Processing Sentinel-2 data with ATCOR

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Background

- ATCOR (3) is a widely used atmospheric correction tool which can process data of many optical satellite sensors, for instance Landsat, Sentinel-2, SPOT and RapidEye.
- Atmospheric correction includes correction of molecular absorption, molecular scattering and aerosol effects. Largest uncertainties are caused by spatial and temporal variability of aerosols.
- Application of atmospheric correction algorithms requires knowledge about the uncertainty of the correction process. Validation of aerosol optical thickness and water vapor column are important for atmospheric correction.
- Sentinel-2 is a polar orbiting satellite constellation of two units carrying each one an optical imaging sensor called MSI (Multi-Spectral Instrument). Sentinel-2A was launched on June 23, 2015.

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Figure 1: ATCOR outputs, 20 m spatial resolution, Test site Belsk (Poland); August 07, 2015

Figure 2: ATCOR outputs, 10 m spatial resolution, Test site Belsk (Poland); August 07, 2015

Processing results and Conclusions

Table 1: AOT(550 nm) validation results for Landsat and RapidEye satellites (4):

<table>
<thead>
<tr>
<th>Satellite</th>
<th>Accuracy [%]</th>
<th>Max. dif.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landsat</td>
<td>0.038 ± 0.024</td>
<td>14.09</td>
</tr>
<tr>
<td>5 TM</td>
<td>0.050 ± 0.006</td>
<td>2.05</td>
</tr>
<tr>
<td>7 ETM</td>
<td>0.046 ± 0.034</td>
<td>5.09</td>
</tr>
<tr>
<td>8 OLI</td>
<td>0.030 ± 0.016</td>
<td>7.05</td>
</tr>
<tr>
<td>RapidEye</td>
<td>0.038 ± 0.016</td>
<td>17.07</td>
</tr>
<tr>
<td>all together</td>
<td>0.038 ± 0.019</td>
<td>31.09</td>
</tr>
</tbody>
</table>

- About 1/3 of the samples perform with the AOT uncertainty better than 0.02 and about 2/3 perform with AOT uncertainty better than 0.05.

Figure 3: Test site Belsk (Poland); August 07, 2015

Figure 4: Test site Alta Floresta (Brazil); February 22, 2016

Acknowledgement:
- We thank the PIs and their staff for establishing and maintaining the AERONET sites used in this investigation.

References: