VOCs & NH_3 in urban environments

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Summary

- Overview of RI-URBANS-WP1-task 1.1 & D1.1
- Some preliminary results – VOC
- Some preliminary results – NH_3
- Perspectives

WP1 - T1.1 : Data survey and compilation of non-regulated pollutants

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- **List of the most relevant of observable parameters** including time resolution and spatial coverage

⇨ ***Among the targeted variables (in-situ measurements): VOC species, and NH_3***

- **List of corresponding measurement requirements (instrumental and operational conditions) according** to existing guidelines and protocols when available (CEN, ACTRIS…)
- **Inventory of existing long-term datasets (including metadata) on urban measurement sites in Europe** with indication of their belonging to AQNMs and/or RIs

  Detailed with Time length and completeness of the dataset / Instrument-types / Measurement protocols / QA &QC / Level of quality, Accessibility of the data

- **The data will be gathered (D.1.1) and made accessible for the source apportionment (T1.2)**
- **Contribution to a Pan-European overview papers (D1.2.)**

WP1 - T1.1 : Overview of D1.1: contribution to VOC & NH_3 parts

Deliverable D1 (D1.1)

Guidelines, datasets of non-regulated pollutants incl. metadata, methods.

RI-URBANS

Research Infrastructures Services Reinforcing Air Quality Monitoring Capacities in European Urban & Industrial AreaS (GA n. 101036245)

By

CSIC, IMT, PSI, NILU & UHEL

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WP1 Deliverable D1 (D1.1)

WP1 - T1.1 : Data survey and compilation of non-regulated pollutants

Overview of VOCs database

21 European sites of different typology: urban (16 sites) and 5 sites of other typology (traffic, industrial, suburban...)

Measurements: online GC-FID, Passive sampling, PTRMS
Time resolution: hourly, 24 h 1 day out of 2
Age of the datasets: from few years to 20 years
Temporal coverage: >75%
% of outliers: < 0.5%

Guidelines:

- ACTRIS guidelines
- CEN WG12: 5 norms related to benzene measurements
- CEN WG13 on-going work: development of 6 norms for VOC and formaldehyde

WP1 - T1.1 : Data survey and compilation of non-regulated pollutants

Overview of NH_3 database

6 European sites of different typology: urban, suburban and traffic

Measurements: mainly passive sampling

Guidelines:

-CEN WG 11: N 17346:2020 «Ambient air - Standard method for the determination of the concentration of ammonia using diffusive samplers». This norm specifies a method for the sampling and analysis of NH_3 in ambient air using diffusive sampling.
-France: LCSQA guideline
-German norm: VDI 3869-4, Measurement of ammonia in ambient air – Sampling with diffusive samplers – Photometric or ion chromatographic analysis

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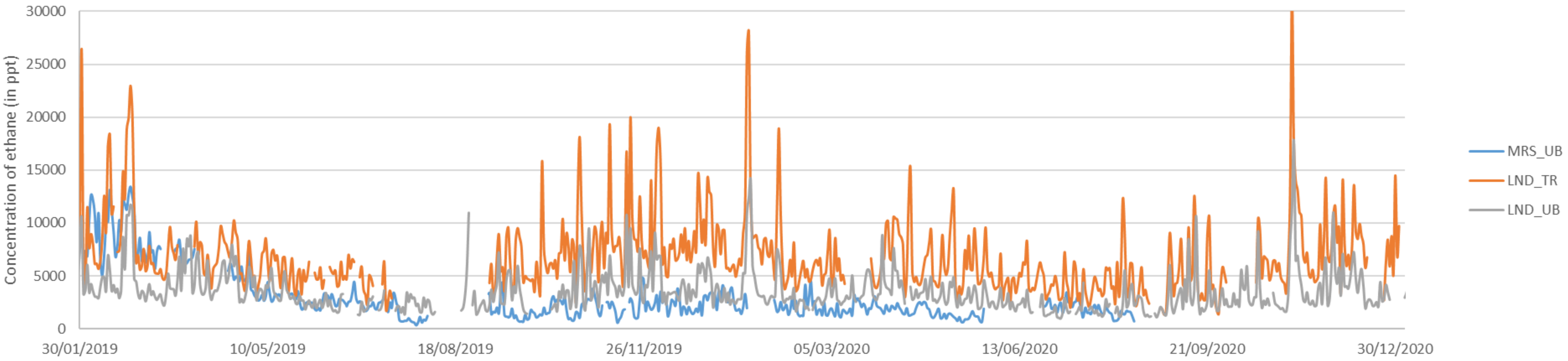
WP1 - T1.1 : some preliminary results – VOC – ethane

Concentration of ethane between 2019 and 2020 in :

- Marseille – Longchamp, France = urban background (MRS_UB)
- London – Marylebone road, UK = urban traffic (LND_TR)
- London – Eltham, UK = urban background (LND_UB)



