

Using Satellite Data for Land and Water Management: Digital Earth Australia and Open Data Cubes



What is the Digital Earth Australia Data Cube?

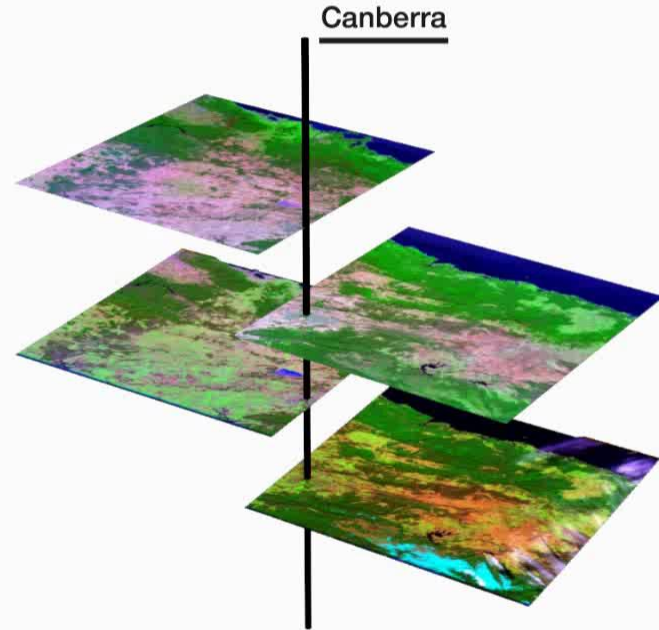
Orthorectification



Calibration



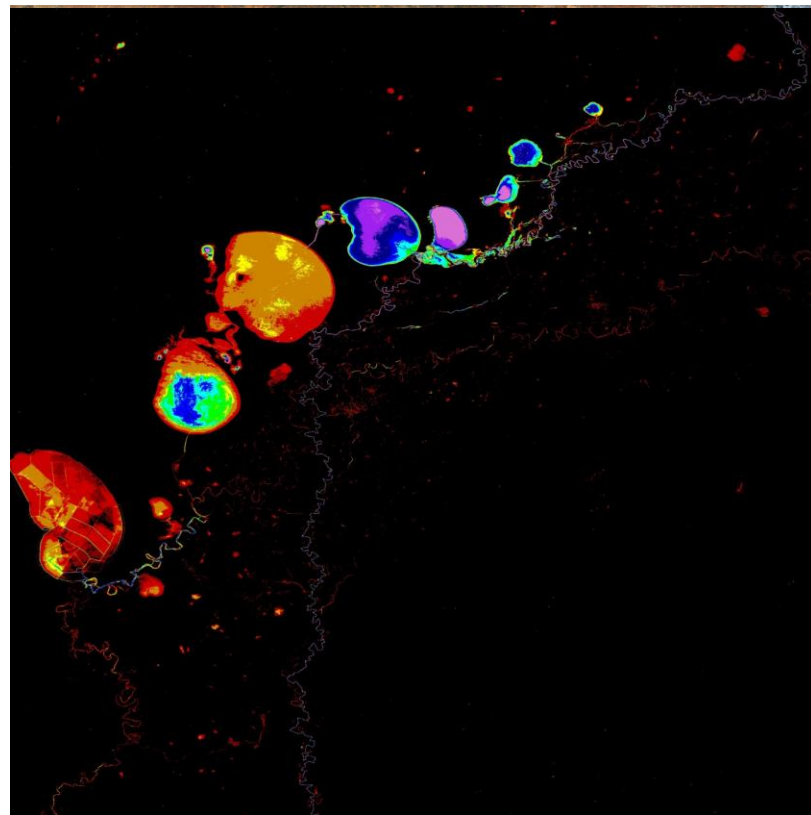
Time series



Observing Water from Every Landsat Scene

- WOfS tells us where water regularly occurs (such as in lakes and rivers) and where it is rare (such as due to floods).
- This animation shows the water observed from a set of satellite observations of Menindee Lakes in western NSW as the lakes dry out, and the total of all water observations combined.
- Regularly observed water is shown in blue – purple. Rarely observed water in red colours.

