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Multi-proxies study of the Hanon paleo-maar sediment, Jeju Island, Korea: implications for paleoclimate variability over the last 35 kyrs

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ABSTRACT

The inorganic and organic proxies were investigated in the Hanon paleo-maar sediment, Jeju Island of Korea to understand paleoclimate variabilities since the last 35 kyr. Based on the major element concentration, and its variations in Al/Ti, Al/Th showed stratigraphic difference between lower and upper part, and suggesting that sediment provenance and sources are associated with paleo-environmental changes in study area. CIA, which indicating chemical weathering of source materials, also shows continuous changing with two breaking points at 14. ka and 3.0 ka. Combining with inorganic and organic proxies, the core column stratigraphy was divided into three units, namely from the bottom to 14.5 ka (Unit I), from 14.5 ka to 3.0 ka (Unit II), and from 3.0 ka to the core top (Unit III), respectively. Various organic proxies were measured to track the paleoclimatic variations, and compared with inorganic data. The TOC (%), TN (%), and their $\delta^{13}\text{C}_{\text{org}}$ and $\delta^{15}\text{N}_{\text{org}}$ show specific excursion. In particular, $\delta^{13}\text{C}_{\text{org}}$ showed marked fluctuation from -17.31‰ to -28.68‰, suggesting different organic carbon sources. A relatively narrow range of variation in $\delta^{13}\text{C}_{\text{org}}$ was observed in Unit III, and drastic changes in $\delta^{13}\text{C}_{\text{org}}$ were observed from Unit II to Unit I. This may indicate a mixture of C3 and C4 plants in Unit III, and drastic changes from terrestrial C4 in Unit II to C3 plants in Unit I. The distributions of *n*-alkane were characterized by a continuous predominance of odd-numbered *n*-alkanes, particularly $n\text{C}_{29}$ and $n\text{C}_{31}$, and by high fluctuation of the total *n*-alkanes concentrations. The distribution of *n*-alkanes and inorganic

proxies support paleoclimatic variations as well as vegetation changes, and their time-dependent variations matched well with glacial-interglacial paleoclimate variations. Therefore, organic and inorganic geochemical proxies recorded in Hanon paleo-maar sediment reflects paleoclimate variabilities as well as paleovegetation changes for the last 35 kyr in Jeju Island, Korea.

