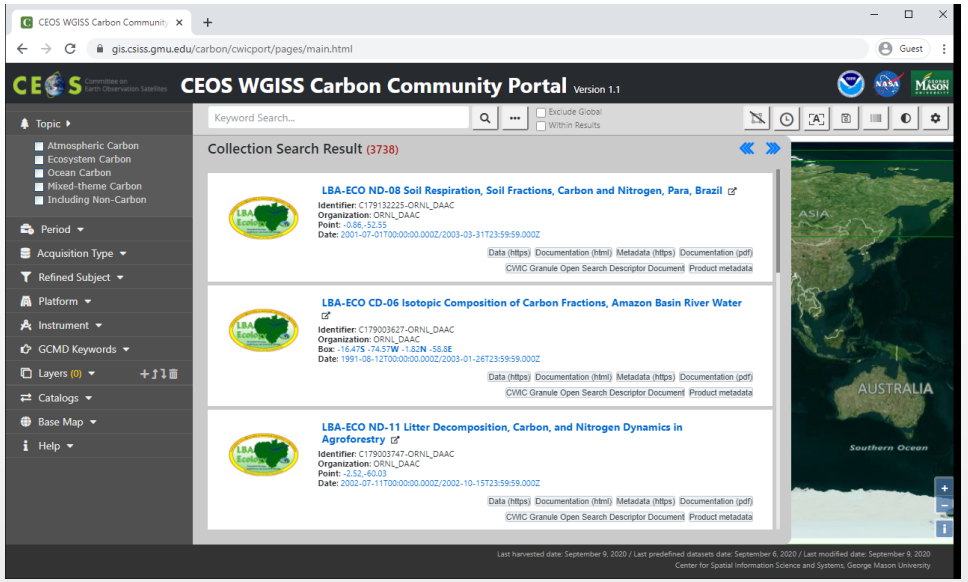
Progress of WGISS Carbon Community Portal
Report to WGISS -50

Goal: To support CEOS Carbon Science Mission by providing easy discovery of and access to carbon-related data resources in CEOS member agencies

The Objectives: ***1) enable carbon community to easily find their interested data in the CEOS agency collections brokered by both CWIC and FedEO; 2) allow searching and accessing data within collections using CWIC and FedEO with keywords, spatial and/or temporal constraints; and 3) provide common discovery and access of all CWIC partner holdings targeting at the CEOS Carbon Community***



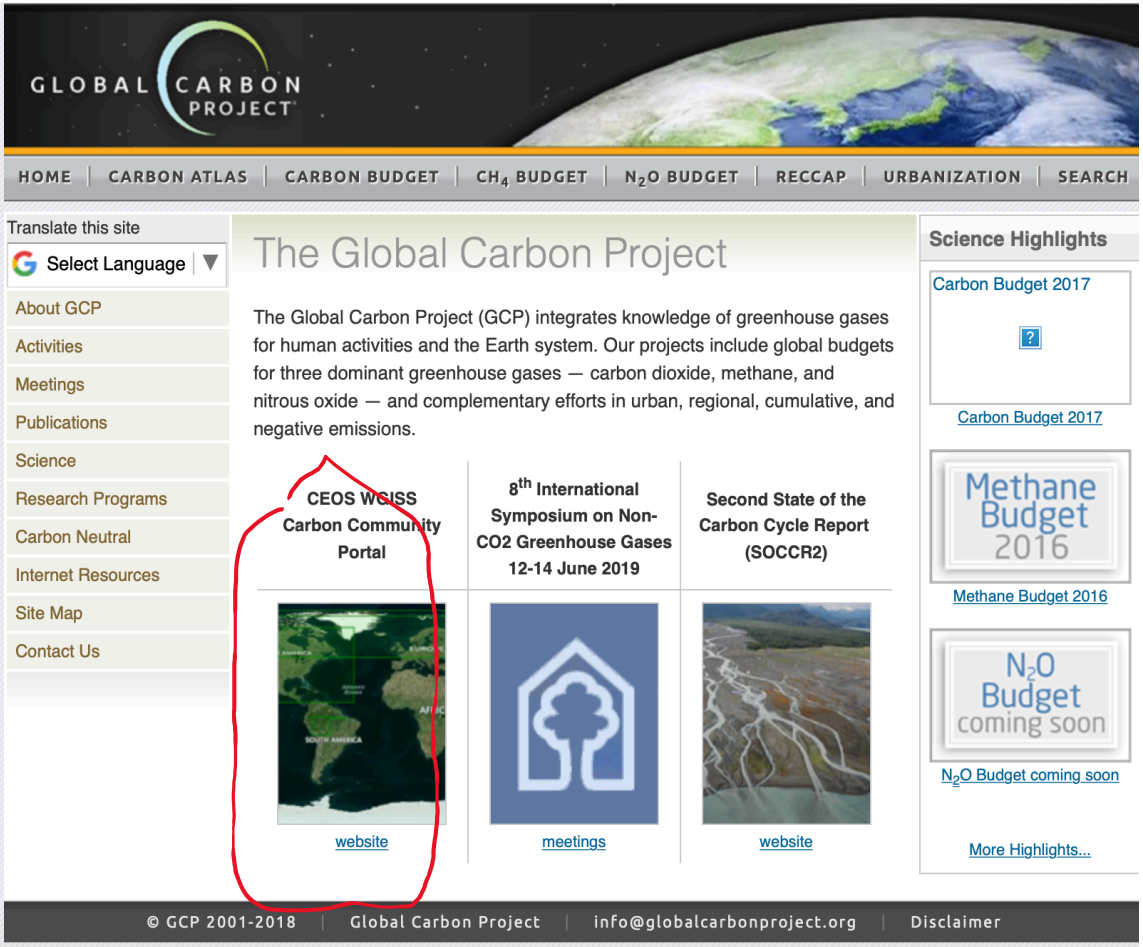
Summary of progresses since WGISS-48 in September 2019:

- Public release of CWIC Carbon Portal and subsequent revisions. Current version is Version 1.1
- Collected new requirements and inputs from the CEOS and GEOSS carbon science community and responded to requirements:
- Allowed searching of ECV and CDRs with additional filters
- Enabled interoperability with Open Data Cube (ODC)
- Released the white paper (architecture) on portal support to CEOS chair initiative
- Improved performance by server-side proxy and caching, adopting the Accessibility Insights for Web tool, GCMD hierarchical search
- Improved accessibility compliant to Web Content Accessibility Guidelines (WCAG) 2.0
- Explored the possibility of repurposing the portal to support other CEOS initiatives (e.g., coastal initiative)

Next steps: Enhances the portal to support new requirements from CEOS, GEOSS, and Global Carbon Project; Enhances interoperation with Open Data Cube; Explores the support to other CEOS Initiatives.

