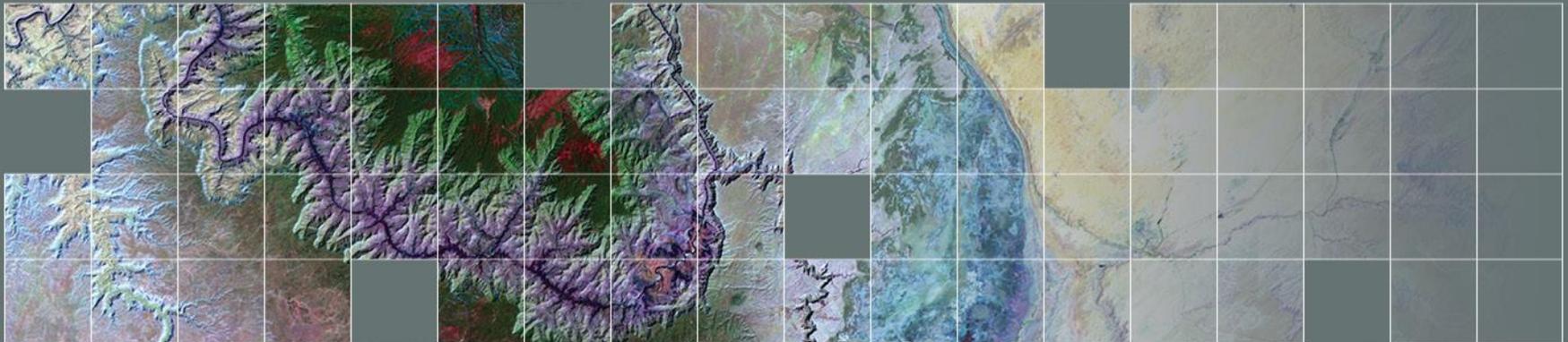




Climate and Land Use Change
Earth Resources Observation and Science (EROS) Center

