Long-term atmospheric inorganic nitrogen deposition in West African savanna over 16 year period (Lamto, Côte d'Ivoire)

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Introduction

Nitrogen critical loads are poorly assessed in Africa.

The International Network to study Deposition and Atmospheric chemistry in Africa (INDAAF) project, operational since 1995, has provided the first consistent in situ measurements of wet and dry N deposition fluxes in rural Sub-Saharan Africa ecosystems.

This study aims for the first time to assess long-term statistical trends of atmospheric and seasonal dynamic of N depositions in a regionally representative African wet savanna ecosystem, using a 16 year dataset representing the 2000–2015 period.

Here we present a compilation of INDAAF wet and dry nitrogen deposition fluxes collected at the wet savanna site of Lamto (Côte d'Ivoire).

This work should contribute to the on-going International Nitrogen Assessment in the framework of the International Nitrogen Initiative (INI).



Study site





Location (06°13'N, 05°02' W) : Reserve located in the V-shaped Baoulé region (120 km North of Abidjan, Côte d'Ivoire) and constituted essentially of the so called Guinean savanna along the Bandama River.

Vegetation : Mosaic of savannas with various tree densities, and gallery forests

Soils : Granites and derived sands and classified as tropical ferruginous soils with a superficial gravelly horizon

Results and discussion

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Total inorganic N deposition (2000–2015) = 10.3 ± 1.2 kgN ha⁻¹ yr⁻¹.

Wet N Deposition (68%) ; Dry N deposition (32%) PM10 + gas.

Decreasing trends for dry N deposition (N-NO₂ and N-NH₃), increasing trends for N-HNO₃ dry deposition flux and WD of N-NO₃- and N-NH₄⁺.

No significant trend in total N deposition over the 16 year study period.

N deposition influenced by variation in NOx and NH₃ emission from **biomass burning** and **agricultural** sources, and **rainfall amount**.

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