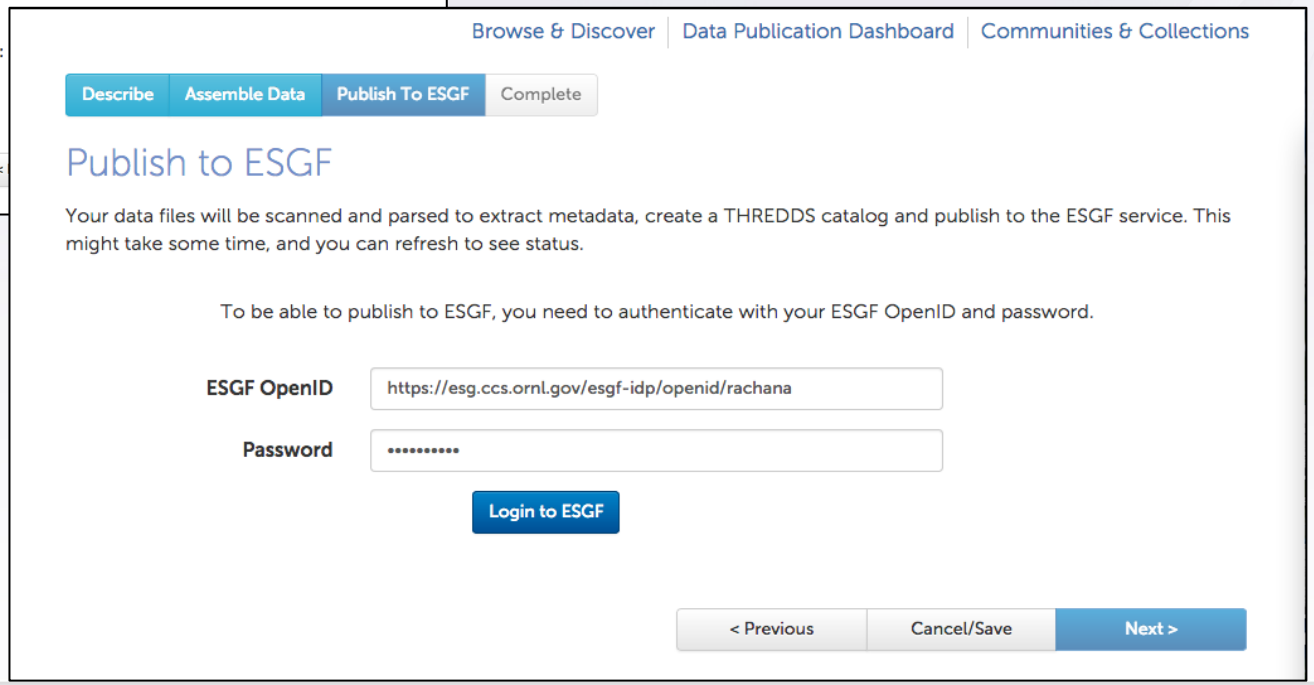




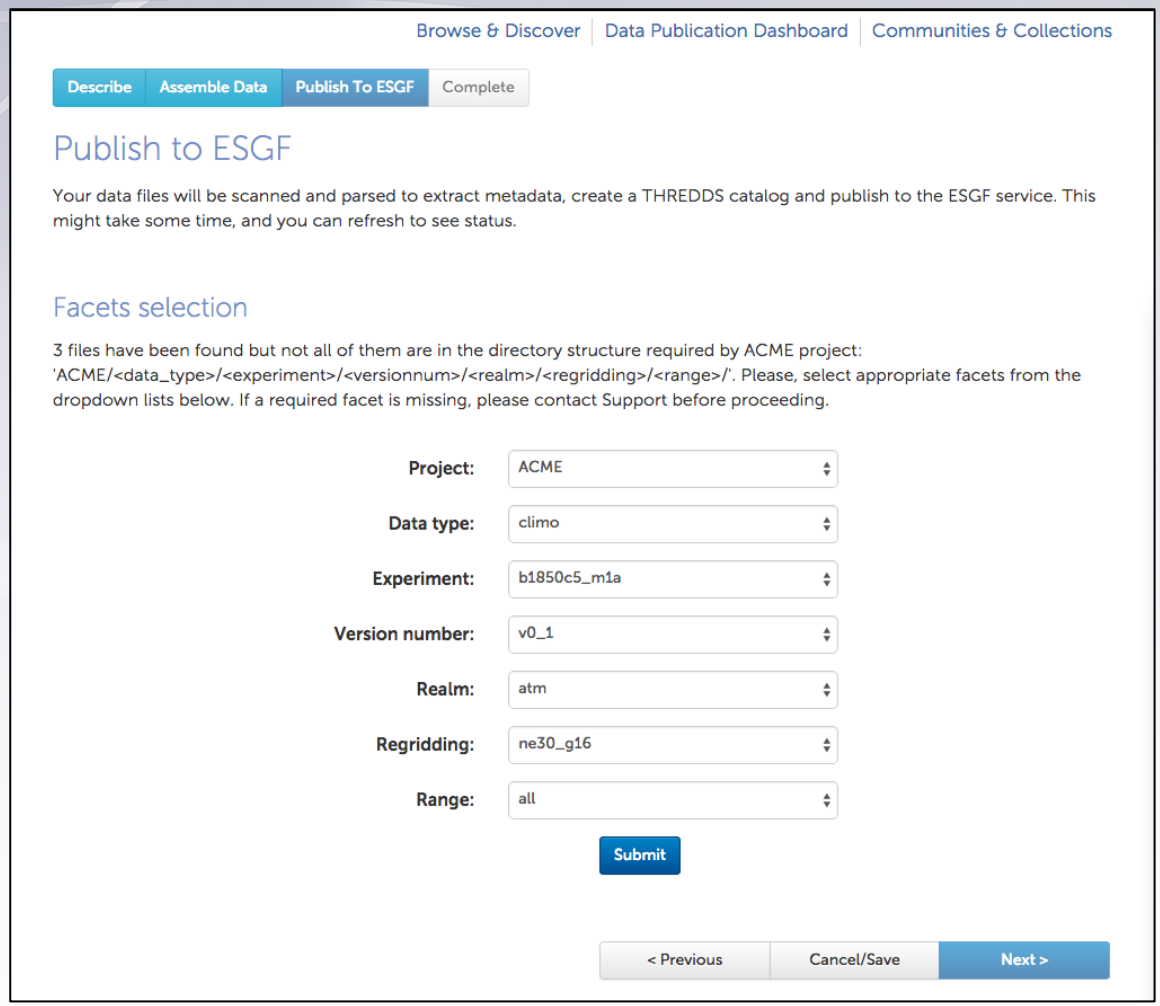
Login to ESGF



Checks permissions to see if user can publish

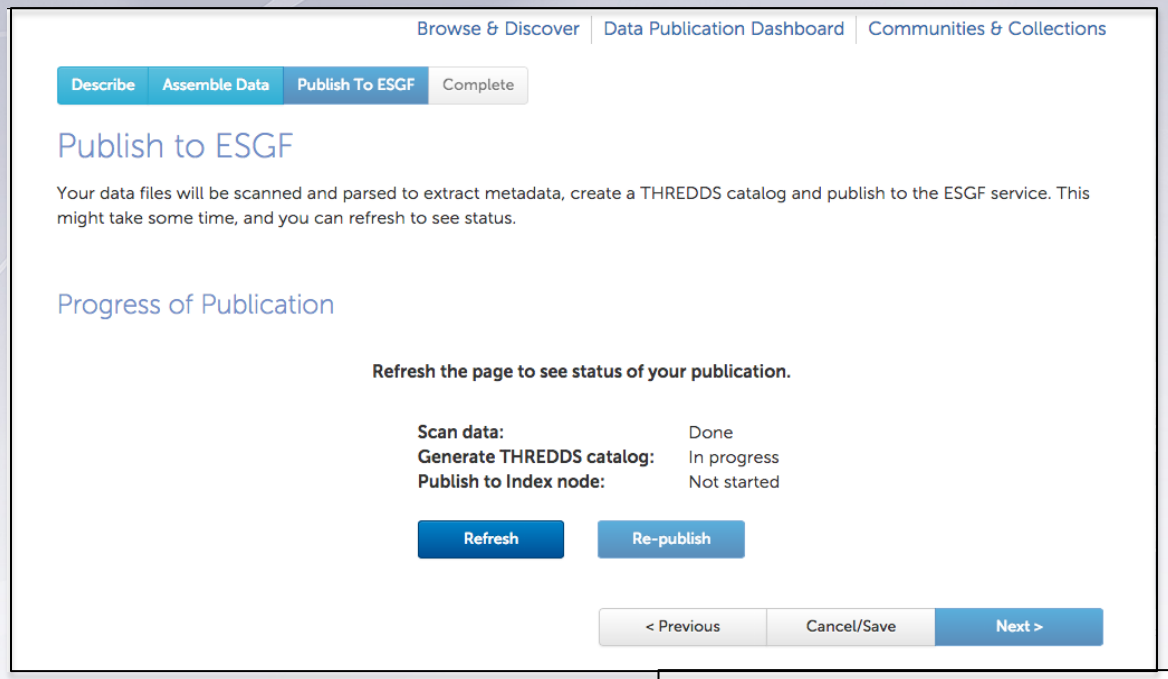


Pick search categories

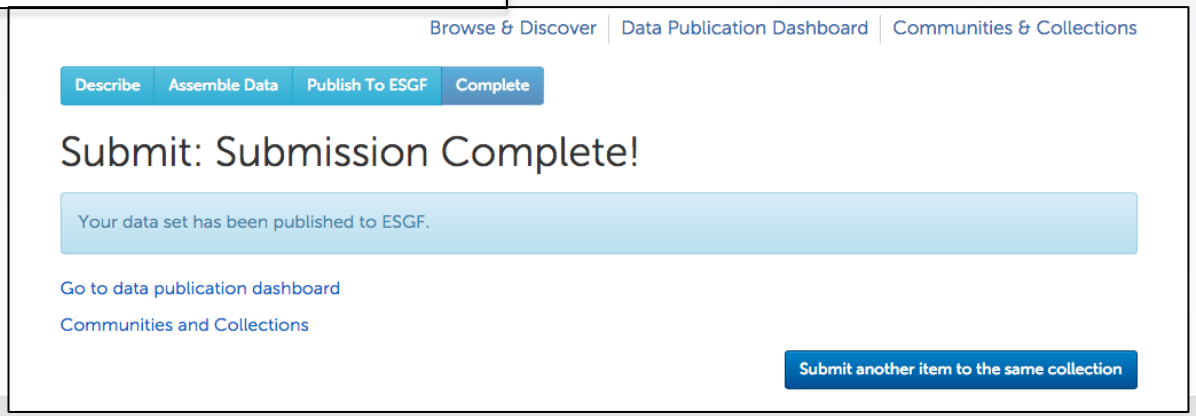


Optional step to rearrange files in directory structure needed by ESGF publish tool

Status updates



Manage remote metadata extraction, generation of THREDDS catalogs and push to ESGF search index



Planned Work

- Deployment of next version with email notification
- Production deployment of service
- Support for other ESGF data nodes
- Programmatic interface for supporting automation and scripting
- Seamless integration with ESGF policies for publication
- Integration with publication tool configuration manager (developed at ORNL)

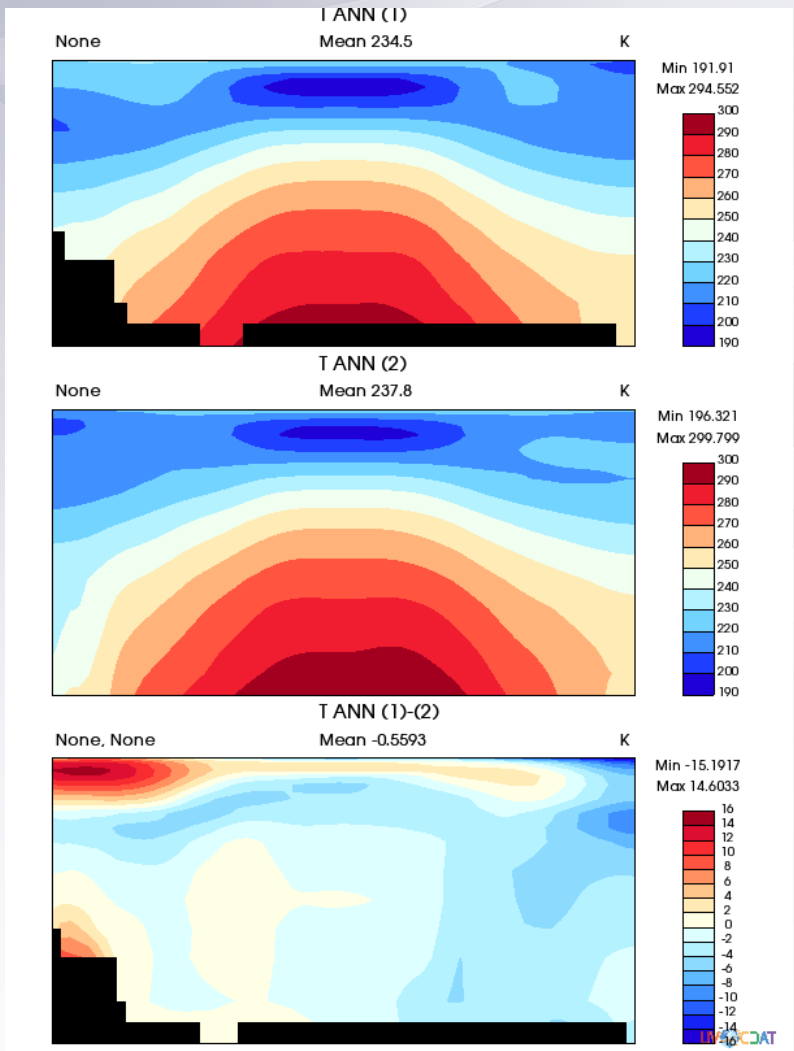
Task Leads = Jeff Painter and Brian Smith