Menindee Lakes, NSW

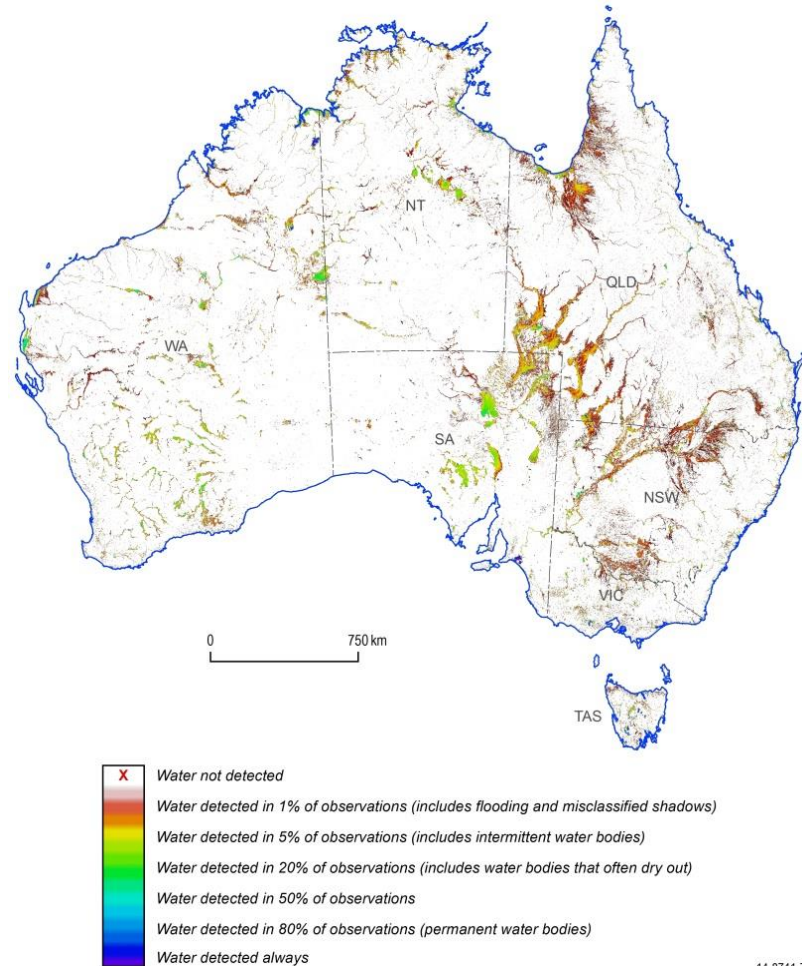


Water Observations from Space

The 30 year history of surface water observation from satellite.

Shows what percentage of satellite observations were detected as being wet.

Used to understand how perennial water bodies are and to detect changes in surface water such as due to floods and agriculture.



