



## Nitrogen deposition along an elevation gradient in Taiwan

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Taiwan is one of the areas that has high nitrogen deposition. The deposition of nitrogen, however, is not homogeneous, but rather is heterogeneous with high spatial and temporal variation. In this study, we evaluated nitrogen deposition along an elevation gradient ranged from 100 m which was closest to the agricultural and industrial areas to 1800 m which was located in the mid-elevation mountainous areas to identify how elevation affects nitrogen deposition under an annual determination. Bulk precipitation was collected using the funnel apparatus mounted on a post 1.5 m above ground level in each study site ( $n=7$ ), and collected weekly or every other weekly depending on the frequency of rainfall events. Cations ( $K^+$ ,  $Na^+$ ,  $Ca^{+2}$ ,  $Mg^{+2}$ , and  $NH_4^+$ ), anions ( $F^-$ ,  $Cl^-$ ,  $SO_4^{-2}$ , and  $NO_3^-$ ), pH and electric conductance (EC) of precipitation water were analyzed. The results indicated a significant trend along the elevation gradient. Volume-weighted mean concentration ( $\mu g L^{-1}$ ) and deposition amounts ( $kg ha^{-1}$ ) of based cations, anions,  $NH_4^+$ , pH and EC decreased with the elevation, whereas hydrogen ion increased with elevation. The mean ratio of  $NH_4^+-N/NO_3^- -N$  for all study sites was 2.87 and no clear elevation trend existed. However, a relatively high ratio of  $NH_4^+-N/NO_3^- -N$  was found in the sites with elevation less than 500 m during the periods between March and May, suggesting the seasonal agricultural input in these sites. Deposition of  $NH_4^+-N$ ,  $NO_3^- -N$ , and total inorganic N were 12 – 25, 4 – 10, and 16 – 37  $kg N ha^{-1}$ , respectively, during the period from January 2016 to August 2016. Higher nitrogen deposition is expected for the whole 2016 year. High nitrogen deposition poses an ecological threat in Taiwan and more research is warranted to understand how nitrogen deposition could be detrimental to environment.