

New aerosol measurement infrastructure in Lutjewad

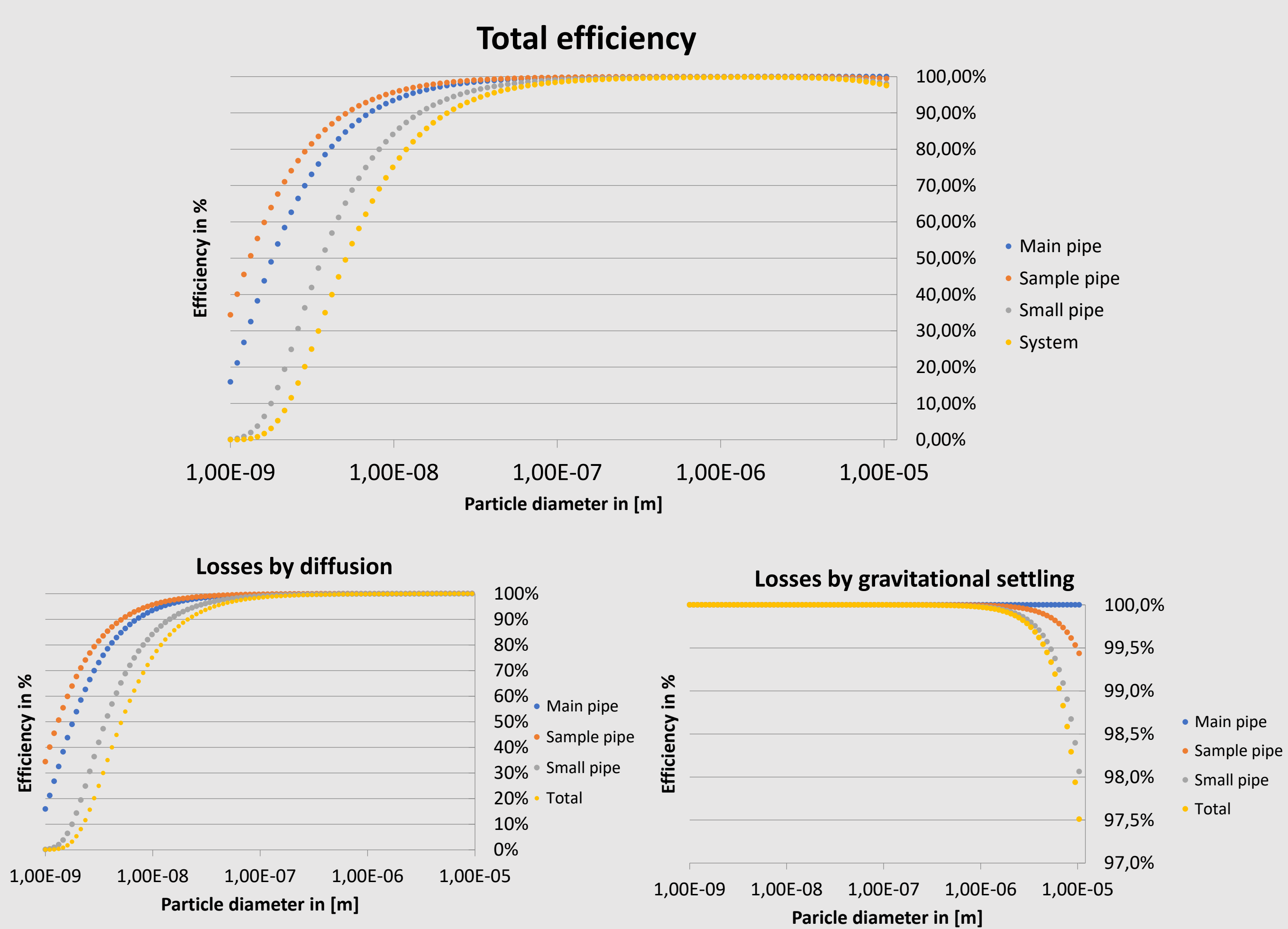
Stijn van Rijn, Bert Kers, Bert Scheeren, Ulrike Dusek
University of Groningen

Introduction

A new aerosol sample infrastructure is designed in Lutjewad. The aerosol inlet must be on 20 meters height, for the Lutjewad station is located behind a dike of 9 m height. The setup is still under construction and will be build in the summer of 2019.