Summary of Contributions to CEOS Carbon Community

- Closely collaborate with CEOS Carbon Task and Global Carbon Project in the development of the portal to ensure it is useful for the community
- Collaborators are involved in
  - Define requirements
  - Design, test, evaluation
  - Use in their studies
  - Provide feedbacks for refinement and improvement
- Revisions of the portal was released to CEOS carbon community for use in July 2019
- The portal has been highlighted in the home page of the Global Carbon Project with a live link (See the screen capture right)
- Enabled support to CEOS Chair Initiatives on Forest Initiative and Open DataCube connection

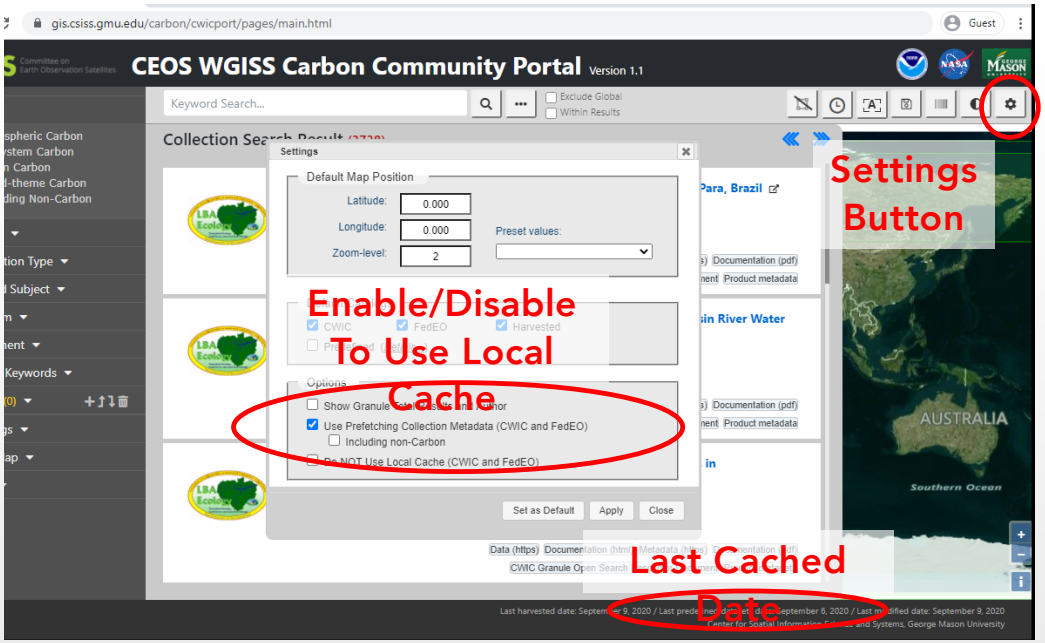


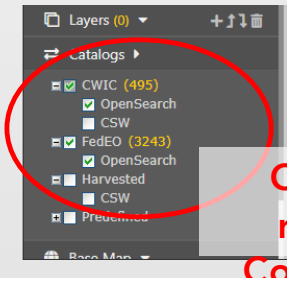
Extended summary of progress

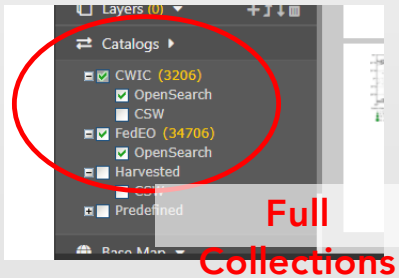
- Milestone 1: Demonstrated CWIC Carbon Portal at WGISS-48, Oct. 9, 2019
- Milestone 2: Released the white paper (architecture) on portal support to CEOS chair initiative, Jan. 2020
- Milestone 3: Released the version 1.1 of the portal, and deployed it in September 2020
- Progresses:
  - Testing and evaluation of the released portal
  - Collected new requirements and inputs from the carbon science community: Linking Open Data Cube (ODC)
  - Analyzed the new requirements and inputs to design the implementation approaches: Testing ODC API and designing metadata and data exchange interfaces with ODC
  - Implemented new requirements: Metadata harvesting at both collection and granule levels
  - Analyzed requirements from CEOS and VNSC for supporting the CEOS chair initiative
  - Prepared a white paper (architecture) to describe the feasibility and approaches for the portal to support the chair initiative.
  - Participated in GEO Week in November to integrate CWIC and the portal with GEOSS.
  - Improved performance of server-side proxy and caching logic for fetching contents under the Cross-Origin policy
  - Improved the portal accessibility by using the Accessibility Insights for Web tool
  - Improved efficiency by using the IndexedDB provided by web browser
  - Appended matching counter at each filter, including GCMD keywords
  - Improved performance of hierarchical GCMD keywords filter
  - Applied analytics by using the Google Analytics
  - Explored the possibility to repurpose the portable to support other CEOS initiative, such as CEOS Coastal Initiative

Performance Improvements

- Progress
  - Performance improvement - Local Cached CWIC and FedEO Collections
    - Both carbon-related and Full collections
    - Transfer compressed cached metadata to reduce network traffic
    - 15MB -> 2MB for Full CWIC
    - 280MB -> 29MB for Full FedEO
    - Changeable to use cached or on-demand searching
    - Exclude global is truly working

