

VIIRS Land C2 Changes

1. Introduction:

The land products are being reprocessed through this reprocessing campaign (Collection 2.0) mainly to address several issues and inconsistencies reported in the C1. The current reprocessing will include improvements to many of the land products, a) code change to address known issues in the operational C1 products, b) make additional new land products not generated in the C1. The C2 reprocessing when completed is expected to provide users with temporally consistent set of land product suite from the full mission period of SNPP and J1, and continue the legacy of MODIS long-term data record.

2. Key C2 specific land product science changes and updates, other than routine bug fixes, are summarized below:

- a. Implementation of the LIB cross-calibration for selected RSB VIS/NIR and SWIR bands to mitigate the bias observed in the TOA reflectance values between SNPP and J1 and to constrain them within 1%, using MODIS Aqua as the reference.
- b. Use these new cross-calibrated (CC) LIB inputs for all downstream L2 products.
- c. Start using the 8-class land-water-mask (LWM) from the V**03 geolocation products, instead of the 5-class LWM from the cloud mask. This will be in line with what has been done for MODIS processing all along.
- d. Cloud Mask
 - Improve cloud mask performance through the use of 1km rolling gridded snow inputs and replacing the 5km static VI with 1km VI files. Also made some algorithm improvements for better delineation of snow/sea-ice over the higher latitudes.
- e. LSR
 - Propagate the LWM from the upstream geolocation and create a new “land_water_mask” layer in the L2 product for possible use by the downstream products. – Use improved version of the algorithm for flagging of aerosol impact, a change implemented in the C61 MODIS reprocessing – Addition of a new secondary daytime flag to be used by the downstream LSR CMG code and for better retrieval of CMG values over all daytime pixels. Also updated some SDS attributes to make them more consistent with other data products.
- f. Snow
 - Reduced snow commission errors in L2 snow, through the use of a new SWI (Snow Water Index) and addition of a new basic QA value to mark pixels that were screened for false snow. – Addition of daily snow CMG product.
- g. Fire

- Bug fixes in the 375m snow algorithm to avoid exceeding array bounds and causing segmentation faults. Some other bug fixes were also made along with this.
- h. LST
- Introduction of the daily, 8-day and monthly LST CMG products. – Switch from using MERRA2 in C1 to GEOS5 inputs in C2 – Retrieve LST over inland water bodies by including pixels designated as inland water bodies.
- i. VI
- Correct QA VIUsefulness bits to ignore BRDF flag. – Use a VI only dedicated LWM developed by SCF.
- j. IST
- Addition of new daily V[N|J][P|1]30P1D/N daily global products.
- k. Sea-Ice
- Addition of new daily V[N|J][P|1]29P1D daily global products.
- l. VNP04ANC
- Change the format of the VNP04ANC products from HDF4 to NetCDF4/HDF5
- m. Black Marble
- Change the data format of nighttime light radiance from integer to float to avoid saturation.
 - Add aurora mask and lunar eclipse flags.
 - Optimize the observation selection criteria.
 - Add lunar-BRDF correction for water.
 - Update the gap-filling process.
 - Update quality flag.
 - Update Suomi-NPP DNB Relative Spectral Response (RSR) with annual RSR.