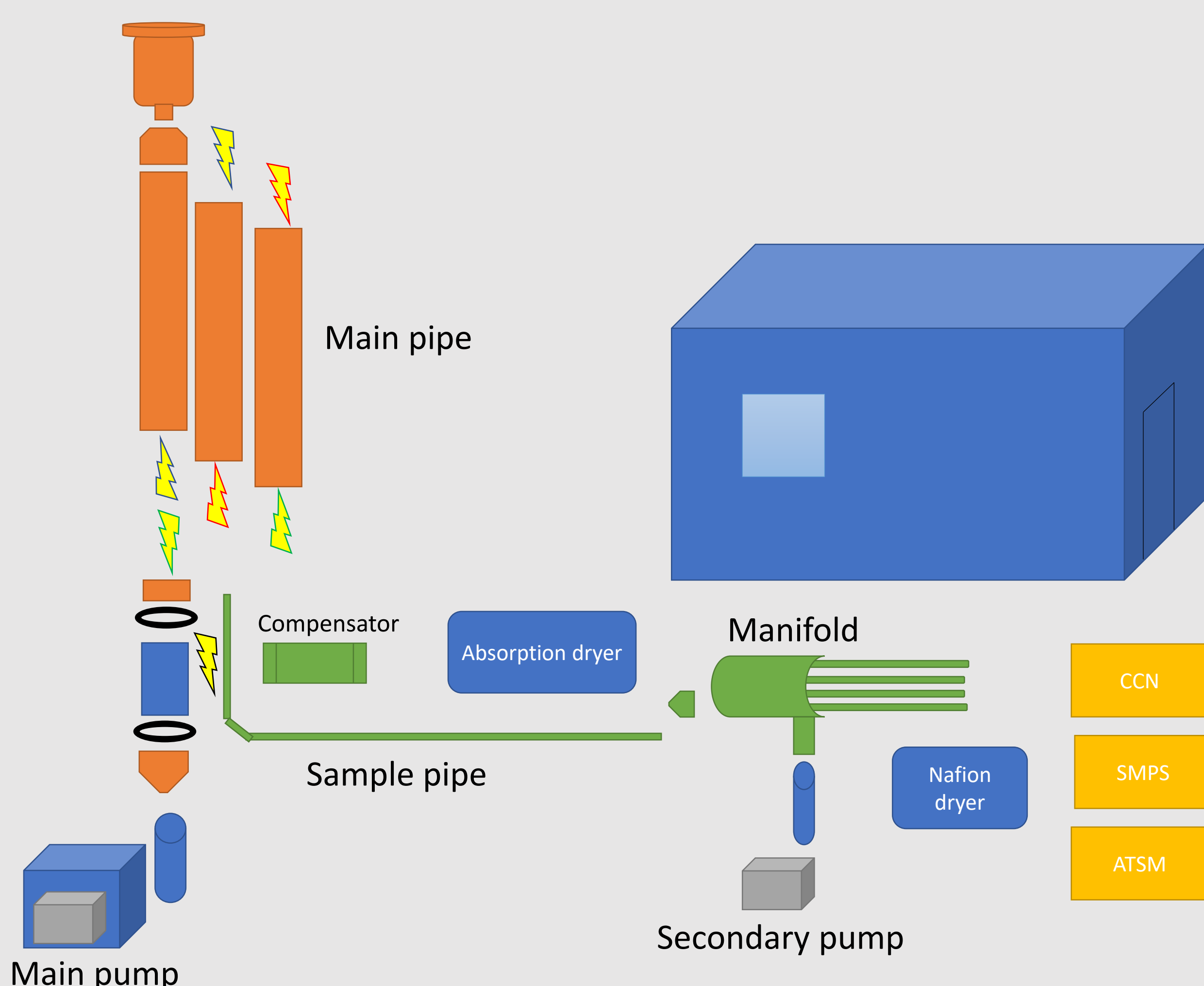
Particle loss

The loss of particles by diffusion and gravitational settling in the pipes of the system is calculated theoretically. The results of the calculation are shown below [1].



