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Examination of improved agricultural field identification by comparison of contemporaneous MODIS, Landsat-8 OLI and Sentinel-2 MSI data over Africa

Hankui K. Zhang*, Jian Li, Lin Yan, David P. Roy

Geospatial Science Center of Excellence, South Dakota State University,

Brookings, SD 57007, USA

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The ability of satellite data to monitor agriculture reliably is dependent on several factors but is constrained fundamentally by the satellite spatial resolution relative to the field spatial dimensions. The recently launched Sentinel-2 MultiSpectral Instrument (MSI) and Landsat-8 Operational Land Imager (OLI) sensors have 10m and 30m visible and near-infrared bands respectively and offer an opportunity to monitor agriculture over regions with small and complex fields that cannot be resolved using coarser resolution 250m MODIS data. This study examines the spatial characteristics of these sensors in Africa considering regions of small holder and commercial agriculture that provide examples of small/complex and large/uniform fields respectively. The Sentinel-2 data were reprojected into alignment with the Landsat-8 data Web Enabled Landsat Data (WELD) that are defined in tiles in the MODIS product global sinusoidal projection. Visual examination and spatial profile analysis of contemporaneous MODIS, Landsat-8 and Sentinel-2 normalized difference vegetation index data are used to demonstrate the potential improvements that 10m Sentinel-2 data will make for agricultural monitoring in small holder dominated agricultural regions that are difficult to monitor but are common in Africa and Asia.

Related references:

White, E. and Roy, D.P., 2015, A contemporary decennial examination of changing agricultural field sizes using Landsat time series data, Geo: Geography and Environment. DOI: 10.1002/geo2.4

* Corresponding author. Email: hankui.zhang@sdstate.edu