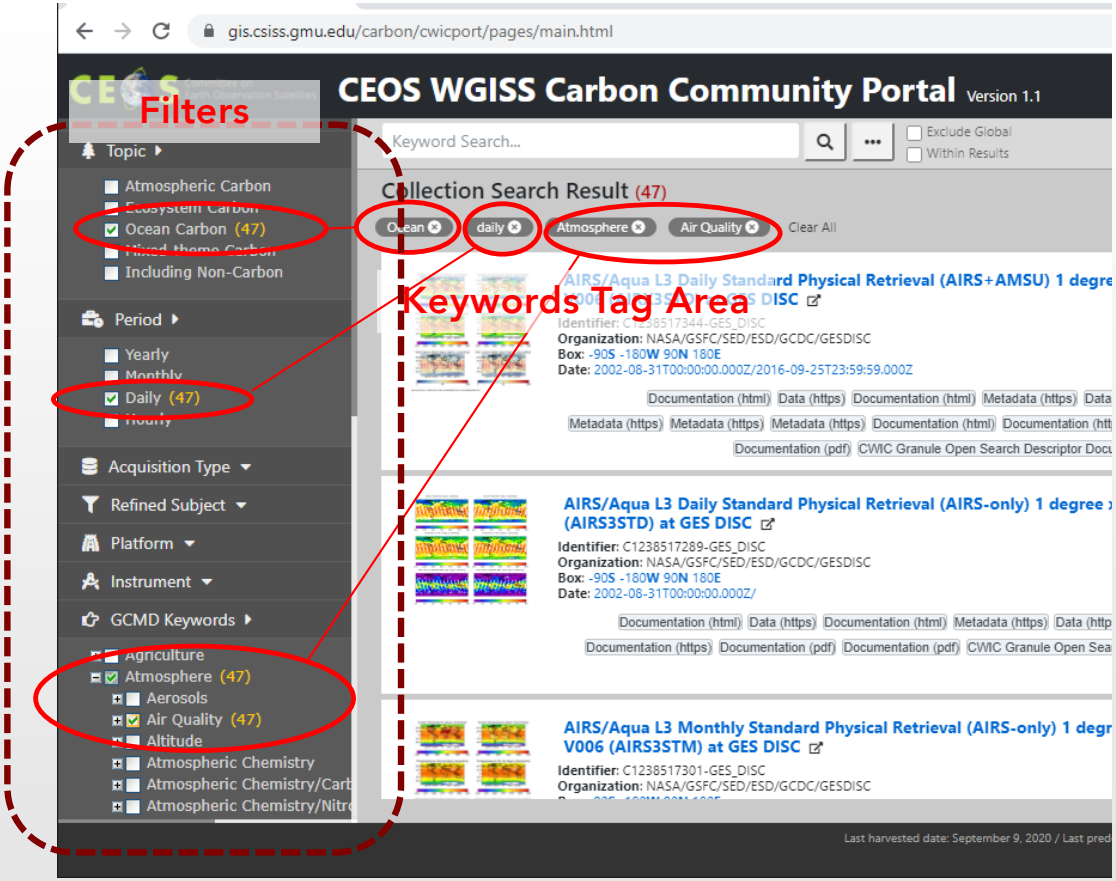






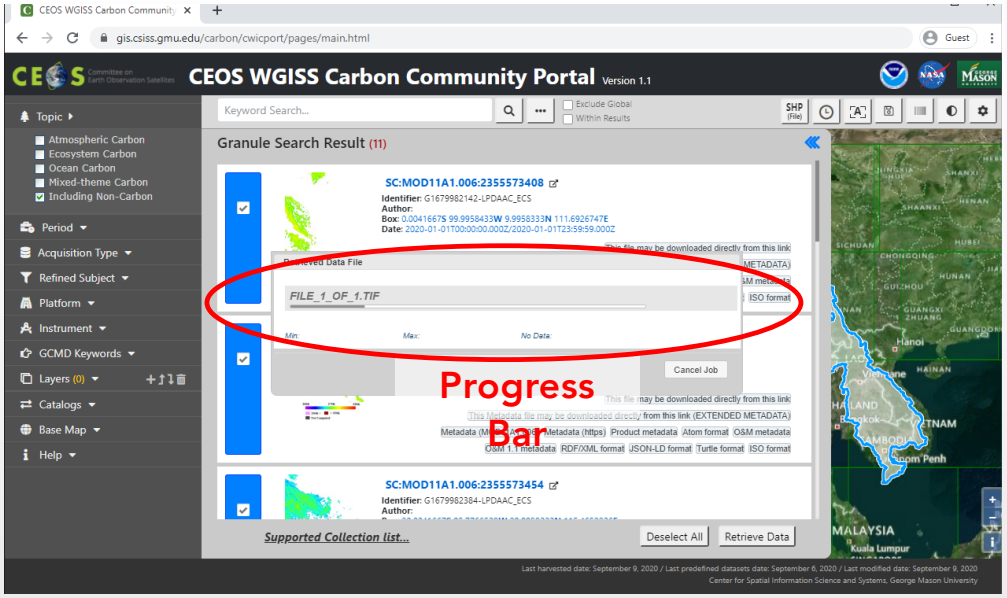
UI Improvements

- Progress
  - User interface improvement - Filter and keywords tag UI interaction
    - All selected filters are shown at the keywords tag area
    - Keyword tag manipulation



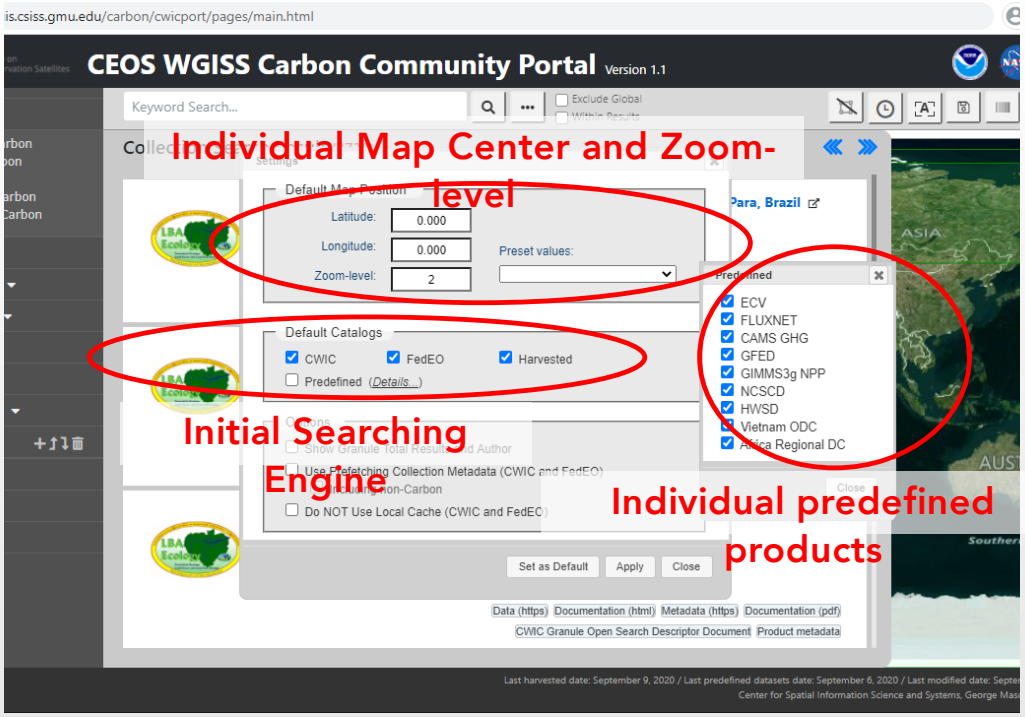
UI improvements

- Progress
  - User interface improvement – Showing Processing Progress Status Bar
    - o Progress monitoring
    - o Asynchronous image producing
    - o Do not need to wait the portal usage until finishing producing
    - o Can be performed multiple producing coincidentally



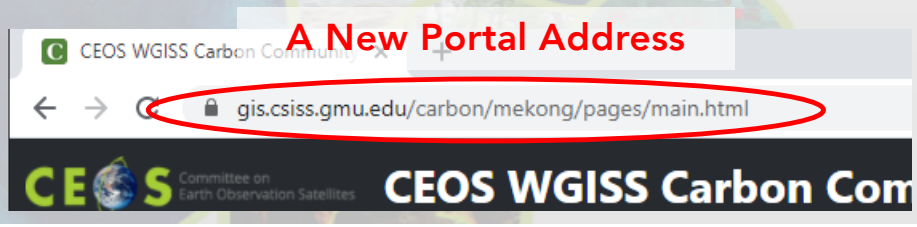
UI Improvements

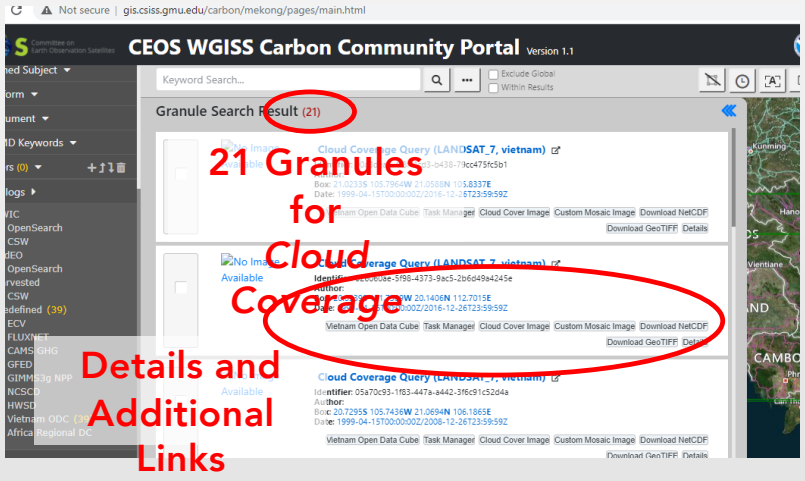
- Progress
  - User Preference Setting - Initial Configuration
    - o Set default initial Map Center and Zoom-level
    - o Selectable default initial searching engine
    - o Selectable individual products as well as Top-level category