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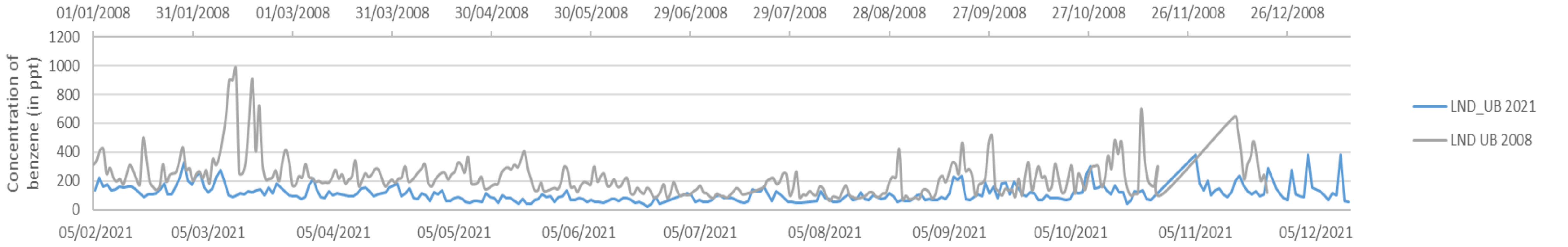
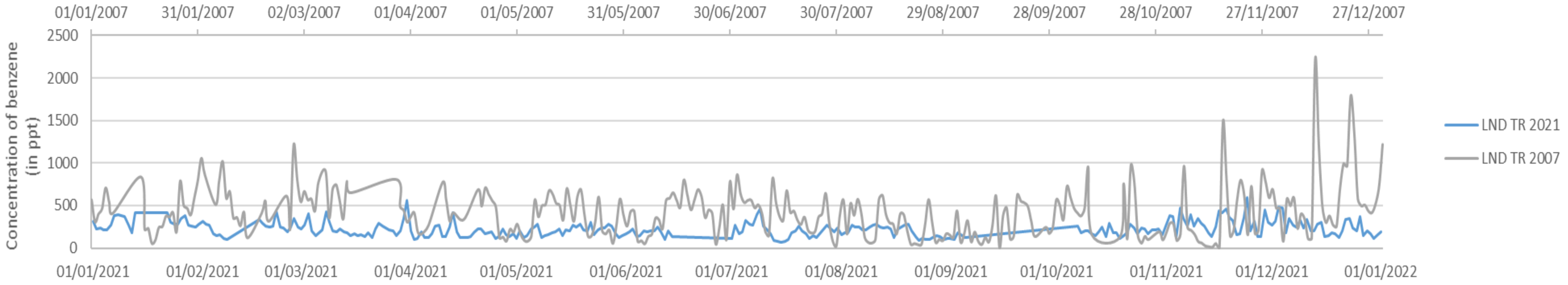
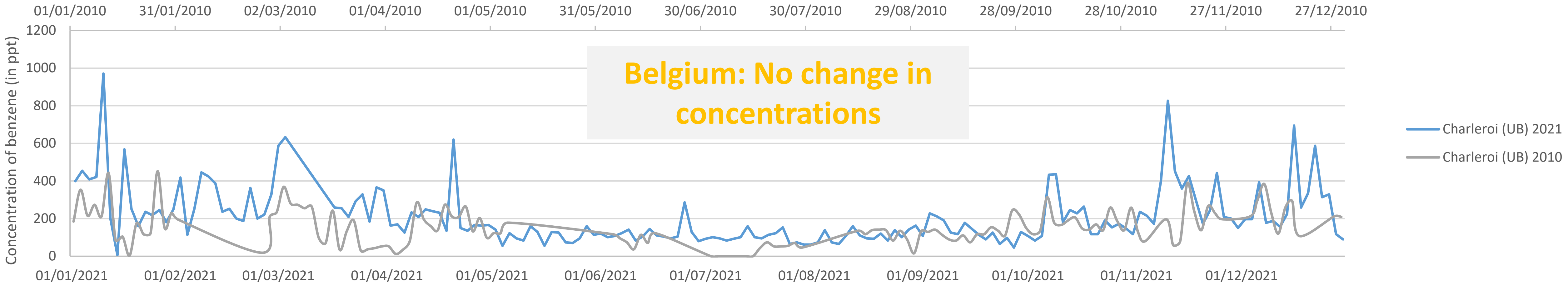
WP1 - T1.1 : some preliminary results – VOC- benzene

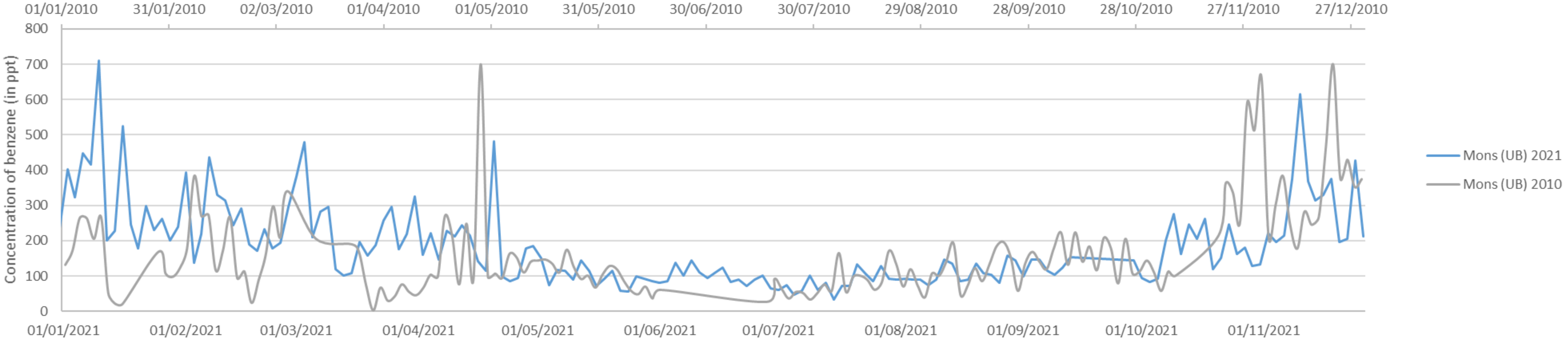
London (UK) : Decrease of concentrations





