

# Report of a Technical Workshop under the Task Force on Measurement and Modelling:

Application of the DELTA low-cost denuder methodology  
(Edinburgh, 14-15 July 2005)

Mark Sutton

Presentation to TFMM, Helsinki, 10 May 2006



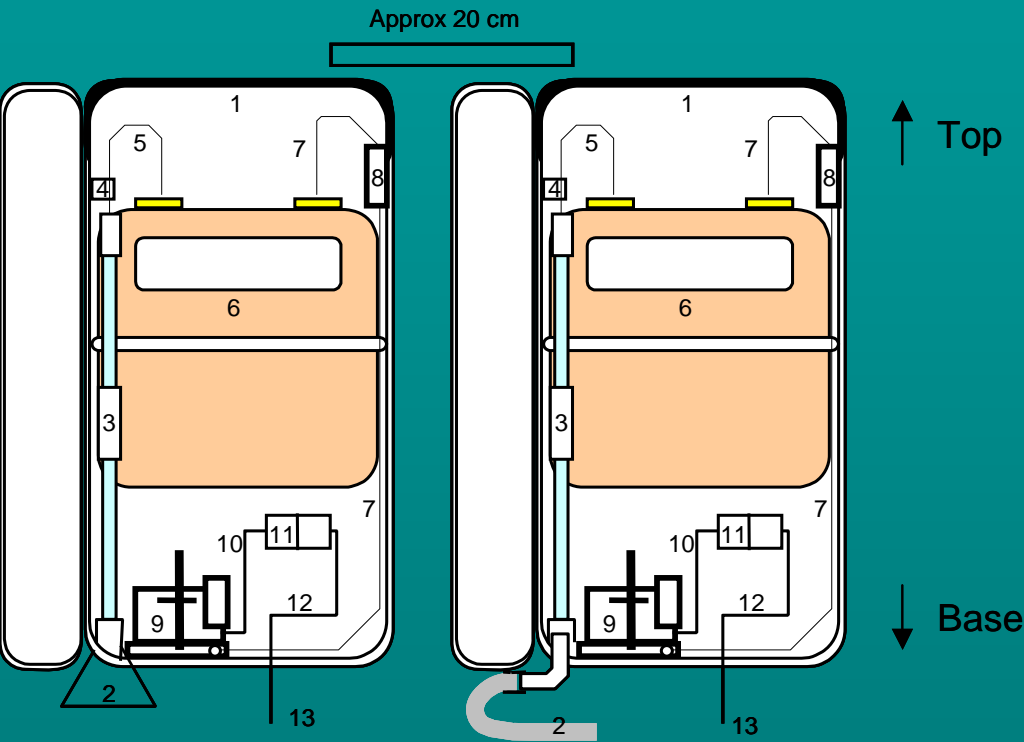
# Sampling and chemical species

## DEnuder for Long-Term atmospheric sampling

- Typically monthly sampling (weekly and greater)
- Important for gas-aerosol split for nitrogen compounds (TIN, TIA)
- Comparison with EMEP daily filter packs where available.
- DELTA method much easier as low-frequency
- Species covered:
  - Gases:  $\text{NH}_3$ ,  $\text{HNO}_3$ ,  $\text{SO}_2$ ,  $\text{HCl}$ ,
  - Aerosol:  $\text{NH}_4^+$ ,  $\text{NO}_3^-$ ,  $\text{SO}_4^{2-}$ ,  $\text{Cl}$ , base cations