Diagnostics

Command Line Diagnostics

Specify:

- Model information - data location, optional filter specification, optional flag indicating climatology vs raw
- Observation information (optional)
- Package type - atmosphere / land / ocean
- Variables, seasons (optional), additional variable options (optional)
- “plot set”




```
diags --outputdir ~/diagout/  --modelpath=~/metrics_data/cam35_data/,climos=yes
--obs path=~/metrics_data/obs_data_5.6/,filter="f_startswith('NCEP')",climos=yes
--package AMWG --set 4 --vars T --seasons ANN
```

Command Line Diagnostics

Output is:

- One PNG image file for each plot
- Another PNG image file for all plots combined
- A NetCDF file with the data used to compute each plot.
  - suitable for further analysis or preparing specialized plots for publication

Command Line Diagnostics

metadiags.py:

- Wrapper around diags script to create all diagnostics collections with a single command line invocation
- Additional diagnostic “collections” are easy to add
- Example:

```
diags_collection['so']['desc'] = 'Tier 1B Diagnostics (Southern Ocean)'
diags_collection['so']['regions'] = ['Southern_Extratropics']
diags_collection['so']['SHFLX'] = {'plottype': '3', 'obs': ['LARYEA_1'] }
diags_collection['so']['QFLX'] = {'plottype': '5', 'obs':['LARYEA_1'] }
....
```

- Takes model location, obs location, and output directory as arguments

climatology.py (and new climatology2.py):

- Creates climatology files
- Supports unstructured native grid datasets
- Takes input data location and output directory as arguments

Classic Viewer

Menu

Output Display

Controls

Diagnostic Selection

UV-CDAT:EA | Classic | Logout

Back to Atm Home

Classic View

Dataset: cam5se

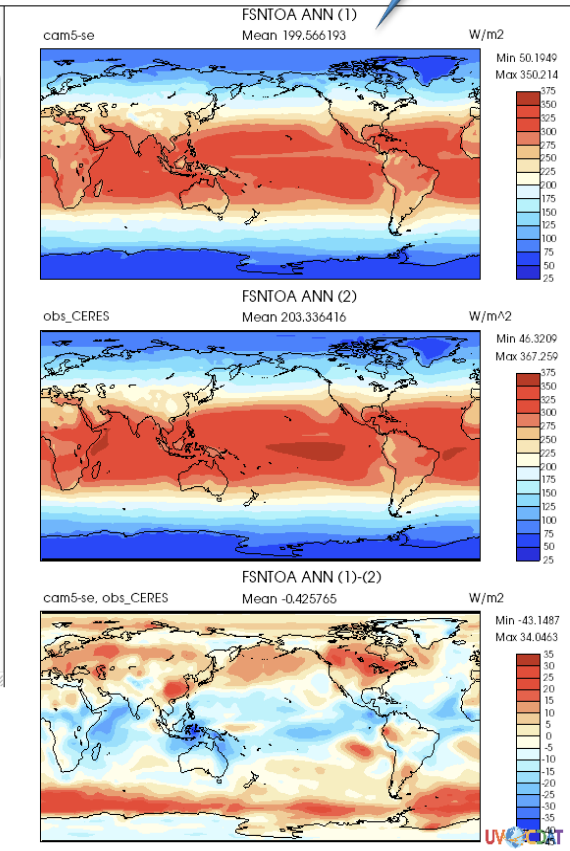
Package: amwg

Variables: 7 selected

Times: 17 selected

Plot Dataset

		DJF JJA ANN
	NVAP 1988-1999 - Tropics	
TGCLDLWP	Cloud liquid water	plot plot plot
PREH2O	Total precipitable water	plot plot plot
	Legates and Willmott 1920-80 - Tropics	DJF JJA ANN
PRECT_TROP	Tropical Precipitation rate	plot plot plot
	MODIS Mar2000-Aug2004	DJF JJA ANN
MEANTAU	Mean cloud optical thickness (Day)	plot plot plot
MEANTTOP	Mean cloud top temperature (Day)	plot plot plot
TGCLDLWP	Cloud liquid water	plot plot plot
TCLDAREA	Total cloud area (Day)	plot plot plot
MEANPTOP	Mean cloud top pressure (Day)	plot plot plot
PREH2O	Total precipitable water	plot plot plot
	ERA40 Reanalysis 1980-2001 - Tropics	DJF JJA ANN
PREH2O	Total precipitable water	plot plot plot
	CERES 2000-2003	DJF JJA ANN
FSNTOA	TOA new SW flux	plot plot plot
LWCF	TOA longwave cloud forcing	plot plot plot
FSNTOAC	TOA clearsky new SW flux	plot plot plot
FLUTC	TOA clearsky upward LW flux	plot plot plot
SWCF	TOA shortwave cloud forcing	plot plot plot
ALBEDO	TOA Albedo	plot plot plot
FLUT	TOA upward LW flux	plot plot plot
ALBEDOC	TOA clearsky albedo	plot plot plot
	IPCC/CRU Climatology 1961-90	DJF JJA ANN
TREFHT	2-meter air temperature (land)	plot plot plot
	ISCCP D2 1983-2001	DJF JJA ANN
CLDMED	Mid cloud amount (IR clouds)	plot plot plot



Unlock

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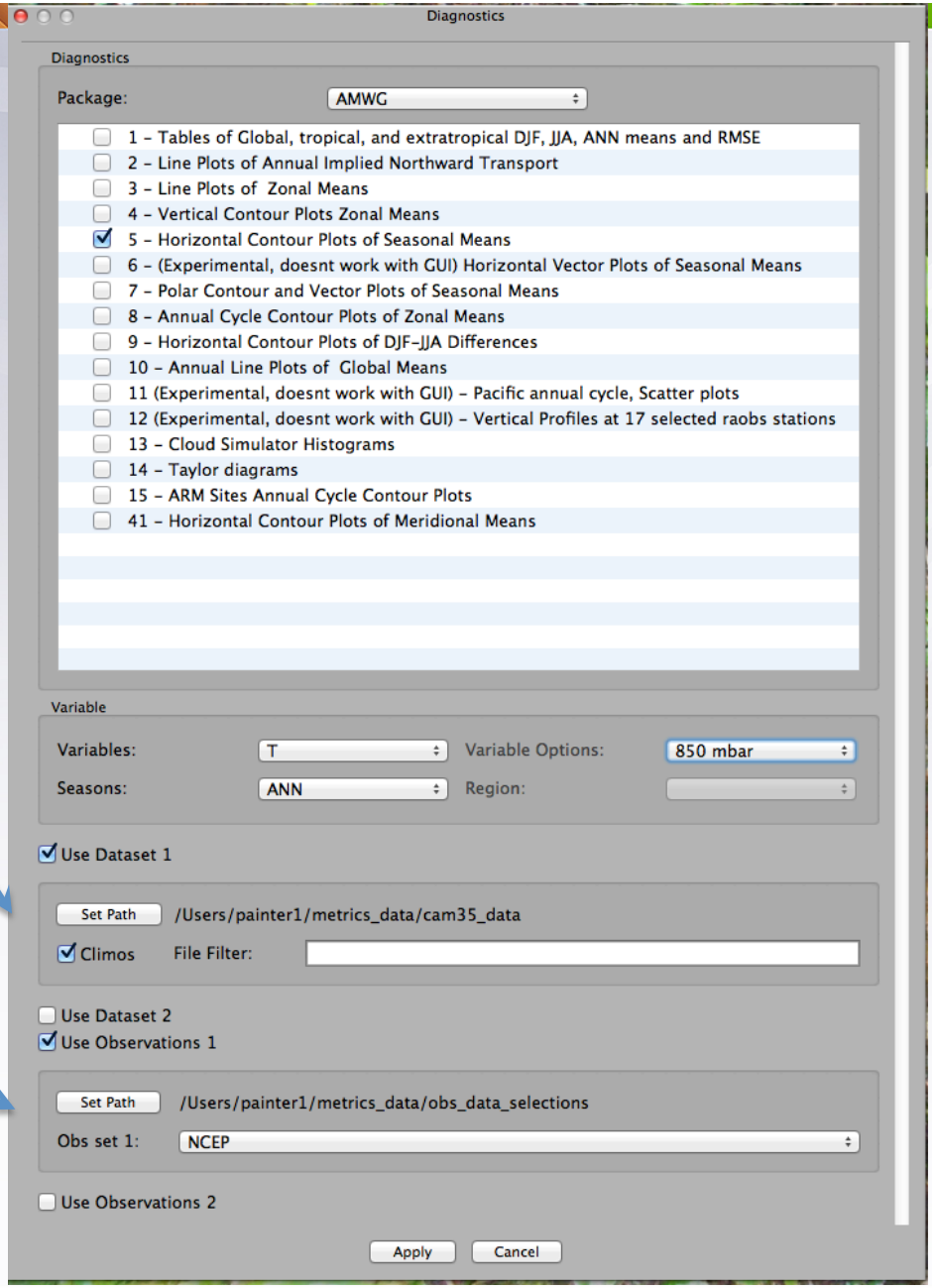
UV-CDAT Integration

Click on “Set Path” to choose the model data location.
Optionally, you can type in a filter or state that data is climo files.

Click on “Use Observations 1” and “Set Path” to choose the obs data location.
Click on the “Obs set 1” pull-down menu to choose among the obs sets in that location.

