Nitrate release from a sub-tropical forest in south China: implications from nitrogen and oxygen isotope ratios of nitrate

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Atmospheric deposition of nitrogen increases in populated areas of tropical and sub-tropical Asia, possibly because of an increase in use of fossil fuel and expansion of industrial and agricultural activities. In such areas in south China, high nitrogen depositions have been reported recently. Because of different soil properties as well as different climate, plant species composition and hydrological settings, the responses of these subtropical forest ecosystems to the high nitrogen depositions can be different from those of well-studied temperate forests.

We measured ¹⁵N and ¹⁸O natural abundances (delta-¹⁵N and delta-¹⁸O) in nitrate in precipitation, throughfall and streamwater in an old-growth, monsoon evergreen broadleaf forest in Dinghushan Biosphere Reserve (DHSBR) in south China. Streamwater nitrate had much lower delta-¹⁸O values than precipitation and throughfall, indicating the contribution of atmospheric nitrate to streamwater nitrate would be small, although net nitrogen loss from this watershed had been reported using mass-balance approach (Fang et al. 2007). We will discuss the possible mechanisms that regulate delta-¹⁵N and delta-¹⁸O of streamwater nitrate in DHSBR.