INTERESTS OF AUTOMATIC ODOUR SAMPLING DEVICES,

ILLUSTRATION WITH A WALLONIA STUDY

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In collaboration with ISSeP – Mr S. FAYS

WALLONIA PROJECT: MAIN SCOPES

- Collaboration with ISSeP for developing new odour measurement methods for complex industrial area
- **Evaluation** of the OdorPrep automatic sampling system coupled with a mobile phone triggering
  - Industrial wallonia area (Engis and Habay)
  - Odor complaints
- **Citizens/Local authorities involvement**
- **Data collection in the fenceline**
  - (olfactometry, physico-chemical analyses, questionnaires)
- **Research activities**
  - Preliminary check to link odour concentration at the receptor level and dispersion model validation
  - Chemical compounds-Odour relationship

TWO STUDY CASES

ENGIS

INDUSTRIAL VALLEY

- Small town near Liège, alongside the Meuse river valley, with steep inclines (frequent thermal inversion effects)
- Several industries (chemical fertilizer, plaster, industrial wastes treatment,,)
- Poor air quality (monitored since several years by ISSeP) and several odor complaints
- November 2018 - August 2019

TWO STUDY CASES

HABAY

MUNICIPAL SOLID WASTE TREATMENT PLANT

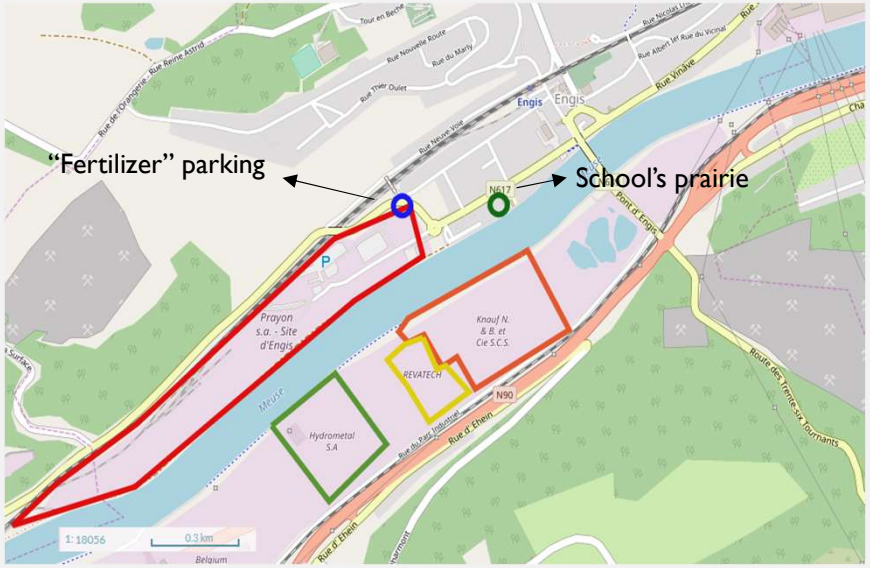
- Small town close to Arlon
- MSW plant along highway, in southwest of Habay
- Odor emissions studied since several years by our lab
- April 2019 – August 2019

EXPERIMENTAL APPROACH

- Two OdorPrep samplers
- Two trailers equipped with continuously chemical analysers (ISSeP)
  - for NH_3, H_2S, BTEX, limonene and pinene
  + meteorological station (T, RH, Pressure, wind direction/speed)
- Olfactometric analyses (TO Evolution 6FC) according to EN 13725 (ULiège SAM)
- Odour dispersion model software, ADMS 5 "CERC"
- ULiege-SAM IOMS –enose- (Habay)
- 2 environmental officers of the municipality of Engis and one MSW technician (Habay) to trigger sampling with their smartphone,
- + questionnaires to fill, with a predefined frequency, and each time there is a triggering

EXPERIMENTAL APPROACH

ENGIS
(2 OdorPrep until March 2018
one moved to Habay)



HABAY
(one Odorprep)

EXPERIMENTAL APPROACH

ENGIS
(2 Odorprep until march 2018)

LIÈGE université Sciences Arlon Campus Environnement

ISSeP

SOME DATA/RESULTS…
(ENGIS)

[NOSE 2021]

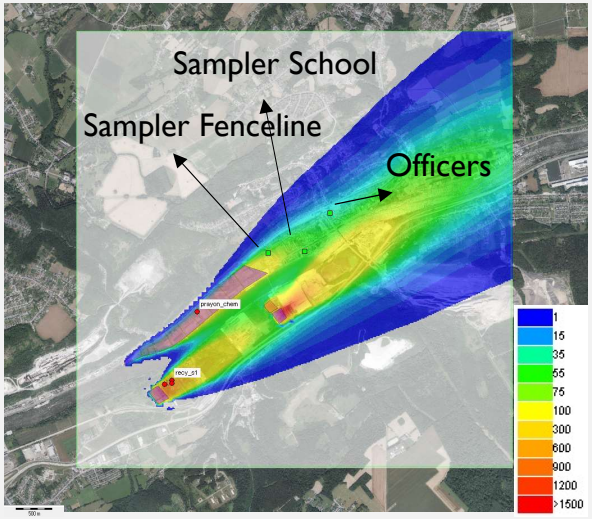
Only 6 odour events (5 days) during 8 months?
→ No enough data for having significant results