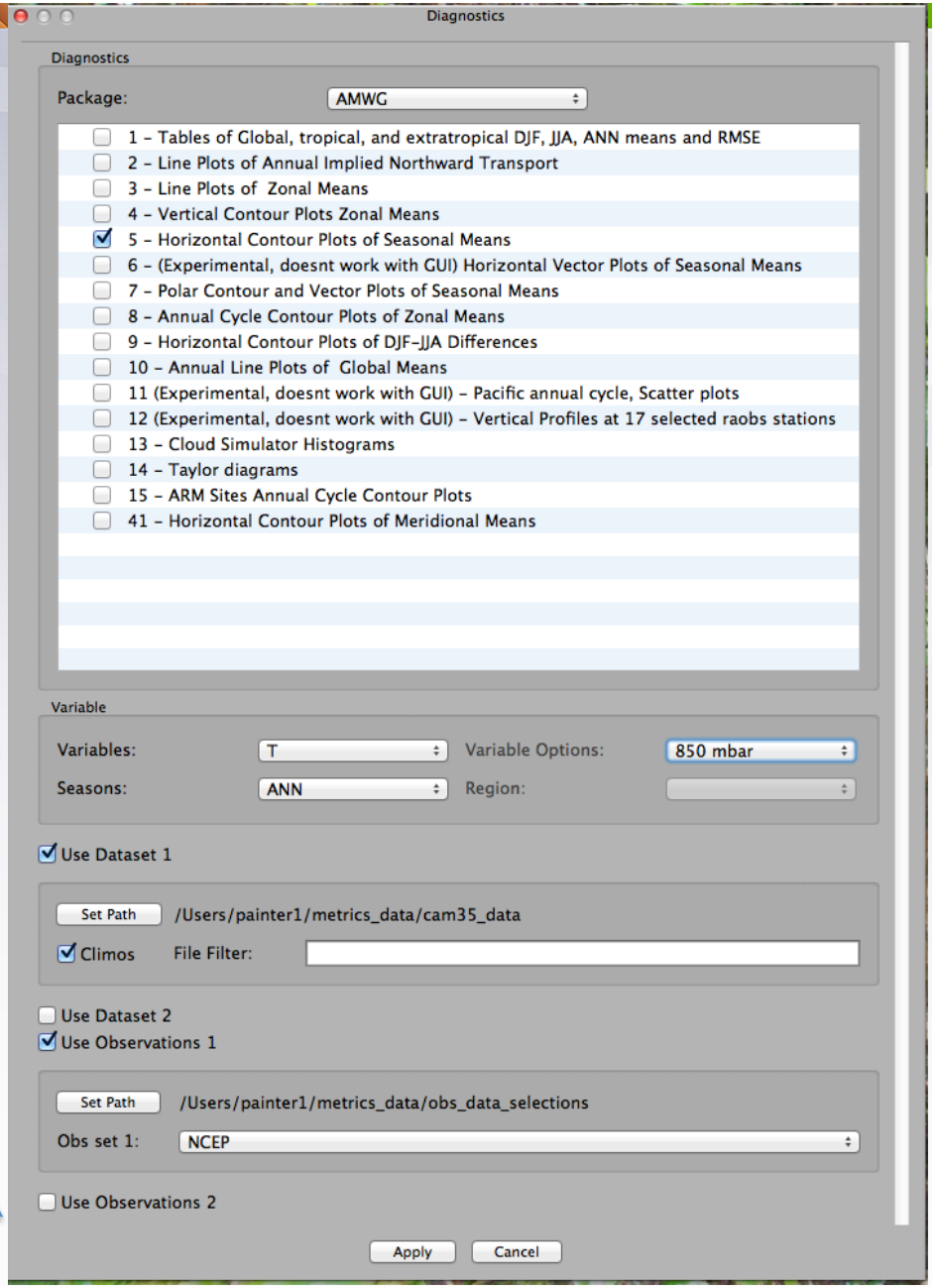


UV-CDAT Integration

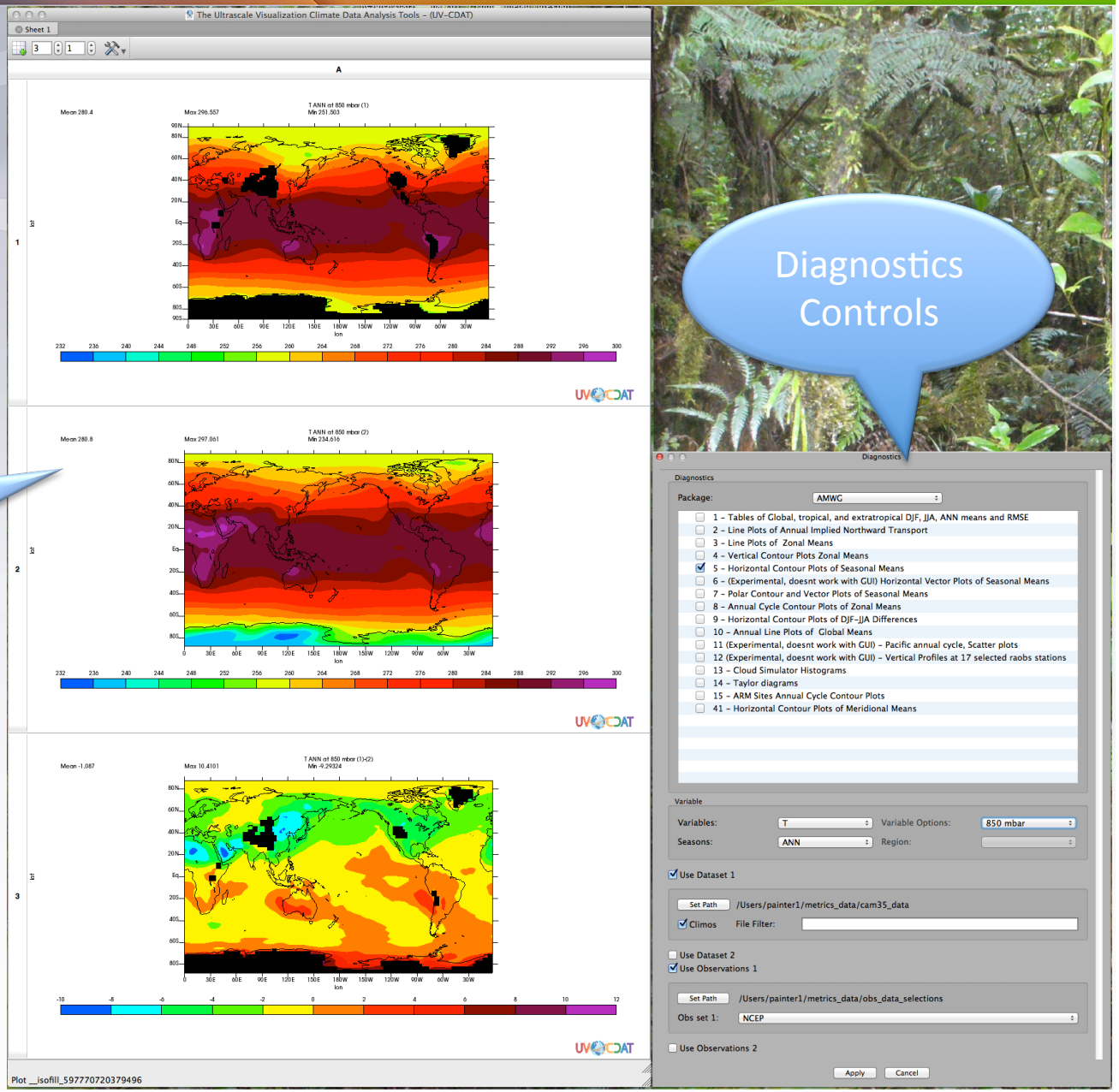
Choose a plot set

Choose a variable and a season. Sometimes more options are available – a level set in this case.

Finally, click on Apply!



UV-CDAT Integration



Generated Diagnostics

Diagnostics Controls

Task Leads = Charles Doutriaux and Aashish Chaudhary

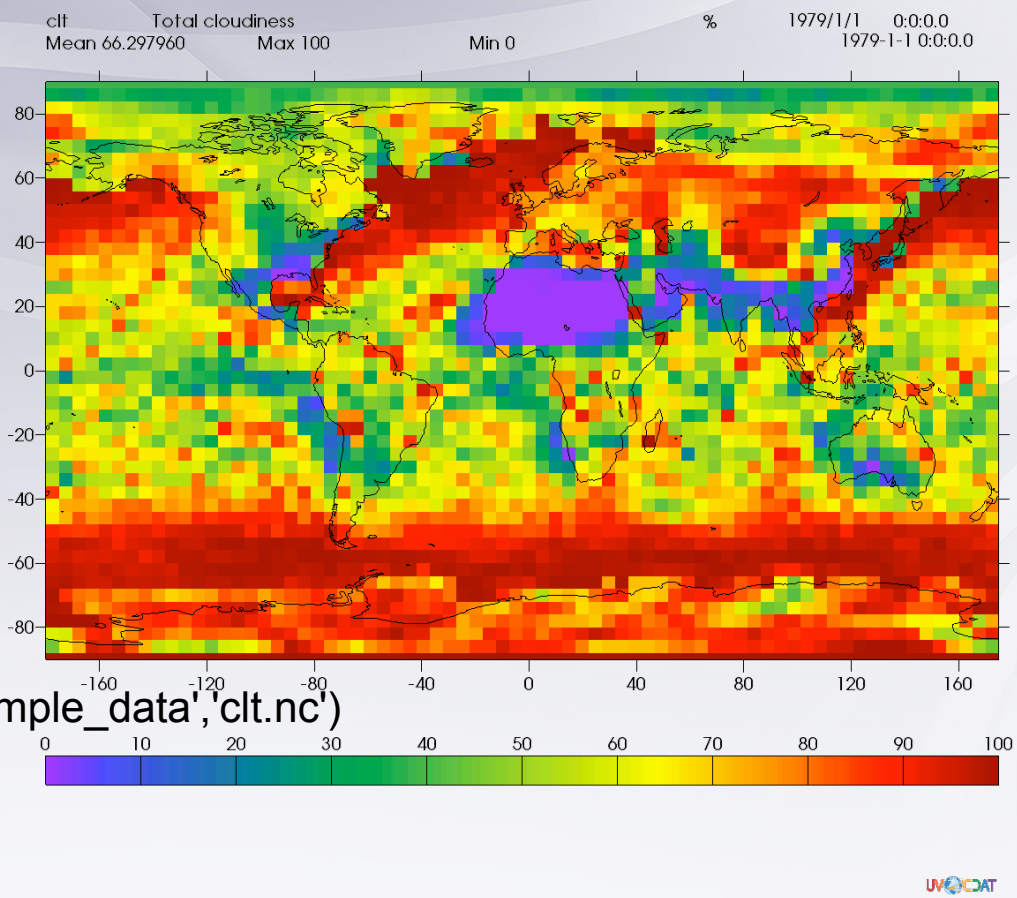
UV-CDAT

Documentation (http://uvcdat.llnl.gov)

- Input/Output: cdms2
  - http://uvcdat.llnl.gov/documentation/cdms/cdms.html
- Arrays: NumPy/NumPy.ma/MV2
  - http://www.numpy.org/
- Utilities: genutil and cdutil
  - http://uvcdat.llnl.gov/documentation/utilities/utilities.html
- Visualization: VCS
  - http://uvcdat.llnl.gov/documentation/vcs/vcs.html
  - http://uvcdat.llnl.gov/gallery.php
- Tutorials
  - http://uvcdat.llnl.gov/tutorials.html

Quick Script Example

- import sys,os, cdms2, vcs
- x=vcs.init()
- x.setcolormap("rainbow")
- gm = vcs.createboxfill()
- f=cdms2.open(os.path.join(sys.prefix,'sample_data','clt.nc')
)
- s=f("clt")
- x.plot(s,gm)
- #x.png('test_vcs_basic_boxfill.png')

