

Ammonia air-surface exchange in an unfertilized hay field in the southeastern U.S.

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The processes of ammonia (NH₃) air-surface exchange in unfertilized grass ecosystems remain largely uncharacterized in the U.S. This study was conducted near Chapel Hill, North Carolina during the spring and summer of 2008 to quantify the flux of ammonia (NH₃) above an unfertilized grass field managed for hay production. Objectives were to examine the influence of management practices (e.g., cutting and removal of cuttings) on fluxes and to assess the relative importance of soil versus foliage processes with respect to the net canopy-scale flux. Ammonia fluxes above the vegetation were measured by the modified Bowen-ratio technique using an AMANDA continuous rotating wet denuder system with online conductivity detection to measure vertical concentration gradients. Additionally, ammonium (NH₄⁺) and hydrogen ion (H⁺) concentrations in the soil solution, grass tissue, and grass surface water (i.e., dew and guttation) were measured throughout the experiment to assess component emission potentials. Differences in flux characteristics before and after cutting, patterns of soil and foliage chemistry, and the relationships between fluxes and surface characteristics are discussed.

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