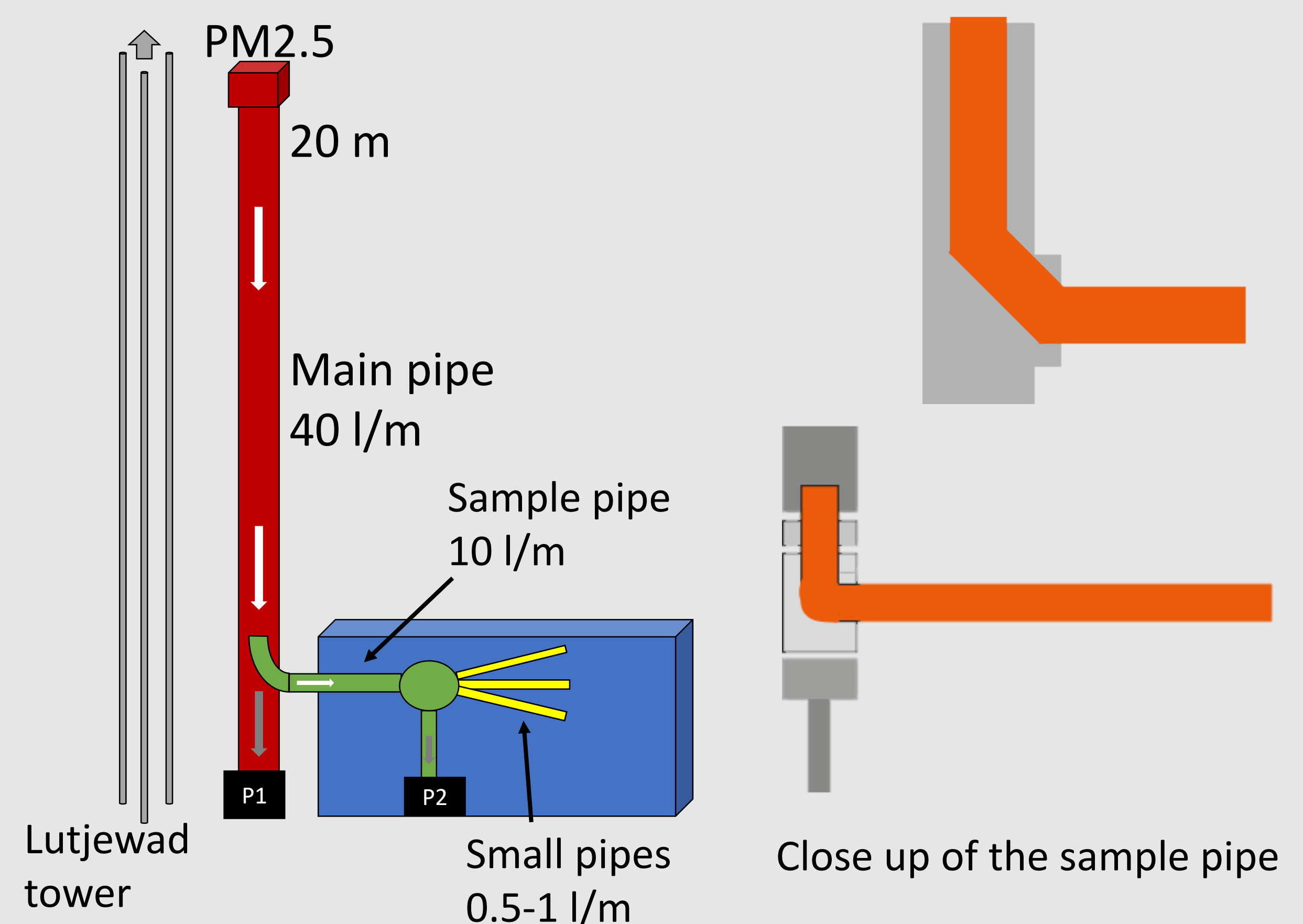
As expected, the particle loss is significant for small particles due to diffusion, while particle loss for bigger particles is mostly due to gravitational settling.

Part by part analysis



A representation of all the parts of the setup.

