S5P-TROPOMI Methane

Jochen Landgraf, Tobias Borsdorff, Alba Lorente, Andreas Schneider, Otto Hasekamp
The Tropomi SWIR spectral band

Quality requirement for operational data product:

<table>
<thead>
<tr>
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<th>Precision [%]</th>
<th>Accuracy [%]</th>
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</thead>
<tbody>
<tr>
<td>CO</td>
<td>10 %</td>
<td>15 %</td>
</tr>
<tr>
<td>CH₄</td>
<td>1 %</td>
<td>1 % (bias)</td>
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</tbody>
</table>

![Graph showing transmission of CO, H₂O, and CH₄ over wavelength range from 2320 to 2380 nm.](image)
S5P - Suomi NPP loose formation

- Time difference within $\leq 5$ min
- VIIRS data are used as cloud filter, TROPOMI requires ‘confidently clear-sky’ observations.
The methane product

Time range: 06.2018 - 01.2019, 0.5° x 0.5° grid

Data release march 2019

XCH₄ [ppb]

1650 1700 1750 1800 1850 1900 1950

CEOS 2019 Tokyo
The methane product

Data release march 2019

CH4 mixing ratio [ppb]


GOSAT
S5-P TROPOMI
Validation with TCCON

Mean bias:
1.4 ppb (0.07 %)
Station-to-station bias
6.2 ppb (0.34 %)
Mean std. dev.
12.9 ppb (0.7 %)

CH4 product well within the S5P requirement.
Wetland emissions seen by TROPOMI

Time range: 06.2018 - 01.2019, 0.5° x 0.5° grid

SRON
CEOS 2019 Tokyo
Wetland emission seen by TROPOMI

CEOS 2019 Tokyo
Methane from Oil and Gas Production

De Gouw et al, 2019, submitted
CEOS 2019 Tokyo
Methane from Oil and Gas Production

Uintah Basin in Utah

December 2018 - March 2019

de Gouw et al., 2019, submitted

CEOS 2019 Tokyo
Methane from Oil and Gas Production
Methane from Oil and Gas Production

\[ X_{\text{CH}_4} = \frac{\text{CH}_4 \text{ column}}{\text{dry air column}} \]

de Gouw et al., 2019, submitted

SRON

CEOS 2019 Tokyo

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Conclusions

• The S5P methane product fulfils all mission requirement.
• Many new types of applications are possible due to the spatial and temporal coverage in combination with the high spatial resolution of TROPOMI.