Content Enhancement

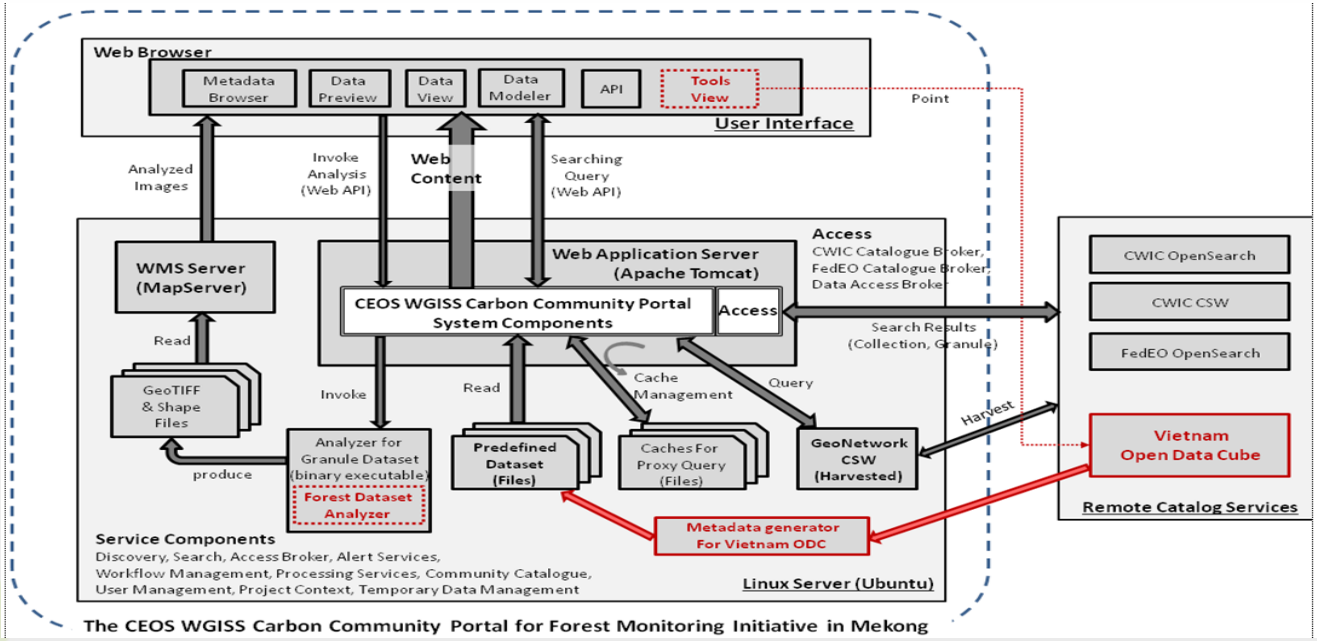
- Progress
  - Support metadata from ODC – Prototyping with VODC
    - o Vietnam Open Data Cube
    - o Both Collection and Granule level
    - o Totally 39 collections (6 for Tasks, 33 for products)
    - o Supporting additional links





White paper for GEO Chair Forest Monitoring Initiative

- White paper on architecture
  - Initial version on Dec. 1, 2019
  - Released on Jan. 14, 2020
  - Architecture Design following ISO/IEC 10746



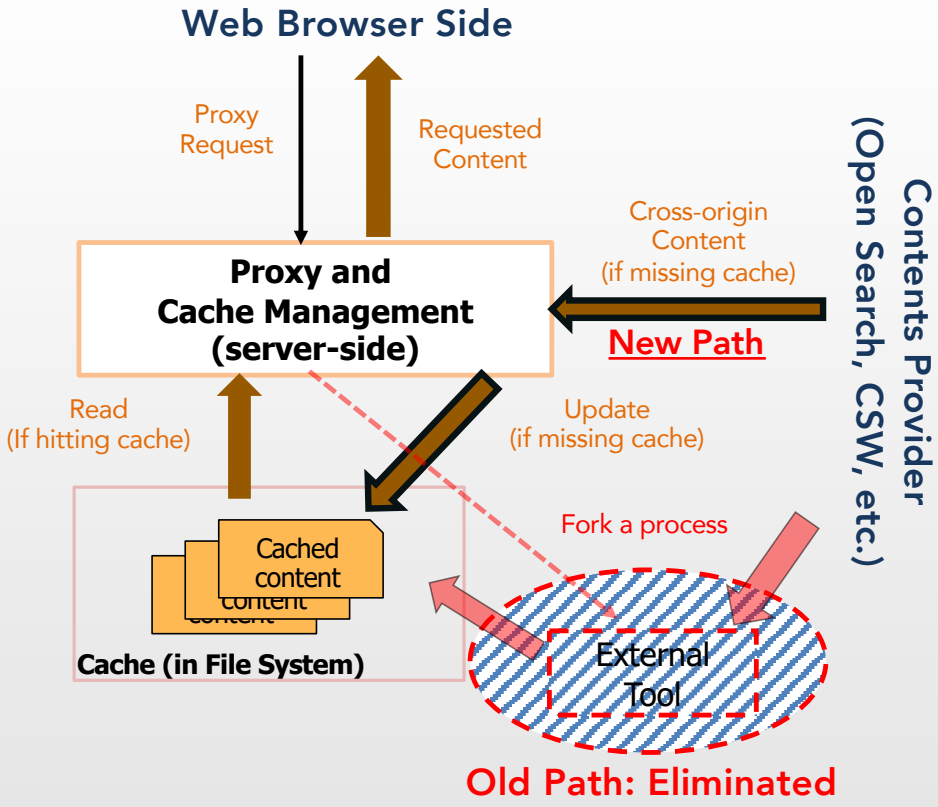
The CEOS WGISS Carbon Community Portal for Forest Monitoring Initiative in Mekong

Adaptation of the CEOS WGISS Carbon Community Portal for the Forest Monitoring Initiative in Mekong - Architecture

Document Identifier:	CWCCP4Mekong_Architecture_V0.2.0
Release Date:	January 14, 2020
Edition:	0.2.0
Edition Date:	January 14, 2020
Responsible Party:	General Science and Technology Solutions, Inc.
Audience:	Stakeholders of CWCCP project and Forest Monitoring Initiative (CEOS Chair Initiative)