Landsat 8 Surface Reflectance Update



John Dwyer
July 28, 2016
Landsat Science Team

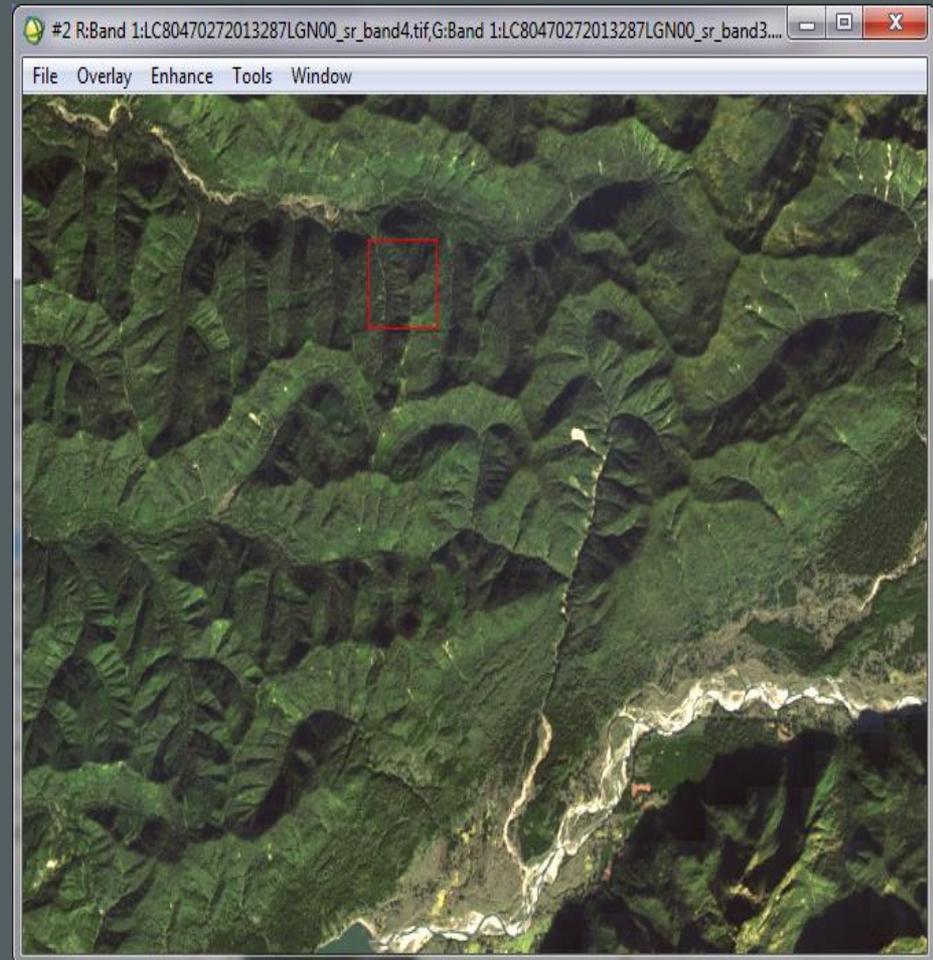
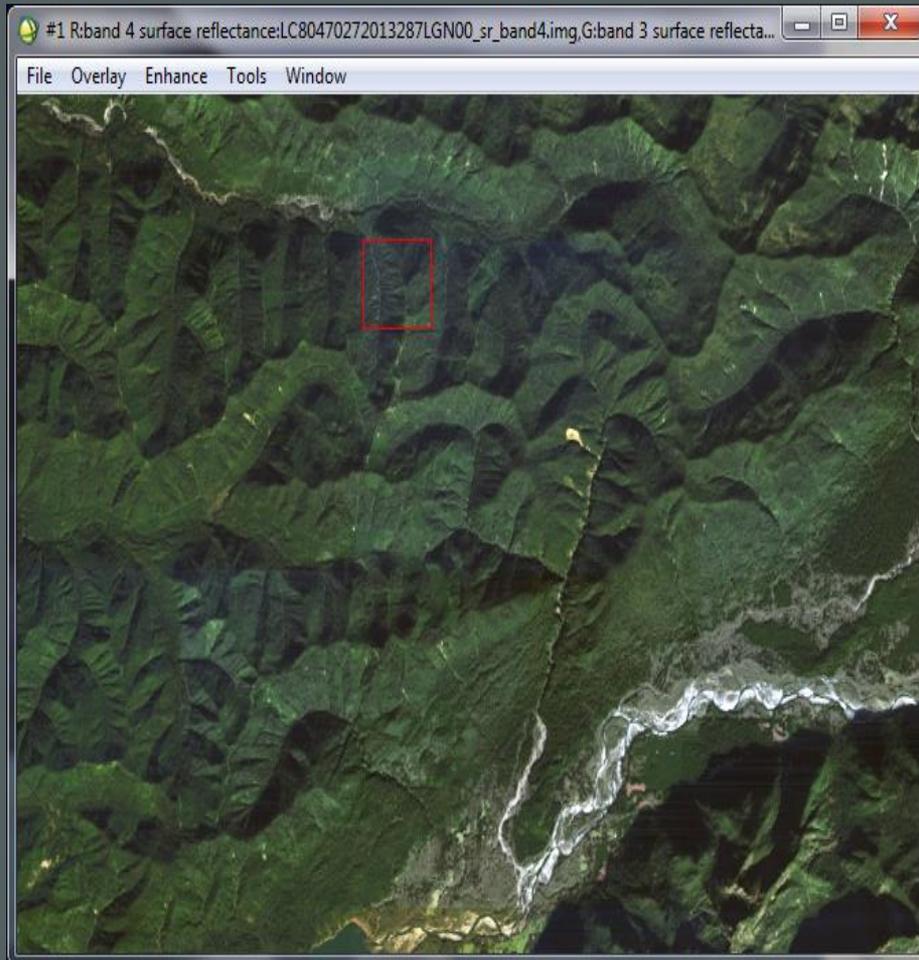
U.S. Department of the Interior
U.S. Geological Survey

