A major decline of C_4 plant in the source region of the North Pacific eolian dust (Asian interior) from 12 to 9 Ma

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Aeolian deposition in the central north Pacific has been well recognized to originate from arid Asian interior. However, works on terrestrial organic tracers therein are rare. In this work, higher plant leaf wax n-alkanes from ODP Site 1208 in the northwest Pacific since the middle Miocene were analyzed to explore the source region vegetation and climate changes. Both average chain length of wax n-alkanes and their accumulation rates showed a general increasing trend, consistent with the well recognized climatic drying trend of the Asian interior. The record of isotopic fractionation factor between plant and atmospheric CO_2 ($\varepsilon_{plant-CO2}$), calculated from $\delta^{13}C$ values of n-alkane and atmospheric CO_2, showed a prominent decrease from 12.4 to 9.3 Ma, and displayed a general pattern of higher values prior ~8 Ma and lower values post ~8 Ma. Although all values of $\varepsilon_{plant-CO2}$ (−18.5 to −16.8‰) were well within the range of C_3 plants, adjustment of isotopic discrimination of C_3 plants was rule out as the main cause of the observed $\varepsilon_{plant-CO2}$ variations. Therefore, relative abundances of C_3 vs. C_4 plants were invoked to interpret the $\varepsilon_{plant-CO2}$ record, and higher C_4 contributions (13.8 ± 2.0%) were inferred due to slightly warmer climate in the source region prior to ~8 Ma. The suggested major C_4 decline from 12.4 to 9.3 Ma was concurrent with evidences supporting a prominent uplift of northern Tibetan plateau [1], demonstrating close relationships of Tibetan uplift, drying and cooling climates, and vegetation changes of the Asian interior.

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Geochemistry of the Xuanwei Group in Guizhou, Southwestern China

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Introduction

According the regional geological information, the sedimentation of southwestern margin of the Yangtze plate was of platform type, its sedimentation in the Xuanwei Group was series of marine to land transformation association [1]. The Upper Permian Emeishan basalt group underlying contact with Xuanwei Group, is continental flood basalt [2], as an eruption of the Emeishan large igneous province magmatism [3]. Sedimentary environment is very useful to understand activities in the Emeishan large igneous province and geological event of great significance to the changed environmental process.

Methods and Results

Trace elements and strontium isotopes are measured of samples from the Xuanwei Group, west Guizhou, and we also collected data from publications from the Emeishan Group and its adjacent regions [1-3]. Based on analyses of petrochemistry and strontium isotopes of carbonaceous shale and sandy shale rocks, geochemical characteristics indicate that sedimentary environments show hydrothermal activity, accomanyed with normal sedimentary participation. The fluctuations in Ce anomaly represent conversion process from oxidative environment and deoxidized environment. Strontium isotopic ratios $(^{87}Sr/^{86}Sr)_{t0}$ manifesting that materials of the Xuanwei Group may be derived from Emeishan basalts mixed with marine carbonate from chemical weathering. It conclude that sedimentary sources were not only by Emeishan basalt weathering, but also causes of hot water sedimentary display.

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