Fractional Cover Time Series



1988

2000

2006

2014

■ green

■ dry

■ soil

Powered by Open Data Cube

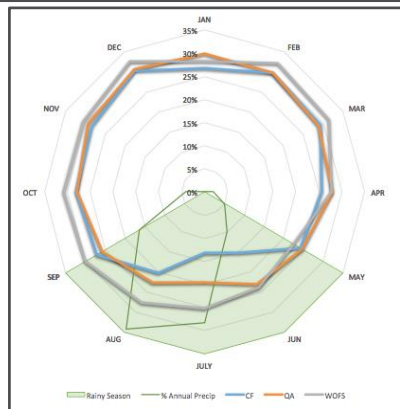
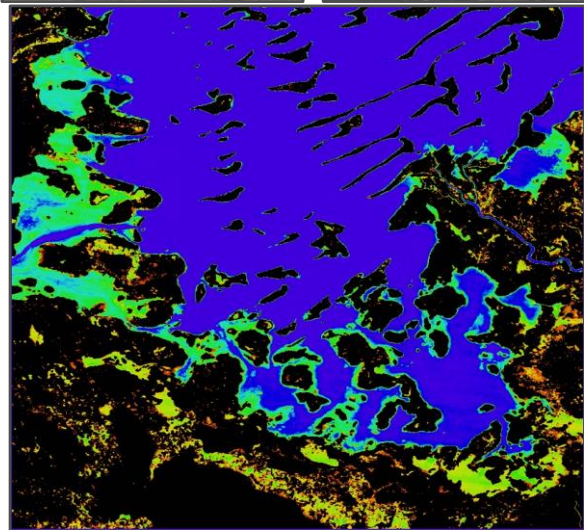
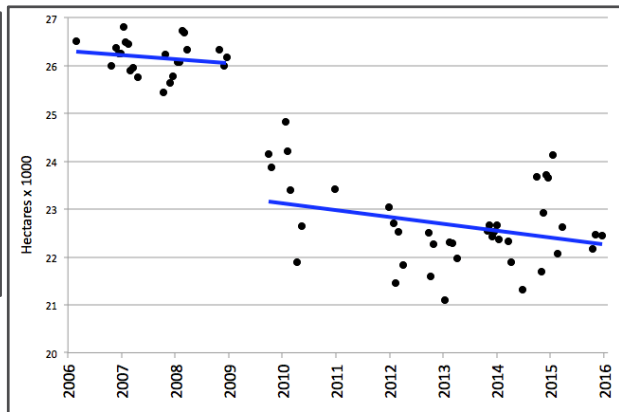
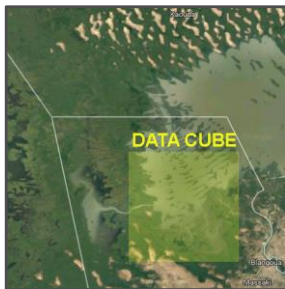
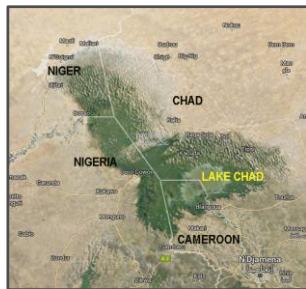
Digital Earth Australia is Australia's implementation of the global, open source technology – Open Data Cube

- This is an embryonic open source, community driven effort
- Currently supported by CEOS, USGS, GA, AMA, Symbios and CSIRO who are providing some of the resources to help establish and grow the community

Actively seeking new contributors and new ideas

- <https://github.com/opendatacube>
- www.opendatacube.org

Open Data Cube in Cameroon



WofS implemented on USGS Landsat surface reflectance data over Lake Chad in Cameroon.

Further ODCs in Kenya and Colombia with WofS analyses produced over important water bodies.

Lake Chad example shows an average reduction in water surface area of 1.4ha per day over a 10 year period.

