



## **Recent Advances in Detection of Ammonia and Nitric Acid on Short Timescales Suitable for Eddy Covariance Flux Measurements**

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Ammonia and nitric acid play important roles in aerosol, cloud, and  $\text{NO}_x$  chemistry. Accurately measuring these species' concentrations on a fast timescale has historically been complicated due to their tendency to slowly and irreversibly interact with instrument surfaces. Here we present recent efforts aimed at mitigating these effects using new inlet technologies. First, an inlet that combines an inertial impactor with a pressure drop across a critical orifice provides particle removal without a traditional filter. This approach is used to reduce instrumental time responses for  $\text{NH}_3$  and  $\text{HNO}_3$  to 3-15 seconds. Second, a further reduction in time response is achieved by entraining functionalized perfluoroalkane vapor into the inlet sampling stream. This "active passivation" method is used to achieve time responses of  $\sim 0.5$  seconds for both  $\text{NH}_3$  and  $\text{HNO}_3$ , and is found to be applicable to a variety of inlet designs. These technologies enable fast time response sampling suitable for eddy covariance flux measurements.