

TROPOMI on Sentinel5-precursor : a new European satellite instrument for atmospheric research - some highlights focusing on CO and CH₄

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Vrije Universiteit Amsterdam, NL

EDF Environmental Defense Fund, USA

TNO, NL

Thanks to the entire TROPOMI team

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Space
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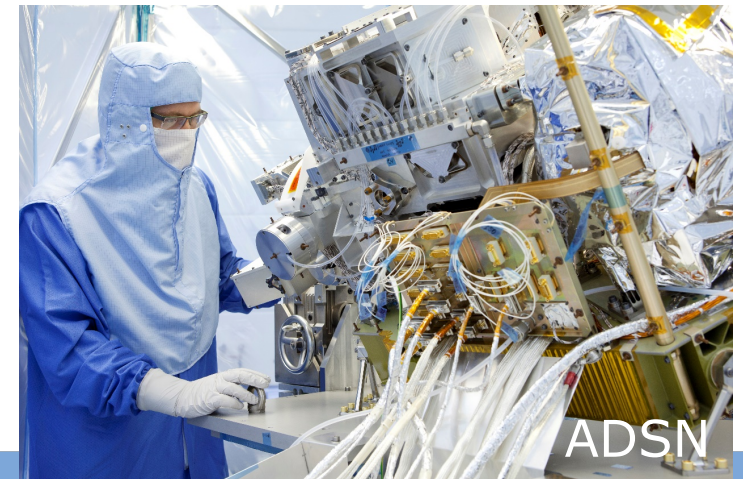


Nether

Research (NWO)