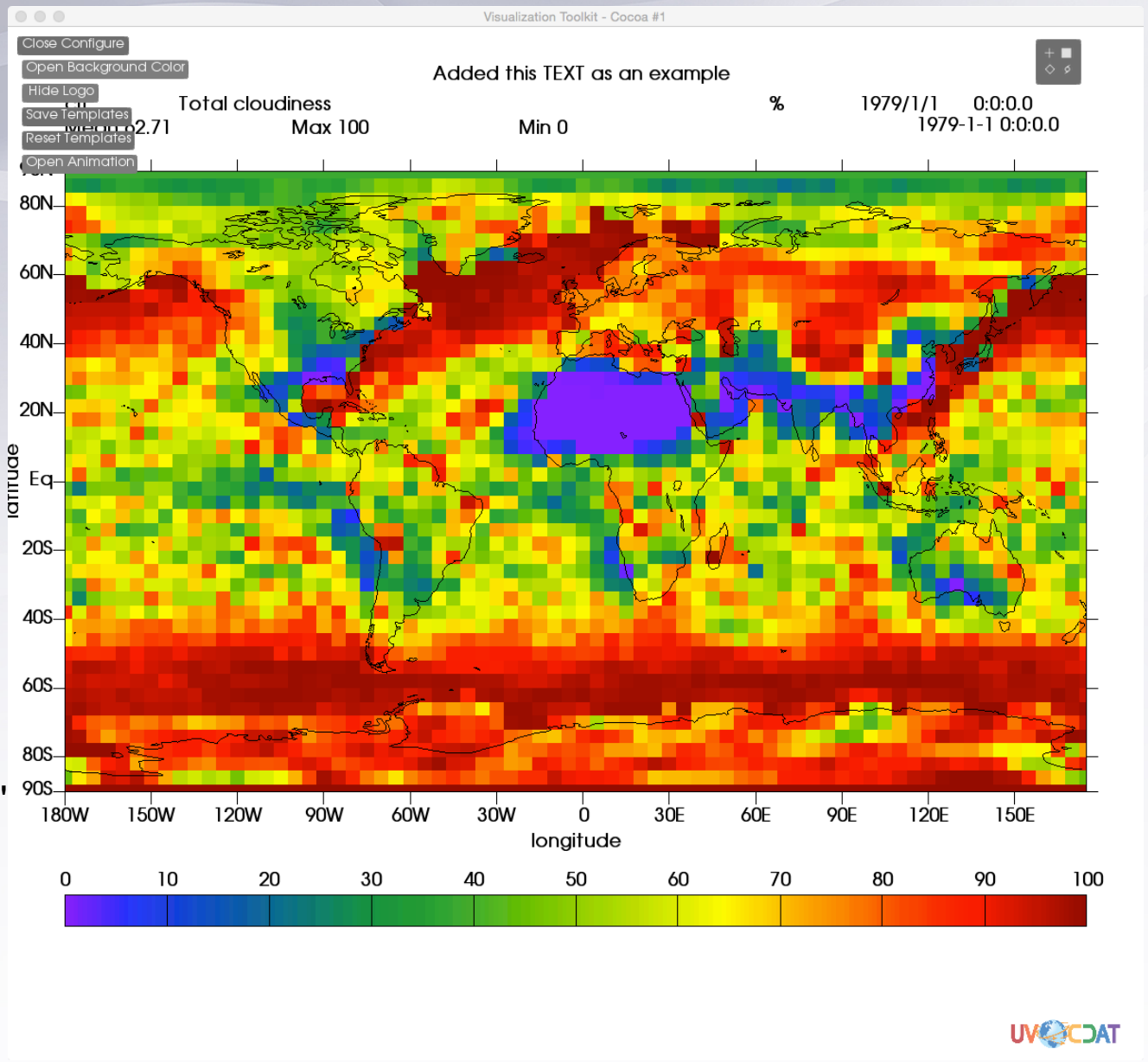


Plot Interaction

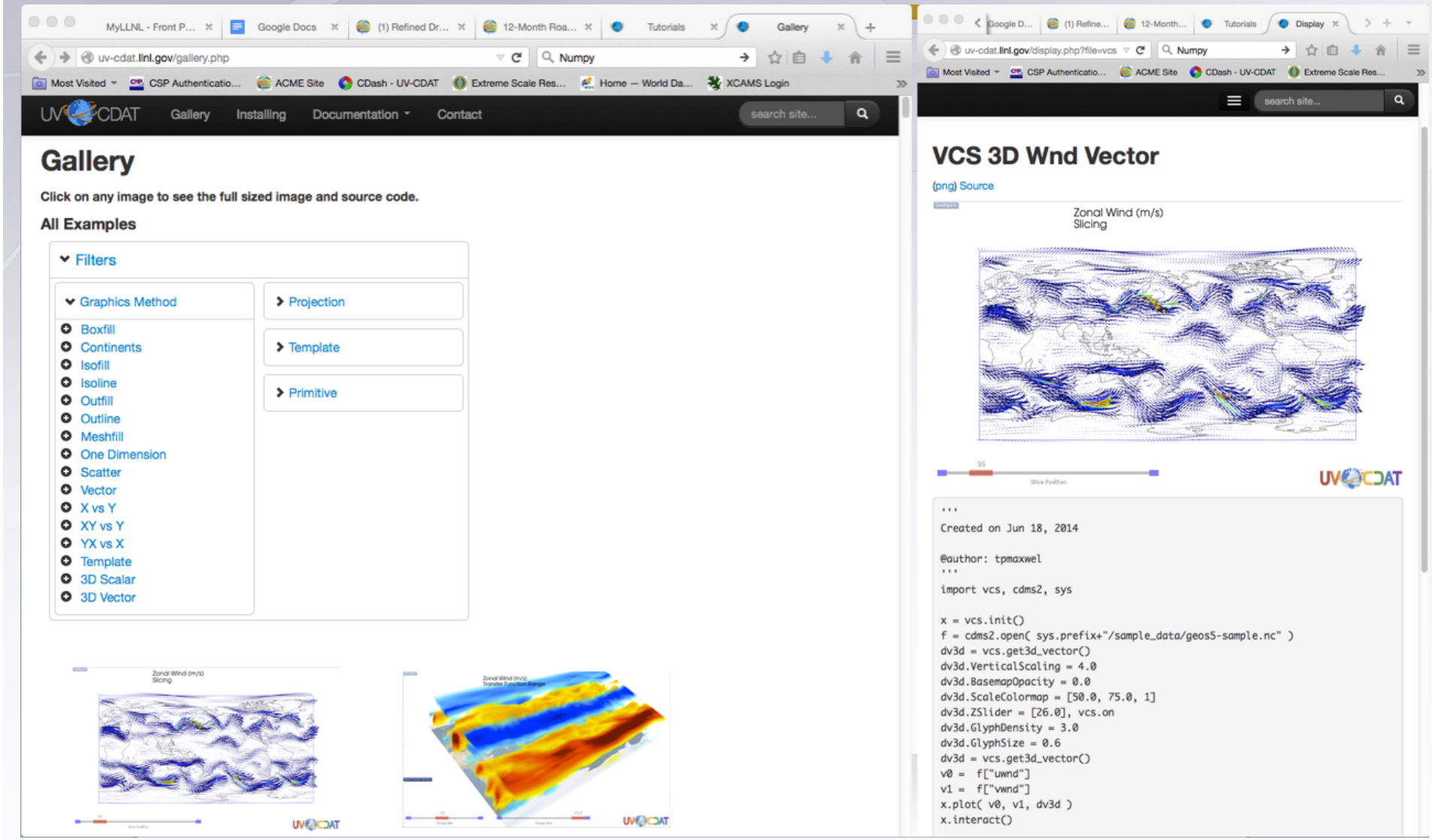
- import sys,os
- Import cdms2, vcs

- x=vcs.init()
- x.setbgoutputdimensions (1200,1091,units="pixels")
- x.setcolormap("rainbow")
- gm = vcs.createboxfill()

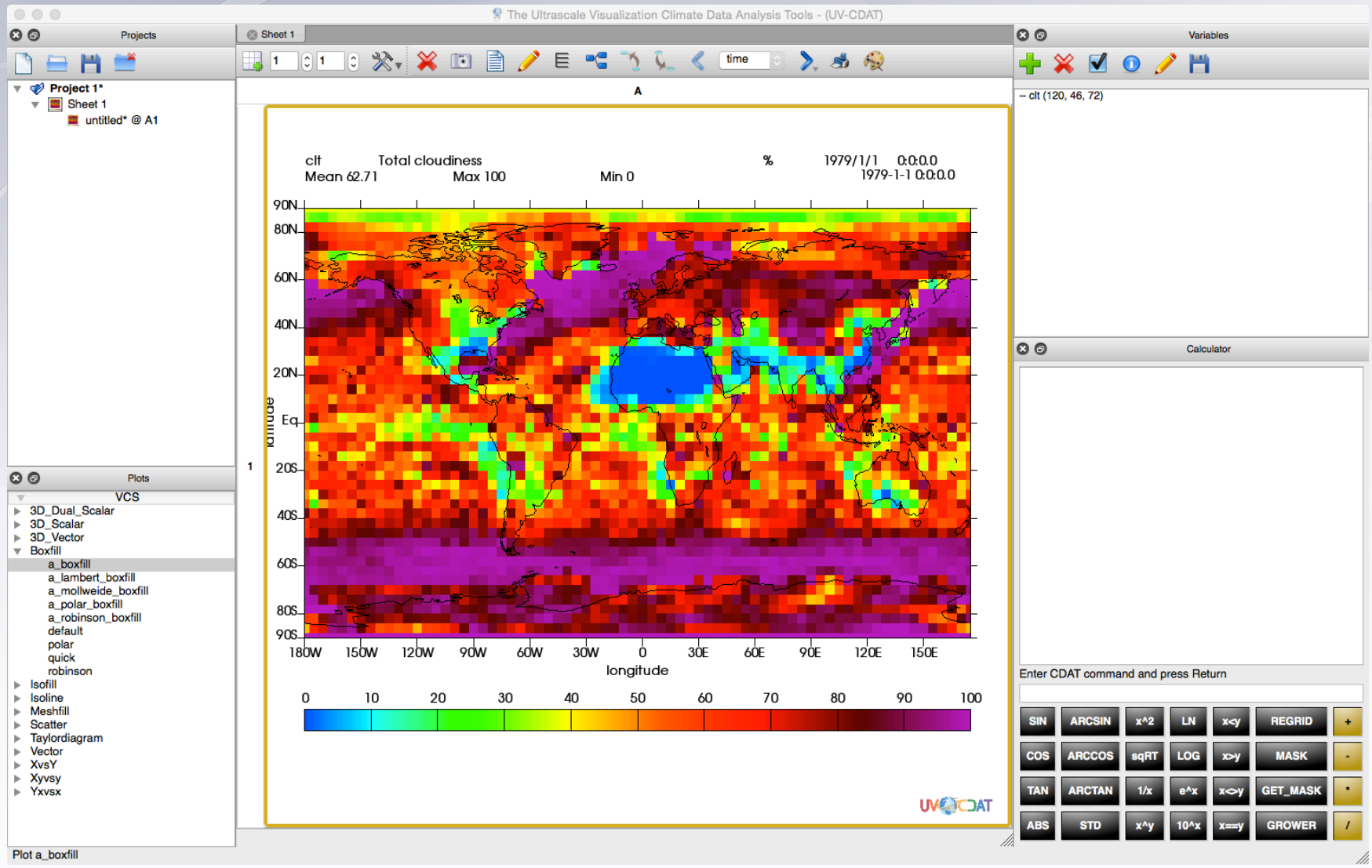
- f=cdms2.open(os.path.join(sys.prefix,'sample_data','clt.nc'))
- s=f("clt")
- x.plot(s,gm)
- x.interact()



Gallery and Example Scripts



Graphical User Interface



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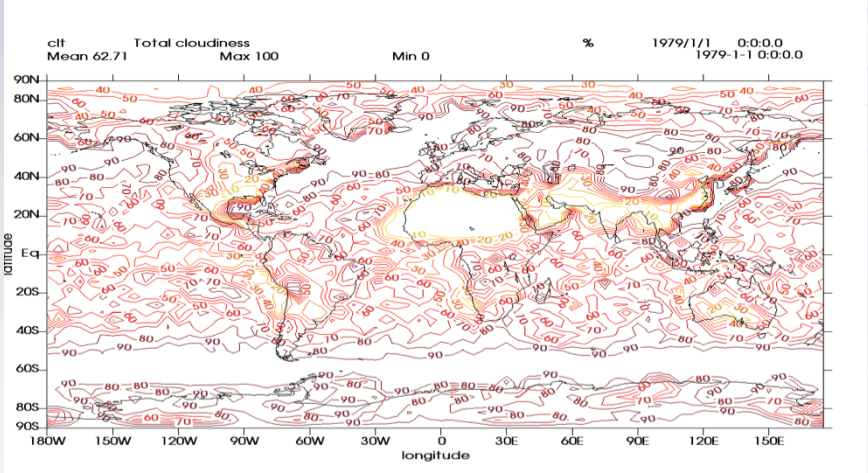
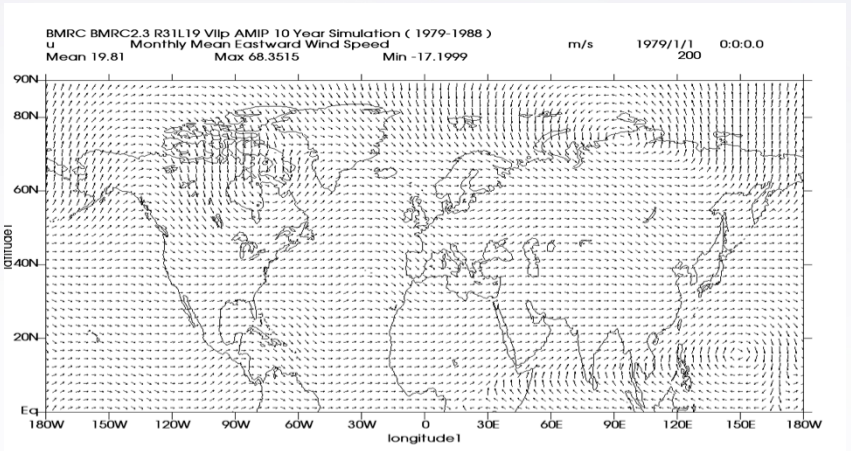
Visualization Improvements

- VCS 2D and VCS 3D code sharing
- Sophisticated labeling of contours
- Customization of font face, color, background, etc for each isoline.
- Better vector plots
- Various bug fixes, rendering improvements.