Images courtesy of Brian Killough of CEOS / NASA

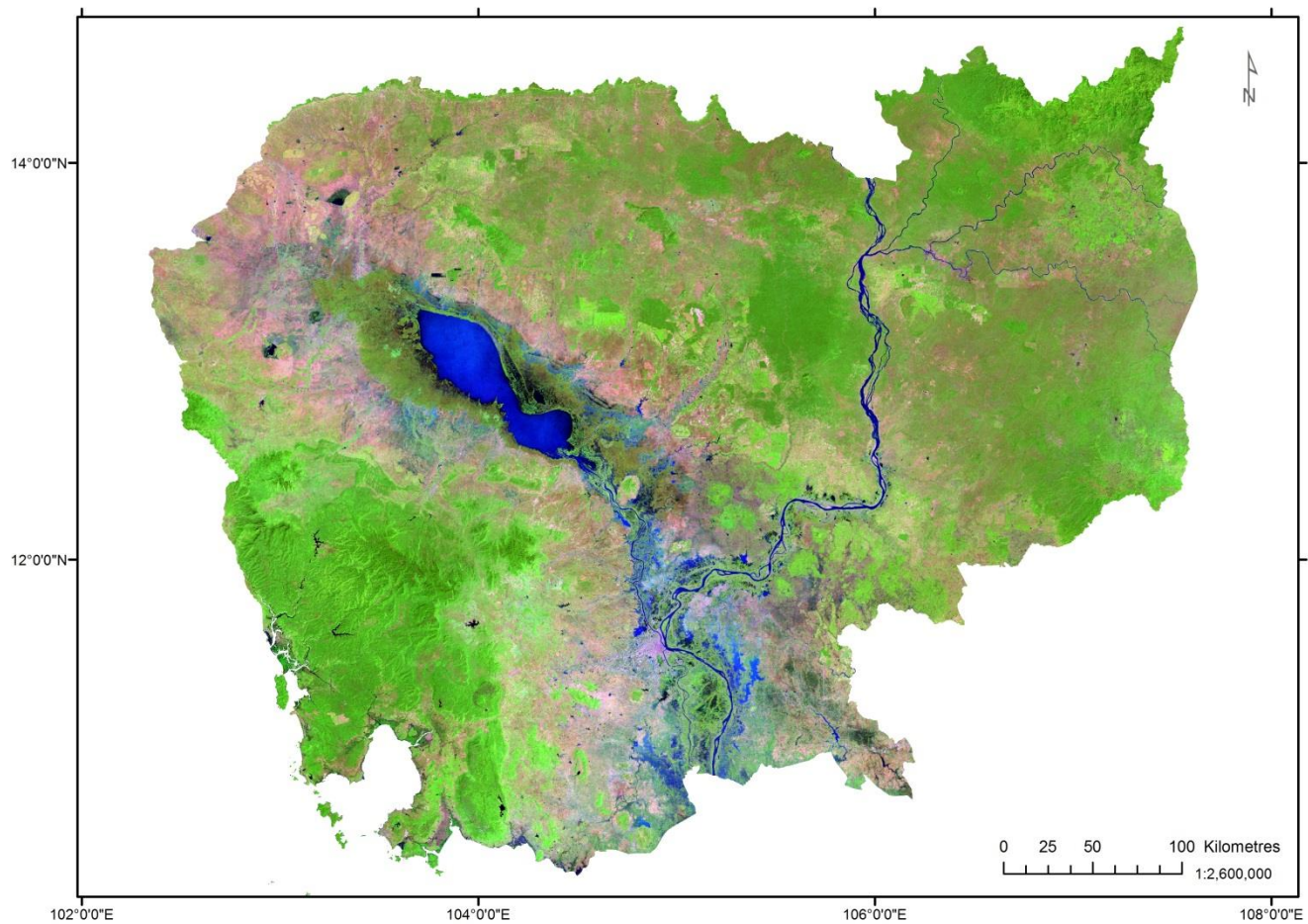
Cambodia Cube

- A pilot project with UN-ESCAP, eWater, and the Australian Bureau of Meteorology
- The presence, availability, location, form, and movement of water. Also, the response of the environment (e.g. plant response) to this water.
- Combining satellite data with climate forecasting and hydrological modelling.
- An input into, and data structure to compliment, eWater Source

