

## Biogas Recognition over Landfill with MOS Gas Sensors Array and PCA-quantile Regression

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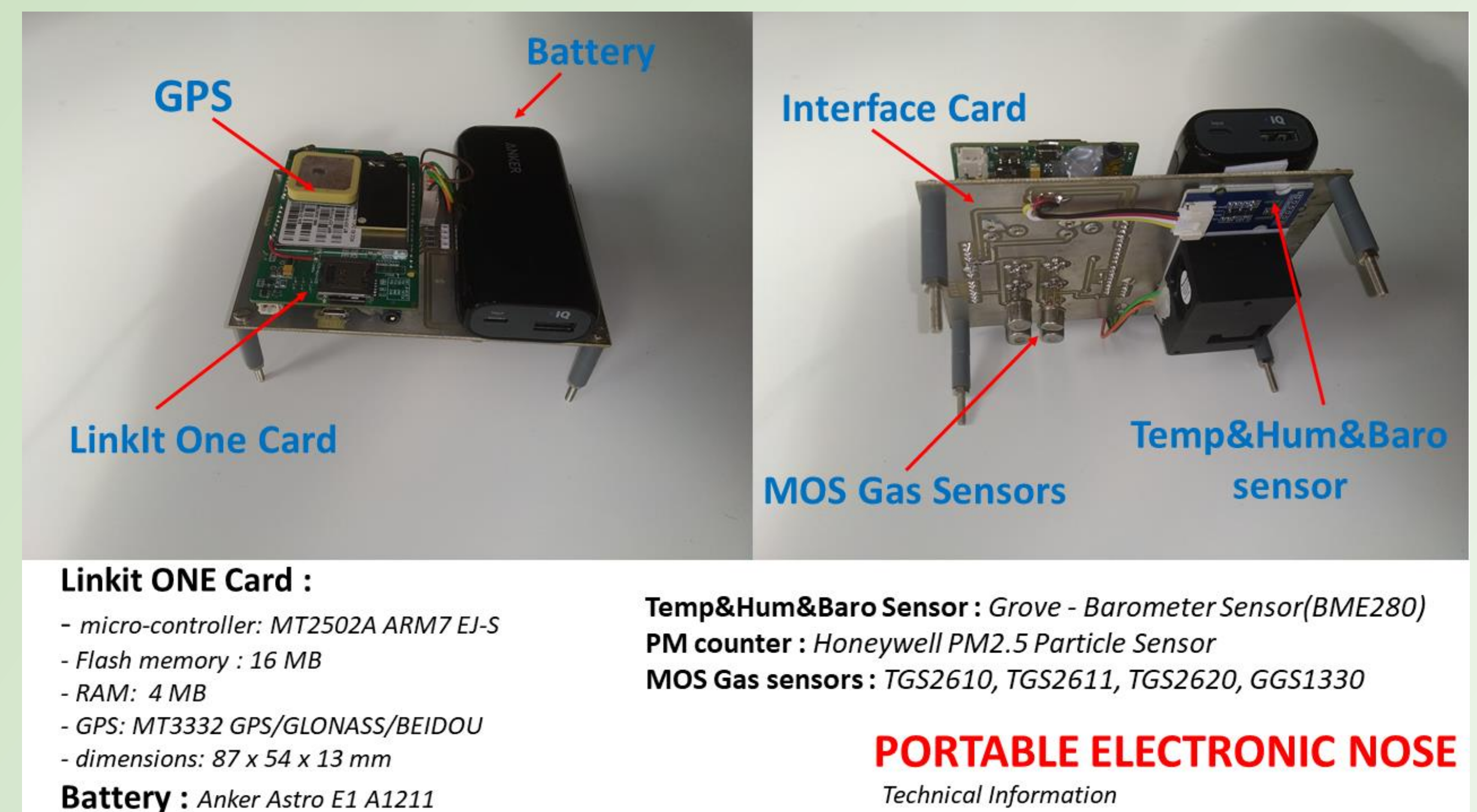


## Objectives

The biogas monitoring over a landfill has become a matter of interest because of Climate change and CH<sub>4</sub> emissions control. On the other hand, MOS gas sensors have brought the possibility to build low-cost instruments for intensive monitoring. However, it is important to check the performance through a test on the field. This poster presents the result of a field monitoring test of a MOS gas sensors array (instrument) with a PCA-quantile regression (Prediction Model).