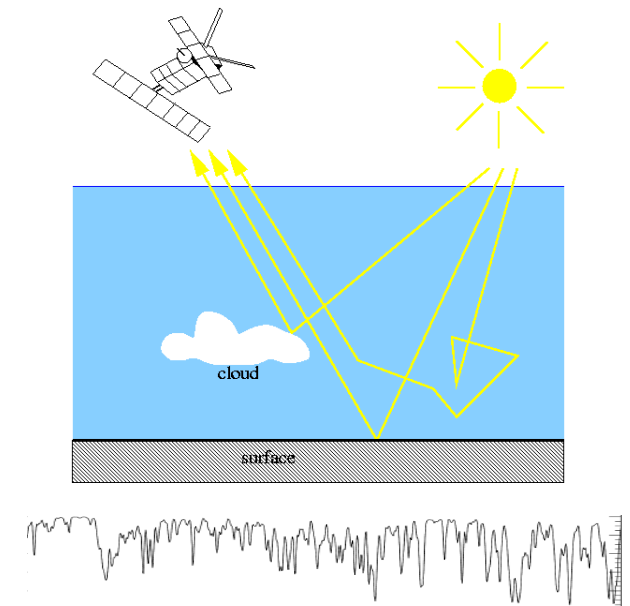
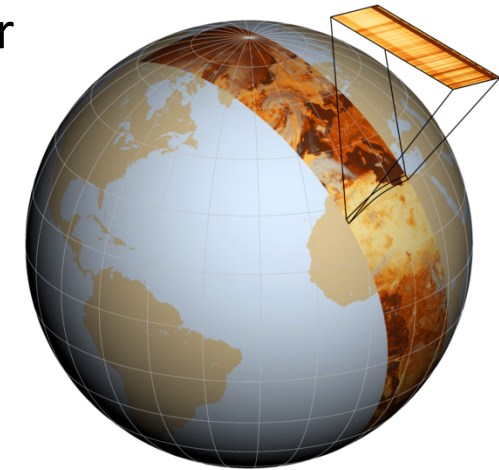
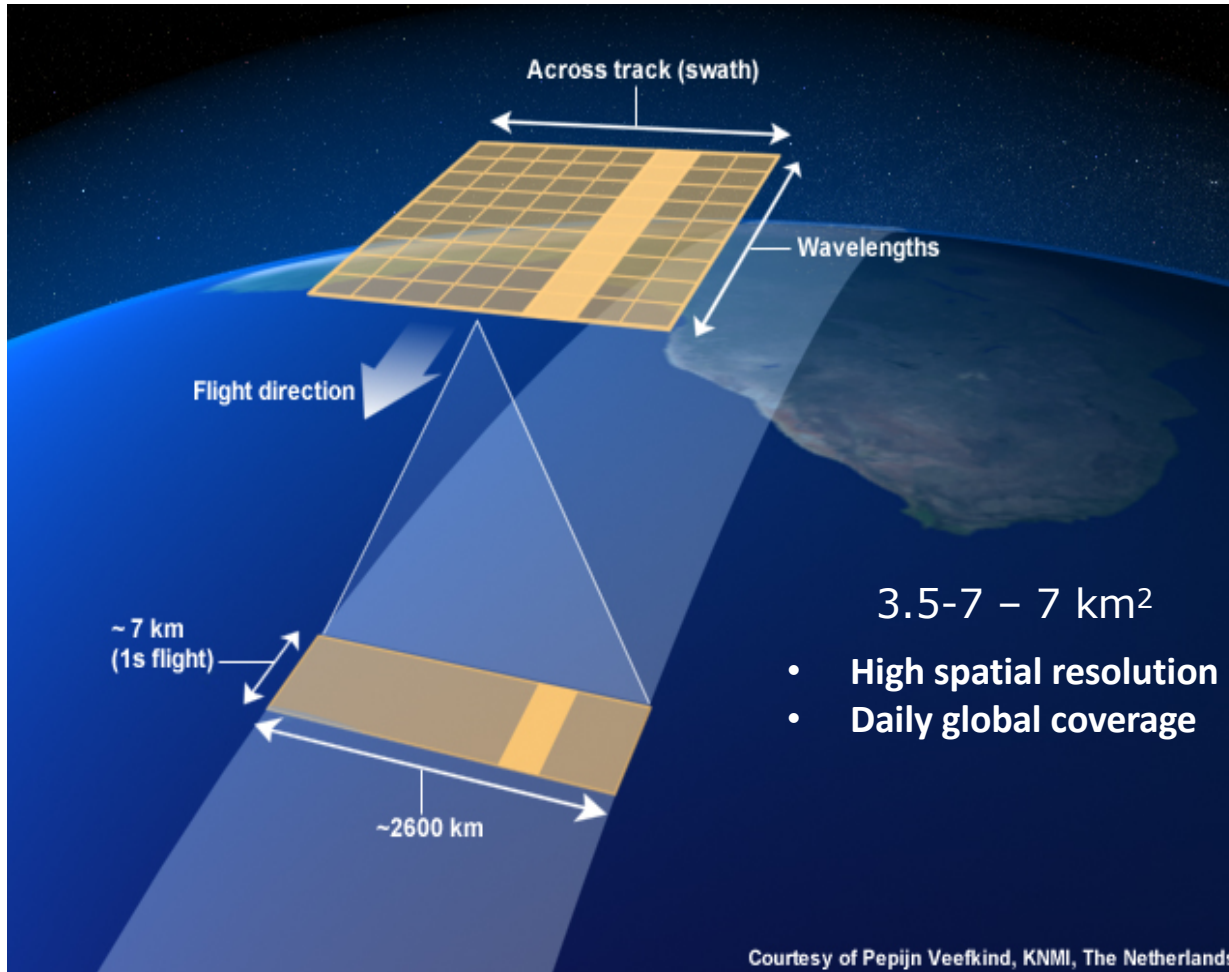
TROPOMI

- TROPOMI is single instrument on Sentinel-5 precursor and developed by the **Netherlands** and ESA, launched Oct 2017
- Part of the EU Copernicus programme and the 1st atmospheric Sentinel mission, data is freely available
- Measures many species : O₃, NO₂, SO₂, formaldehyde, CO, Methane, ... (total columns)
- Applications Air Quality, Emission monitoring, Climate data records, UV-index, volcanic ash detection aviation safety, ..
- Pushbroom UV-VIS-NIR-SWIR spectrometer swath 2600 km, individual obs. 3.5-7x7 km²
- More info : tropomi.eu

