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Dry and wet deposition of inorganic nitrogen compounds to a tropical pasture site (Rondônia, Brazil)

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Abstract. The input of nitrogen (N) to ecosystems has increased dramatically over the past decades. While total (wet + dry) N deposition has been extensively determined in temperate regions, only very few data sets of N wet deposition exist for tropical ecosystems, and moreover, reliable experimental information about N dry deposition in tropical environments is lacking. In this study we estimate dry and wet deposition of inorganic N for a remote pasture site in the Amazon Basin based on insitu measurements. The measurements covered the late dry (biomass burning) season, a transition period and the onset of the wet season (clean conditions) (12 September to 14 November 2002) and were a part of the LBA-SMOCC (Large-Scale Biosphere-Atmosphere Experiment in Amazonia - Smoke, Aerosols, Clouds, Rainfall, and Climate) 2002 campaign. Ammonia (NH<sub>3</sub>), nitric acid (HNO<sub>3</sub>), nitrous acid (HONO), nitrogen dioxide  $(NO_2)$ , nitric oxide (NO), ozone  $(O_3)$ , aerosol ammonium  $(NH_4^+)$  and aerosol nitrate (NO3 ) were measured in real-time, accompanied by simultaneous meteorological measurements. Dry deposition fluxes of NO<sub>2</sub> and HNO<sub>3</sub> are inferred using the "big leaf multiple resistance approach" and particle deposition fluxes are derived using an established empirical parameterization. Bi-directional surface-atmosphere exchange fluxes of NH<sub>3</sub> and HONO are estimated by applying a "canopy compensation point model". N dry and wet deposition is dominated by  $NH_3$  and  $NH_4^+$ , which is largely the consequence of biomass burning during the dry season. The grass surface appeared to have a strong potential for daytime NH<sub>3</sub> emission, owing to high canopy compensation points, which are related to high surface temperatures and to direct NH<sub>3</sub> emissions from cattle excreta.

NO<sub>2</sub> also significantly accounted for N dry deposition, whereas HNO<sub>3</sub>,



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■ Final Revised Paper (PDF, 800 KB) ■ Discussion Paper (ACPD)

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