## Materials and methods

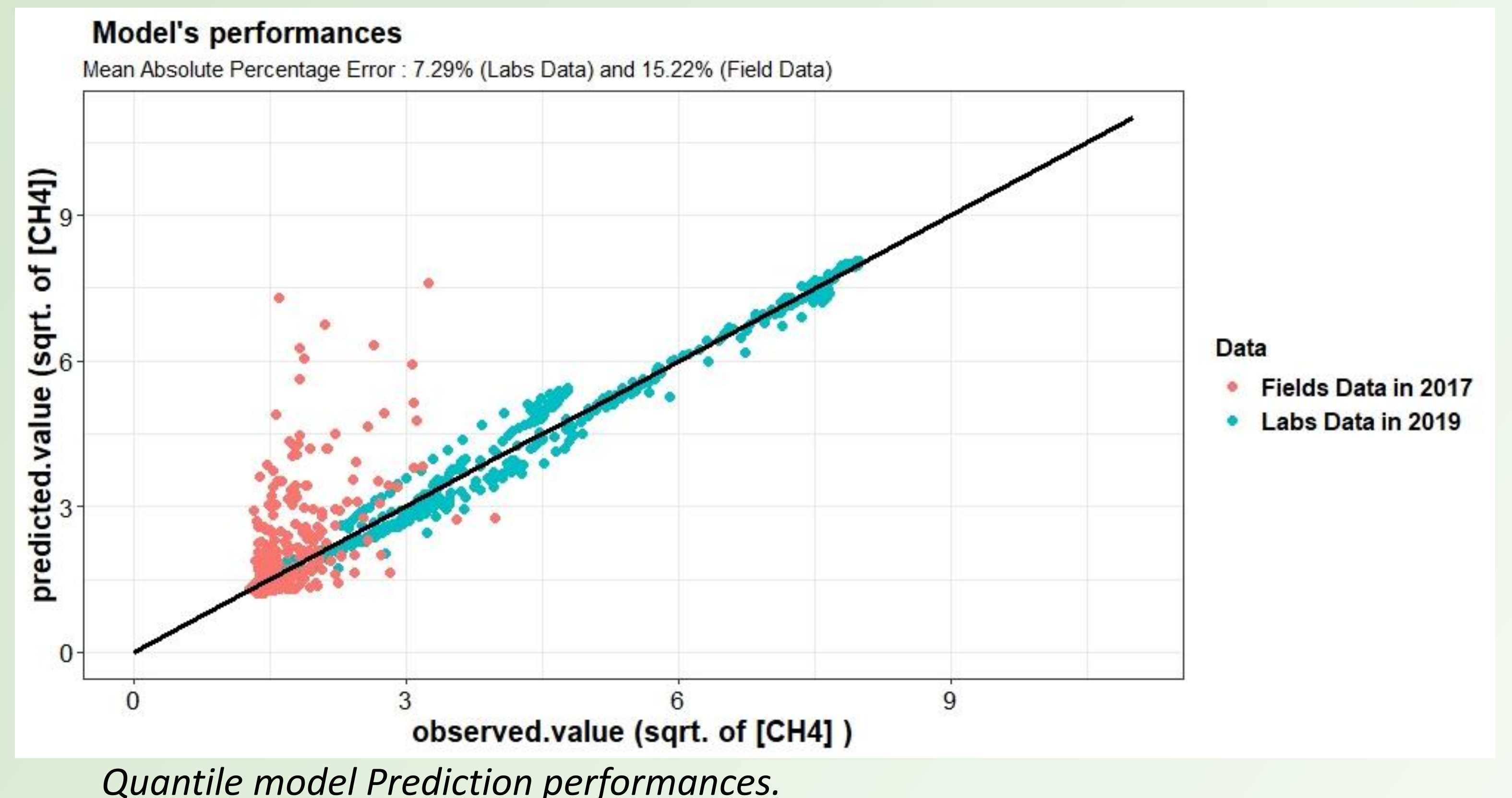
- **Array of four MOS sensors (Portable e-nose)** TGS2610, TGS2611, TGS2620, GGS1330.
- **Field samples** collected in a municipal solid waste site (**Landfill**) in October 2019
- **Labs calibration:** MOS sensor's conductance Data paired with FID methane analyser Data.
- **PCA-Quantile regression** (PCA for extracting new features) + Median regression (robust against outliers).
- Field test over an area with known biogas source.