Cambodia Cube

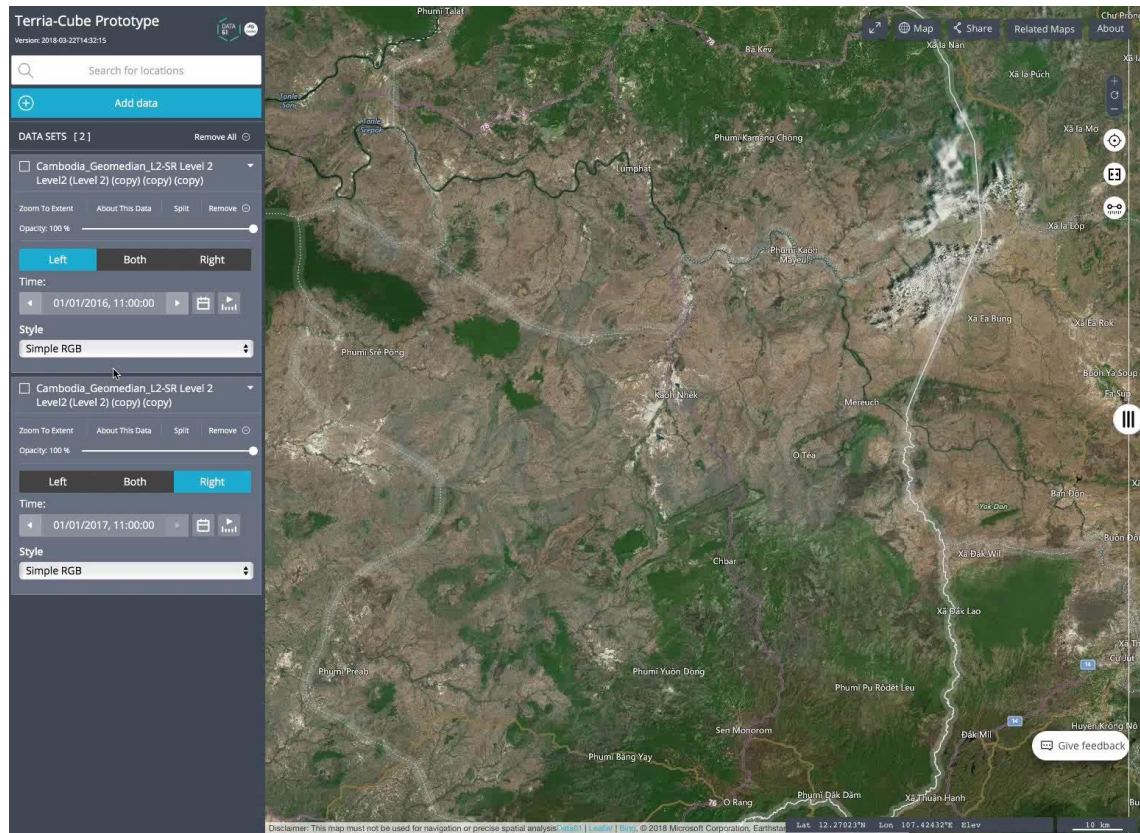


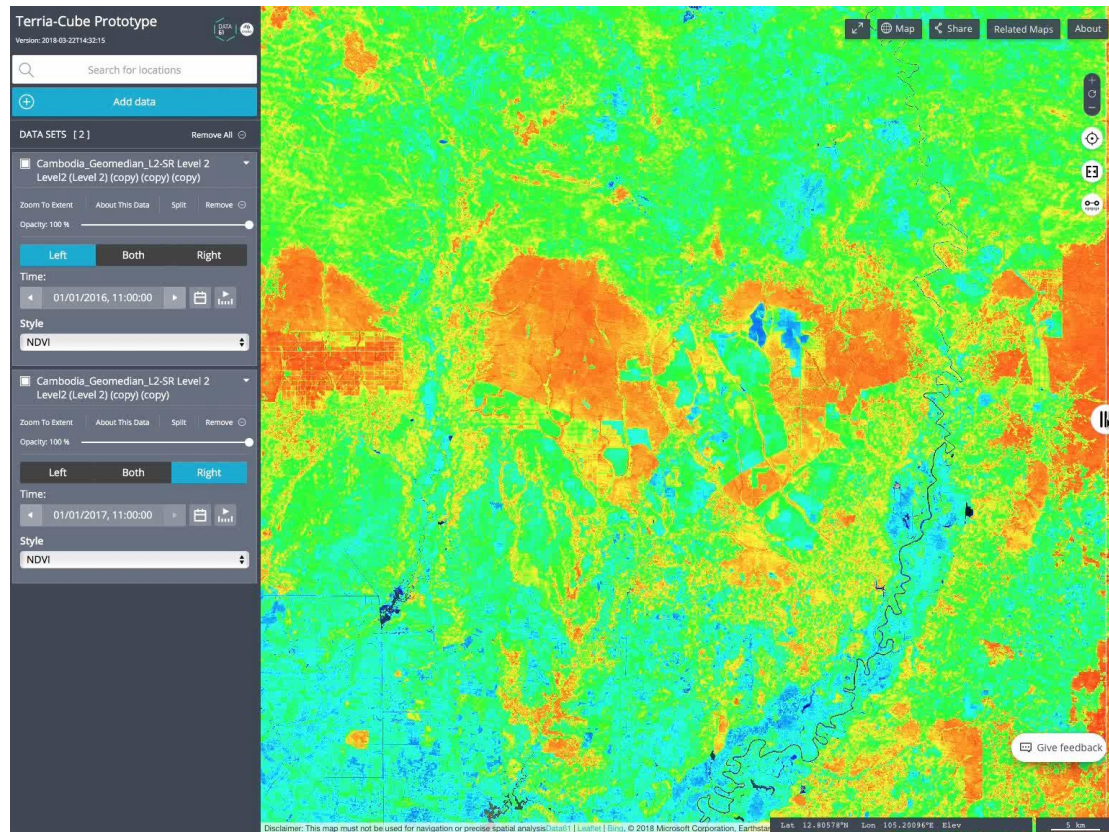
<https://www.worldwildlife.org/pages/hydrosheds>

