

## Brief Description of bi-directional exchange of NH<sub>3</sub>

CMAQ estimates bi-directional exchange of NH<sub>3</sub> using a two-layer canopy compensation point model following Nemitz et al (2001) parameterized using North American agricultural NH<sub>3</sub> flux observations (Walker et al. 2006; Bash et al. 2010). Stomatal and non-agricultural soil compensation points were modeled as a function of the land cover type. In this pilot project, soil compensation points for agricultural areas were dynamically modeled following Cooter et al. (2010) using commercial fertilizer application survey data from the National Nutrient Loss and Soil Carbon Database (<http://www.brc.tamus.edu/data-resources/national-nutrient-soil--carbon-losses>) and applied to the agricultural fraction of the land use data set used by CMAQ and the driving meteorological model. We have a series of manuscripts that will document the implementation, results and evaluation of this pilot project that will be submitted to Biogeosciences later this year as part of the special issue from the Nitrogen and Global Change conference in Edinburgh UK in April.

Nemitz, E. Milford, C., Sutton, M.A.: A two-layer canopy compensation point model for describing bi-directional biosphere-atmosphere exchange of ammonia. Q. J. R. Meteorol. Soc. 127, 815-833, 2001

Walker, J.T., Robarge, W.P., Wu, Y., Meyers, T.P.: Measurement of bi-directional ammonia fluxes over soybean using the modified Bowen-ratio technique. Agric. Forest Meteorol. 138, 54-68, 2006

Bash, J.O., Walker, J.T., Katul, G.G., Jones, M.R., Nemitz, E., Robarge, W.P.: Estimation of in-canopy ammonia sources and sinks in a fertilized *Zea mays* field. 44, 1683-1689, 2010

Cooter, E.J., Bash, J.O., Walker, J.T., Jones, M.R., Robarge, W.: Estimation of NH<sub>3</sub> bi-directional flux from managed agricultural soils. Atmos. Environ. 44, 2107-2115, 2010