



Eddy correlation flux measurements of ammonia by QC-TDLAS over fertilised grassland

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Ammonia is the most important alkaline gas in the atmosphere. It plays a significant role in atmospheric chemistry and contributes to the formation of secondary particulate matter. The impacts of ammonia and ammonium salts on the environment are varied and range from acidification and eutrophication of sensitive ecosystems to changes in local and global radiation budgets. It has been widely established that agriculture is the largest contributor to ammonia emissions, accounting for an estimated 90% of emissions in the UK. However, significant uncertainties in the magnitudes of these emissions remain an issue. Accurate measurements of ammonia fluxes provide a useful tool in estimating these emissions. The eddy-correlation (EC) technique is the most direct method of measuring vertical flux, but its application to ammonia exchange has been hindered both by the lack of instrumentation capable of the required fast-response sampling, and by the effects of inlet wall interactions due to the highly reactive nature of ammonia. Tunable Diode Laser Absorption Spectroscopy (TDLAS) shows promise as a technique suitable for EC flux measurements of ammonia. In April 2005, a Quantum Cascade Tunable Diode Laser Spectrometer (QC-TDLAS) was deployed at Easter Bush, a grassland site south of Edinburgh, to measure EC fluxes of ammonia. During the measurement period, the field upwind of the instrumentation was spread with slurry. The resulting emissions were measured and will be presented and discussed. The performance of the system will be assessed with respect to inlet losses, and intercomparisons will be made with other instruments located at the same site, including a lead-salt TDL.