

GENERAL INFORMATION

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ABSTRACT

During 9 months, the weekly bulk and wet-only precipitation depositions in an urbanised region of Flanders (Belgium) were compared at two sites with a different height and separated by 1 km. The amount of rainfall at the two sites was similar, and the difference in ion deposition between the two sites was generally less than 5%. While the amount of rainfall measured was almost the same for both collector types, bulk deposition was significantly ($p < 0.02$) higher than the wet deposition of all ions other than H^+ and NH_4^+ . Averaged for both sites, bulk deposition was 129 % (K^+), 84 % (Ca^{2+}), 51 % (Cl^-), 50 % (Mg^{2+}), 46 % (Na^+), 32 % (SO_4^{2-}), 27 % (NO_3^-), 17 % (F^-), and 11 % (NH_4^+) higher than wet-only deposition. The acidity of bulk samples was significantly ($p < 0.06$) lower than the acidity of wet-only samples. Bulk NH_4^+ concentrations were only significantly ($p < 0.002$) higher than wet-only concentrations at one site because of the sensor-related, delayed closing of the wet-only lid at the second site. Although dry deposition significantly contributed to bulk precipitation measurements, bulk deposition exceeded the wet acidifying deposition of NO_3^- , NH_4^+ , and SO_4^{2-} by less than 25 %.

MATERIALS & METHODS

study area	5n (measuring tower)
time period	04/03/2003–09/12/2003
goal	<ul style="list-style-type: none"> - quantification of the systematic bias on precipitation chemistry measured with continuously open funnel collectors - comparison of the precipitation amount & chemistry measured at different heights at two sites (1 km apart)
set-up	top measuring tower (h = 36.5 m) + open field site wet-only and bulk precipitation
data collection	weekly collection of water samples: pH, conductivity, anions (F, Cl, PO_4 , SO_4 , NO_3 , NO_2), cations (NH_4 , Na, K, Mg, Ca) 4-weekly passive sampling of ammonia: NH_3 concentration
remarks	Chapter 2 of Staelens_2006_PhD

RESULTS

Bulk deposition was 30–130 % higher than the wet deposition of all major elements, except NH_4^+ . The acidity of the bulk deposition was significantly lower than that of the wet-only precipitation. Wet-only samplers are preferred for the accurate determination of wet deposition fluxes, and bulk deposition measurements should be corrected for dry deposition on the funnels.