HelioClim-4, or how to build a successful and sustainable business service based on CAMS radiation service
Claire Thomas, Lucien Wald, Etienne Wey, Laurent Saboret, Philippe Blanc

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HelioClim-4, a successful and sustainable business service based on CAMS radiation service

**Evaluation of the performance**

*HelioClim-4 (HC4) = CAMS radiation service enhanced with several value-added post-processing layers*

- CAMS radiation components are horizon free data (gray + yellow values).
- HC4 proposes an option to take into account (yellow values + a fraction of gray values) the shadowing effect due to the far horizon computed from SRTM data on every plane orientation
- CAMS radiation service: all components on horizontal plane + Direct Normal Irradiation.
- HC4: all the irradiation components in all plane orientations: fox tilted, 2D Sun tracking, 1D Sun tracking (North-South or East-West axis), tilt or azimuth tracking
- Two models tested to compute fix-tilted components:
  - **CASE 1**: Exploit all CAMS radiation components (GHI and BHI)
  - **CASE 2**: Exploit only GHI, and use an empirical model (Ruiz-Arias et al.) to compute BHI prior transfer on the tilted plane

<table>
<thead>
<tr>
<th>Group</th>
<th>Hourly GHI values</th>
<th>Hourly GTI values</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Perspectives**

- Reliable precursor of service
- Further development: e.g. modulate HC4 value with the height of the selected point inside a Meteosat pixel

**Conclusions**

- HC4 is fairly close to HC3v5 in most cases
- HC4 Case 1 returns better results than Case 2: the use of an empirical algorithm should be avoided
- Improvement when horizon is taken into account

**Statistical results**

<table>
<thead>
<tr>
<th>Group</th>
<th>Bias (%)</th>
<th>STD (%)</th>
<th>RMSE (%)</th>
<th>CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>8%</td>
<td>25%</td>
<td>26%</td>
<td>0.965</td>
</tr>
<tr>
<td>B</td>
<td>9%</td>
<td>28%</td>
<td>29%</td>
<td>0.976</td>
</tr>
<tr>
<td>C</td>
<td>6%</td>
<td>28%</td>
<td>29%</td>
<td>0.976</td>
</tr>
<tr>
<td>D</td>
<td>7%</td>
<td>24%</td>
<td>24%</td>
<td>0.953</td>
</tr>
</tbody>
</table>

**Horizon**

- 18 stations (hourly data) => 4 groups (A, B, C, D):
  - 17 non-shadowed pyranometers (pyr.) measuring Global Tilted Irradiation (GTI) 25° South => evaluate the performance of fix-tilted data in HC4
  - 1 pyr. measuring GHI with a discriminant horizon => horizon

**Cases tested**

- **CASE 1**: Exploit all CAMS radiation components (GHI and BHI)
- **CASE 2**: Exploit only GHI, and use an empirical model (Ruiz-Arias et al.) to compute BHI prior transfer on the tilted plane

**Users**

HelioClim-3 version 5 (HC3v5) Outperforms all previous versions

More than 60 annual subscriptions (for pay)

More than 1400 requests per week in 2017

**Contact**

support-sales@soda-is.com

**Authors - speaker**

Claire THOMAS
TRANSVALOR
Lucien WALD
MINES ParisTech
Etienne WEY
TRANSVALOR
Laurent SABORET
TRANSVALOR
Philippe BLANC
MINES ParisTech