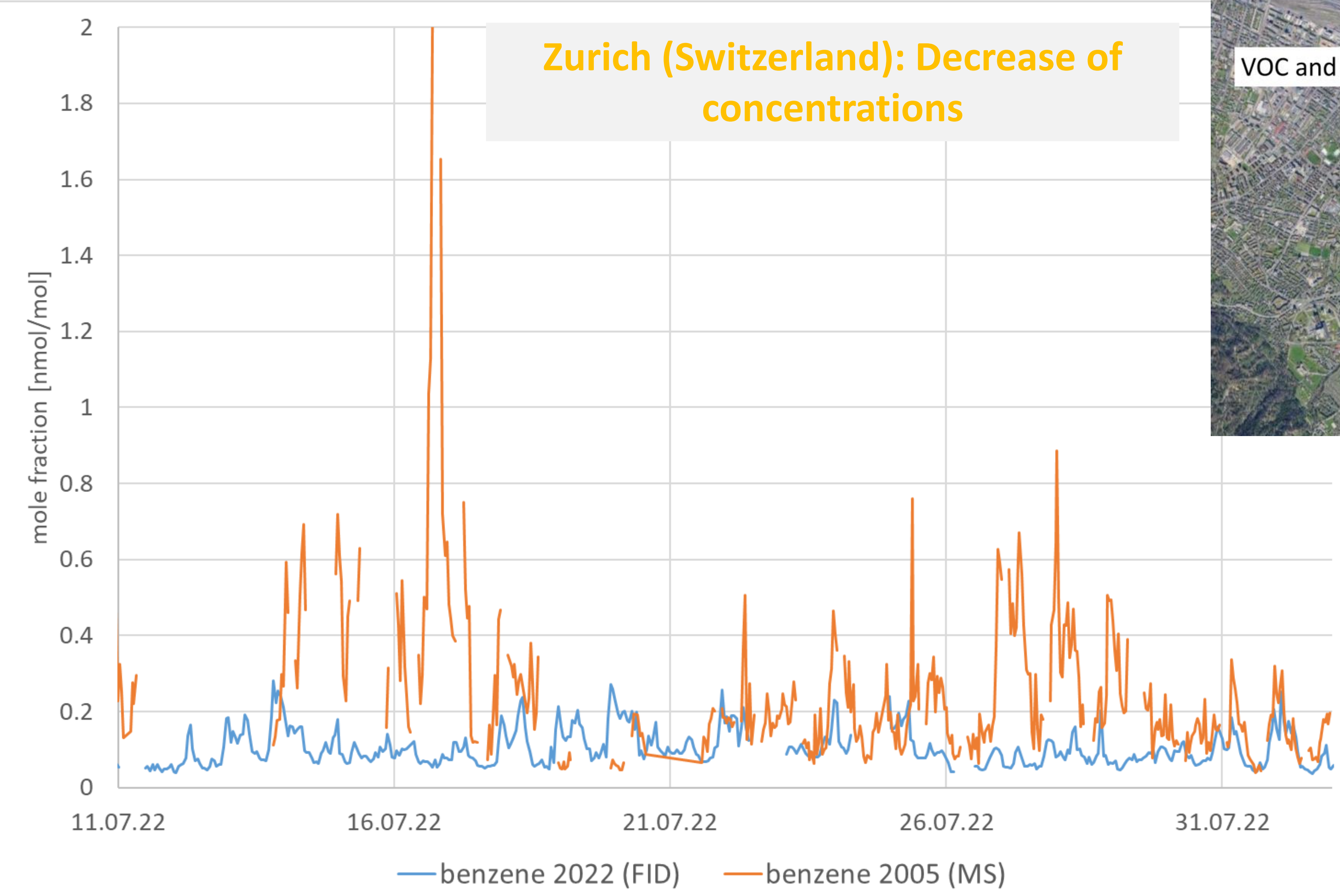
WP1 - T1.1 : some preliminary results – VOC - benzene

