

## **Characteristics of nitrification and the associated biogeochemical factors in tea orchard soil, Southern China**

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In order to study the effect of climate change on the nitrification in the acidic soil region, incubation experiments were conducted with the soils which were taken from three tea orchards at the elevation of 38 m (Site L), 440 m (Site M) and 858 m (Site H) in the Fenghuang Mountain, Guangdong Province, China. The average annual temperature is 19.6 °C at the foot of the mountain where the rate of reduced temperature with elevation is expected about 0.6 °C /100 m.

It was found that the averages of soil pH from high to low elevation were 4.28, 3.62 and 3.88 respectively. The inorganic N of soil at high elevation was significantly larger than the other two sites. In the 48 hours of incubation experiments, the net nitrification rate was high in the first 2 hours then decreased while ammonium was transformed quickly into nitrate. Accordingly, the nitrification potentials were determined by shaken soil slurry method and maximum nitrification activities ( $V_{max}$ ) were estimated by Michaelis-Menten and Haldane models.

In average, the amoA-AOA increased from  $4.78 \times 10^6$  gene copies  $g^{-1}$  dry weight at site H to  $3.28 \times 10^7$  gene copies  $g^{-1}$  dry weight at Site L. The amoA copy numbers had a positive correlation with the nitrification potential, and a negative correlation with soil pH. Therefore, AOA-amoA dominated in amoA, and plays with AOB-amoA an important role in nitrification in the acidic soils.