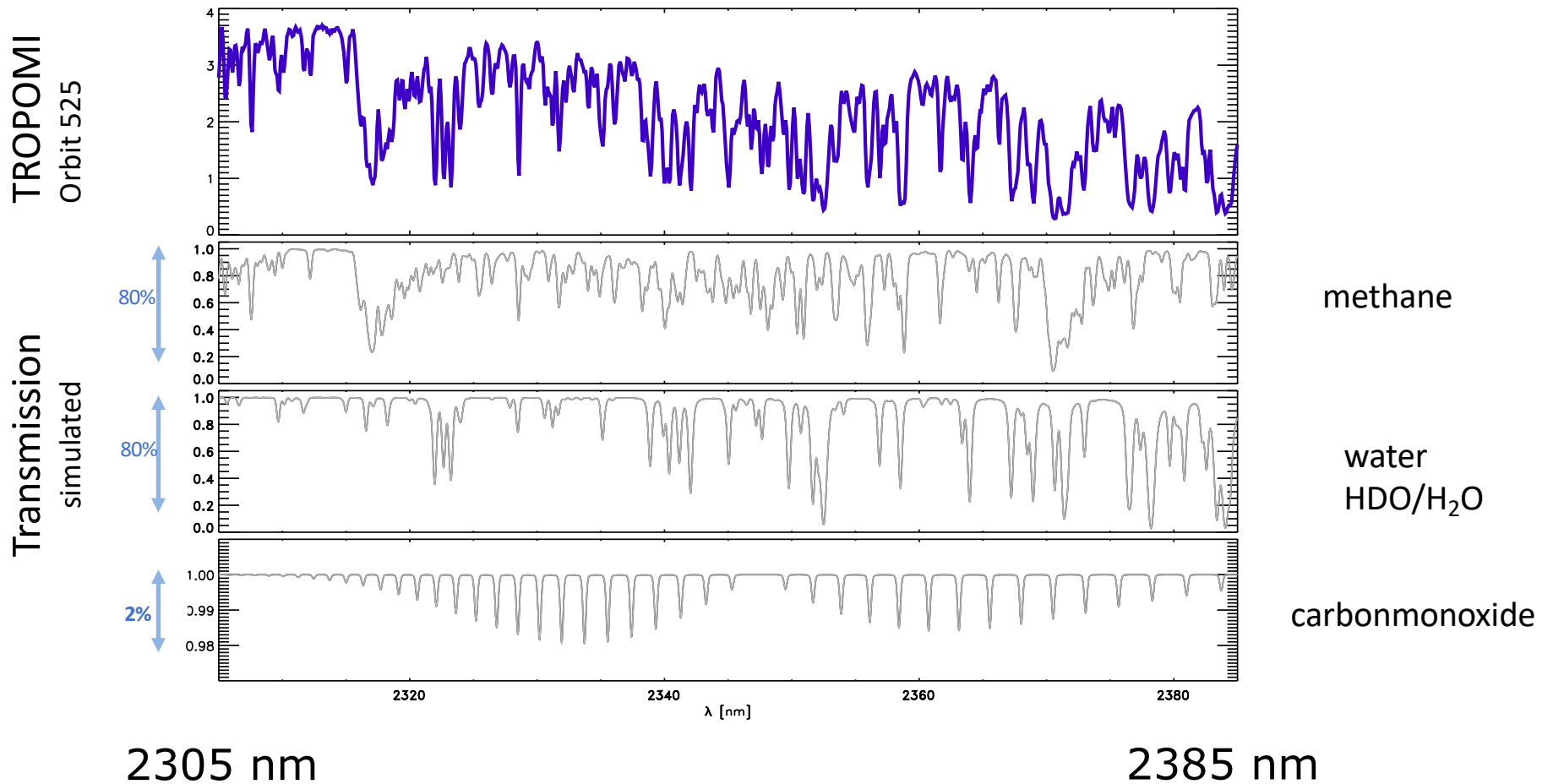


TROPOMI observations