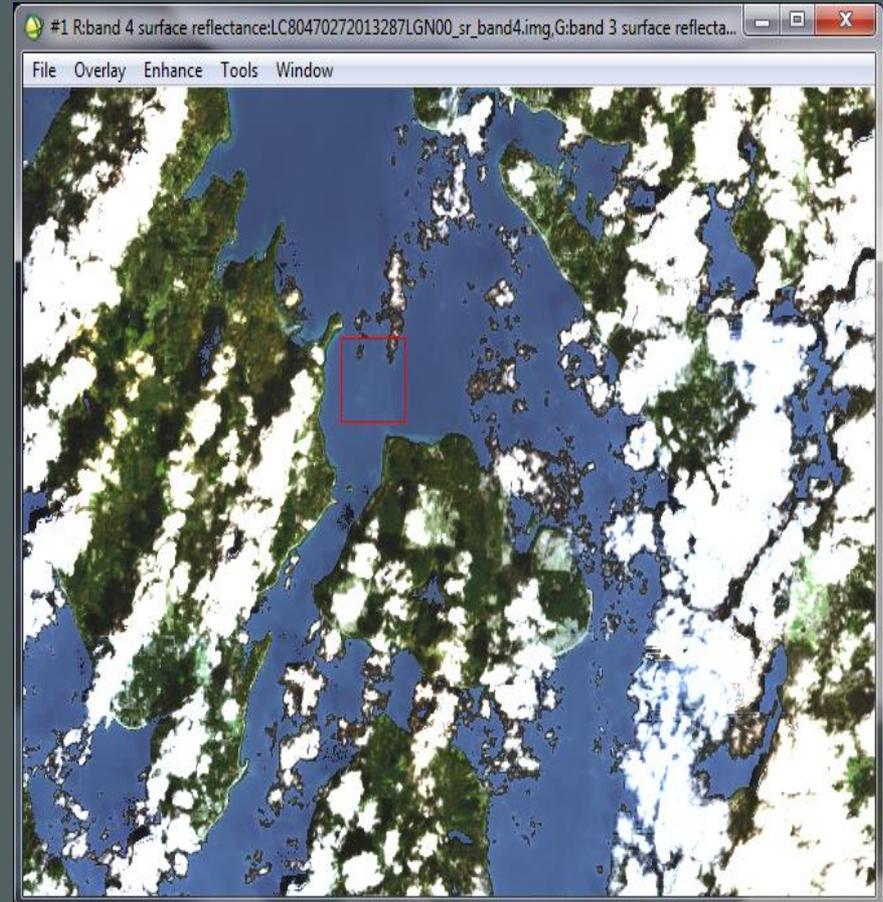
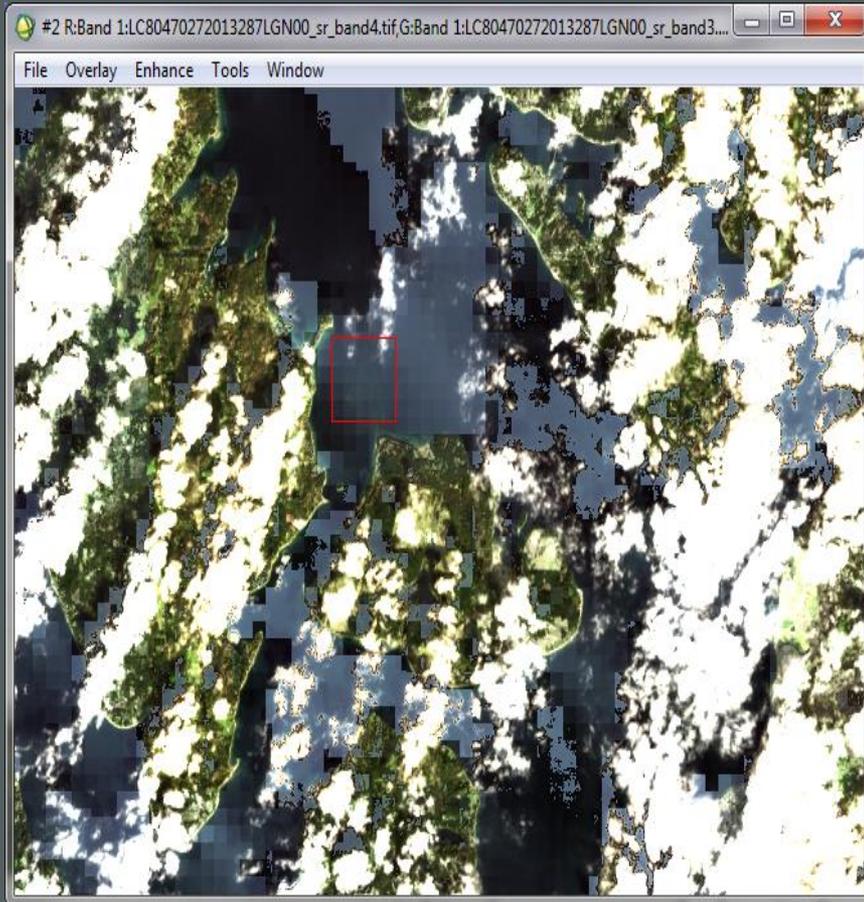
Landsat 8 Surface Reflectance Code (LaSRC)

