Comparison of dual nitrate isotopes in aerosols sampled at two typical cities, Southwest China

X.D. LI[1,2]*, Z. YANG[2,3], Q.K. LI[2,3], G.Y. CUI[2,3], J. HUANG[2,3] AND Y.L. TAO[1]

[1]Institute of Surface-Earth System Science, Tianjin University, Tianjin, PR China (*Email: xiaodong.li@tju.edu.cn)

[2]Institute of Geochemistry, Chinese Academy of Sciences, Guiyang, Guizhou, PR China

[3]University of Chinese Academy of Sciences, Beijing, PR China

Based on the comparison of sulfate-$\delta^{34}S$, water-soluble inorganic components, and dual nitrate isotopes ($\delta^{15}N$, $\delta^{18}O$), we discussed the sources and formation mechanisms of nitrae in aerosols sampled at Chengdu (megacity, heavily polluted) and Guiyang (small city, relatively clean). In Chengdu and Guiyang, the annual means of sulfate-$\delta^{34}S$ in TSP were 4.9‰ and -0.2‰, respectively, which are consistent with the $\delta^{34}S$ values in coals combusted at the two respective regions, indiating coal combustion is still the key source of air pollution in the two cities.

The annual means of nitrate $\delta^{15}N$ and $\delta^{18}O$ in TSP were higher in Chengdu (2.3‰ and 72‰) than in Guiyang (-6.1‰ and 55‰), while in each city the $\delta^{15}N$ and $\delta^{18}O$ values were higher in winter than those in summer (Fig. 1).

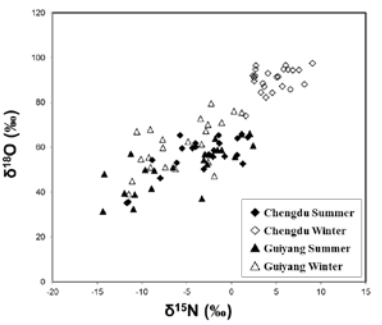

Figure 1. Nitrate $\delta^{15}N$ *vs.* $\delta^{18}O$ in two cities

Considering $\delta^{15}N$ and $\delta^{18}O$ values of emissions from vehicle exhaust, coal combustion, and agricultural soil, etc., high dual nitrate isotopes in Chengdu could be resulted from the ever increasing numbers of cars and subsequent pollution. In the two cities, low $\delta^{15}N$ and $\delta^{18}O$ values in summer might be affected by different formation pathway as NOx mainly oxidized by HO· and/or the hydrolysis of N_2O_5 to generate the nitrate, not as NOx mainly oxidized by O_3 in winter.

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