

# Nat-Seisoen Chemiese Samestelling van Atmosferiese Nat Deposisie by Kaappunt

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## Opsomming

Die meting van die chemie van presipitasie maak die assessering van die tydelike en ruimtelike evolusie van die chemiese samestelling van die atmosfeer, wat met fisiese en chemiese meganismes in die atmosferiese geassosieer word, moontlik. Die doel van hierdie studie was om die chemiese samestelling van reënwater, wat in 'n mariene omgewing by die Cape Point Global Atmosphere Watch (CPT GAW)-stasie, vanaf 2004 tot 2012, versamel is, te rapporteer. Soos verwag, was die volume geweepte gemiddelde (VGG)-konsentrasies van  $\text{Na}^+$  ( $298.64 \mu\text{Eq.L}^{-1}$ ) en  $\text{Cl}^-$  ( $354.18 \mu\text{Eq.L}^{-1}$ ) beduidend hoër in vergelyking met die VGG-konsentrasies van ander ioniese spesies, asook in vergelyking met die VGG-konsentrasies van hierdie twee spesies by ander meetstasies in die Suid-Afrikaanse binneland. Die gemiddelde pH van reënwater was effens laer as die pH van onbesoedelde reënwater, hoofsaaklik as gevolg van  $\text{NO}_3^-$  wat geassosieer is met die af- en toe-invloed van die Kaapstadse metropool. In teenstelling met meetstasies geleë in die noord-oostelike binneland van Suid-Afrika, waar antropogeniese  $\text{SO}_4^{2-}$  die belangrikste komponent in reënwater was, was  $\text{SO}_4^{2-}$  by CPT GAW volledig geassosieer met seelug met geen antropogeniese invloede nie. Daar is ook aangedui dat 94% van die chemiese inhoud by CPT GAW aan die mariene bron toegeskryf kan word.

*Sleutelwoorde:* presipitasie-chemie; atmosferiese vloede; anorganiese ione; Global Atmosphere Watch (GAW); Suid-Afrika

# Wet Season Chemical Composition of Atmospheric Wet Deposition at Cape Point

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## Abstract

The measurement of precipitation chemistry enables the assessment of the temporal and spatial evolution of the chemical composition of the atmosphere associated with atmospheric physical and chemical mechanisms. The aims of this study were to report the chemical composition of rainwater collected at a marine environment, i.e. the Cape Point Global Atmosphere Watch (CPT GAW) station from 2004 to 2012. As expected, the volume weighted mean (VWM) concentrations of Na<sup>+</sup> (298.64 μEq.L<sup>-1</sup>) and Cl<sup>-</sup> (354.18 μEq.L<sup>-1</sup>) were significantly higher compared to the VWM concentrations of other ionic species, as well as compared to the VWM concentrations thereof at the sites in the South African interior. The average pH of rainwater was slightly lower than the pH of unpolluted rainwater, mainly due to NO<sub>3</sub><sup>-</sup> associated with the occasional influence of the Cape Town metropole. In contrast to the sites situated in the north-eastern South African interior, where anthropogenic SO<sub>4</sub><sup>2-</sup> was the major constituent in rainwater, SO<sub>4</sub><sup>2-</sup> at CPT GAW was entirely associated with marine air with no anthropogenic contribution. It was also indicated that 94% of the chemical content at CPT GAW can be attributed to the marine source.

*Keywords:* precipitation chemistry; atmospheric fluxes; inorganic ions; Global Atmosphere Watch (GAW); South Africa