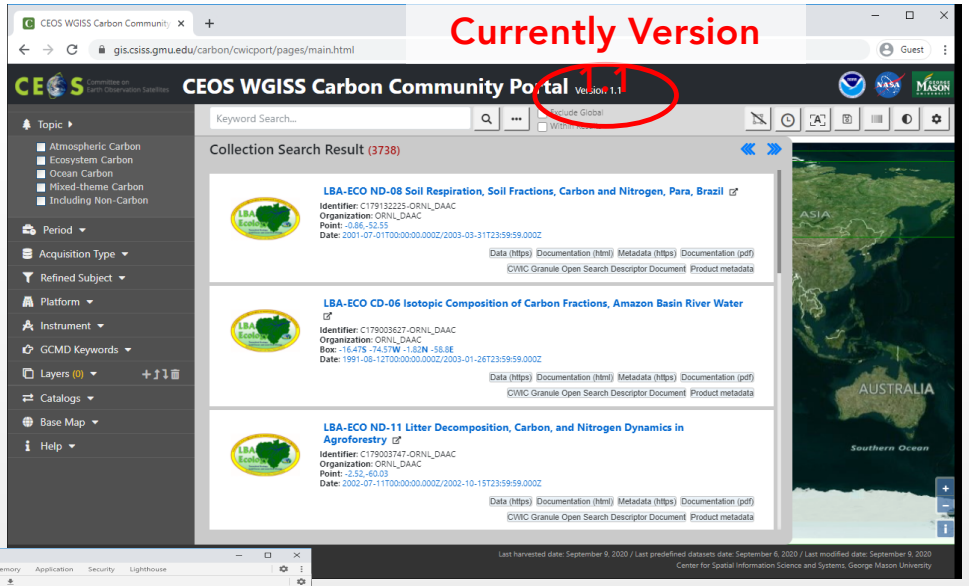
Server-side proxy and caching logic

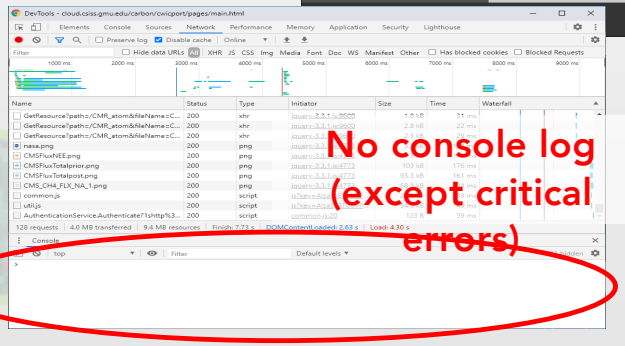
- Function improvement – Improved performance of server-side proxy and caching logic
  - Transcoding Java version of servlets to Java 8 or higher
  - Do not fork a process for external tool when invoking proxy request
  - Efficient cache management, reduced response time, less memory usage on server-side

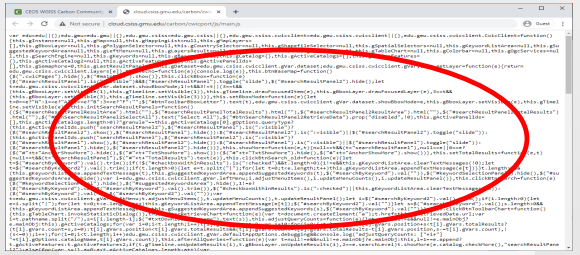


Finalizing version 1.0 of the portal

- Stability improvement – Finalizing version 1.0 of the portal
  - Deployed Version 1.0 in May 2020
  - Deployed Version 1.1 in September 2020
  - Clean up testing codes and console monitoring logs
  - Applied JavaScript minifier to deployment version only – making smaller and clear



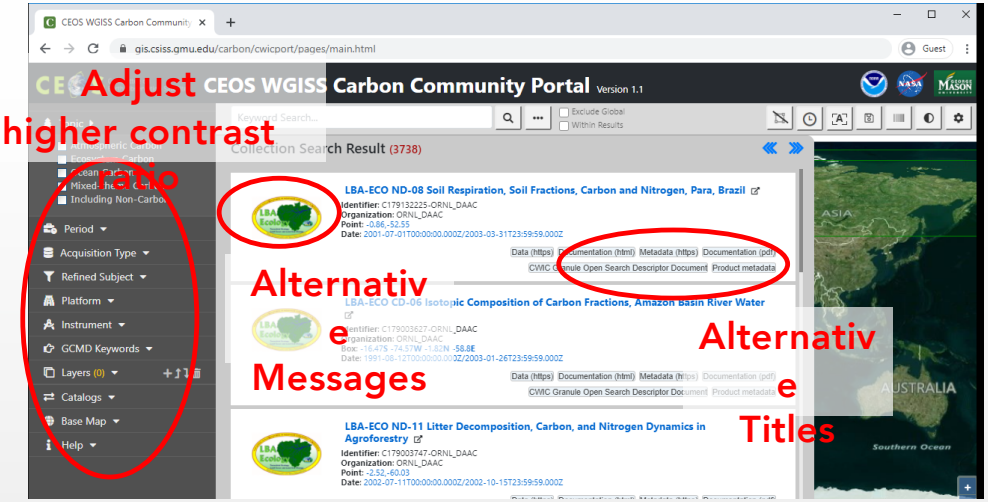


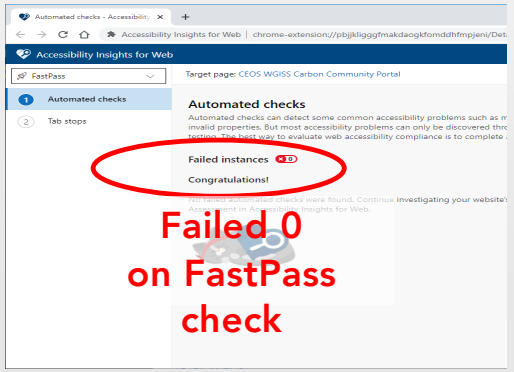


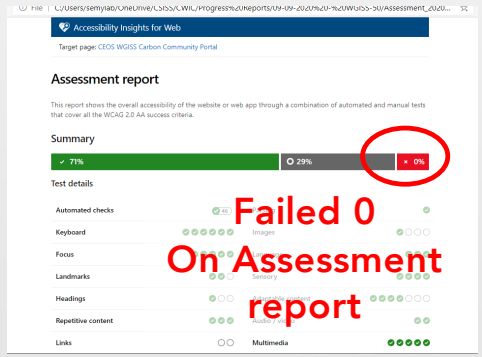
Minified JavaScript Codes

The Portal Accessibility

- Accessibility improvement – Checked Web Content Accessibility Guideline (WCAG) 2.1
  - Checked by using Accessibility Insights tool (compatible with WCAG 2.1)
    - Passed all checklist on FastPass
    - Checked in Assessment checklist
    - Adjusted higher color contrast ratio at each text content
    - Appended alternative message or title at each required element
  - Passed Nu Html Checker (v.Nu) tool
    - Checked HTML / CSS validation on source code level

