



The Open Data Cube

Online User Interface and Jupyter Notebook Demo

Africa Regional Data Cube
Remote Training Workshop for Tanzania

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Important Web Links



- Google Doc webpage for **Questions and Answers**
<https://tinyurl.com/tanzania-odc>
- Primary web address for the **Tanzania User Interface**
<http://18.216.79.174>
- Backup User Interface web addresses
 - (1) <http://13.59.149.225>
 - (2) <http://18.216.137.174>
 - (3) <http://18.219.161.250>
- Primary web address for **Tanzania Jupyter Notebooks**
<http://18.216.79.174:8000>
Password: ardcuser

Key Features of the User Interface (UI)



- An “easy to use” GIS tool for “high level” analyses and case studies
- No need to understand Python code, as everything is menu driven and the algorithms are “built in”
- Open Source modular software design that allows users to modify the interface and add algorithms
- Currently only performs analyses on Landsat-7 and Landsat-8 datasets
- Data Cube viewing ... location, space and time extents
- Subsetting for Data Cube download and offline use
- Outputs in PNG (images), GeoTIFF or netCDF, and GIF animations
- Single pixel analyses or “pixel drill”
- Each country will have their own UI with a view of their data cube.

Details Pane

Main Menu Bar

GIS Viewport

Open Data Cube Home Data Cube Manager Tools Task Manager Submit Feedback Logged in as: temp Logout

Filters History Results

Output

Satellite
Landsat 7

Data Selection:

Image Background Color:
Black

Generate Time Series Animation
None

Geospatial Bounds:

Min Latitude	Max Latitude
Min Longitude	Max Longitude
Start Date	End Date
04/15/1999	12/25/2016

Additional Options Submit

Running tasks

Lat: 17.7226, Lon: 11.8116

Status Pane

Data Cube Manager

- **Data Cube Visualization** ... Where are the cubes?
- **Dataset Types** ... Sortable list of cubes
- **Dataset Viewer** ... Spatial and time extents of cubes
- **Ingestion Configuration Builder** ...
A method to add new datasets and create cubes
- **Ingestion on Demand** ... Subsetting a sample cube for download and offline analyses



Tools (Algorithms)

Land

- Urbanization – Normalized Difference Build-Up Index (NDBI)
- Spectral Indices – Normalized Difference Vegetation Index (NDVI), Water Index (NDWI), Build-Up Index (NDBI), Enhanced Vegetation Index (EVI), Soil Adjusted Vegetation Index (SAVI), Normalized Burn Ratio (NBR)
- Sudden Landslide Identification Product (SLIP)
- NDVI Anomaly – change in NDVI compared to a baseline period
- Fractional Cover – Fraction of green vegetation vs bare soil

General

- Custom Mosaic – least/most recent pixel, median, min/max NDVI
- Cloud Coverage

Water

- Water Detection - Water Observation from Space (WOFS)
- Water Quality – Total Suspended Matter (TSM)
- Coastal Change



Key Features of the Jupyter Notebook Interface



- The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live Python code, equations, visualizations and narrative text.
- To open any notebook, just click on the filename.
- You can make a copy of any notebook by using the "File > Make a Copy" menu selection. The new file will contain "-Copy1" at the end of the filename. You can rename the file by clicking on the title at the top of the screen and then editing the filename.
- You will find two types of "cells" in the Data Cube notebooks. These can be found under the "Cell > Cell Type" menu. A cell used for text or comment is called "Markdown" format. A cell used for Python code is called "Code" format. When you want to add a new cell in the notebook, be sure you use the correct cell type. To add new cells you will use the INSERT menu item. To Cut/Copy/Delete cells, you will use the EDIT menu.

More on Jupyter Notebooks ...



- There are several ways to "run" the notebook code. To run the entire script (starting from the top), you can select "Kernel > Restart & Run All". Once the code has been executed (top to bottom) you can change individual cell content and rerun portions of the code by going to any cell and hitting "Shift - Enter". You will notice this approach will renumber the code blocks starting with the last number that was executed. So, it may be confusing. To reset the numbering (1 to xxx), just run the entire script, as suggested above.
- When the code is "running" you will notice the cell blocks will look like "In [*]". The "star" means the code is executing. When the cell is done executing the "star" will turn into a sequential number, starting with the last executed block number. You will see that some blocks run very fast, and others take some time. If you run the entire stack, you can scroll to the top and see the code execute along the way as it creates output as it moves along the blocks. If you want to stop the execution at any time, just select "Kernel > Interrupt".

More on Jupyter Notebooks ...



- Most of the code blocks have comment blocks directly above the code blocks. By clicking on any cell, it will allow you to edit the cell. To rerun the code changes, just click "Shift - Enter". You will notice that the "#" symbol is used to make any line a comment and it is not executed.
- If your code gets "hung up" and does not appear to be executing you can go back to the main Jupyter Notebook page and select the "Running" tab to view which notebooks are being "executed". In some cases these notebooks are actually running, but in other cases they are just "open" and sitting in the memory and ready for editing or running. You can "Shutdown" any notebook from this screen.
- It should be noted that most of the notebook algorithms are integrated into the online user interface tool. The advantage of using notebooks is that you can view the code and have more flexibility in creating your own products.

