Atmospheric wet depostion fluxes of nitrogen and phosphorus in Lake Qinghai watershed at Qinghai-Tibet Pleatau, China

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Introduction

Over the last decades, human activities have been changing the global cycles of N and P, which has resulted in increasing fluxes of these elements throughout the atmosphere[1]. Long-term and high-level atmospheric N and P deposition may cause eutrophication, which would further decrease the biodiversity of the aquatic ecosystem [2]. Plateau lakes are typically dystrophic and are sensitive to small changes in nutrient deposition. This study investigated the atmospheric wet deposition fluxes of N and P in the Lake Qinghai Watershed of Qinghai-Tibet Pleatau for one year from October 2017 to September 2018.

Results and discussion

Average dissovled N concentration in precipitation was 3.33 mg L^{-1}, mainly consisting of NH_4^+-N (1.97), organic N (0.77) and NO_3^--N (0.55). Average dissoved P concentration in precipitation was 0.36 mg L^{-1}, mainly consisting of inorganic P (0.30). Strong dilution effects in the wet season, a long residency time of nutrient-rich aerosols in the dry season, strong ammonia volatilization in the wet and warm seasons, and moisture sources dominated the seasonal or monthly changing characteristics of N and P concentrations in the precipitation, including high in the wet season and low in the dry season for NH_4^+-N, low in the wet season and high in the dry season for NO_3^--N, and generally increasing from April to September for DIP and DOP. Precipitation quantity dominated the monthly changes in the N and P deposition fluxes, which gradually increased from April to August and then decreased in September. The annual N and P fluxes were 16.82 and 1.86 kg ha^{-1} yr^{-1}, respectively. Average N/P molar riato in the precipitation was 31, thsu N and P wet deposition in Lake Qinghai watershed might be likely to drive the lake ecosystem toward P limitation[3]. Dissolved N and P in the precipitation mostly originated from anthropogenic sources. This study will support the understanding of the biogeochemical cycles of nutrients in the Lake Qinghai Watershed.

[1] Galloway *et al.* (2008) *Science* 320, 889-892.
[2] Conley *et al.* (2009) *Science* 323, 1014-1015.
[3] Anderson *et al.* (2006) *Water Air Soil Pollut*. 176, 351-74