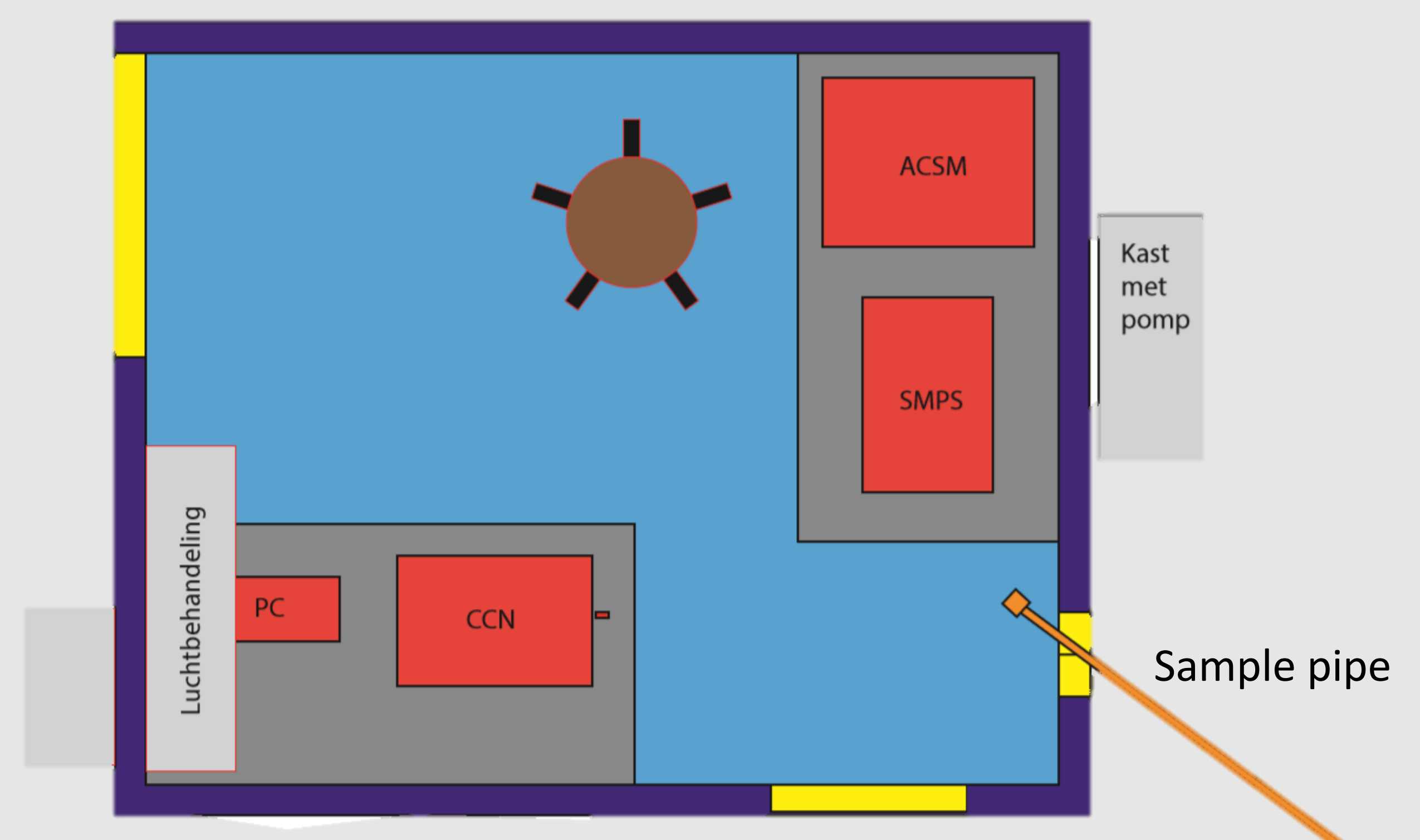
Measurement Setup



The schematic setup is shown above. A PM2.5 inlet is chosen to prevent sea salt from damaging the dryers. The main pipe will be attached at the existing Lutjewad tower. Inside the main pipe (dia = 50mm), a sample pipe is placed (dia = 1 inch). The aerosol will be sampled isokinetically and brought in the container lab. In the container a manifold will split the sample to various measurement machines. The main pipe will weigh 48 kilograms.

Container lab

In the container, three measurement machines will be placed: a SMPS, an ACSM and a CCN Counter. The main pump will be positioned outside the container itself, to reduce noise. The sample pipe will come inside the container under an angle. The entrance should be flexible, so individual parts can be cleaned and replaced. There will be climate control in the container, so the temperature will remain constant.



Contact

Stijn van Rijn, University of Groningen
s.s.a.van.rijn@student.rug.nl

Bibliography

[1] Baron, P., Kulkarni, P. and Willeke, K. (2011). *Aerosol measurement*. 3rd ed. Hoboken, N.J.: Wiley.