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# The Anti-altitude Effect of Hydrogen and Oxygen Stable Isotopes in Precipitation and its influence on Local Water Cycle in Hani Rice Terraces

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Hydrogen and oxygen stable isotopes and their variation with elevation and temperature are effective means of tracing the water vapor cycle. Usually, the value of hydrogen and oxygen isotopes appears negative correlated with altitude in the windward slope of high mountains, which reflects the situation of local water vapor transportation to a certain extent.
This paper takes the Quanfuzhuang River Basin located in the Hani Rice Terraces region as study area, collecting precipitation and surface water samples in rainy season (from May to October) at an altitude range of 500m from 1500m to 2000m a.s.l. . The analysis on samples' hydrogen and oxygen isotope value indicate:
1) The value of hydrogen-oxygen stable isotope show a trend of decreasing firstly and then increasing with altitude, i.e. there is an anti-altitude effect near the top of the mountain. And the same trend observed in the amount of precipitation of the same sampling period. Both of two phenomena have proved the existence of over peak airflow and local water circulation near the mountaintop. 2) However, anti-altitude effect can be found in only three months during entire rainy season, namely June, August and September. According to HYSPLIT(HYbrid Single-Particle Lagrangian Integrated Trajectory) model simulation, the elevation effect of hydrogen and oxygen isotopes in precipitation in the study area is related to the source of water vapor. When the source of water vapor is mainly from the windward slope, the isotopic elevation effect is negative; while when the source is dominated by the over peak airflow, anti-altitude effect appears. Therefore, the phenomena of local circulation and multiple water vapor transport in study area provide a circumstance with various sources of water vapor for ecological maintenance and agricultural production in the Hani rice terraces area, which has been an important guarantee for the high stability of the water source.
Key words: Hani Rice Terraces region, Hydrogen and oxygen isotopes, Anti-altitude effect, Local water cycle, Water vapor sources