PGE 128: MODIS Terra/Aqua Polarization Correction

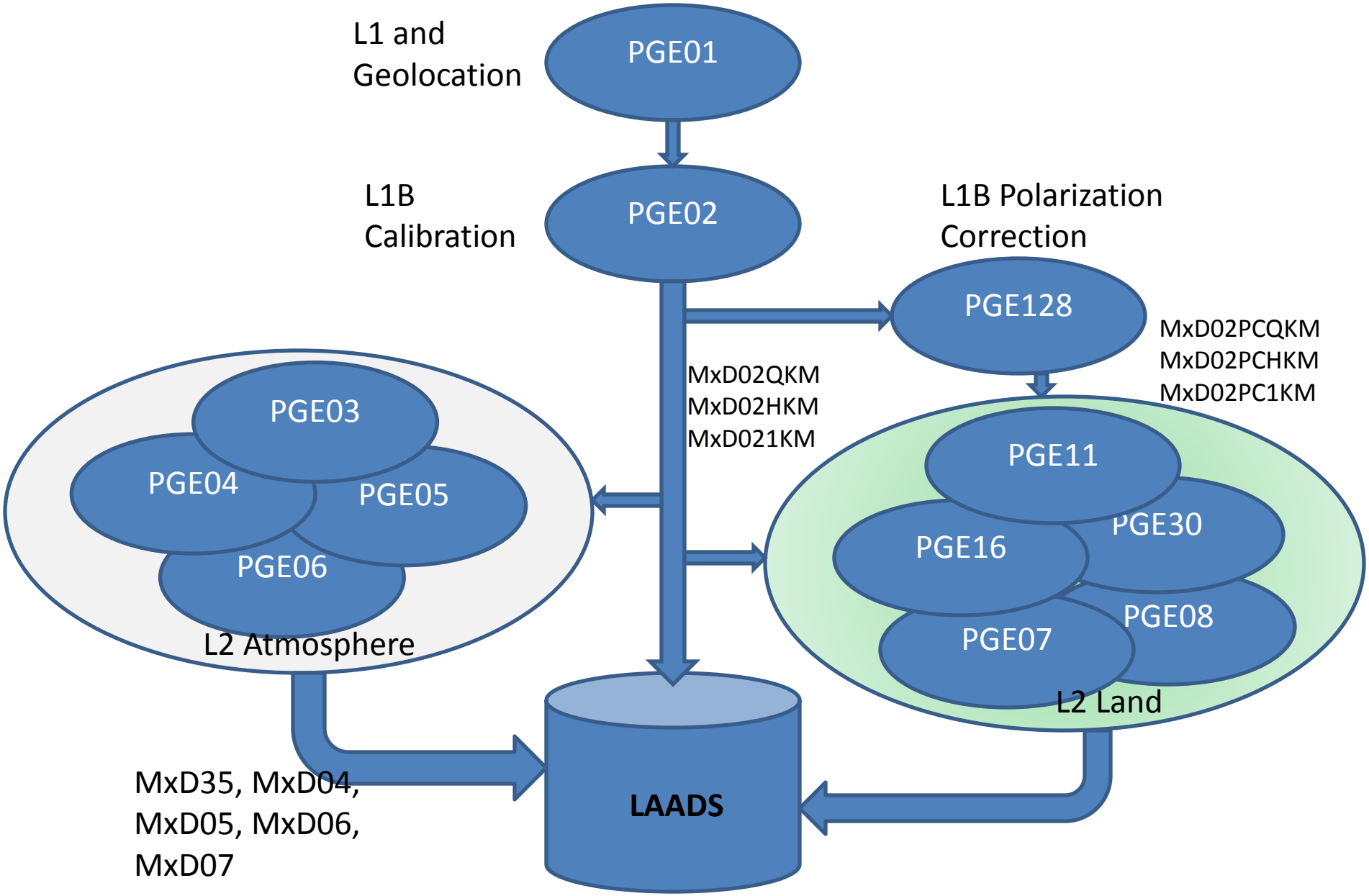
C6 Aqua LUT Version 6.1.33.3

LDOPE

MCST Meeting: 06/29/2016

Aqua C6 LUT Version 6.1.33.3

MODAPS: C6 Processing



Operational Process for Polarization Correction (PGE128)

- LDOPE restructured and ported the correction algorithm developed and delivered by **A. Lyapustin et. al** as a stand alone process for operational processing at MODAPS – so it can be run like any other operational L1B, Land and Atmosphere PGE.
  - Correction performed over bands 1-4, 8, 9 and 10
  - Correction coefficients are functions of time, band, detector, and mirror side
  - Polarization parameters (Q and U) are read from two look-up tables, and then interpolated according to surface pressure/surface height
  - Correction is performed pixel-by-pixel on L1B data
  - Correction performed at 1km resolution (MOD021KM)
- LDOPE updated the code to apply the same correction approach to 250m and 500m resolution - identify the 250m and 500m resolution pixels corresponding to the 1km pixel.
- Process reads in the native L1B granules MOD02QKM, MOD02HKM, and MOD021KM and output polarization corrected L1B granules MOD02PCQKM, MOD02PCHKM and MOD02PC1KM.
- Bands with no correction applied are copied to output file.
- The PC L1B has identical file spec and metadata as the native L1B granules for seamless use by the downstream L2 process.
- Land C6 processing uses PC L1B, atmosphere processing uses original L1B,
- PC L1B is not archived or distributed

Operational Process for Polarization Correction (PGE128)

- Aqua
  - Polarization correction using pre-launch coefficients
  - Detrending for bands 1-4, 8, 9, and 10
- Terra
  - Polarization correction for bands 3, 8, 9, and 10.
    - For bands 8, 9 and 10 coefficients available for period 2000065 - 2013321.
    - For band 3 coefficients available for days 2003193 - 2013321.
    - For days outside of this period use the coefficients from nearest data day for which coefficients are available.
  - Detrending for bands 1-4, 8, 9, and 10
  - Gain adjustments to bands 1, 2 and 4.

New Aqua C6 LUT Version 6.1.33.3

- Science Test1 (Alexei L. and Y. Wang):
  - Generate granules covering the four desert sites for the 12-year mission period.
  - Result: There is almost no trend in the 12-year time series for examined bands (Red, NIR, Blue, Green and deep blue).
- Science Test2 (Eric Vermote):
  - Generate surface reflectance CMG for year 2015 using the L1B from the new LUT
  - Result: The new LUT seems to mitigate the long term drift. Terra L1B seems to drift from 2014 onwards.

Forward

- Promote the Aqua C6 LUT into operation
  - Remove the detrending for Aqua in PG128
  - Starting data day?
  - Will there be an observable difference in the long term trending from this change
- Terra
  - Test the new LUT
  - Plan for reprocessing ?
  - Should there be change to the polarization correction process (coefficients or gain change) until we are ready for the new LUT?