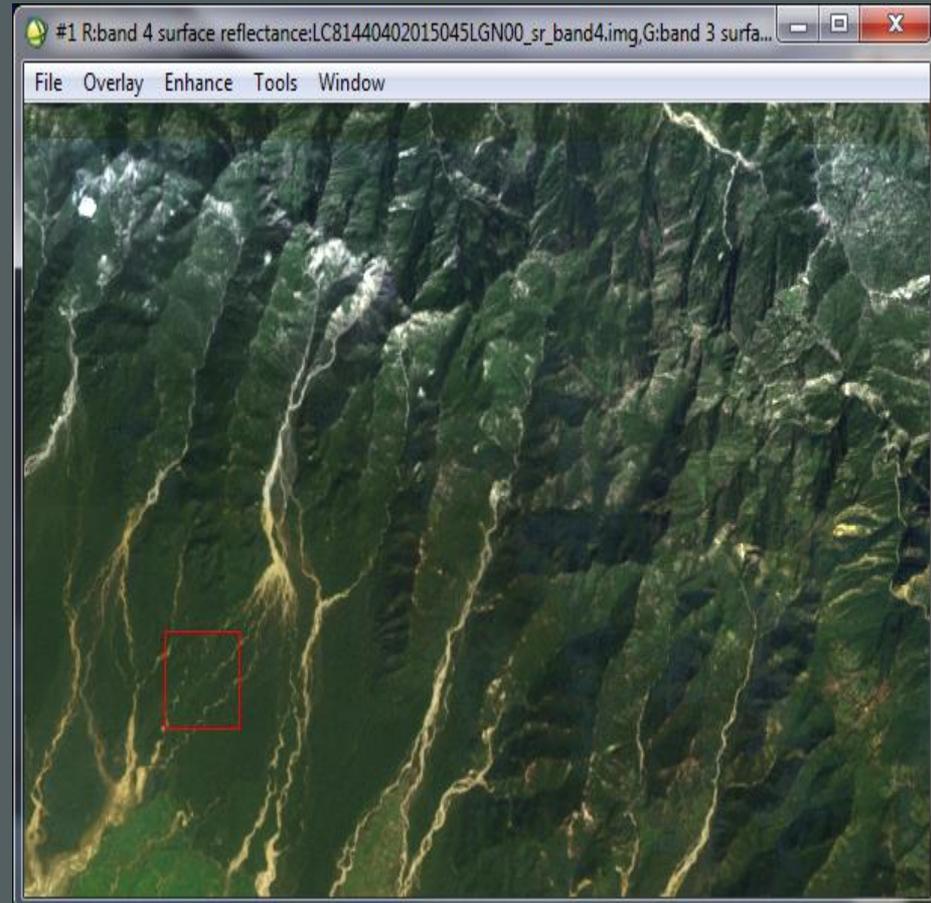
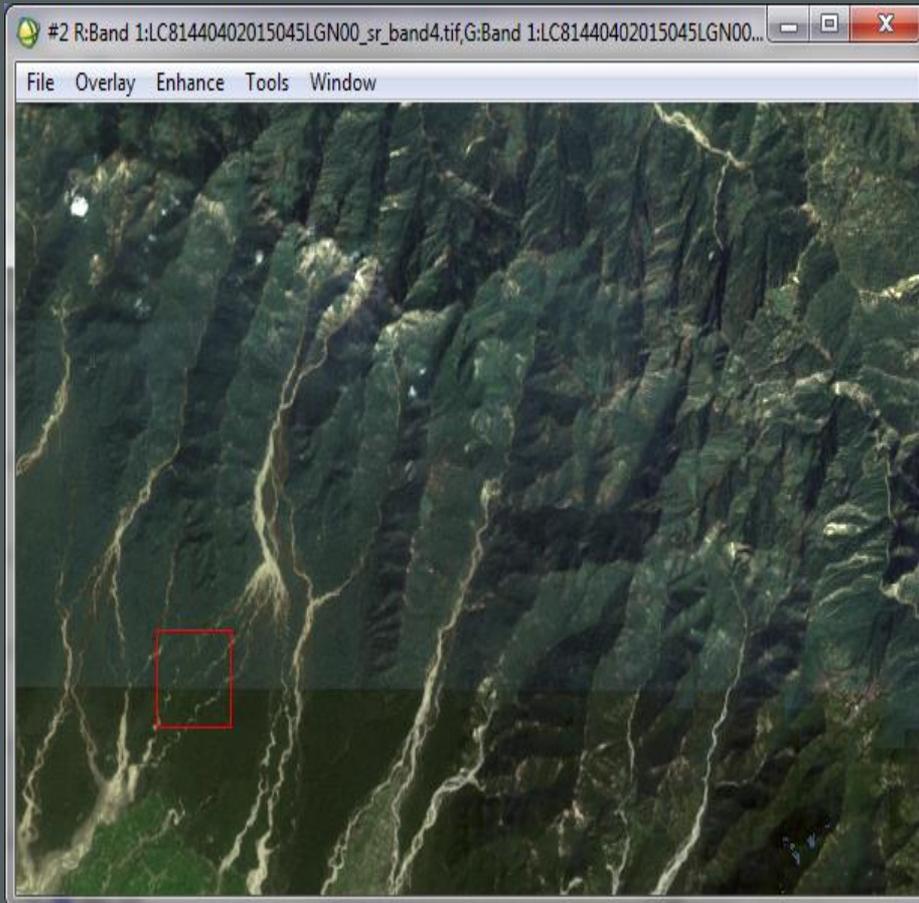
Changes made in LaSRC v3.0 – Released June 23

