

# INTERESTS OF AUTOMATIC ODOUR SAMPLING DEVICES, ILLUSTRATION WITH A WALLONIA STUDY

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## WALLONIA PROJECT: MAIN SCOPES

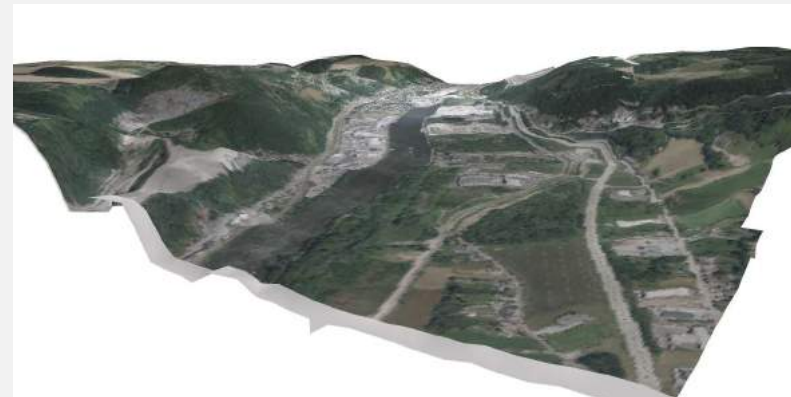
- Collaboration with ISSeP for developing new odour measurement methods for complex industrial area
- **Evaluation** of the OdorPrep automatic sampling system coupled with a mobile phone triggering
  - Industrial wallonia area (Engis and Habay)
  - Odor complaints
- **Citizens/Local authorities involvement**
- **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<sub>3</sub>, H<sub>2</sub>S, 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)



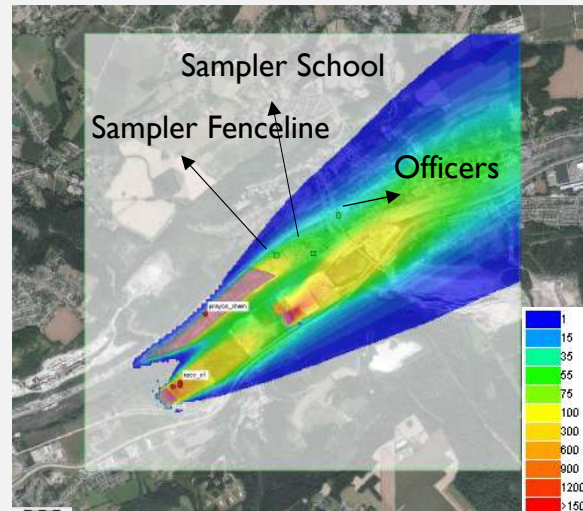
# SOME DATA/RESULTS... (ENGIS)

[NOSE 2021]

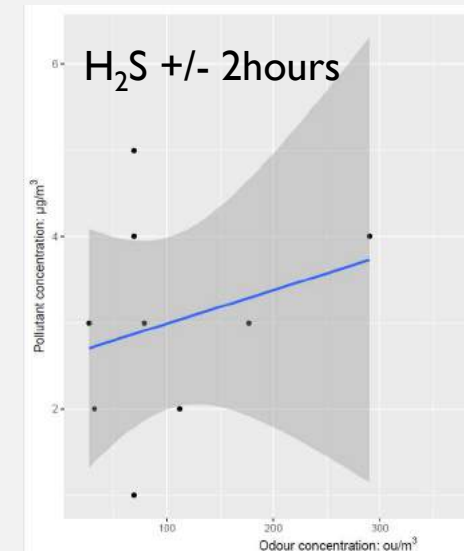
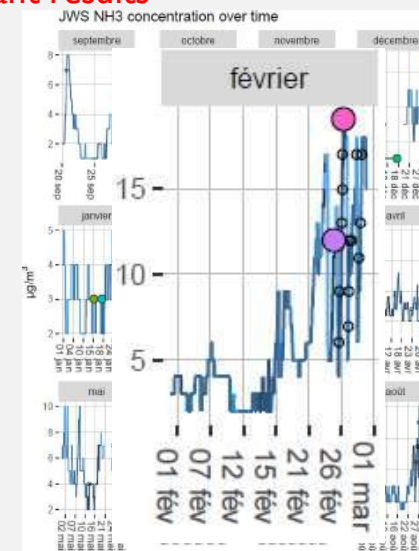
Only 6 odour events (5 days) during 8 months?  
→ No enough data for having significant results

## « SCHOOL »

Sampling date	Sampling time	Analysis date	Results (uoE/m <sup>3</sup> )
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



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



## « FERTILISER » FENCELINE (March 2018)

Sampling date	Sampling time	Analysis date	Results (uoE/m <sup>3</sup> )
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



# 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  $\sim 200$  ou/m<sup>3</sup>), using the Dual Forced Choice (Yes/No method could solve it)
- **Sample bag material?**
  - Nalophan® ? not suited for samples containing NH<sub>3</sub> and H<sub>2</sub>S
- **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

## Acknowledgment to

Noémie Molitor (ULiège),  
Cédric Luthers (ISSeP),  
David Huygen (ISSeP),  
Axel Balon (ULiège),  
Eco-conseillères (Engis),  
Personnel du centre de valorisation des déchets