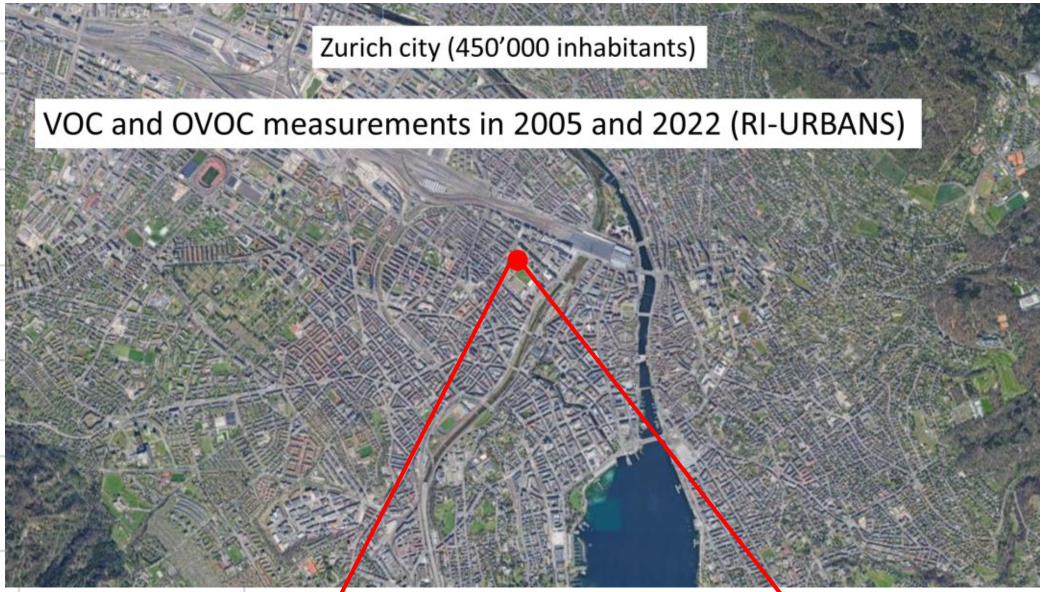




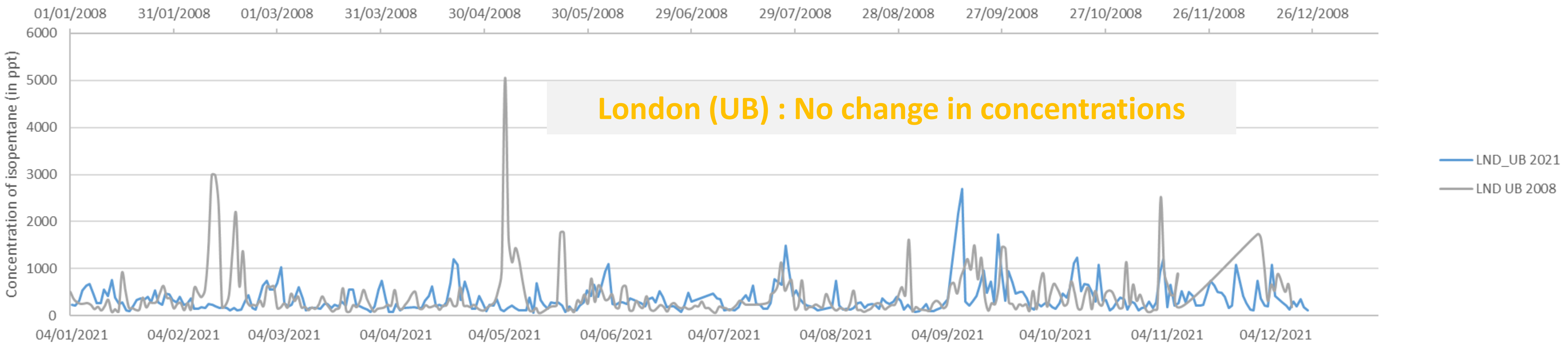
WP1 - T1.1 : some preliminary results – VOC - benzene

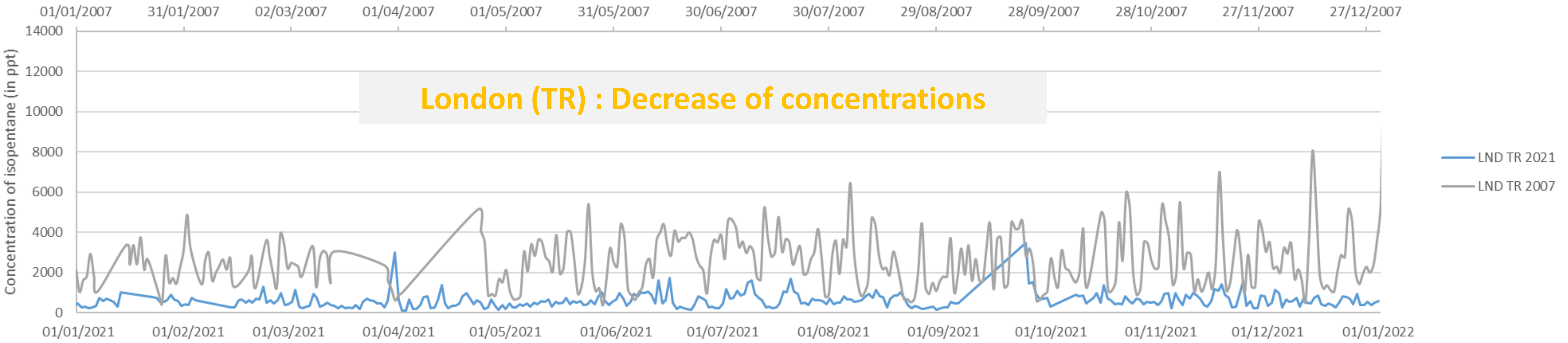
2005 (GC-MS) compared with 2022 (GC-FID)