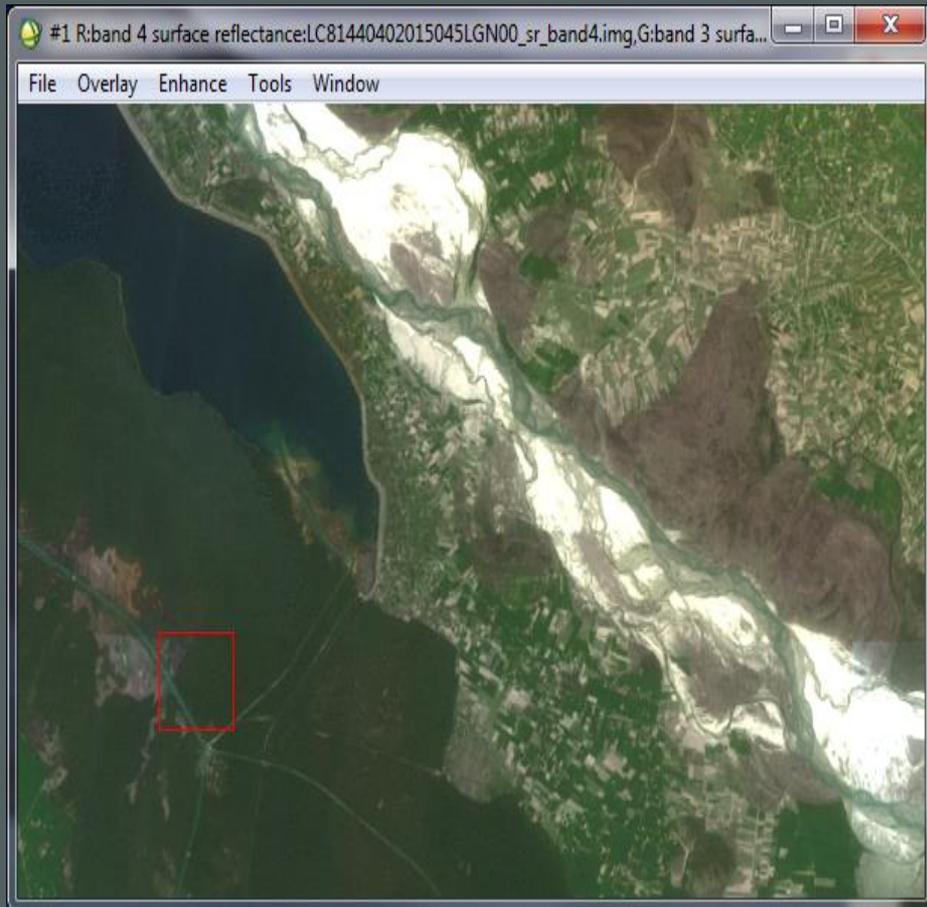
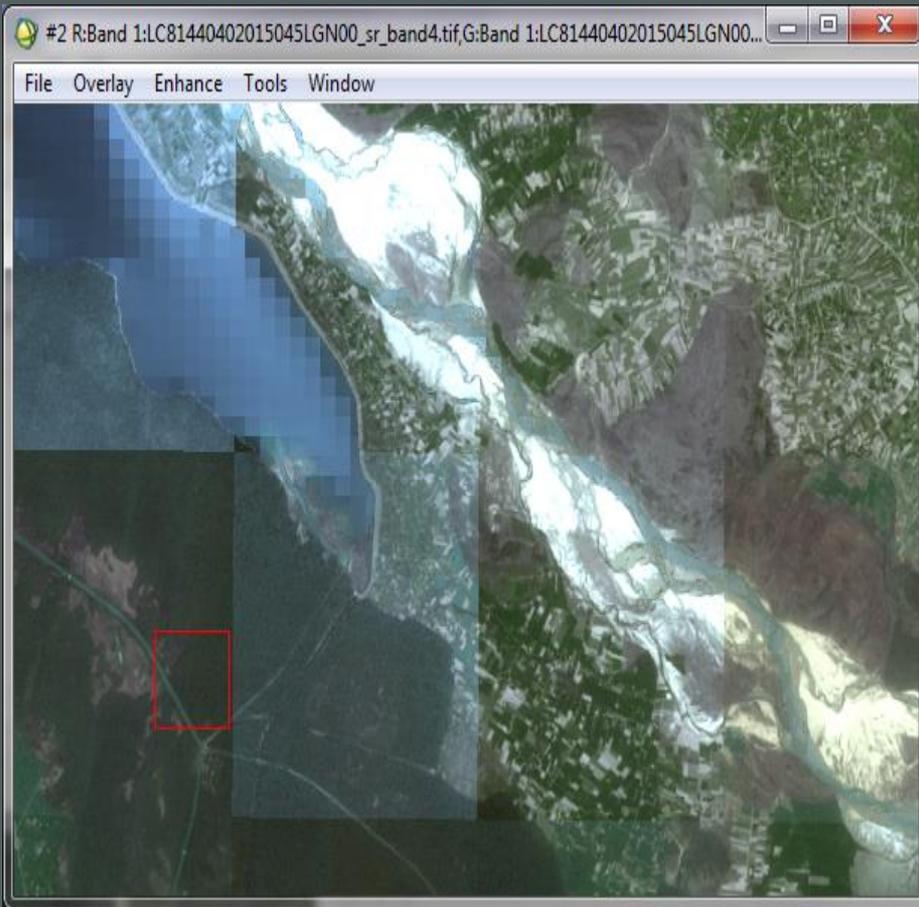
- The ratio of the blue/red bands instead of deep blue/red is used in the aerosol inversion process.
- Aerosol interpolation is performed at the pixel level versus the CMG level, which resolves the blockiness artifacts evident in previous version.
- Aerosols are not retrieved over cirrus, but are over everywhere else including snow and water.
- The aerosol retrievals are tested against NDVI (NDVI $>.5$ is considered snow) and an aerosol inversion residual threshold.
- If a pixel fails these threshold tests, then the aerosol values for these pixels are assigned based on interpolation from the aerosols retrieved for surrounding pixels.
- Interpolation of aerosol values is not performed over clouds, snow, or water.
- Atmospheric correction is not applied to cloud or cirrus pixels.

