

Interactive comment on “Measuring the biosphere-atmosphere exchange of total reactive nitrogen by eddy covariance” by C. Ammann et al.

Anonymous Referee #2

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This manuscript presents the use of a total reactive nitrogen converter (TRANC) system to measure fluxes of total reactive nitrogen over an ecosystem through the eddy covariance approach. The manuscript emphasizes instrument characterization for flux analysis, and verifies the ability of the inlet to measure the expected molecules. Such a system could be useful for determining atmospheric input of nitrogen to sensitive terrestrial ecosystems. The manuscript is clear and well-written. Overall, this manuscript describes a new and potentially useful measurement. I recommend publication with minor changes:

1. Error analysis: The authors do an excellent job of describing most details relevant to eddy covariance measurement, including attenuation, lag-times, and cospectral/ogive analysis. However, while the authors present a 'flux detection limit', they do not provide

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an estimate of the error surrounding each individual flux point. Such an analysis would be useful, particularly for comparing time series of flux measurements between the TRANC and individual nitrogen species.

2. The authors describe a 'slight' dependance of high-frequency damping as a function of wind speed (Fig.7). However, the correlation for the Oensingen (lower height) does not look statistically significant considering both the error bars on the individual points and the likely error on the slope. Please use the error on the slope to determine whether this dependance is statistically different from 0.

3. I am confused by the discussion of an offset signal in the CL detector due to molecules other than NO reacting on longer timescales (p. 6873). Reactions occurring on longer timescales would contribute to the a background - but would not likely, I think, be as consistent throughout the experiment as described in the manuscript - such interferences would presumably vary throughout the field project. Please provide some literature references or experimental observations to support this hypothesis. The background of the system seems more likely noise in the photomultiplier tube detectors in the CL system rather than long chemiluminescent reactions.

4. p.6877, line 15/16: The authors suggest that problematic points may pass through the stationarity test 'accidentally': please clarify what is meant by this. were points manually tested or automatically?

Technical notes: p.6870, l.16, remove an 'and' p.6874, l. 15, should read "with an unheated inlet" Fig.2: y-axis font size should be larger

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