WP1 - T1.1 : some preliminary results - VOC-isopentane





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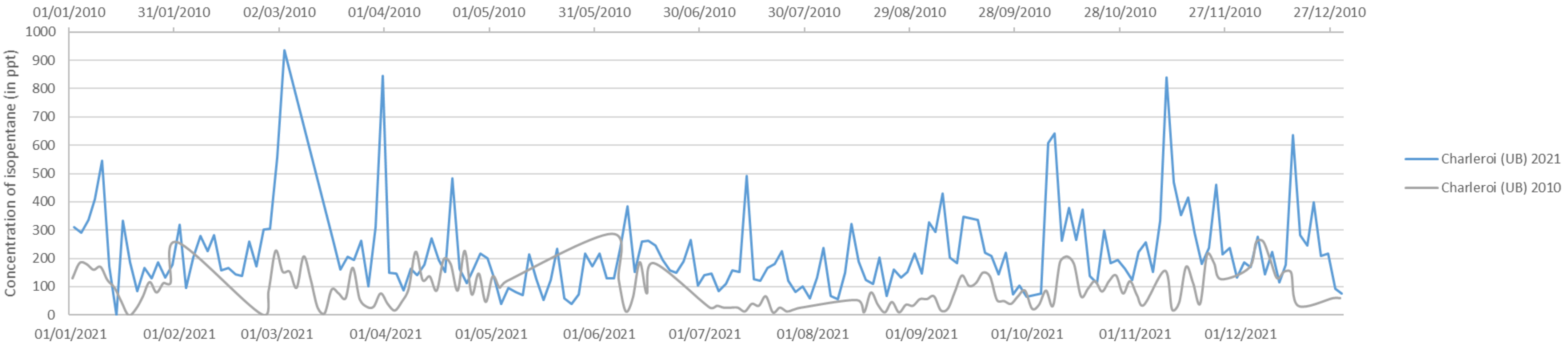