Comparison of LaSRC v.30 (right) against previous version (left)







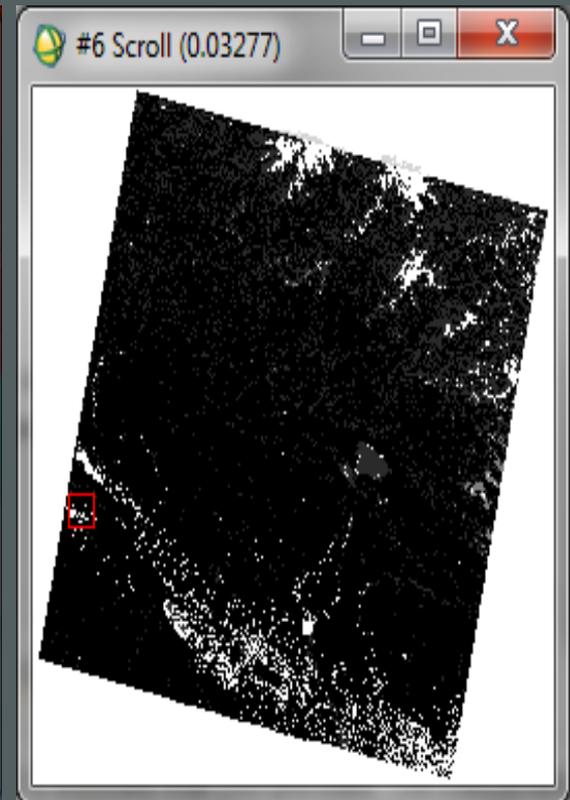


New v3.0 of LaSRC from July

- This version has been implemented in the C code, however has not been released. A few issues have been flagged regarding high aerosol regions being designated as snow.
- Changes include –
 - Using bands 4 and 2 (versus bands 4 and 1) in the aerosol retrievals.
 - Adding a band 4 check (< 1000) to flag for water.
 - Adding a check for snow (band 4 > 1000 and NDVI), and these snow pixels received a different level of correction.
 - Including band 7 in the overall residual calculation for aerosol retrievals.

