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Atmospheric Measurement Techniques Discussions

Interactive comment on "Eddy covariance flux measurements of ammonia by electron transfer reaction-mass spectrometry" *by* J. Sintermann et al.

Anonymous Referee #1

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The paper by Sintermann et al. presents a new way for measuring ammonia eddy covariance fluxes using charge transfer via O2+ based on PTR-MS technology. The main challenge is to correct for high frequency losses due to the 'stickiness' of ammonia, which has posed problems for ammonia flux measurements in the past. The method is tested in the field and compared with complementary methods in the literature. The paper contains significantly new results and should be published after addressing comments listed below:

The instrumental modifications seem to be minor compared to an earlier publication

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Discussion Paper

(Norman et al.) that demonstrated the feasibility of O2+ chemistry to measure ammonia with a PTR-MS instrument. The authors create a new acronym - eTR-MS. While it seems an attractive marketing concept to create new acronyms similar to the 'iPAD, iPhone etc. mania world', my feeling is that the minimum requirement that warrants the creation of a new acronym in scientific technology should be the presentation of a truly novel concept or understanding of a mechanism that has not been published before. In the present case a thorough theoretical explanation and discussion describing the ion-chemistry of O2+ in a flow-driftube (+possible side reactions) would be very valuable. For example is the theoretical reaction rate consistent with the obtained sensitivities? What would be the consequence if more water vapor was present? It seems that there is still enough water to initiate H3O+ chemistry in the system, which is exploited to measure latent heat fluxes. What is the limit of water that can be present so that the detection of ammonia would not suffer? Could H3O+ and O2+ chemistry be operated at the same time for selected VOCs and ammonia?

Page 4713: The Td calculation seems to be wrong: 400V drift pressure and 2.13 mbar drift pressure does not give 120 Td! It should be more like 83 Td.

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 4707, 2010.