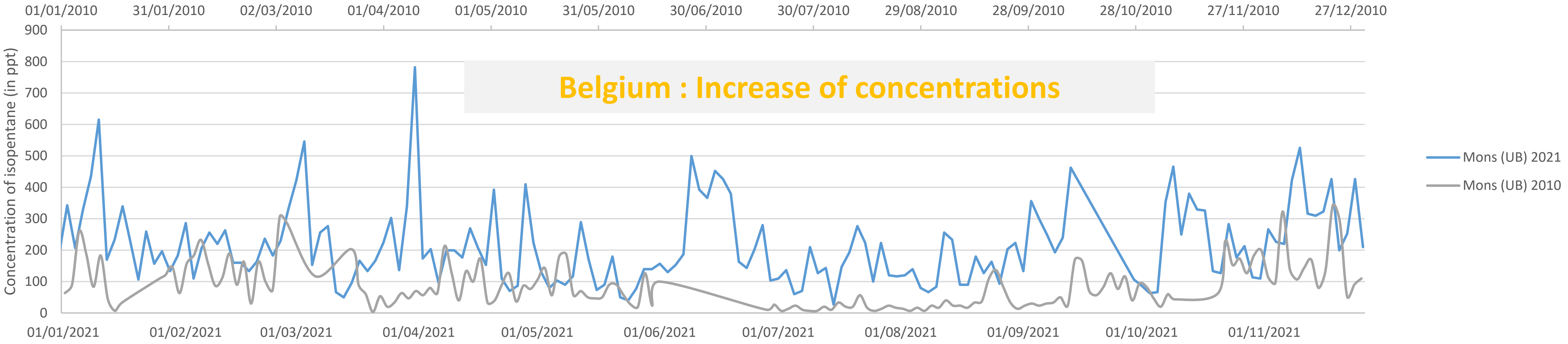
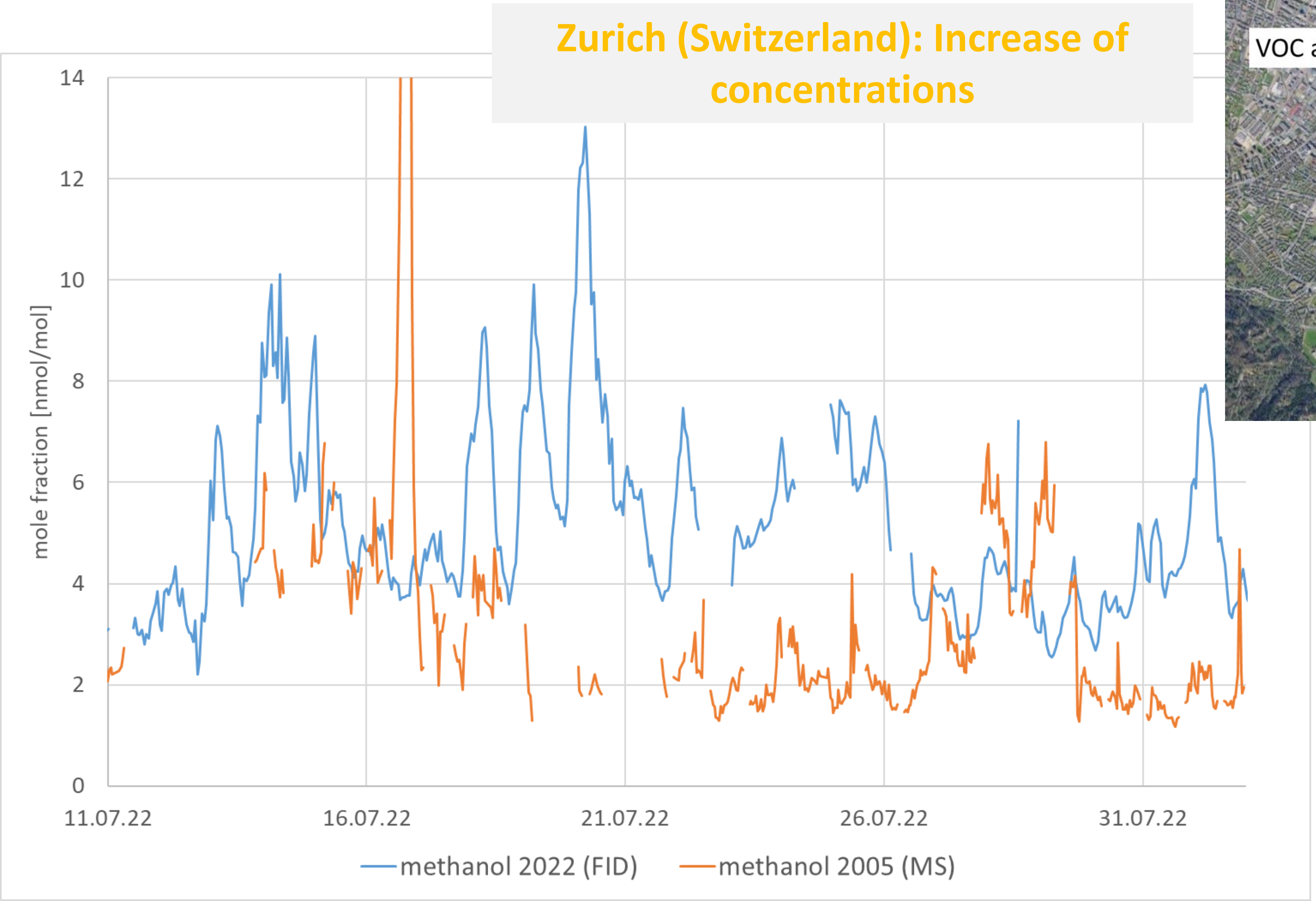
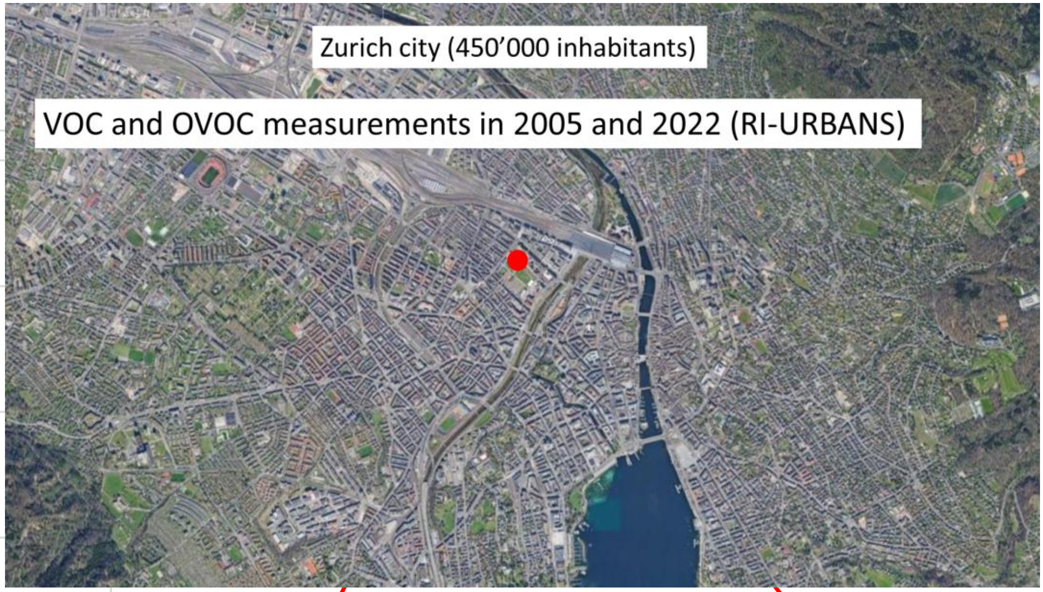