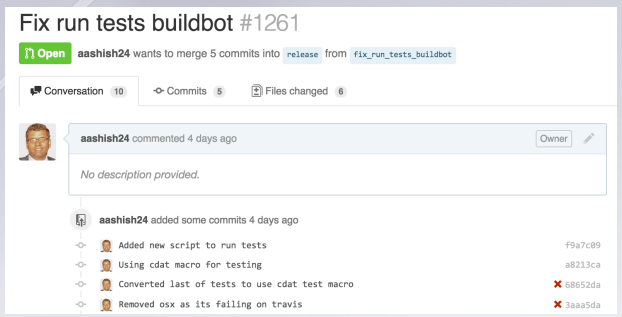




Software Quality "Control"

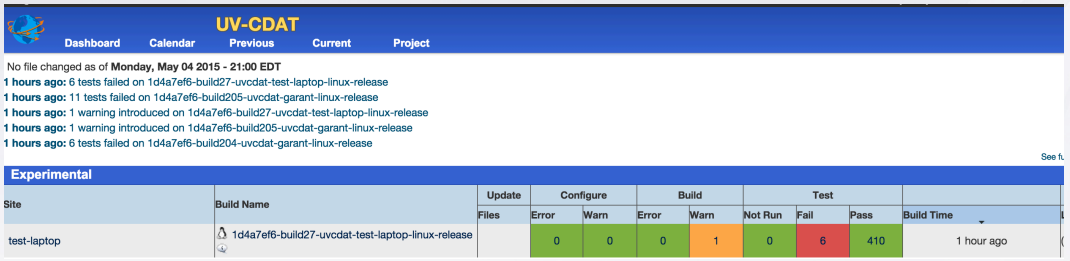
- **Workflow**
  - **Git** branch based workflow
  - **Master** and **Release** branches
  - **Review** and then merge
  - Automated testing using CTest / BuildBot / Travis CI
- **Testing**
  - **400+ tests**
    - **Tests algorithms, state changes etc.**
    - **Includes diagnostics, IO, visualization, and interactions**
  - **Buildbot** is used to monitor the git repositories and schedule builds and tests when pull requests are created or the integration branches (master/release) are changed.
  - **CMake/CTest** deals with the actual building and testing, and then posting the results on dashboards hosted by **CDash**

Software Quality “Control”