« SCHOOL »

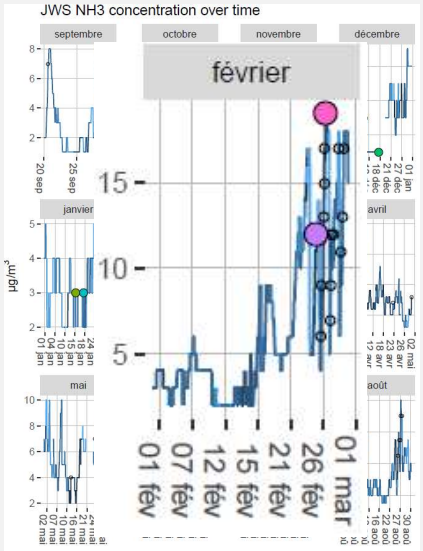
Sampling date	Sampling time	Analysis date	Results (uo_E/m^3)
15/01/2019	13:30	16/01/2019	54
18/01/2019	09:03	18/01/2019	494
25/02/2019	13:50	26/02/2019	32
26/02/2019	14:00	27/02/2019	79
26/06/2019	09:53	28/06/2019	69
08/08/2019	08:30	09/08/2019	27

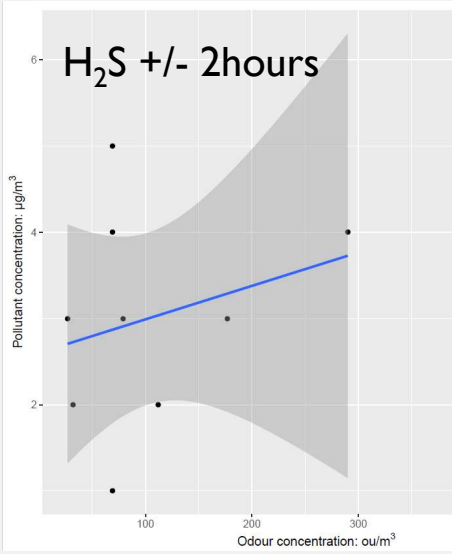
« FERTILISER » FENCELINE (March 2018)

Sampling date	Sampling time	Analysis date	Results (uo_E/m^3)
15/01/2019	12:20	16/01/2019	69
18/01/2019	09:03	18/01/2019	177
25/02/2019	13:50	26/02/2019	112



→ *rough estimate:*
average odour emission rate (01-02/19):
146 141 ou/s (site A)





EVALUATION OF ODORPREP

- ✓ **Sampling representative of the receptor level perception**
  - mobile phone App: triggered sampling when odour is perceived
  - sampling at the receptor site is often challenging due to the **low odour concentration** and **short perception time:** useful for pollution characterised by **puffs**
- ✓ **Practical**
  - minimal maintenance once installed
  - sample safety stored for a long period of time (e.g. over-night): T control-Sunlight protection
- ✓ **Easy to use**
  - remote sampling
  - easy and fast bags collecting and replacement
  - mobile App : the interface is very simple
- ✓ **Versatility**
  - enough room to place additional instruments with their own sampling line and the same storage conditions (temperature control, cover from sunlight)
- ✓ **Professional materials**
  - durable and respect the standard EN13725

EVALUATION OF ODORPREP

- **Electric supply?**
- **Sample bag size?**

  small volume of the bags containers…
  - often not enough to perform 2 measurements with 4 panel members for **low concentration** samples (below ~200 ou/m^3), using the Dual Forced Choice (Yes/No method could solve it)

- **Sample bag material?**

  Nalophan® ? not suited for samples containing NH_3 and H_2S

- **Pump Flow adjustment?**

  No possibility to decide whether the sample should be taken quickly or over a longer period of time

- **(proposal) Coupled to a cloud and localisation (webcam?)**

MAIN ISSUES

- Autosampler equivalent to a speed radar for odour?

About no odour events/no complaints during the campaign?

unfortunately for us and for scientific results, but great for the citizens!

- Citizens/Local authorities involvement?
  - Local authorities were not in favour involving citizens to avoid reactivating the complaints.
  - Environmental officers played the game but the questionnaires were not systematically filled.
- Not enough data to perform a correct scientific study of the odour problem.

MAIN INTERESTS REGARDING THIS SHORT WALLONIA EXPERIENCE

- An automatic sampler allows scientists to counter the usual limitations of sampling at the receptor site (i.e. short exposition time and low concentrations).
- Ideal for cases where there would be frequent sampling at the same place.
- Remote control and system conditioning allows sampling at any time of the day and night,
- The systems' representativeness is correct and all materials ensure no modification of the odour.

THANKS FOR YOUR ATTENTION

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In collaboration with S. Fays

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