WP1 - T1.1 : some preliminary results – VOC - methanol

2005 (GC-MS) compared with 2022 (GC-FID)





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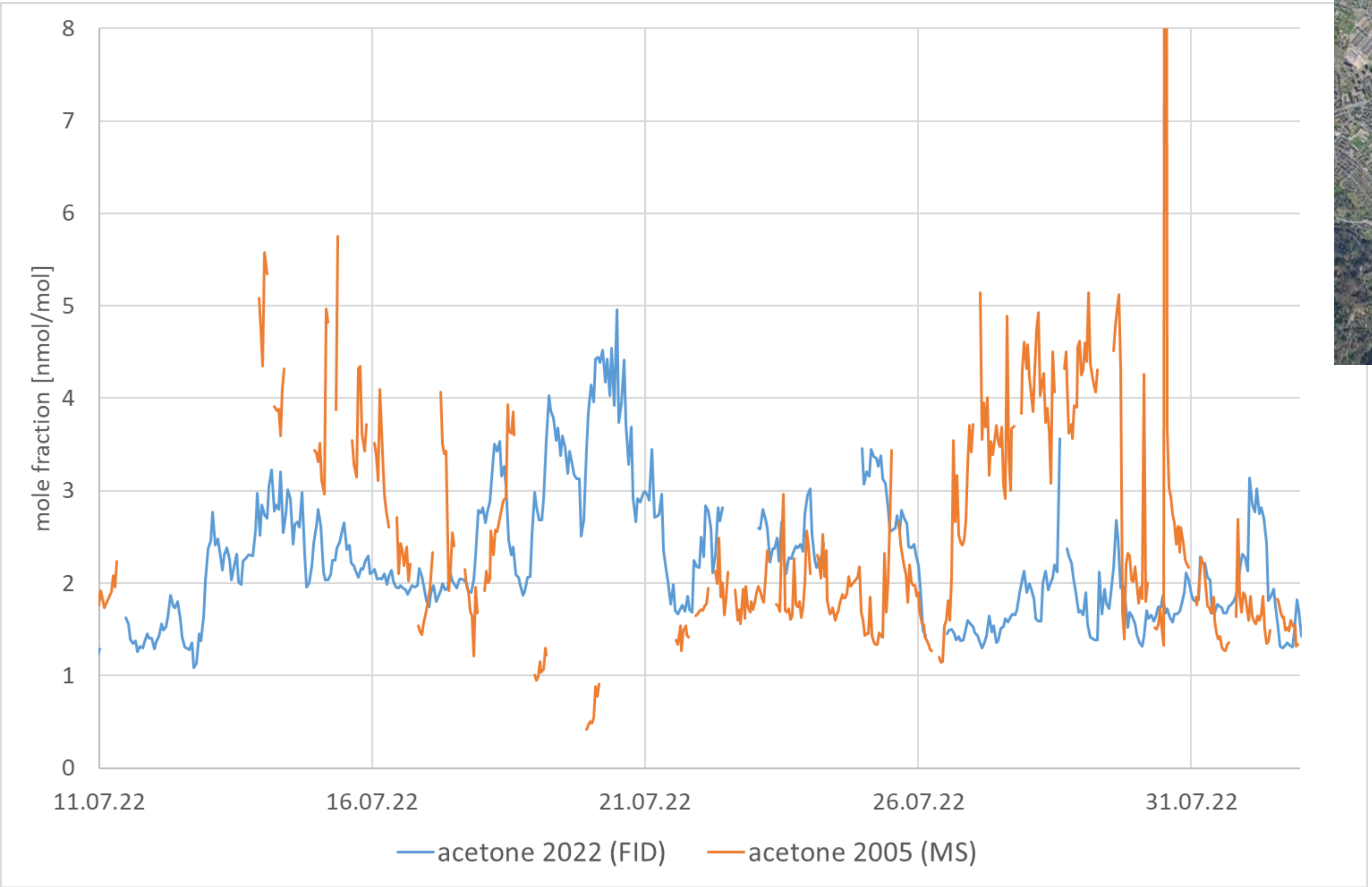
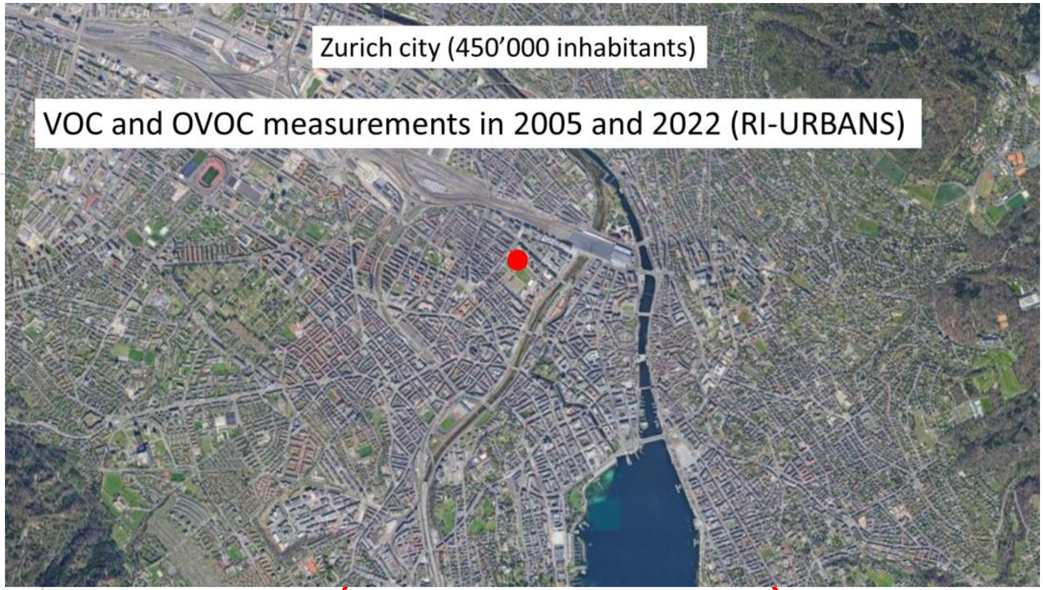
WP1 - T1.1 : some preliminary results - VOC - acetone