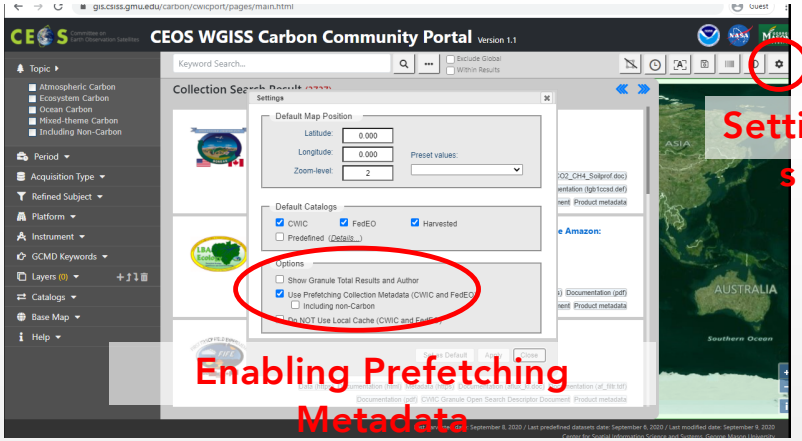


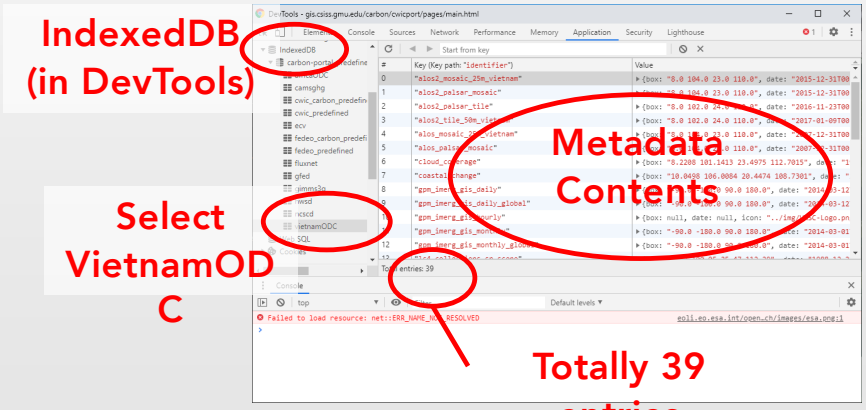




Using IndexedDB

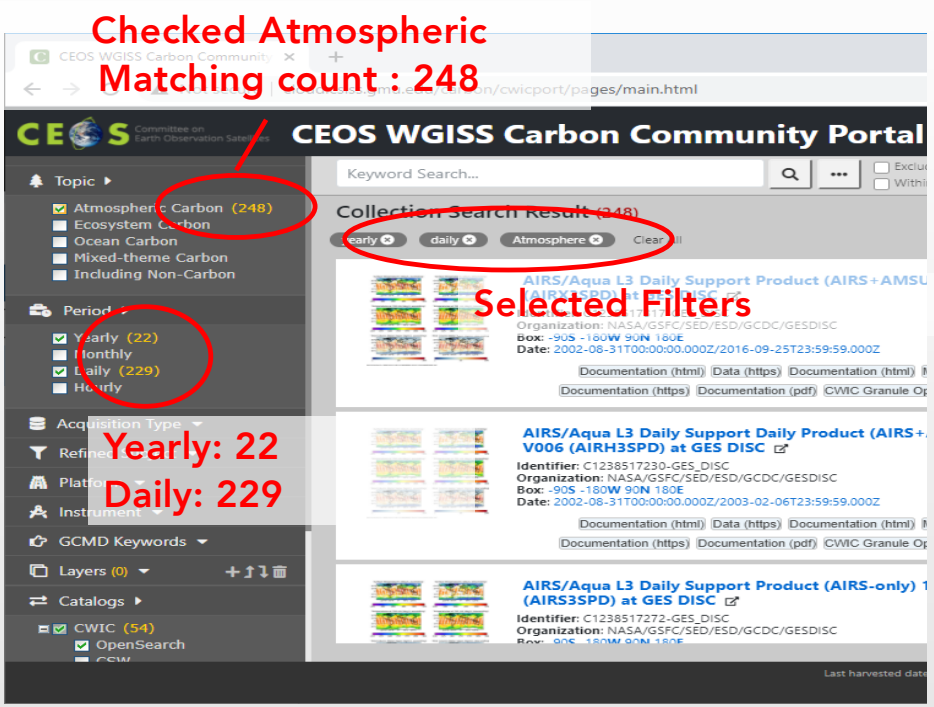
- Efficiency improvement – Stored pre-cached datasets into IndexedDB
  - Pre-cached datasets are stored Into client-side storage
  - Do not use network traffic for pre-cached datasets after storing into IndexedDB
  - Keeps up to date each stored dataset automatically at initial time





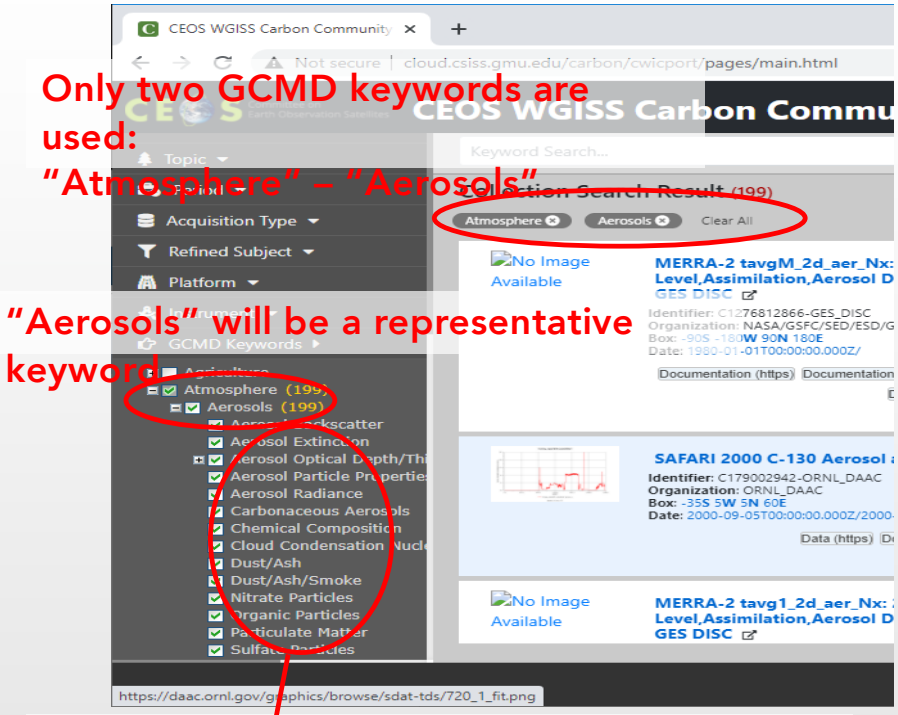
Filter Matching Counter

- **Function improvement –matching counter at each selected filter**
  - **Shows matching counter at the end of each selected filter**
  - Helps end-user to understand how many entries belong to each selected filter
  - Shows accumulated count at any upward parent filter if a filter is selected



Hierarchical GCMD Keywords Filter

- **Performance improvement – Improved hierarchical GCMD keywords filter**
  - Each keyword is representative of all children keywords
  - When all children keywords are selected, the parent keyword will become a representative keyword
  - Removes all marginal keywords which were reducing performance



Demo of Open Data Cube Connectivity (1/7)

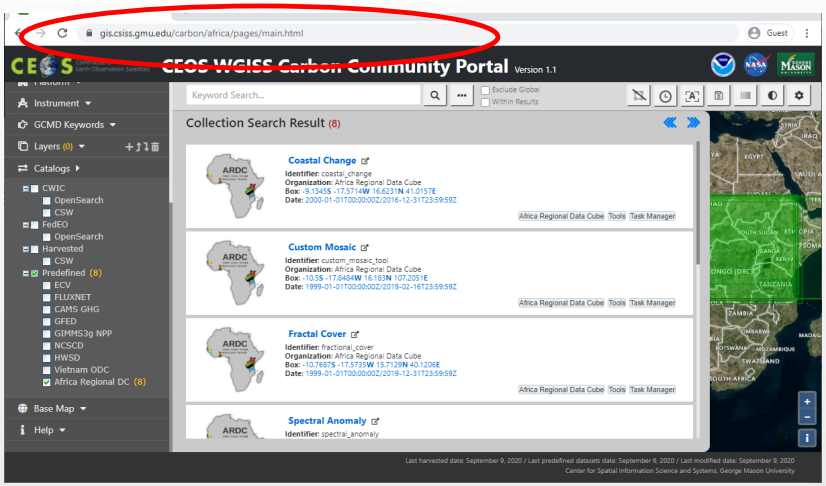
- This demonstration is for Connectivity with Open Data Cube
- Demo Scenario:
  - Step 1) go to the portal URL

https://gis.csiss.gmu.edu/carbon/cwicport/
Or
http://cloud.csiss.gmu.edu/carbon/cwicport/