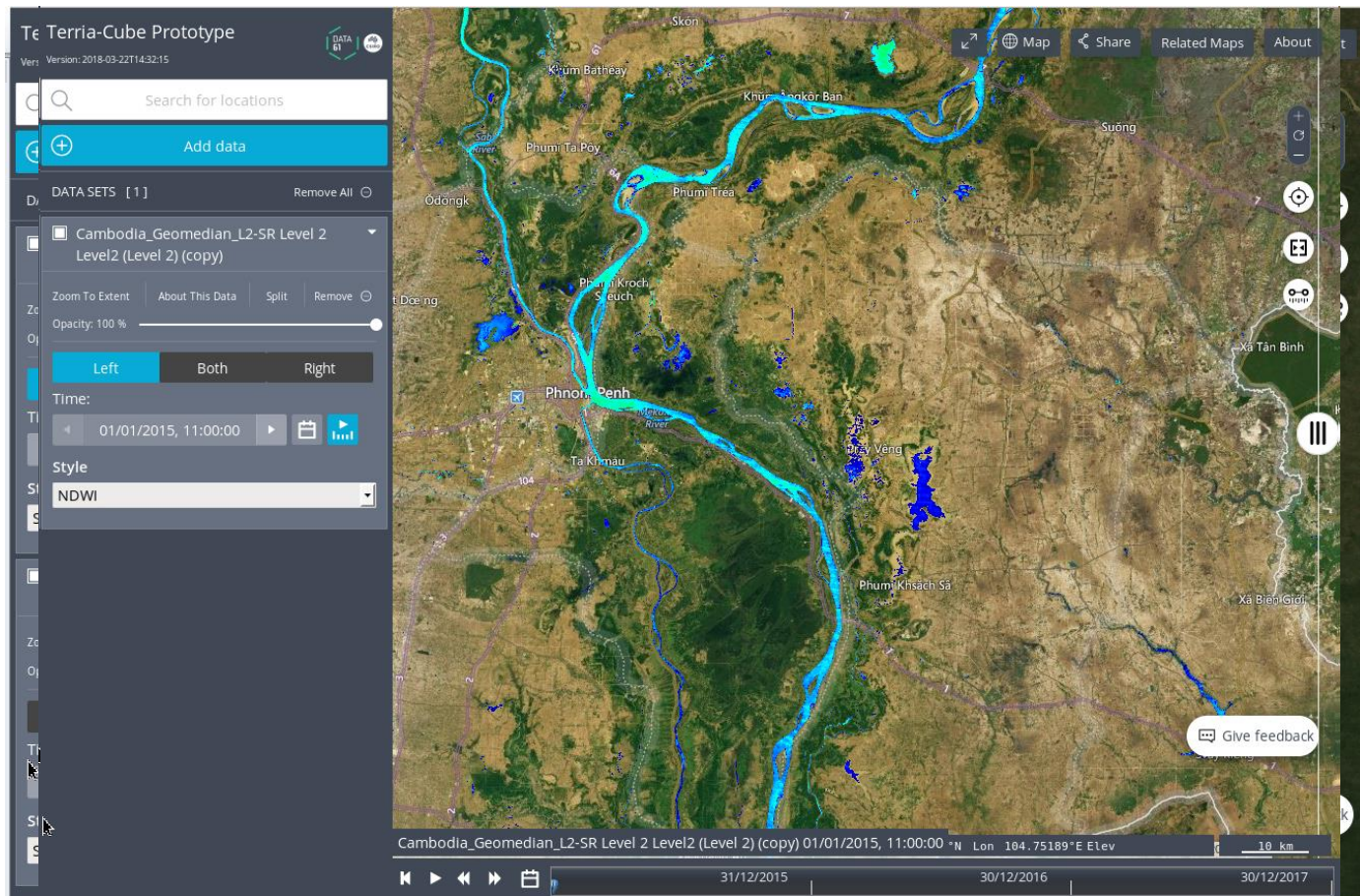


Interactive Web Map Services (WMS)

