



Dry and wet atmospheric nitrogen deposition in Africa

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This work is part of the IDAF (IGAC/DEBITS/AFrica) programme which started in 1995 with the establishment of 10 measurement sites representative of major African ecosystems. The objectives of the programme are to study wet and dry deposition fluxes, to identify the relative contribution of natural and anthropogenic sources and factors regulating these fluxes. In this way, the IDAF activity is based on high quality measurements of atmospheric chemical data (gaseous, precipitation and aerosols chemical composition) on the basis of a multi-year monitoring. The atmosphere is a critical environment for the nitrogen cycle. In 1990 ~140 Tg N were converted from N₂ to reactive N (e.g., NO_x, NH₃) through worldwide energy and food production. A large portion of this N was emitted into the atmosphere as NO_x (~34 Tg N) and NH₃ (~43 Tg N). All of the emitted NO_x and NH₃ were deposited to the earth's surface (Galloway and Cowling, 2002) with significant impacts (Galloway and Cowling, 2002). The main objective of this paper is to present the first estimation of the atmospheric nitrogen deposition budget in Africa based on experimental measurements. To estimate atmospheric nitrogen deposition, including both wet and dry processes, we compiled the IDAF nitrogen data (gas, particles, rain) obtained from the measurement network for three consecutive years. In western and central Africa, we studied a transect going from dry savanna to humid savanna and forest. In South Africa, two very different IDAF sites were chosen to be representative on one hand of a rural (semi-arid savanna) and on the other hand of an industrialized site. Presenting the different components of the nitrogen atmospheric deposition on these sites, i.e., dry deposition in gaseous and particulate forms associated with wet deposition, this study will allow to give the relative contribution of dry and wet deposition processes to the total nitro-

gen deposition. A specific study will also be conducted in the semi arid savannas of Mali and Niger. Based on field measurements of NO emission from soils, the objective is to analyse the relation between the seasonal variability of NO_x emission and the associated N (NO₃ +NO₂) deposition.

Galloway, J. N., and E. B. Cowling, 2002. Reactive nitrogen and the world: 200 years of change, *Ambio*, 31, 64-71.