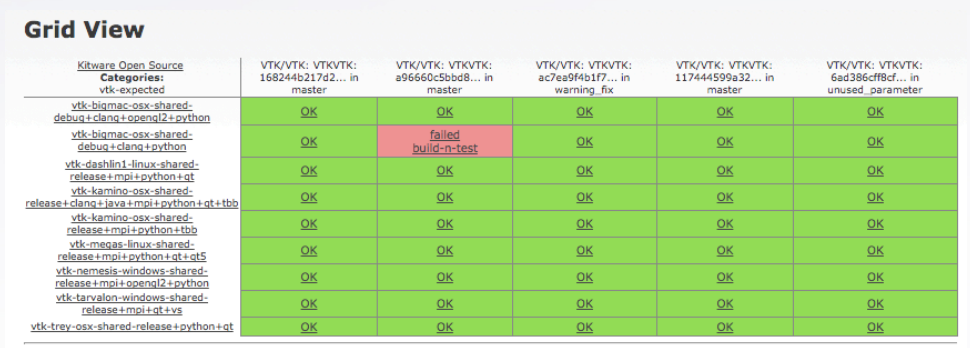


GIT

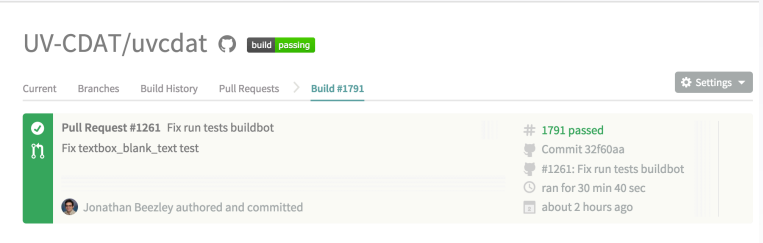
Dashboard



BuildBot

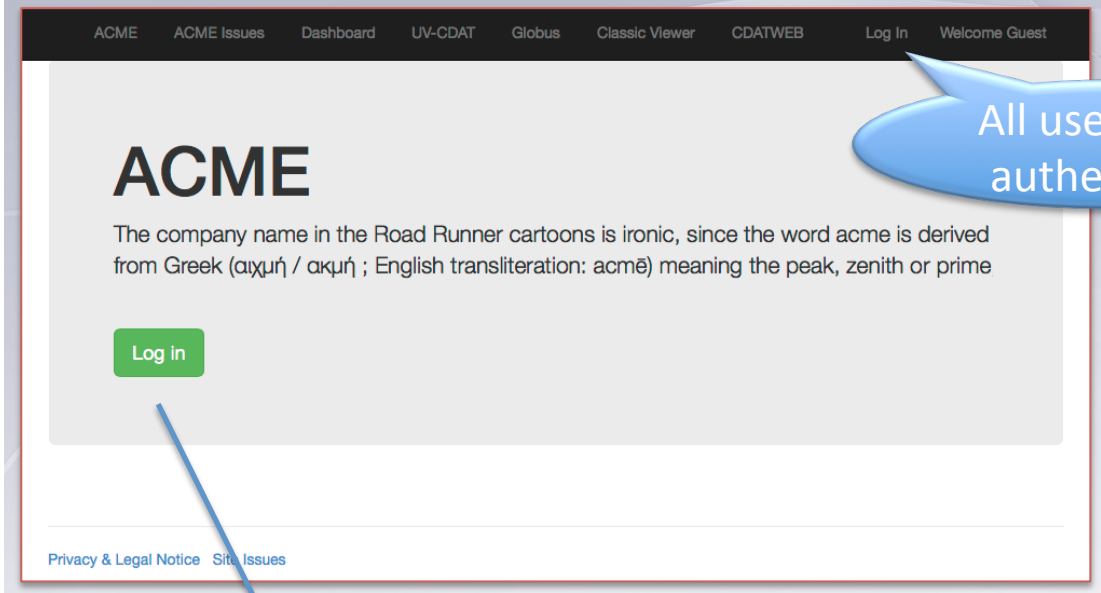


Travis CI

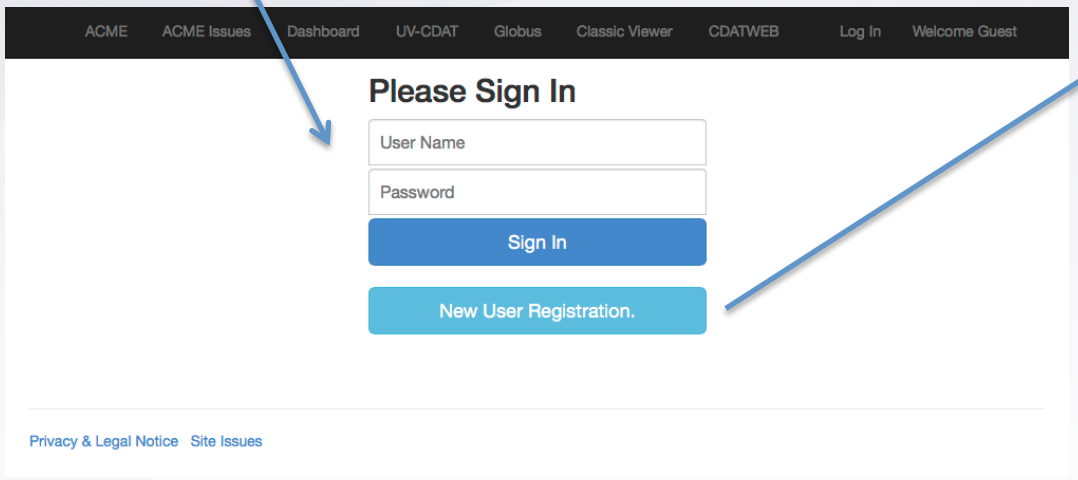


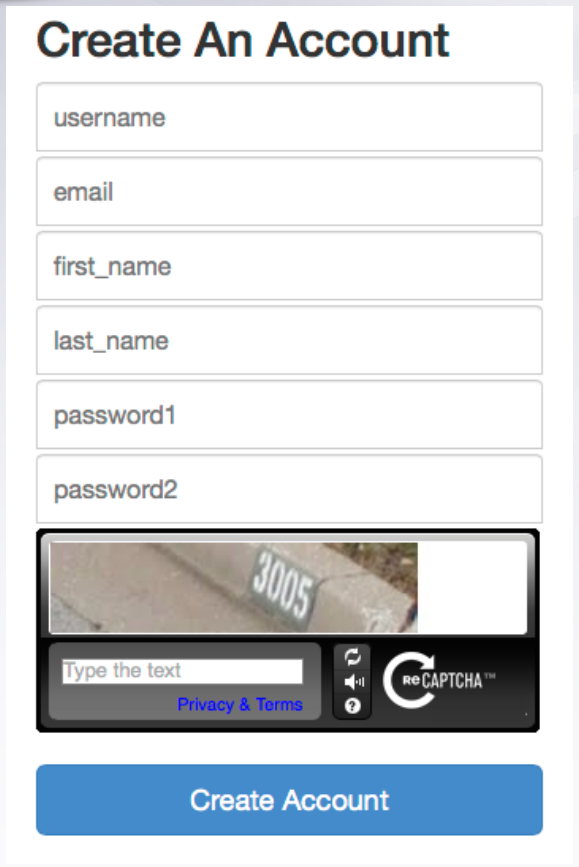
Task Lead = Matthew Harris

User Interface



All users must authenticate






Open Menu
Node List
ACME
ACME Issues
Globus
Log Out
Welcome adben
Node: WDCC_Gat
AdminPeer: esgf-data
Location: Hamburg
Url: esgf-data.dkrz.de
Node: BADC_P2P_INDEX
AdminPeer: pcmdi9.llnl.gov
Location: Appleton
esgf-index1.ceda.ac.uk
Node: IPSL Index Peer
AdminPeer: esgf-node.ipsl.fr
Location: Paris
Url: esgf-node.ipsl.fr
Node: Euclipse
AdminPeer: euclipse1.dkrz.de
Location: Hamburg
Url: euclipse1.dkrz.de
Node: esgf-pcmdi-9
AdminPeer: pcmdi9.llnl.gov
Location: Livermore
Url: pcmdi9.llnl.gov
Node: IPSL CMIP5 data
AdminPeer: esgf-node.ipsl.fr
Location: Paris
Url: vesg.ipsl.fr
Easy access to every ESGF node
status up
dataDownCount 0
dataDownUsers 0
ip 198.128.245.159
hostname pcmdi9.llnl.gov
namespace gov.llnl
registeredUsers 10962
version v1.7.1-phoenix-release-master
adminPeer pcmdi9.llnl.gov
location Livermore
longName PCMDI ESGF P2P NODE 9
dataDownSize 0
org llnl
shortName esgf-pcmdi-9
authService https://pcmdi9.llnl.gov/esg-orp/saml/soap/secure/authorizationService.htm
email pcmdi-node-admin@llnl.gov
nodeSearch
Facet options
institute
Filter value
LLNL : 736
Search string: project=ACME,time_frequency=mon,institute=LLNL,
Search
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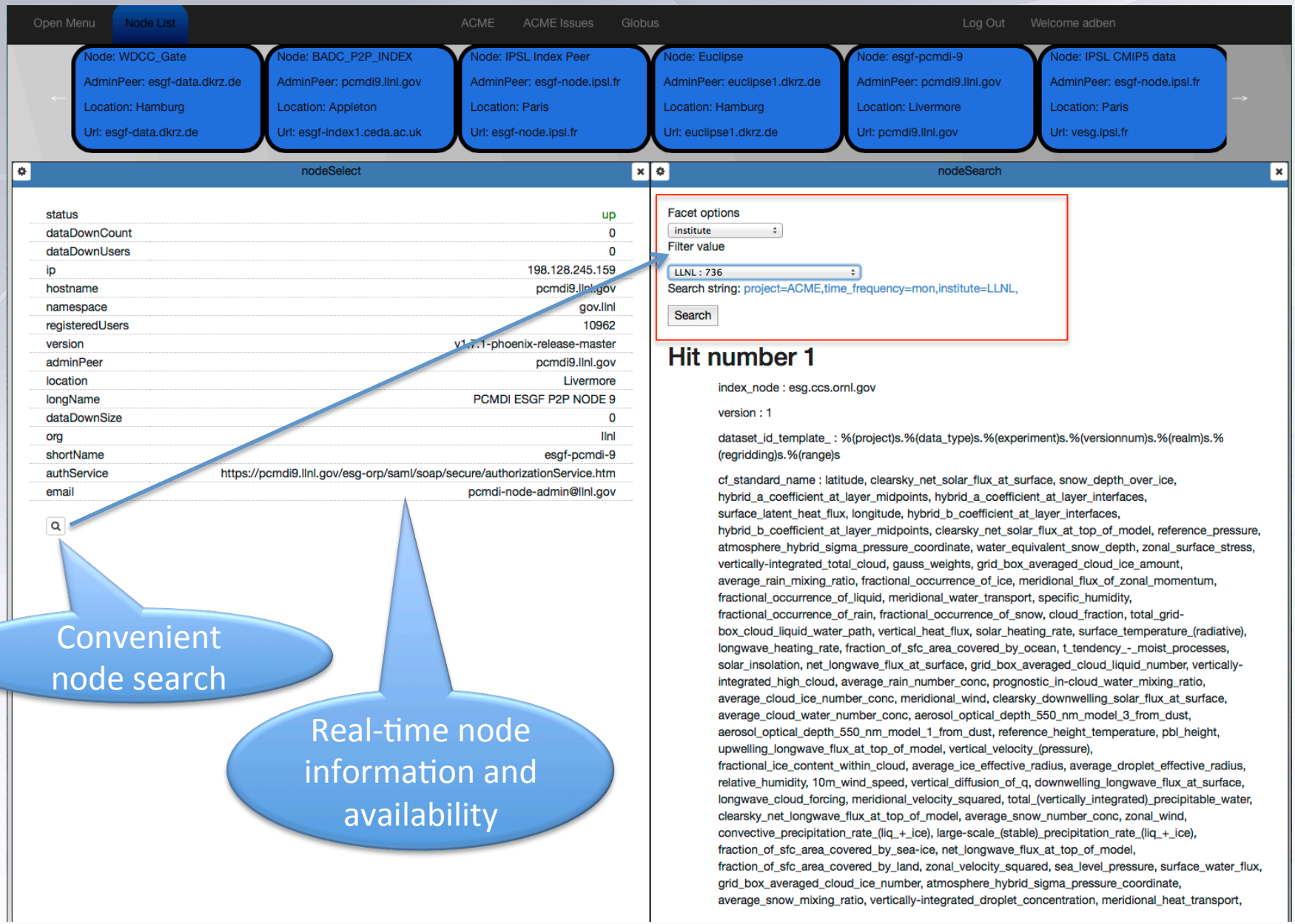
index_node : esg.ccs.ornl.gov
version : 1
dataset_id_template_ : %(project)s.%(data_type)s.%(experiment)s.%(versionnum)s.%(realm)s.%(regridding)s.%(range)s
cf_standard_name : latitude, clearsky_net_solar_flux_at_surface, snow_depth_over_ice, hybrid_a_coefficient_at_layer_midpoints, hybrid_a_coefficient_at_layer_interfaces, surface_latent_heat_flux, longitude, hybrid_b_coefficient_at_layer_interfaces, hybrid_b_coefficient_at_layer_midpoints, clearsky_net_solar_flux_at_top_of_model, reference_pressure, atmosphere_hybrid_sigma_pressure_coordinate, water_equivalent_snow_depth, zonal_surface_stress, vertically-integrated_total_cloud, gauss_weights, grid_box_averaged_cloud_ice_amount, average_rain_mixing_ratio, fractional_occurrence_of_ice, meridional_flux_of_zonal_momentum, fractional_occurrence_of_liquid, meridional_water_transport, specific_humidity, fractional_occurrence_of_rain, fractional_occurrence_of_snow, cloud_fraction, total_grid-box_cloud_liquid_water_path, vertical_heat_flux, solar_heating_rate, surface_temperature_(radiative), longwave_heating_rate, fraction_of_sfc_area_covered_by_ocean, t_tendency_-_moist_processes, solar_insolation, net_longwave_flux_at_surface, grid_box_averaged_cloud_liquid_number, vertically-integrated_high_cloud, average_rain_number_conc, prognostic_in-cloud_water_mixing_ratio, average_cloud_ice_number_conc, meridional_wind, clearsky_downwelling_solar_flux_at_surface, average_cloud_water_number_conc, aerosol_optical_depth_550_nm_model_3_from_dust, aerosol_optical_depth_550_nm_model_1_from_dust, reference_height_temperature, pbl_height, upwelling_longwave_flux_at_top_of_model, vertical_velocity_(pressure), fractional_ice_content_within_cloud, average_ice_effective_radius, average_droplet_effective_radius, relative_humidity, 10m_wind_speed, vertical_diffusion_of_q, downwelling_longwave_flux_at_surface, longwave_cloud_forcing, meridional_velocity_squared, total_(vertically_integrated)_precipitable_water, clearsky_net_longwave_flux_at_top_of_model, average_snow_number_conc, zonal_wind, convective_precipitation_rate_(liq_+_ice), large-scale_(stable)_precipitation_rate_(liq_+_ice), fraction_of_sfc_area_covered_by_sea-ice, net_longwave_flux_at_top_of_model, fraction_of_sfc_area_covered_by_land, zonal_velocity_squared, sea_level_pressure, surface_water_flux, grid_box_averaged_cloud_ice_number, atmosphere_hybrid_sigma_pressure_coordinate, average_snow_mixing_ratio, vertically-integrated_droplet_concentration, meridional_heat_transport,


Open Menu
Node List
ACME
ACME Issues
Globus
Log Out
Welcome adben
Node: WDCC_Gate
AdminPeer: esgf-data.dkrz.de
Location: Hamburg
Url: esgf-data.dkrz.de
Node: BADC_P2P_INDEX
AdminPeer: pcmdi9.llnl.gov
Location: Appleton
Url: esgf-index1.ceda.ac.uk
Node: IPSL Index Peer
AdminPeer: esgf-node.ipsl.fr
Location: Paris
Url: esgf-node.ipsl.fr
Node: Euclipse
AdminPeer: euclipse1.dkrz.de
Location: Hamburg
Url: euclipse1.dkrz.de
Node: esgf-pcmdi-9
AdminPeer: pcmdi9.llnl.gov
Location: Livermore
Url: pcmdi9.llnl.gov
Node: IPSL CMIP5 data
AdminPeer: esgf-node.ipsl.fr
Location: Paris
Url: vesg.ipsl.fr
nodeSelect
status up
dataDownCount 0
dataDownUsers 0
ip 198.128.245.159
hostname pcmdi9.llnl.gov
namespace gov.llnl
registeredUsers 10962
version v1.7.1-phoenix-release-master
adminPeer pcmdi9.llnl.gov
location Livermore
longName PCMDI ESGF P2P NODE 9
dataDownSize 0
org llnl
shortName esgf-pcmdi-9
authService https://pcmdi9.llnl.gov/esg-orp/saml/soap/secure/authorizationService.htm
email pcmdi-node-admin@llnl.gov
nodeSearch
Facet options
institute
Filter value
LLNL : 736
Search string: project=ACME,time_frequency=mon,institute=LLNL,
Search
Hit number 1
index_node : esg.ccs.ornl.gov
version : 1
dataset_id_template_ : %(project)s.%(data_type)s.%(experiment)s.%(versionnum)s.%(realm)s.%(regridding)s.%(range)s
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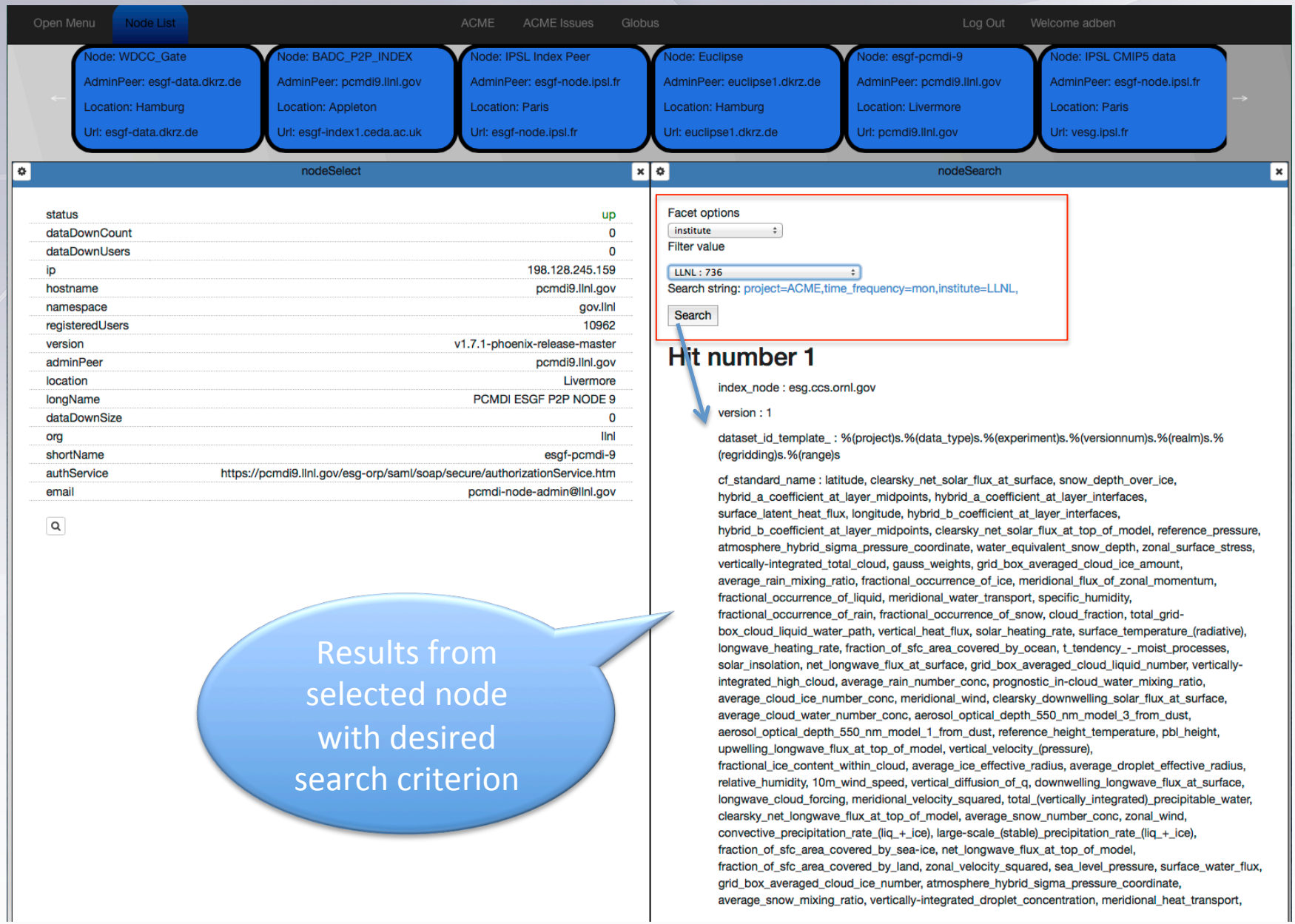
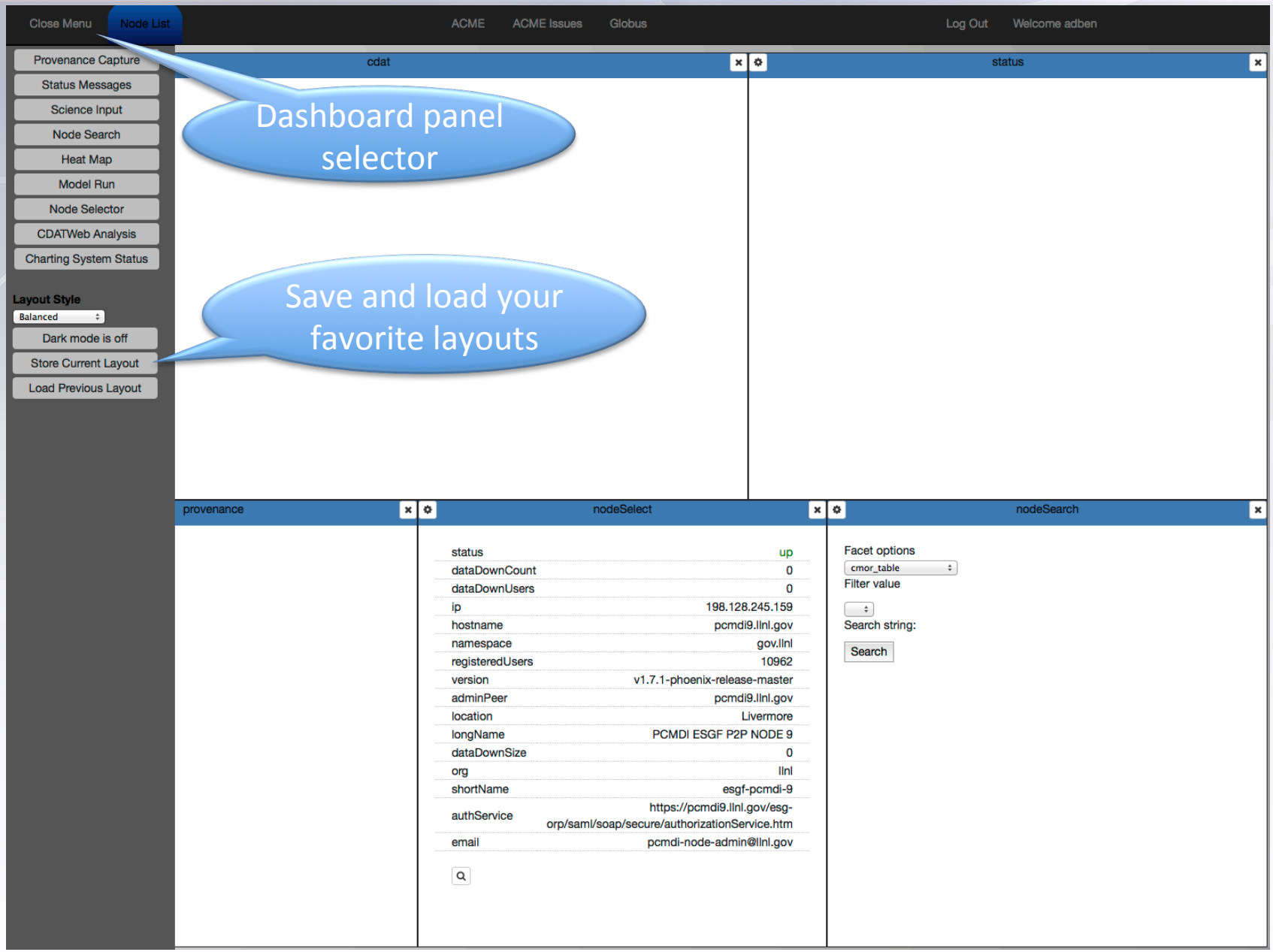
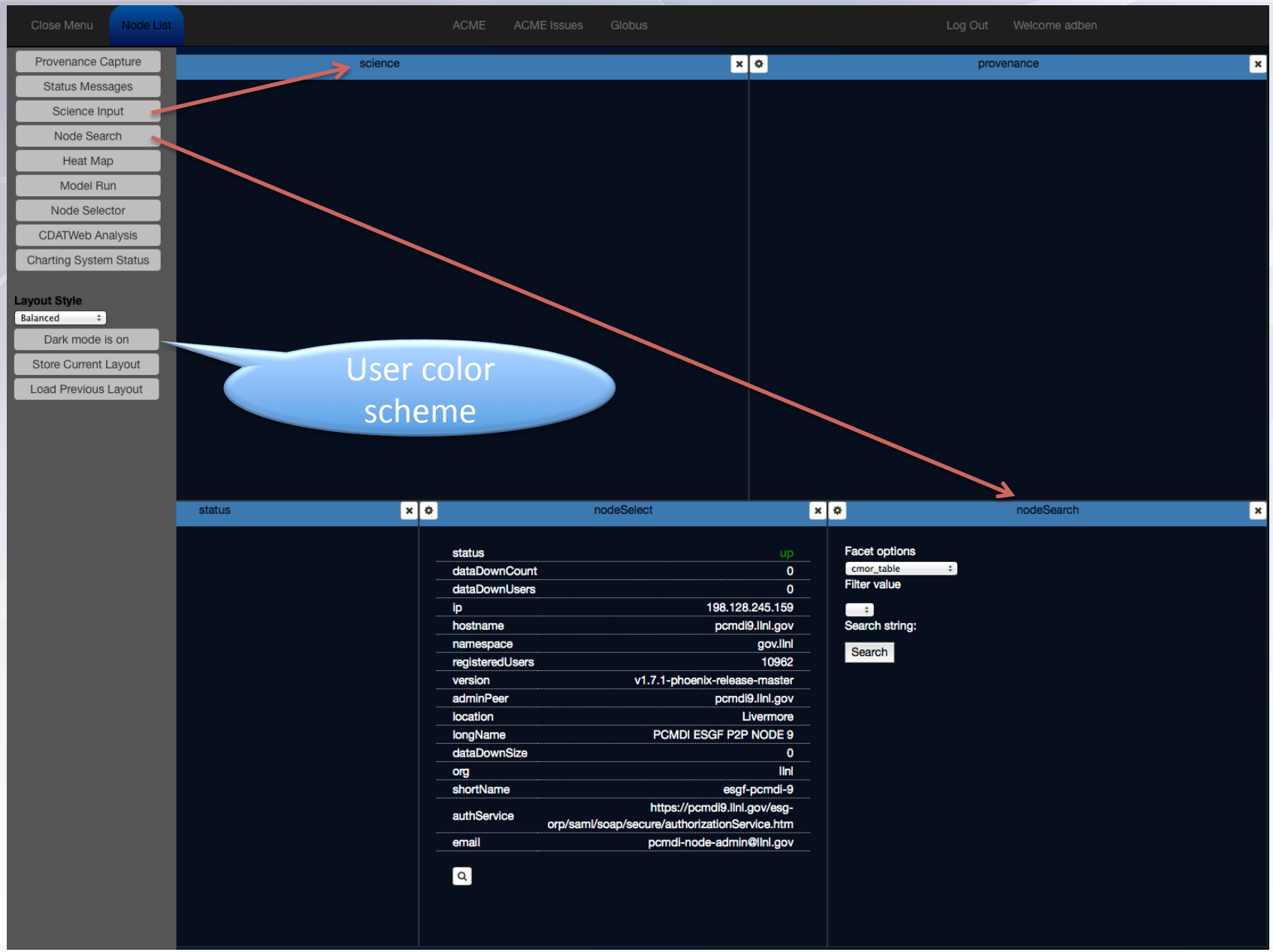
Convenient node search
Real-time node information and availability