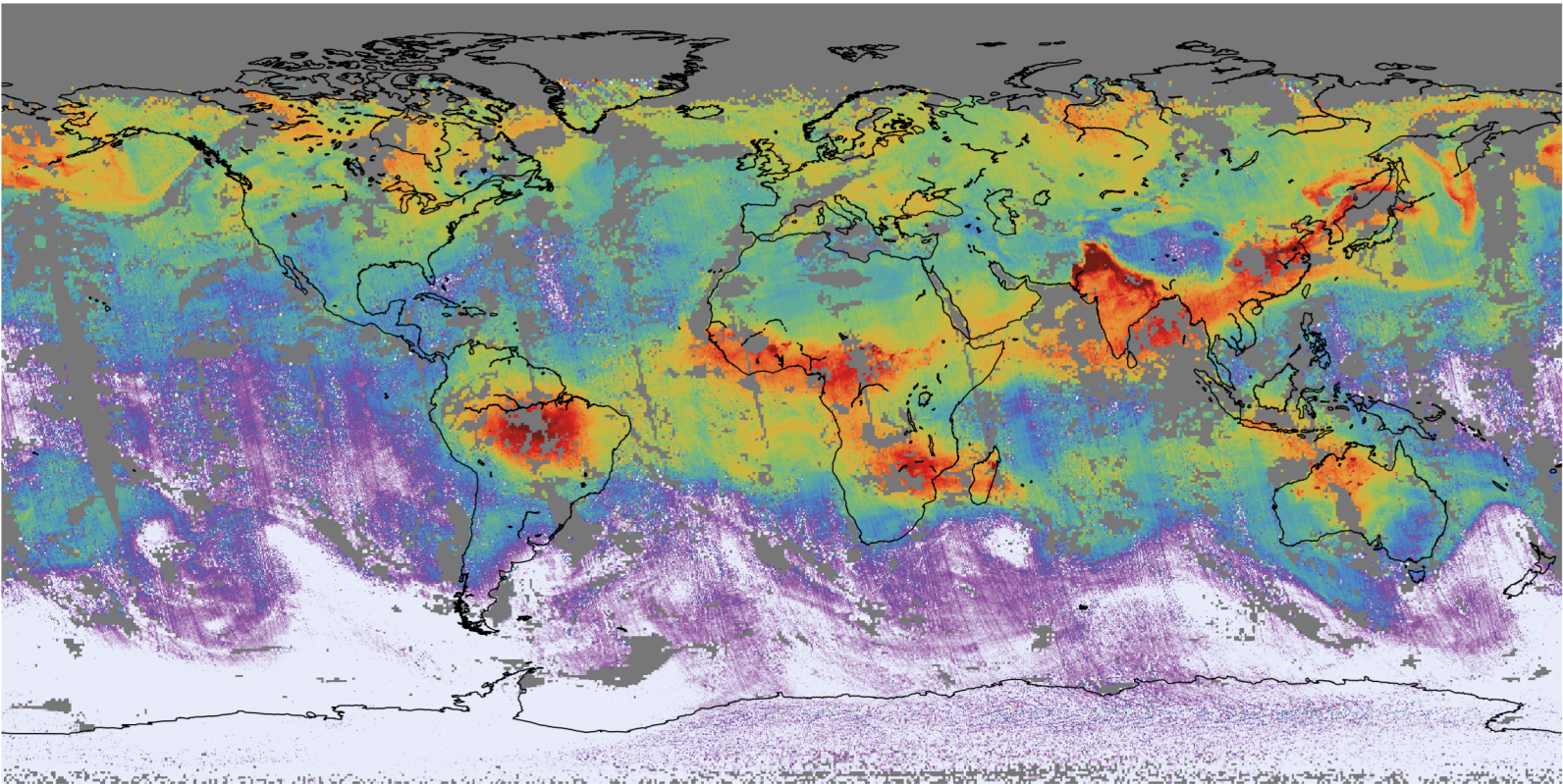
TROPOMI measurement principle : push-broom spectrometer



