Introduction

- EPIC onboard the DISCOVR satellite at L1A lacks onboard calibration.
- Other platforms radiometrically calibrated exist but need to maintain stability.
- EPIC's constant view of the Earth provides unique opportunity for inter-calibration of EPIC channels using well-calibrated instruments on low Earth orbit (LEO) satellites.
- EPIC calibration is performed by ray-matching with MODIS or Aqua MODIS or VIIRS on NPP-Suomi.
- EPIC bands 1-4 are in the ultraviolet wavelengths and have no MODIS/VIIRS channel counterparts, and therefore are not considered here.

Data

- EPIC L1B, bands 5-10
  - Version 01 is used for most of this study.
  - Version 01 is briefly used for navigation analysis.
- Aqua-MODIS Collection 6 L1B.
- NPP-VIIRS Land PEATE L1B version 001.
- EPIC L1B, bands 5-10 considered here.

Version 01 to 02: Navigation Improvement

- Total EPIC image shifts from navigation correction for E7/B1 matching up through June 2016, using EPIC version 01 (V01) and version 02 (V02).
- Image shift analysis indicates that navigation could still be improved, although in V02 it does appear more consistent than in V01.
- The most common shift seems to be in 1 East and 1 North, with -VE=+VE also in high frequency.
- All other channel channel pairings show similar shift frequency.
- Shifts using both MODIS and VIIRS show similar results.

Spectral Band Adjustment Factor (SBAF)

- Spectral band differences must be taken into account when inter-calibrating EPIC with MODIS/VIIRS bands.
- Use SBAF to try to hyper-spectral features covered with spectral response functions provide radiance pairs and apply a 2º order fit to estimate the SBAF over the all-sky ocean domain.
- The 2º order fit allows the SBAF to be a function of sky-view direction, although radiance will differ from bright radiances.

Comparison of ATO and DCC Ray-matched Calibration

- EPIC Version 02 shows navigation improvement over version 01, but still could be further improved.
- EPIC Version 02 shows navigation improvement over version 01, but still could be further improved.

Conclusions

- EPIC Version 02 shows navigation improvement over version 01, but still could be further improved.
- EPIC Version 02 shows navigation improvement over version 01, but still could be further improved.

References