

Holocene Typhoon history recorded by leaf wax n-alkane hydrogen isotope in a subtropical lake in southern China

Jiantao Cao¹, Jixiang Fan² and Guodong Jia³

¹Tongji University

²Not applicable, retired

³State Key Laboratory of marine Geology, Tongji University

Presenting Author: jjagd@tongji.edu.cn

The coastal region of South China is in the typical East Asian monsoon zone. Precipitation isotope records have been intensively used in the reconstruction of the East Asian summer monsoon history, but there is a lack of such a record in the coastal South China. A record of leaf wax n-alkane hydrogen isotope (δD_{wax}) reflective of Holocene precipitation δD , from a maar lake in the coastal South China, was extracted in this study. The carbon isotope record of leaf wax n-alkanes from the same sediment core has been published and exhibits a humid climate from 9.2 to 1.8 ka, with a drying climate in the time periods before and after that. However, the δD_{wax} record in this work does not agree with the above wet and dry variations, and even, contrary to what is commonly understood, exhibits higher values during 9.5-3.2 ka and lower values in other time periods. This is also distinct from the stalagmite isotope record that reflects the history of East Asian summer monsoon changes. We believe that the pattern of precipitation δD_{wax} variations in the study area may have been strongly influenced by typhoon precipitation, which is a major feature of the coastal South China. Nowadays, δD values of typhoon precipitation ($\sim -57\text{‰}$) are significantly lighter than those of monsoon precipitation (-39‰) and non-monsoon precipitation (-15‰) under normal conditions. Thus, the δD_{wax} records in this study should reflect the contribution of typhoon precipitation to the annual rainfall, i.e., the contribution of typhoon precipitation decreased during the middle-late Holocene between 9.5-3.2 ka in the coastal South China, despite the humid climate, and increased during the early and late Holocene. This pattern of typhoon change in the Holocene may be related to the thermal state of the equatorial Pacific in some way.