  - o Both are same service endpoint of the portal
  - o Especially for the Africa Region, the following URL is initially customized for the region

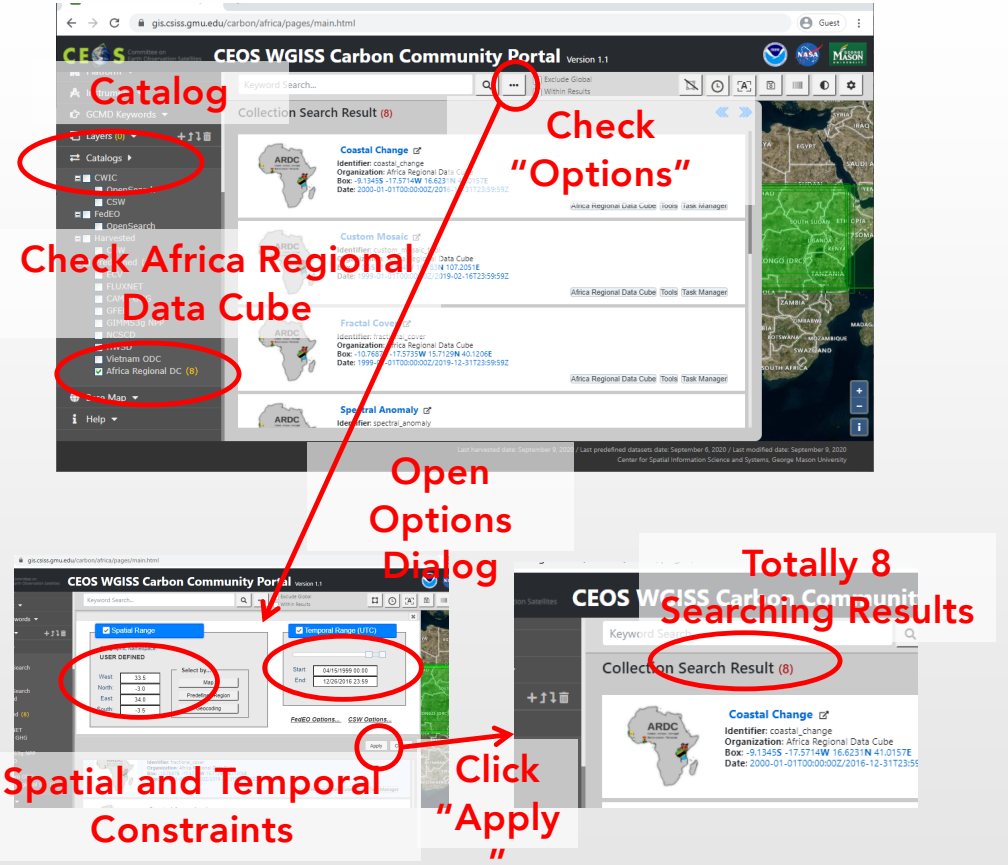
http://cloud.csiss.gmu.edu/carbon/africa/

Type the Portal URL



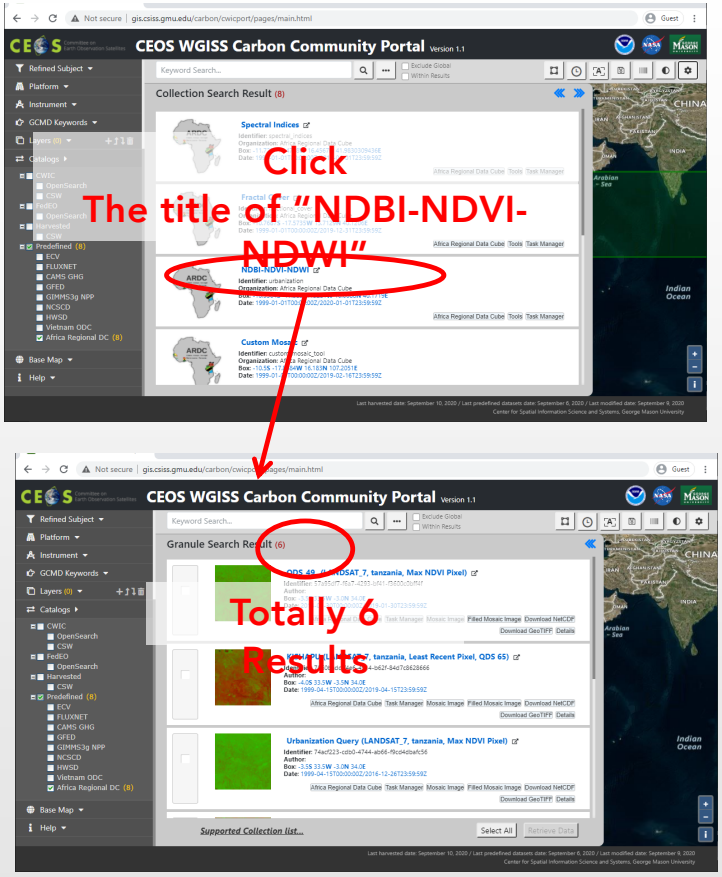
Demo of Open Data Cube Connectivity (2/7)

- Demo Scenario (Cont.):
  - Step 2) Checked “Africa Regional DC” at Predefined of Catalog filter
    - Uncheck all other catalogs may be helpful to reduce total number of matching datasets
  - Step 3) Click “Options” button, and set Spatial and Temporal restrictions
    - Spatial Range – type West 33.5, , North: -3.0, East: 34.0, South: -3.5
    - You can also use Bbox drawing tool or upload a shape file
    - Temporal Range – set April 15, 1999 to Dec. 26, 2016
    - You will get totally 8 Results



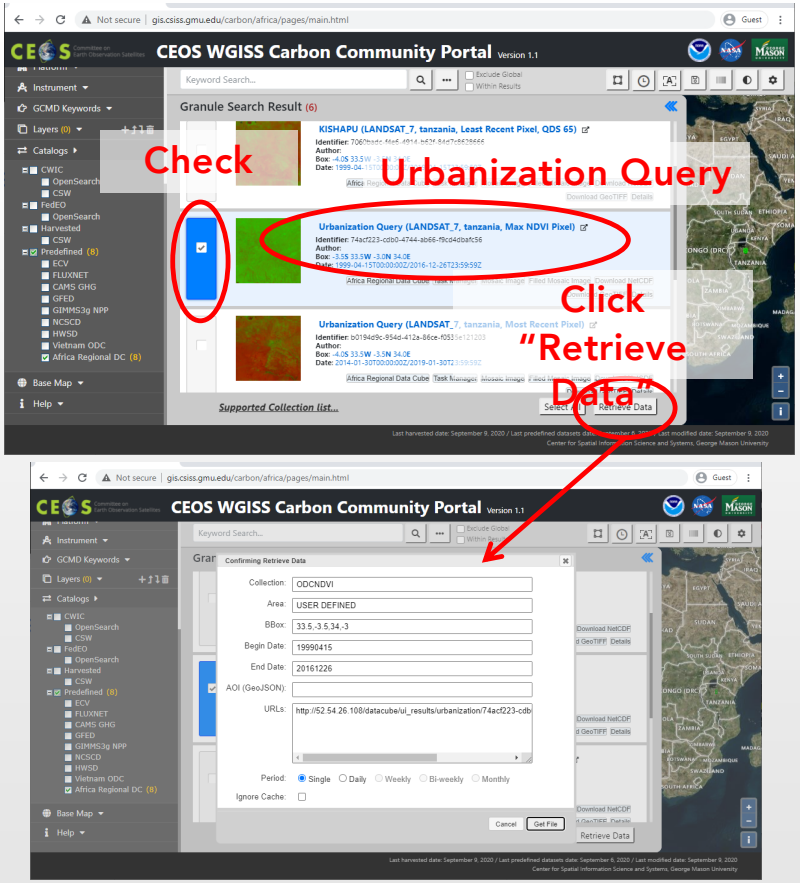
Demo of Open Data Cube Connectivity (3/7)