Snow vs. high aerosols

- The image on the far right is the designation of snow in this scene. The lower portions of the scene do not contain snow, however are flagged as snow. The left image shows the newly corrected product versus the previous product shown in the center image.

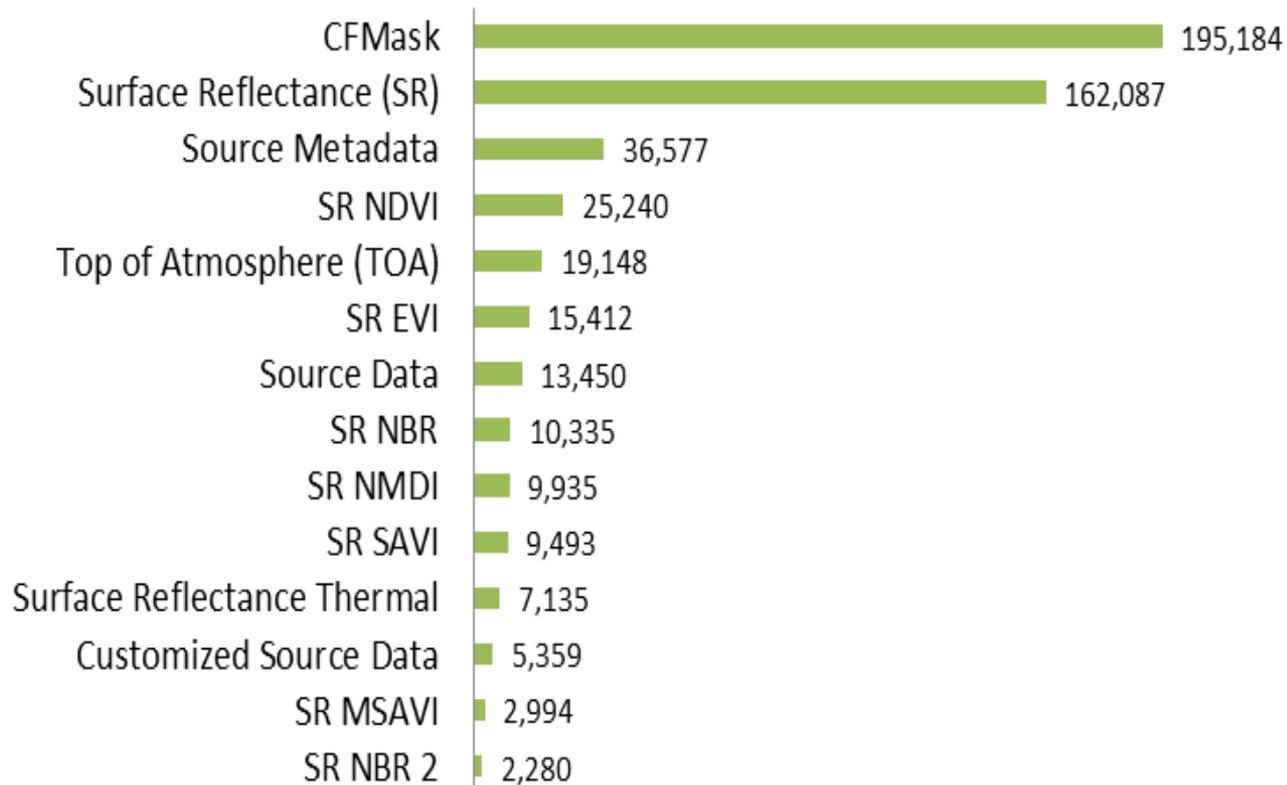


Next Steps

- Continue to review code to further understand the algorithm and source of residual artifacts
- Define an approach for ongoing quality assessment, improvement, and sustainment
- Perform comparative analysis of LEDAPS and LaSRC reflectance retrievals to demonstrate compatibility or document differences and constraints

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