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EP22C-02: Harmonized Landsat/Sentinel-2 Reflectance Products for Land Monitoring (Invited)

Tuesday, 12 December 2017
10:35 - 10:50
New Orleans Ernest N. Morial Convention Center - 352

Many land applications require more frequent observations than can be obtained from a single “Landsat class” sensor. Agricultural monitoring, inland water quality assessment, stand-scale phenology, and numerous other applications all require near-daily imagery at better than 1ha resolution. Thus the land science community has begun expressing a desire for a "30-meter MODIS" global monitoring capability. One cost-effective way to achieve this goal is via merging data from multiple, international observatories into a single virtual constellation.

The Harmonized Landsat/Sentinel-2 (HLS) project has been working to generate a seamless surface reflectance product by combining observations from USGS/NASA Landsat-8 and ESA Sentinel-2. Harmonization in this context requires a series of radiometric and geometric transforms to create a single surface reflectance time series agnostic to sensor origin. Radiometric corrections include a common atmospheric correction using the Landsat-8 LaSRC/6S approach, a simple BRDF adjustment to constant solar and nadir view angle, and spectral bandpass adjustments to fit the Landsat-8 OLI reference. Data are then resampled to a consistent 30m UTM grid, using the Sentinel-2 global tile system. Cloud and shadow masking are also implemented. Quality assurance (QA) involves comparison of the output 30m HLS products with near-simultaneous MODIS nadir-adjusted observations. Prototype HLS products have been processed for ~7% of the global land area using the NASA Earth Exchange (NEX) compute environment at NASA Ames, and can be downloaded from the HLS web site (https://hls.gsfc.nasa.gov). A wall-to-wall North America data set is being prepared for 2018.

This talk will review the objectives and status of the HLS project, and illustrate applications of high-density optical time series data for agriculture and ecology. We also discuss lessons learned from HLS in the general context of implementing virtual constellations.

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