# DELTA Denuder System

## DEnuder for Long-Term atmospheric sampling



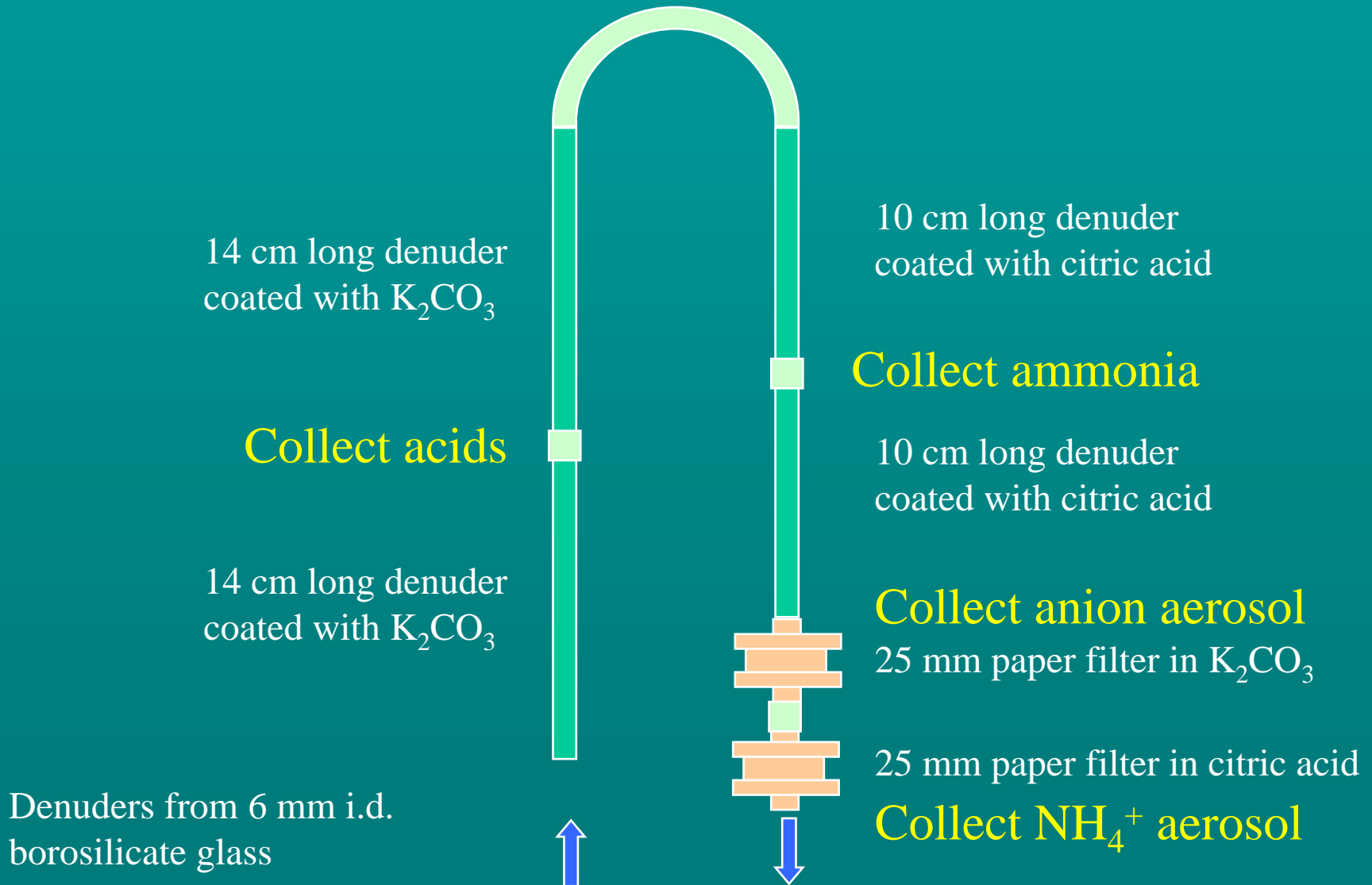
a. box mounted outdoors.

