Water Observations from Space

Digital Earth Africa's (DE Africa) Water Observations from Space (WOfS) is a product that translates years of satellite imagery into easy to consume information on the presence, location and recurrence of surface water across the continent. This product allows African countries to map, assess and visualise surface water and understand water availability trends over time.

Input to the WOfS product is multi-spectral observations from the USGS Landsat satellite series. Surface water is identified using a supervised decision tree algorithm that considers surface reflectance measurements in selected spectral bands and a number of normalised difference indices. The algorithm has been developed and well-tested in Australia, and DE Africa is actively working with partners to assess the accuracy of WOfS across the diverse environment of Africa.

WOfS maps water at a spatial resolution of 30m by 30m. The operational product will cover the entire continent from 1980s to present, and is automatically updated when new images become available. The WOfS product suite includes daily water observations and statistical summaries.

Daily water observations, also known as Water Observation Feature Layers, detect water in each input satellite observation. The dataset can be used to map historical flood and to understand surface water dynamics; however, given the time between satellite passes (approximately once every 16 days), it is rare that the maximum extent of any given flood is captured.

A WOfS summary shows what percentage of clear observations were detected as wet in a given period of time. The all-time summary, derived over the entire span of the Landsat archive (up to more than 30 years), provides a snapshot of long-term surface water pattern. Annual summaries, derived for each calendar year, can be used to track year to year changes of water extent.

Currently, two development versions of WOfS are available, which can be used for accuracy assessment and evaluation of the product for different applications:

   a. A development version that covers Tanzania, Senegal, Sierra Leone, Ghana, and Kenya from 1984 to 2019. This is produced from USGS Collection 1 Landsat data.

   b. A beta version that covers the continent and the time period of 2013 to mid-2019. This is produced from provisional USGS Collection 2 Landsat 8 data.

This figure shows WOfS summary for an area in Senegal from 2013 to 2019. Colours indicate the percentage of times water was detected (Red = rarely water, green = often water, blue = always water).