SWIR spectrum



Carbonmonoxide



one (1) day of measurements (10 nov)

CO [ppb]

Borsdorff, Landgraf et al, 2018



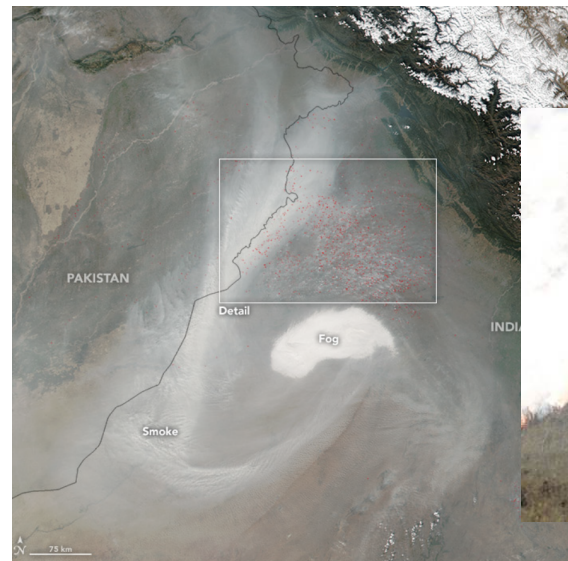
Delhi's Government Declares A Public Health Emergency As Air Pollution Chokes The City

Forbes



Je ziet door de smog geen hand voor ogen op Rajpath Avenue New Delhi.