- Demo Scenario (Cont.):
  - Step 4) Scroll down and click the title of “NDBI-NDVI-NDWI” entry
    - o You will get totally 6 granule-level searching result



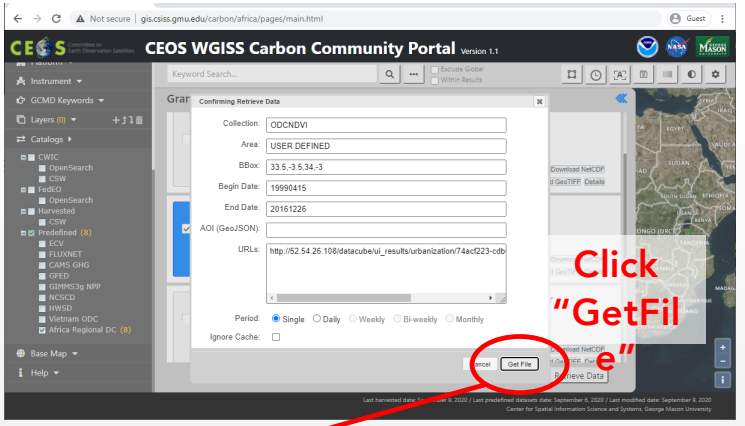
Demo of Open Data Cube Connectivity (4/7)

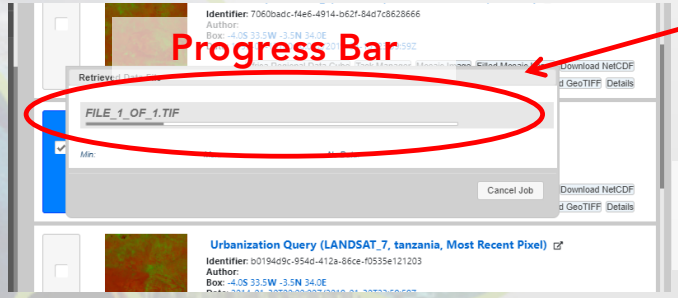
- Demo Scenario (Cont.):
  - Step 5) Check “Urbanization Query (LANDSAT_7, Tanzania, Max NDVI Pixel)” and then click “Retrieve Data” button
    - o You will get a dialog box for “Confirming Retrieve Data”



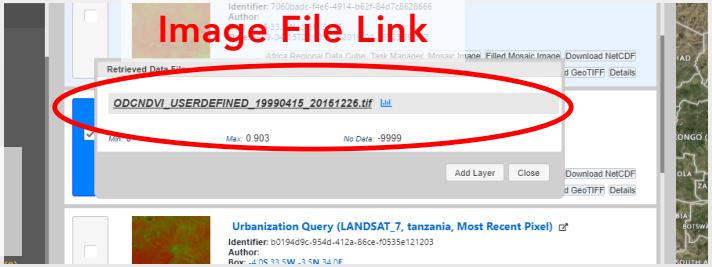
Demo of Open Data Cube Connectivity (5/7)

- Demo Scenario (Cont.):
  - Step 6) Review the parameters, and click “GetFile” button
    - You will get a “Retrieve Data File” dialog box
    - After reached the end of the Progress Bar, you will get an image file link for downloading



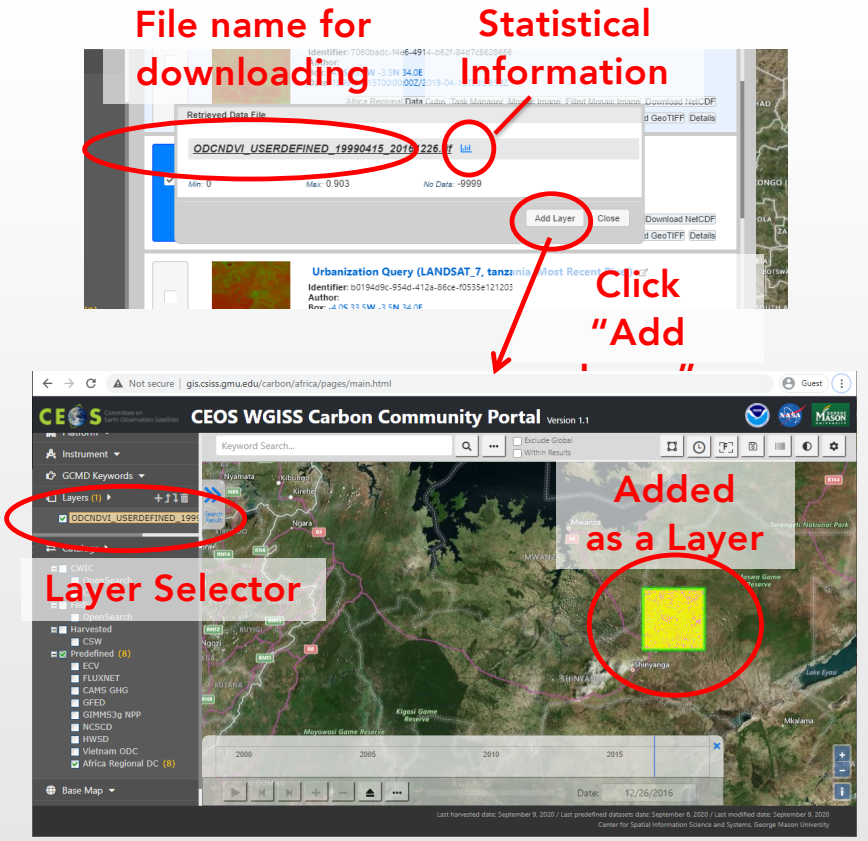


When finished



Demo of Open Data Cube Connectivity (6/7)

- Demo Scenario (Cont.):
  - Step 7) Download the image file and/or click “Add Layer”
    - o You will see the file name on the Layer selector, and the image will be shown on the base map
    - o You can see a statistical information by clicking a button which is on right-side of the image file name



Demo of Open Data Cube Connectivity (7/7)

- Demo Scenario (Cont.):
  - Step 8) Layer Manipulations
    - o You can select a layer by clicking the name in the Layer menu
    - o You can recall Get File dialog by clicking “Download” button in toolbar
    - o You can change opacity by clicking “Layer Opacity” button
    - o You can see statistical information and charts