b. box mounted in cabin

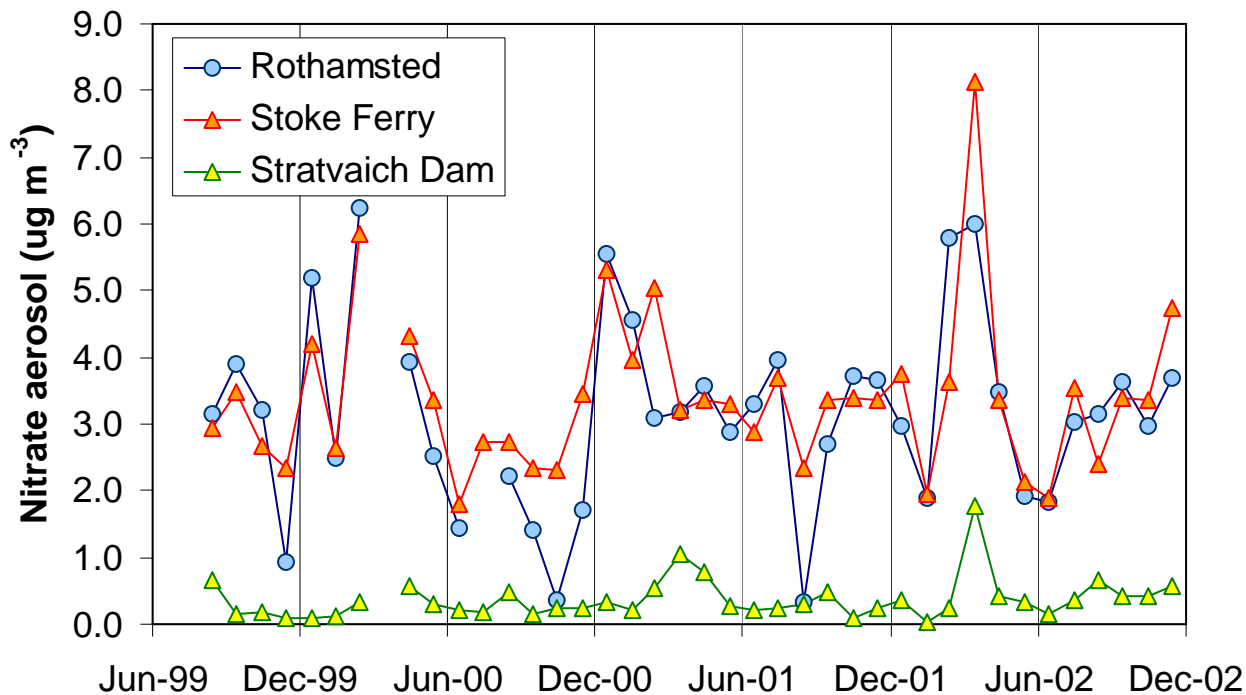
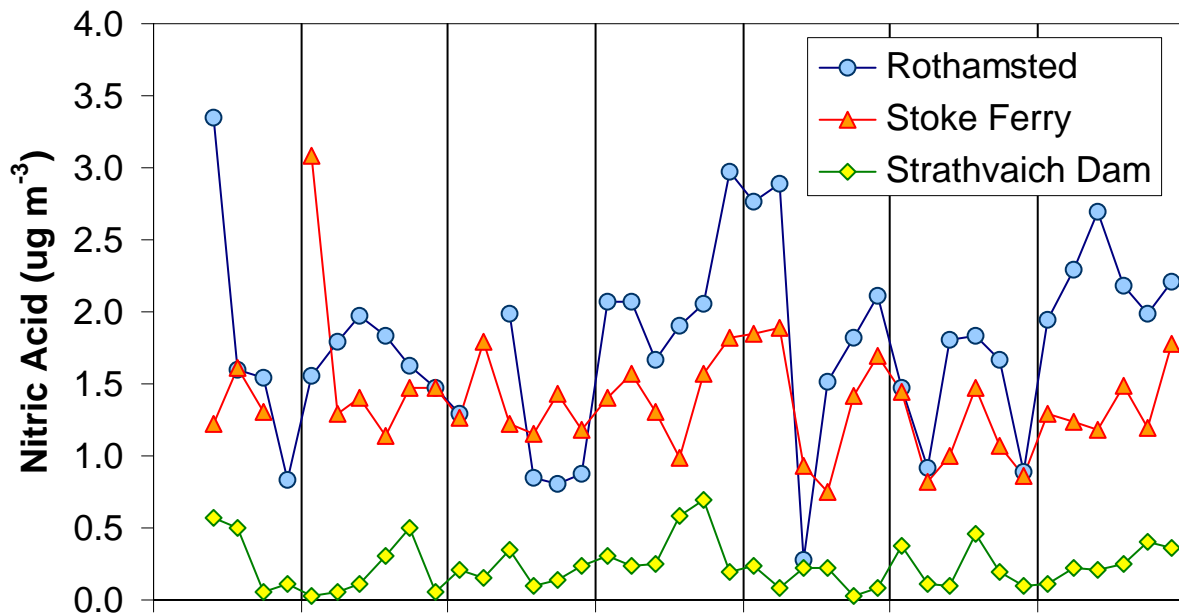
Front view, door open



# Architecture of full DELTA system



# Example $\text{HNO}_3$ and $\text{NO}_3^-$ data from full DETLA system



# TFMM: Edinburgh DELTA workshop

- Organized by Sim Tang, CEH Edinburgh
- 20 experts, 15 countries, inc representative of EMEP-CCC
- Presented practical implementation of the method with hands on sessions
  - Design of DELTA system
  - Theory of denuder sampling
  - Building and running DELTA systems
  - Coating of denuders
  - Preparing post denuder filter packs
  - Chemical analysis
  - QA/QC approaches

# TFMM: Edinburgh DELTA workshop

- Field trip to EMEP Super Site “Auchencorth Moss”
- Priorities for further testing and refinement
  - Potential for NO<sub>2</sub> interference with carbonate coating in urban areas
  - Most suitable denuder coatings for different climates
  - Radiation protection for enclosures in hot climates
  - Need to improve characterization of particle size cut-off
  - Relevance of temperature corrections for air volume
  - Standardization of measurement sampling height (1.5-2 m above short grass)
- Copy of report available.