© EPA

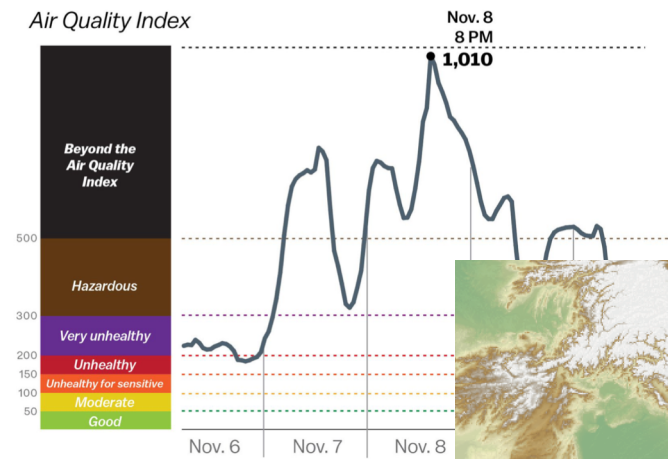


TROPOMI

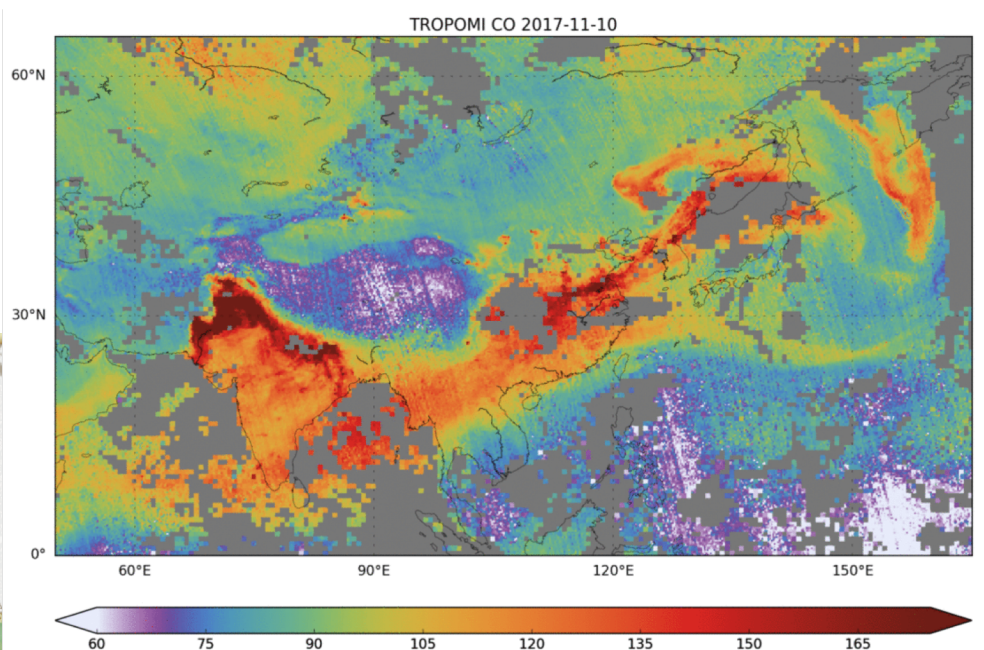
TROPOMI CO 2017-11-10

When Delhi became the most polluted city on Earth

Air Quality Index



Source: US State Department



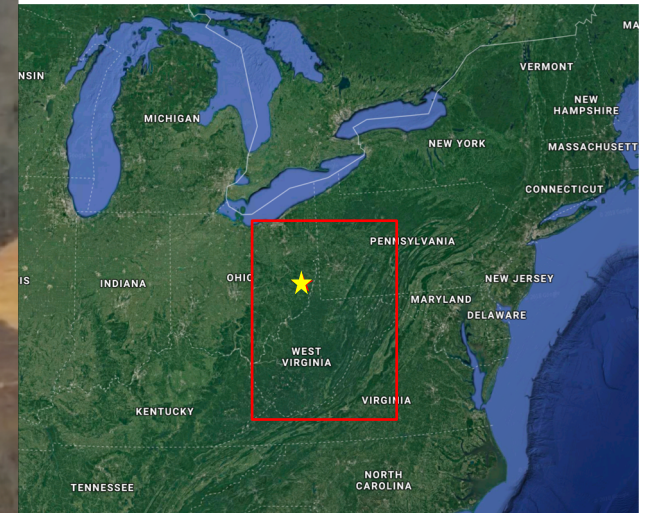
*Borsdorff, Landgraf et al., 2018
Dekker et al., 2019*

Gas Leaks from Space (GALES) - METHANE CH_4

- A large part of the total anthropogenic CH_4 emissions originate from localized point sources.
- Fixing a few leakages can lead to a substantial reduction in CH_4 emissions: Fat-tail distribution of point CH_4 sources (super emitters)
- Can be quick way to achieve short term climate change mitigation targets.



Accidental leakage detection by TROPOMI : the Ohio blow-out case



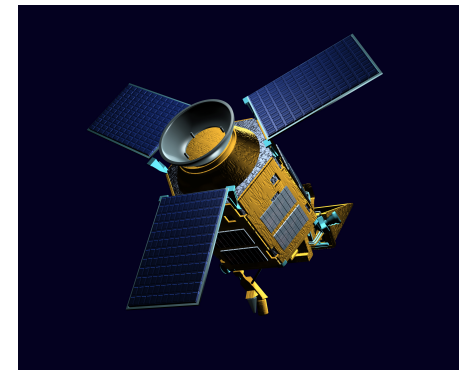
Feb-March 2018 (~3 weeks)

Installation of new well pad, newly drilled well exploded

Company reported to EPA : ~ 80 ton gas hr⁻¹

Summary

- TROPOMI is performing very well.
Data freely available : **s5phub.Copernicus.eu**
no need to register
- TROPOMI measurements the ONLY CH₄ meas. related to the Ohio blow out event
- Many more accidental emissions likely to go 'unnoticed' or unreported
→ how much accidental CH₄ emissions missing from national reports ?
- Observations from space will help address this
- Looking forward to many more TROPOMI data users (in Asia) !
Feel free to contact us : i.aben@sron.nl



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User Committee GALES : ADSN, Shell, TNO, EDF*

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This presentation contains (modified) Copernicus Sentinel data (processed by SRON)