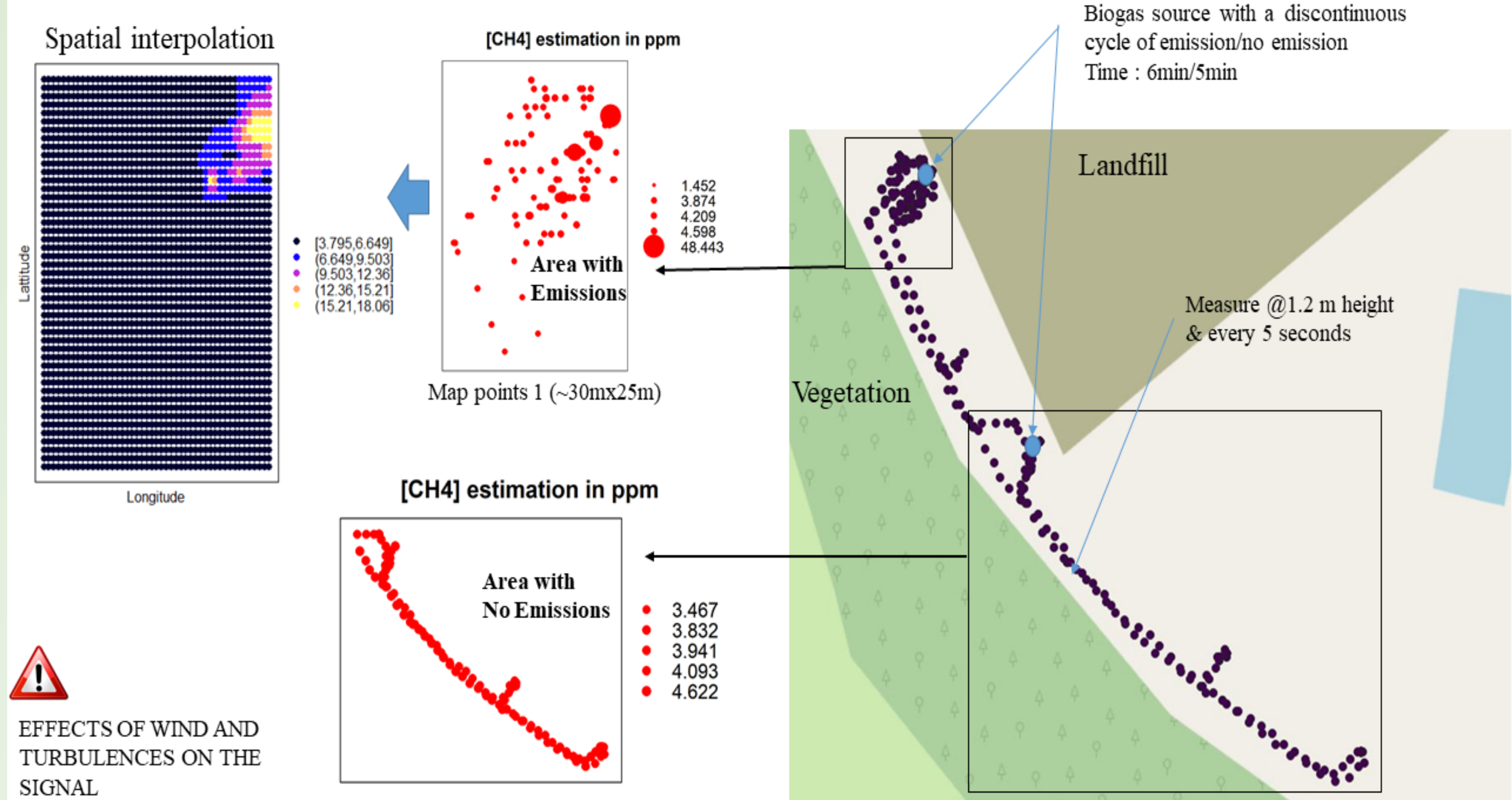
Portable electronic Nose (e-Nose) with MOS gas sensors and Linkit One card as acquisition system.

## Results and discussion

- The PCA-quantile regression model showed good predictions with lab data (MAPE = 7.29%).
- Lab predictive model (2019) compared with the field one made after experimentation in 2017, suggest that field prediction might be subject to additional error due to unknown field factors. Although this mixed results, the predictions looked acceptable.
- The monitoring over a part of landfill showed two distinct zones of emission: **area with biogas emission** ([CH<sub>4</sub>] between 1.45 and 48.44 ppm) and **area with low emission** ([CH<sub>4</sub>] between 3.46 and 4.62 ppm).
- However, there was necessary to do several trials before getting correct data for the spatial interpolation. We suspected perturbations during the experimentation due to environmental factors as the wind turbulences.

CH<sub>4</sub> MONITORING OVER AN AREA

Running time : for 1.5 hours  
 Sampling rate : 1 measure/5 seconds



## Conclusions

- Acceptable methane predictions in field experimentation and clear distinction between **areas with emissions** and **area with no emissions**.
- Perspectives: intensive monitoring over all the landfill and more attention to local factors.