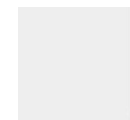
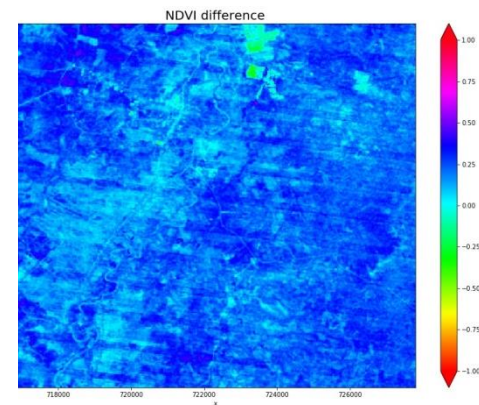
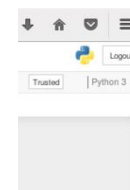
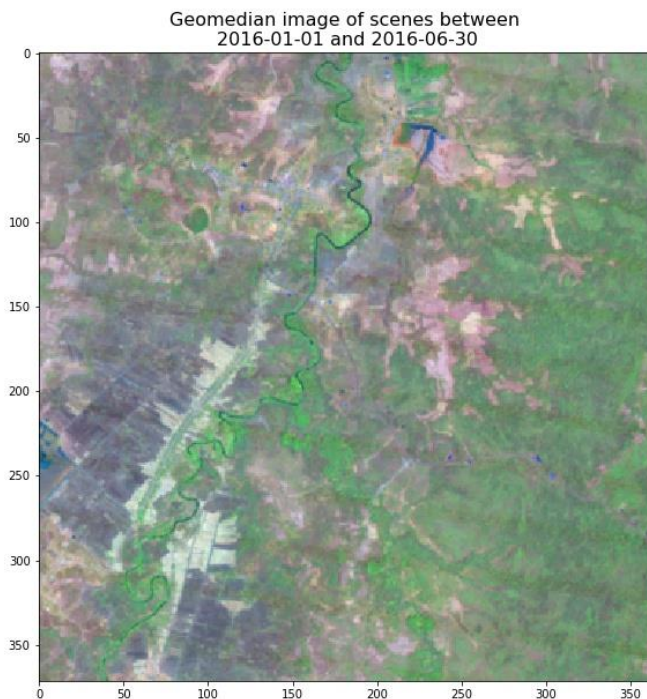
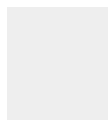
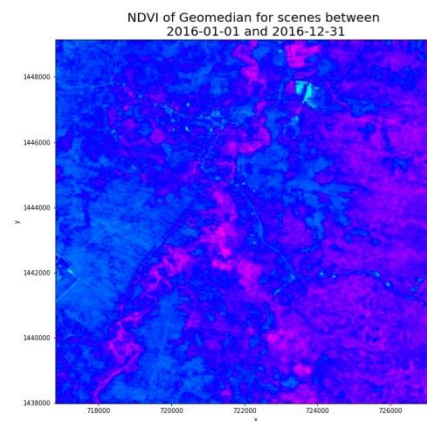
- This is a prototype instance and is not for public use
 - <http://terria-cube.terria.io/>
 - RGB- <http://terria-cube.terria.io/#share=s-jTbFrPAHdxJh8lpFxQaWNouLaH6>
 - NDVI - <http://terria-cube.terria.io/#share=s-iGngfEOcgBoTzsYwUebyfTFuBMu>
 - NDWI - <http://terria-cube.terria.io/#share=s-t6yO5rV9sFEvQ0EQfeDfVY5w6dc>
-
- <http://ewater-geomedian-wms.dea.gadevs.ga/>







Jupyter notebooks





Australian Government
Geoscience Australia



Thank you

Questions?

Phone: +61 2 6249 9111

Web: www.ga.gov.au

Email: clientservices@ga.gov.au

Address: Cnr Jerrabomberra Avenue and Hindmarsh Drive, Symonston ACT 2609, Australia

Postal Address: GPO Box 378, Canberra ACT 2601