Geophysical Research Abstracts
Vol. 17, EGU2015-15752, 2015
EGU General Assembly 2015

Flux measurements of reactive nitrogen compounds using a chemiluminescence analyser with different converter types

Christof Ammann and Veronika Wolff
Agroscope Research Station, Zurich, Switzerland (christof.ammann@agroscope.admin.ch)

The availability of reactive nitrogen (Nr) is a key limiting factors for the productivity and the competition success of individual species. On the other hand, certain nitrogenous compounds can also be emitted from natural or managed ecosystems. Thus the quantification of the Nr exchange can be essential for the interpretation of ecosystem behavior. For the observation of Nr dry deposition and emission the eddy covariance (EC) method is preferable since it does not modify the environmental conditions of the ecosystem, is less prone to wall effects than chamber methods, and is less affected by gas phase chemical reactions than gradient methods. Since the various Nr compounds can undergo fast chemical reactions and have differing chemical and physical characteristics, a variety of detection techniques is usually necessary that often cannot meet the fast response requirements of the EC technique.
Here we show applications of a fast response 2-channel NO analyzer suitable for EC measurements. In combination with different inlet converters (photolytic converter, gold catalyst converter, and high-temperature steel converter), the system could alternatively be used for flux measurements of NO_2, NO_y, and total Nr. The quantification of By combining the 2-channel analyzer with the NO_y and total Nr converter simultaneously, the NH3 flux could be determined from the difference between the two channels. Concentration and flux measurements of the system were verified by inter-comparison with other methods. Potential problems include the damping of high-frequency fluctuations in the inlet system. It is therefore important to place the converter close to the sampling inlet and to quantify and correct the damping effects. Moreover, like most other flux measurement techniques, the system is susceptible to non-stationary trace gas concentrations that often occur near pollution sources.