Open Menu
Node List
ACME
ACME Issues
Globus
Log Out
Welcome adben
Node: WDCC_Gate
AdminPeer: esgf-data.dkrz.de
Location: Hamburg
Url: esgf-data.dkrz.de
Node: BADC_P2P_INDEX
AdminPeer: pcmdi9.llnl.gov
Location: Appleton
Url: esgf-index1.ceda.ac.uk
Node: IPSL Index Peer
AdminPeer: esgf-node.ipsl.fr
Location: Paris
Url: esgf-node.ipsl.fr
Node: Euclipse
AdminPeer: euclipse1.dkrz.de
Location: Hamburg
Url: euclipse1.dkrz.de
Node: esgf-pcmdi-9
AdminPeer: pcmdi9.llnl.gov
Location: Livermore
Url: pcmdi9.llnl.gov
Node: IPSL CMIP5 data
AdminPeer: esgf-node.ipsl.fr
Location: Paris
Url: vesg.ipsl.fr
nodeSelect
status up
dataDownCount 0
dataDownUsers 0
ip 198.128.245.159
hostname pcmdi9.llnl.gov
namespace gov.llnl
registeredUsers 10962
version v1.7.1-phoenix-release-master
adminPeer pcmdi9.llnl.gov
location Livermore
longName PCMDI ESGF P2P NODE 9
dataDownSize 0
org llnl
shortName esgf-pcmdi-9
authService https://pcmdi9.llnl.gov/esg-orp/saml/soap/secure/authorizationService.htm
email pcmdi-node-admin@llnl.gov
nodeSearch
Facet options
institute
Filter value
LLNL : 736
Search string: project=ACME,time_frequency=mon,institute=LLNL,
Search
Hit number 1
index_node : esg.ccs.ornl.gov
version : 1
dataset_id_template_ : %(project)s.%(data_type)s.%(experiment)s.%(versionnum)s.%(realm)s.%(regridding)s.%(range)s
cf_standard_name : latitude, clearsky_net_solar_flux_at_surface, snow_depth_over_ice, hybrid_a_coefficient_at_layer_midpoints, hybrid_a_coefficient_at_layer_interfaces, surface_latent_heat_flux, longitude, hybrid_b_coefficient_at_layer_interfaces, hybrid_b_coefficient_at_layer_midpoints, clearsky_net_solar_flux_at_top_of_model, reference_pressure, atmosphere_hybrid_sigma_pressure_coordinate, water_equivalent_snow_depth, zonal_surface_stress, vertically-integrated_total_cloud, gauss_weights, grid_box_averaged_cloud_ice_amount, average_rain_mixing_ratio, fractional_occurrence_of_ice, meridional_flux_of_zonal_momentum, fractional_occurrence_of_liquid, meridional_water_transport, specific_humidity, fractional_occurrence_of_rain, fractional_occurrence_of_snow, cloud_fraction, total_grid-box_cloud_liquid_water_path, vertical_heat_flux, solar_heating_rate, surface_temperature_(radiative), longwave_heating_rate, fraction_of_sfc_area_covered_by_ocean, t_tendency_-_moist_processes, solar_insolation, net_longwave_flux_at_surface, grid_box_averaged_cloud_liquid_number, vertically-integrated_high_cloud, average_rain_number_conc, prognostic_in-cloud_water_mixing_ratio, average_cloud_ice_number_conc, meridional_wind, clearsky_downwelling_solar_flux_at_surface, average_cloud_water_number_conc, aerosol_optical_depth_550_nm_model_3_from_dust, aerosol_optical_depth_550_nm_model_1_from_dust, reference_height_temperature, pbl_height, upwelling_longwave_flux_at_top_of_model, vertical_velocity_(pressure), fractional_ice_content_within_cloud, average_ice_effective_radius, average_droplet_effective_radius, relative_humidity, 10m_wind_speed, vertical_diffusion_of_q, downwelling_longwave_flux_at_surface, longwave_cloud_forcing, meridional_velocity_squared, total_(vertically_integrated)_precipitable_water, clearsky_net_longwave_flux_at_top_of_model, average_snow_number_conc, zonal_wind, convective_precipitation_rate_(liq_+_ice), large-scale_(stable)_precipitation_rate_(liq_+_ice), fraction_of_sfc_area_covered_by_sea-ice, net_longwave_flux_at_top_of_model, fraction_of_sfc_area_covered_by_land, zonal_velocity_squared, sea_level_pressure, surface_water_flux, grid_box_averaged_cloud_ice_number, atmosphere_hybrid_sigma_pressure_coordinate, average_snow_mixing_ratio, vertically-integrated_droplet_concentration, meridional_heat_transport,
Results from selected node with desired search criterion


Close Menu
Node List
ACME
ACME Issues
Globus
Log Out
Welcome adben
Provenance Capture
Status Messages
Science Input
Node Search
Heat Map
Model Run
Node Selector
CDATWeb Analysis
Charting System Status
Layout Style
Balanced
Dark mode is off
Store Current Layout
Load Previous Layout
Dashboard panel selector
Save and load your favorite layouts
cdat
status
provenance
nodeSelect
nodeSearch
status up
dataDownCount 0
dataDownUsers 0
ip 198.128.245.159
hostname pcmdi9.llnl.gov
namespace gov.llnl
registeredUsers 10962
version v1.7.1-phoenix-release-master
adminPeer pcmdi9.llnl.gov
location Livermore
longName PCMDI ESGF P2P NODE 9
dataDownSize 0
org llnl
shortName esgf-pcmdi-9
authService https://pcmdi9.llnl.gov/esg-orp/saml/soap/secure/authorizationService.htm
email pcmdi-node-admin@llnl.gov
Facet options
cmor_table
Filter value
Search string:
Search


Close Menu
Node List
ACME
ACME Issues
Globus
Log Out
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Provenance Capture
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Node Search
Heat Map
Model Run
Node Selector
CDATWeb Analysis
Charting System Status
Layout Style
Balanced
Dark mode is on
Store Current Layout
Load Previous Layout
User color scheme
science
provenance
status
nodeSelect
nodeSearch
status up
dataDownCount 0
dataDownUsers 0
ip 198.128.245.159
hostname pcmdi9.llnl.gov
namespace gov.llnl
registeredUsers 10962
version v1.7.1-phoenix-release-master
adminPeer pcmdi9.llnl.gov
location Livermore
longName PCMDI ESGF P2P NODE 9
dataDownSize 0
org llnl
shortName esgf-pcmdi-9
authService https://pcmdi9.llnl.gov/esg-orp/saml/soap/secure/authorizationService.htm
email pcmdi-node-admin@llnl.gov
Facet options
cmor_table
Filter value
Search string:
Search

CDATWeb

Search

ESGF Search

esg.css.ornl

The ESGF host URL to search. For example, "esg.ccs.ornl.gov/esg-search"

