Introduction

SNPP was launched on Oct. 28th, 2011, Visible Infrared Imaging Radiometer Suite (VIIRS) is one of the five onboard instruments

VIIRS DNB and M bands characteristics (Table 1)

DNB and M bands RSRs (Figure 1)

Calibration reference sites

Libya 4 and Dome C sites (Figure 2)

Table 1. List of characteristics of VIIRS DNB and M bands within DNB wavelength range.

<table>
<thead>
<tr>
<th>Band</th>
<th>Wavelength (nm)</th>
<th>Solar Angles</th>
<th>Solar Irradiance (W/m²)</th>
<th>LUTs</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4</td>
<td>540</td>
<td>0.11</td>
<td>0.50</td>
<td>SDR</td>
</tr>
<tr>
<td>M5</td>
<td>560</td>
<td>0.14</td>
<td>0.03</td>
<td>SDR</td>
</tr>
<tr>
<td>M6</td>
<td>570</td>
<td>0.12</td>
<td>0.05</td>
<td>SDR</td>
</tr>
<tr>
<td>M7</td>
<td>580</td>
<td>0.10</td>
<td>0.06</td>
<td>SDR</td>
</tr>
</tbody>
</table>

Results

Libya 4 integrated DNB radiance calculation

R_{DNB} = \frac{H_{DNB} - H_{DNB, SDR}}{H_{DNB, SDR}}

Figure 6. Libya 4 DNB Land PEATE and SCIAMACHY comparison.

Data

Solar irradiance LUT and the modulated RSR LUTs

SCIAMACHY spectral data

The DNB and M bands SDR products:

Interface Data Processing Segment (IDPS)

NASA Land Product Evaluation and Algorithm Testing Element (PEATE)

Nadir overpass, cloud free, 32x32 pixel standard deviation of radiance < 0.0001

32x32 pixels mean radiance and reflectance for DNB; same geolocation pixels for M bands

Methodology

Libya 4 DNB radiance and reflectance calculation

R_{DNB} = \frac{H_{DNB} - H_{DNB, SDR}}{H_{DNB, SDR}}

Figure 4. Normalized Libya 4 and Dome C SCIAMACHY spectra of Libya 4 and Dome C.

Conclusions

DNB modulated RSR introduced about 3.8% increase at band dependent solar irradiance, M4-M7 bands have 0.1% or less increase.

After excluding data before 2013 April, IDPS to Land PEATE data ratio in both radiance and reflectance are consistent (Libya ≤ 0.6%, Dome C ≤ 2.0%). The difference in early data collection period are caused by the inconsistent calibration LUTs.

At Libya 4 site, the TOA reflectance from SCIAMACHY indicates 1.2% decrease and the Land PEATE data has 1.3% decrease. The significant RSR changes cause reflectance changes even though the ground target is same.

The difference of Land PEATE integrated M bands radiance to DNB radiance trends are small (Libya 4 ≤ 2%, Dome C ≤ 4%). This demonstrate the consistent quality of DNB and M band calibration.

We suggest using the IDPS DNB data after 2013 April 5th for long term change detection which contain better quality LUTs. The Land PEATE DNB, M4,M5,M7 data have stable radiometric calibration in operation period.

Acknowledgment

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