Temporal variability in NH$_3$ air concentrations at Level II plots in Flanders

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Outline

- Study area
- Sampling
- Results
  - Intra-annual variability
  - Inter-annual variability
  - Trends
  - Relationship with air humidity
  - Relationship with precipitation
- Conclusions
• 5 ICP Forests Level II plots in Flanders, Belgium
Sampling

- Radiello® passive samplers
- Placed at 2-3 m height; in Brasschaat at 24 m on scaffold tower (in shelter)
- Vegetation period (Mar-Oct, 8 months): 3 replicates
  Outside vegetation period (Nov-Feb, 4 months): 2 replicates
- Monthly sampling, synchronized with deposition
- Analysed by specialized lab
Results: Intra-annual variability (data 2009-2017)

- 1st peak in March-April (fertilizer application)
- 2nd smaller peak in August (2nd gift)
- Critical loads clearly exceeded during the growing season except for higher plants in HOE
Results: Inter-annual variability (Brasschaat)

Results: Trends in NH$_3$ air concentration ($\mu$g m$^{-3}$)

- No clear trends
- In GON the location was changed after the samplers were vandalized
Results: Relationship with air humidity

- NH₃ air concentration is negatively related with relative humidity
Results: Relationship with precipitation

- Negative relationship with monthly precipitation: NH$_3$ is washed out from the air
Conclusions

- NH$_3$ air concentrations in Flanders are high and exceed the CLs for vegetation during the growing season (except 1 remote site)
- Strong influence of manure application, particularly in spring
- No clear trends in NH$_3$ air concentrations (2009-2018), despite sharp decrease in NH$_4^+$ deposition between 1994 and 2010 (Verstraeten et al. 2012 ATM ENV)
- NH$_3$ is washed out from the air by precipitation
Acknowledgements

We would like to thank Yvan De Bodt for coordinating the passive sampling in the field.
Thank you for your attention!