Text

A free text search query in any metadata field

ACME

Search by project

10

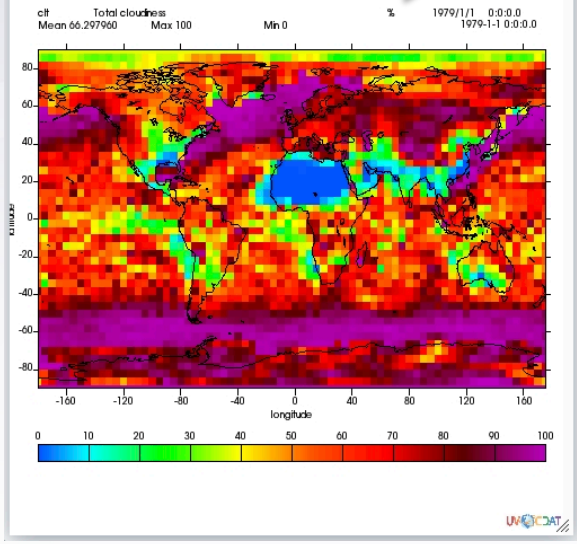
The maximum number of files to return

Off Set

Start at this result

Search

/TESTING/CLT.NC: CLT



Search Results

- Project: ACME
  Experiment: B1850C5_ne30gx1_tuning
  Title: B1850C5e1_ne30_01_climo.nc
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  Variables: lat FSNSC SNOWHICE hyam hyai LHFLX lon hybi hybm FSNTC P0 ilev SNOWHLND TAUX CLDTOT gw CLDICE AQRAIN FREQI VU FREQL VQ Q FREQR FREQS CLOUD TGCLDLWP OMEGAT QRS TS QRL OCNFRAC DTCOND SOLIN FLNS NUMLIQ CLDHGH ANRAIN ICWMR AWNI V FSDSC AWNC AODDUST3 AODDUST PBLH FLUT OMEGA FICE AREI AREL RELHUM U10 VD01 FLDS LWCF VV TMQ FLNTC ANSNOW U PRECC PRECL ICEFRAC FLNT LANDFRAC NUMICE lev WSUB Z3 ICIMR PS DTV SWCF CLDLOW FSNTOA FSDS CLDMED TAUY T AODVIS PRECS CCN3 time time_bnds

- Project: ACME
  Experiment: B1850C5_ne30gx1_tuning
  Title: B1850C5e1_ne30_02_climo.nc
  Downlaod
  Variables: lat FSNSC SNOWHICE hyam hyai gw CLDICE AQRAIN FREQI VU FREQL VQ Q FREQR FREQS CLOUD TGCLDLWP OMEGAT QRS CLDHGH ANRAIN ICWMR AWNI V FSDSC AWNC AODDUST3 AODDUST1 TREFHT PBLH FLUT OMEGA FICE AREI VD01 FLDS LWCF VV TMQ FLNTC ANSNOW U PRECC PRECL ICEFRAC FLNT LANDFRAC UU PSL QFLX NUMICE lev AQSNOW CDNUMC VT FLNSC SHFLX WSUB Z3 ICIMR PS DTV SWCF CLDLOW FSNTOA FSDS CLDMED TAUY T AODVIS PRECSL PRECSC DCQ CLDLIQ FSNT FSNS TGCLDIWP IWC FLUTC FSNTOAC CCN3 time time_bnds

- Project: ACME
  Experiment: B1850C5_ne30gx1_tuning
  Title: B1850C5e1_ne30_03_climo.nc
  Downlaod
  Variables: lat FSNSC SNOWHICE hyam hyai LHFLX lon hybi hybm FSNTC P0 ilev SNOWHLND TAUX CLDTOT gw CLDICE AQRAIN FREQI VU FREQL VQ Q FREQR FREQS CLOUD TGCLDLWP OMEGAT QRS TS QRL OCNFRAC DTCOND SOLIN FLNS NUMLIQ CLDHGH ANRAIN ICWMR AWNI V FSDSC AWNC AODDUST3 AODDUST1 TREFHT PBLH FLUT OMEGA FICE AREI AREL RELHUM U10 VD01 FLDS LWCF VV TMQ FLNTC ANSNOW U PRECC PRECL ICEFRAC FLNT LANDFRAC UU PSL QFLX NUMICE lev AQSNOW CDNUMC VT FLNSC SHFLX WSUB Z3 ICIMR PS DTV SWCF CLDLOW FSNTOA FSDS CLDMED TAUY T AODVIS PRECSL PRECSC DCQ CLDLIQ FSNT FSNS TGCLDIWP IWC FLUTC FSNTOAC CCN3 time time_bnds

- Project: ACME
  Experiment: B1850C5_ne30gx1_tuning
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  Downlaod
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- Project: ACME
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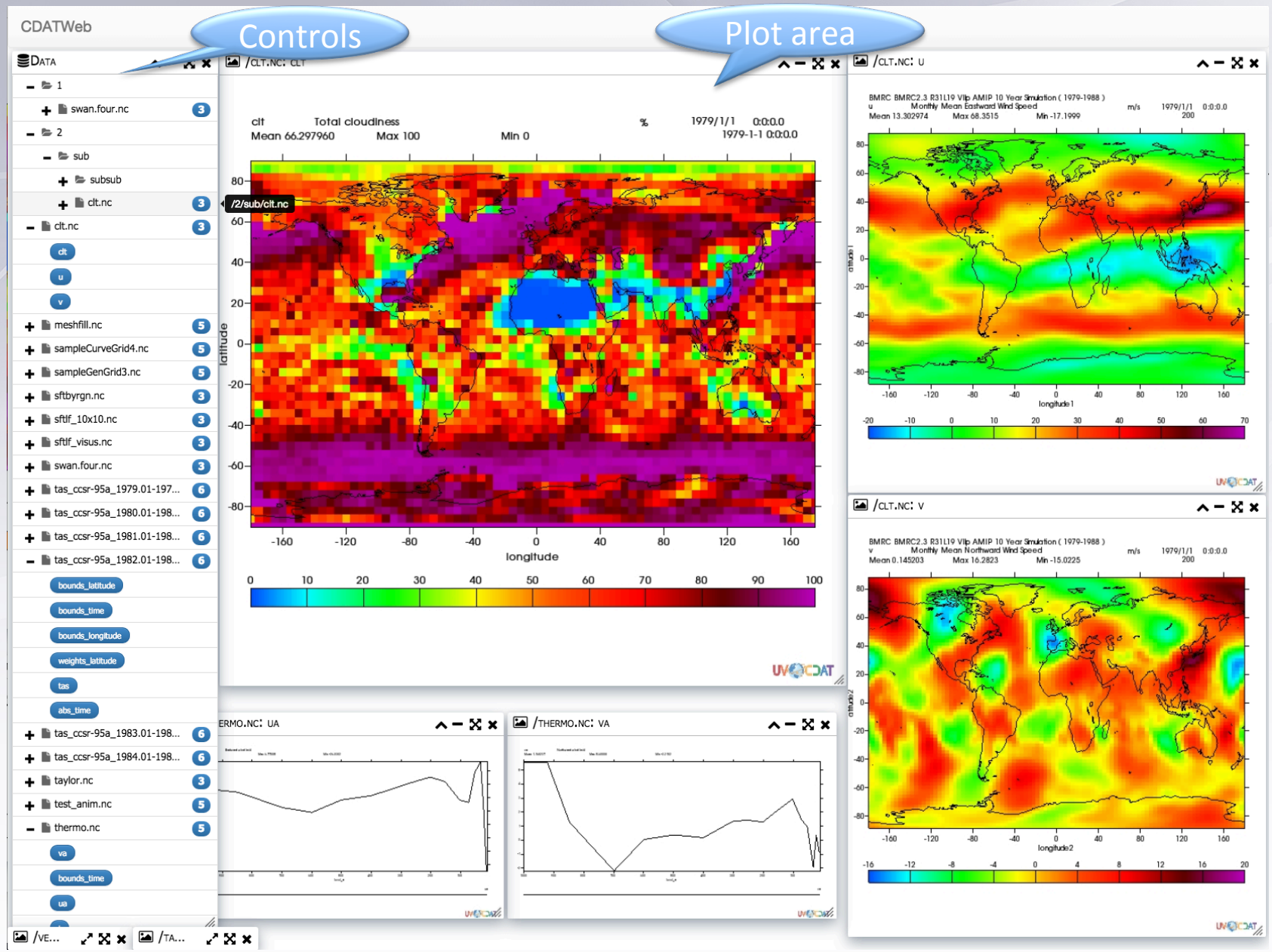
Selecting a variable to display a plot


CDATWeb
Controls
Plot area
DATA
1
swan.four.nc
2
sub
subsub
clt.nc
clt.nc
clt
u
v
meshfill.nc
sampleCurveGrid4.nc
sampleGenGrid3.nc
sftbyrgn.nc
sftlf_10x10.nc
sftlf_visus.nc
swan.four.nc
tas_ccsr-95a_1979.01-197...
tas_ccsr-95a_1980.01-198...
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tas_ccsr-95a_1982.01-198...
bounds_latitude
bounds_time
bounds_longitude
weights_latitude
tas
abs_time
tas_ccsr-95a_1983.01-198...
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va
bounds_time
ua
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clt Total cloudiness %
Mean 66.297960 Max 100 Min 0
1979/1/1 0:0:0.0
1979-1-1 0:0:0.0
/2/sub/clt.nc
latitude
longitude
/CLT.NC: U
BMRC BMRC2.3 R31L19 Vilp AMIP 10 Year Simulation (1979-1988)
u Monthly Mean Eastward Wind Speed m/s
Mean 13.302974 Max 68.3515 Min -17.1999
1979/1/1 0:0:0.0
200
longitude1
/CLT.NC: V
BMRC BMRC2.3 R31L19 Vilp AMIP 10 Year Simulation (1979-1988)
v Monthly Mean Northward Wind Speed m/s
Mean 0.145203 Max 16.2823 Min -15.0225
1979/1/1 0:0:0.0
200
longitude2
/THERMO.NC: UA
/THERMO.NC: VA
/VE...
/TA...

Classic Viewer

Menu

Output Display

Controls

Diagnostic Selection

UV-CDAT:EA | Classic | Logout

Back to Atm Home

Classic View

Dataset: cam5se

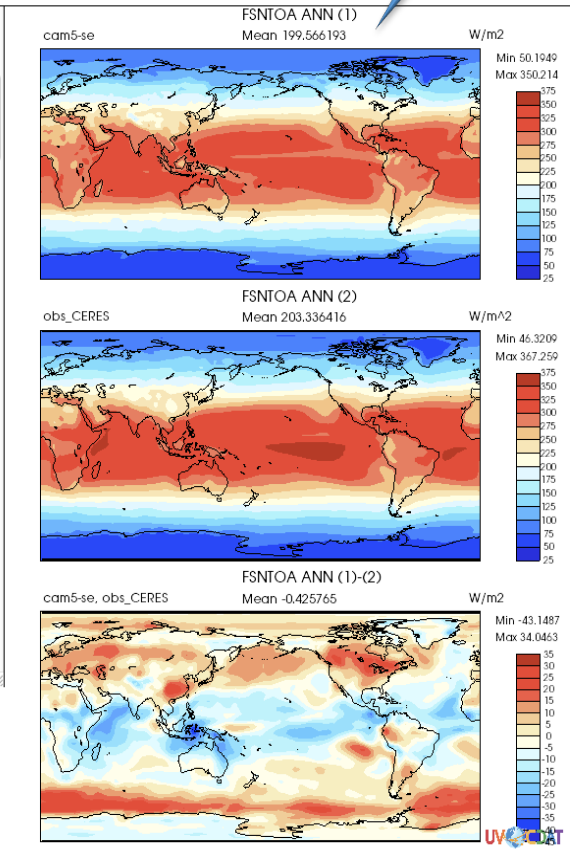
Package: amwg

Variables: 7 selected

Times: 17 selected

Plot Dataset

		DJF JJA ANN
	NVAP 1988-1999 - Tropics	
TGCLDLWP	Cloud liquid water	plot plot plot
PREH2O	Total precipitable water	plot plot plot
	Legates and Willmott 1920-80 - Tropics	DJF JJA ANN
PRECT_TROP	Tropical Precipitation rate	plot plot plot
	MODIS Mar2000-Aug2004	DJF JJA ANN
MEANTAU	Mean cloud optical thickness (Day)	plot plot plot
MEANTTOP	Mean cloud top temperature (Day)	plot plot plot
TGCLDLWP	Cloud liquid water	plot plot plot
TCLDAREA	Total cloud area (Day)	plot plot plot
MEANPTOP	Mean cloud top pressure (Day)	plot plot plot
PREH2O	Total precipitable water	plot plot plot
	ERA40 Reanalysis 1980-2001 - Tropics	DJF JJA ANN
PREH2O	Total precipitable water	plot plot plot
	CERES 2000-2003	DJF JJA ANN
FSNTOA	TOA new SW flux	plot plot plot
LWCF	TOA longwave cloud forcing	plot plot plot
FSNTOAC	TOA clearsky new SW flux	plot plot plot
FLUTC	TOA clearsky upward LW flux	plot plot plot
SWCF	TOA shortwave cloud forcing	plot plot plot
ALBEDO	TOA Albedo	plot plot plot
FLUT	TOA upward LW flux	plot plot plot
ALBEDOC	TOA clearsky albedo	plot plot plot
	IPCC/CRU Climatology 1961-90	DJF JJA ANN
TREFHT	2-meter air temperature (land)	plot plot plot
	ISCCP D2 1983-2001	DJF JJA ANN
CLDMED	Mid cloud amount (IR clouds)	plot plot plot



Unlock

ACME Accelerated Climate Modeling for Energy

U.S. DEPARTMENT OF ENERGY


ACME
Accelerated Climate Modeling
for Energy