2005 (GC-MS) compared with 2022 (GC-FID)

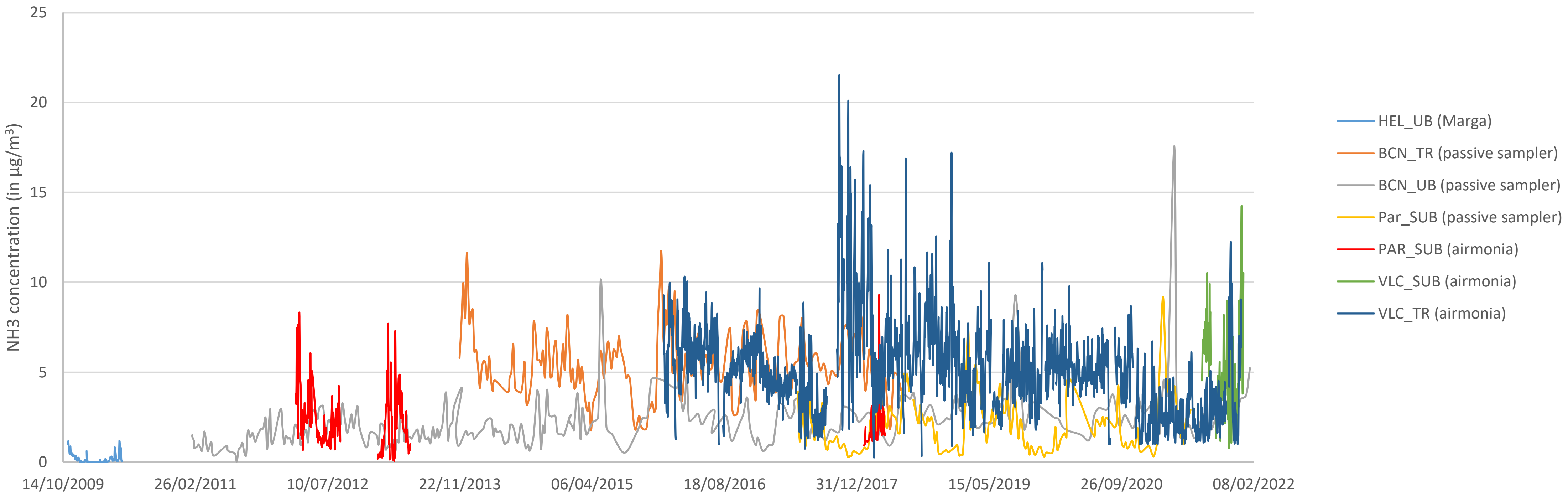
Zurich (Switzerland): acetone is stable





WP1 - T1.1 : some preliminary results – NH_3

Between 2009 and 2021 : Helsinki; Paris; Barcelona; Valencia



Perspectives

Data quality assessment – multicriteria evaluation: *ongoing*

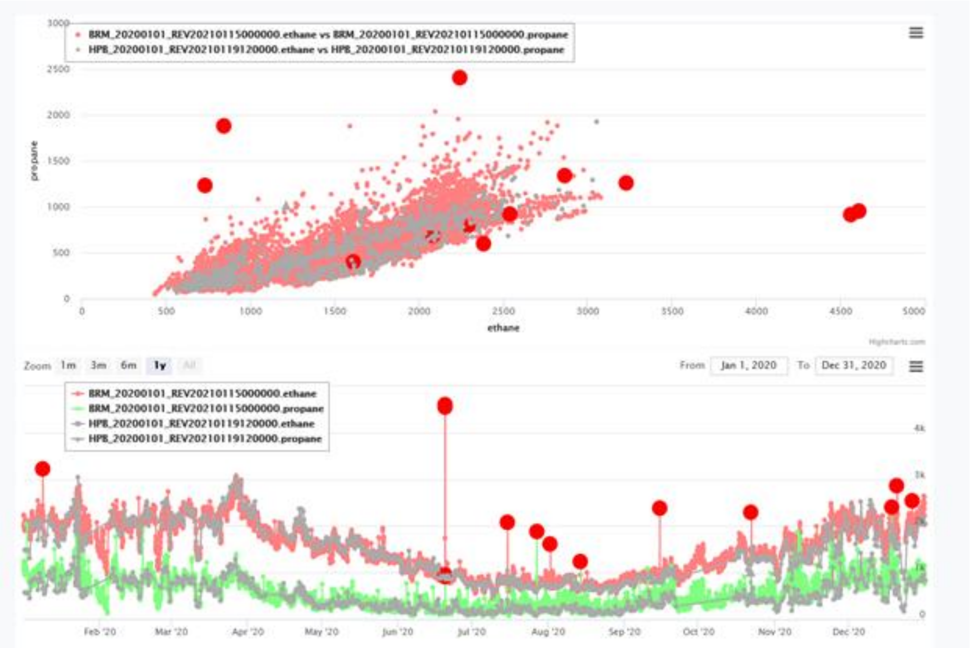
<u>Examining Dataset – multicriteria evaluation:</u>

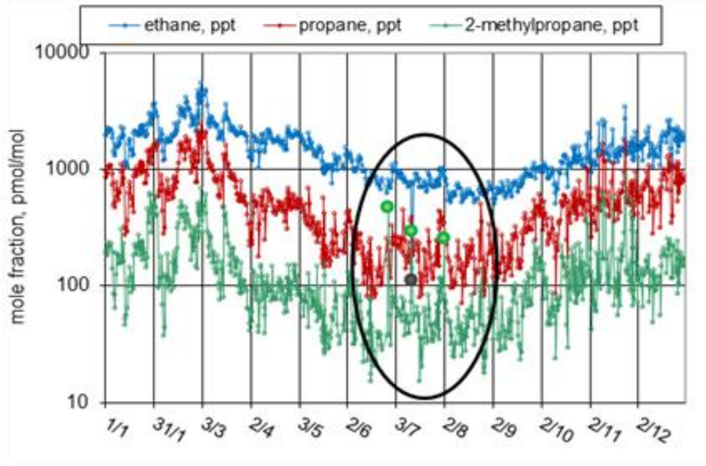
-List of species

-Completness : year, season representativeness

-Assessment of the dataset using the ACTRIS tool : @VOC@

-Data obtained converted to a convenient format for the @VOC@ tool and an automation process is still in progress with R: Time series, outliers; typical ratios, Scattering from year to year..

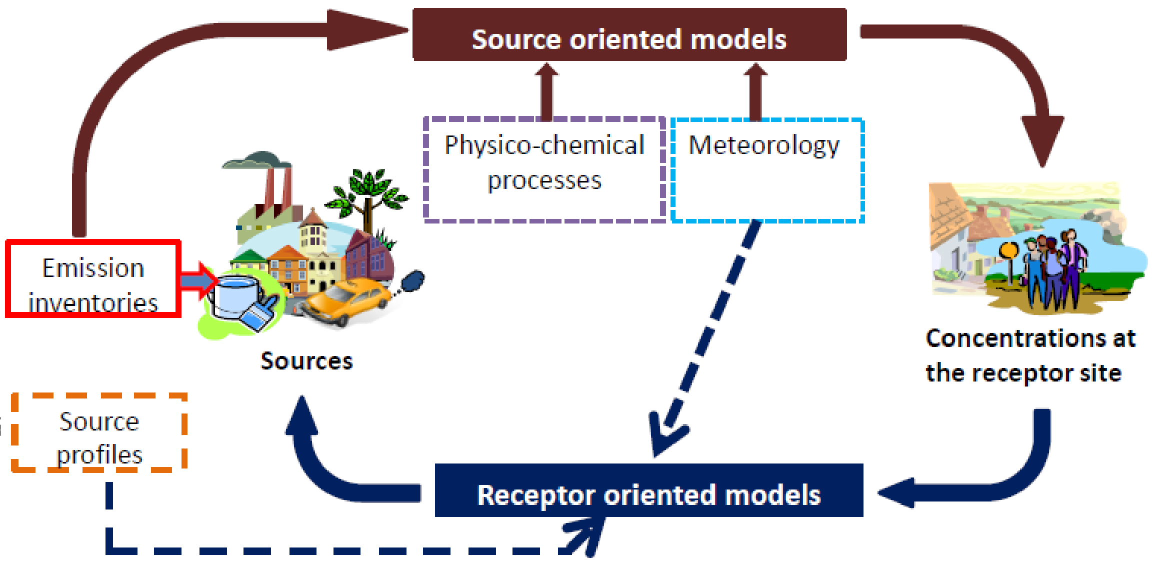




Next step

VOC source apportionment at 2 sites

Measures and models ⇨ Complementary approaches



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Thank you for your attention!