

柴达木盆地察尔汗古湖相地层正构烷烃与河蚬化石记录的古生态环境

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中文摘要:利用常规 ^{14}C 、加速器(AMS)方法对柴达木盆地察尔汗湖一典型古湖相沉积剖面系统测年,并对测年结果进行不同组分和不同实验室对比,确定该剖面发育于察尔汗古湖高湖面时期(39.7 ka B.P.~17.5 ka B.P.)。通过对剖面沉积物正构烷烃的系统分析,结果表明正构烷烃携带了重要的湖泊演化的环境和生物信息,其中 $n\text{C}27/n\text{C}31$ 记录了陆生植被的木本和草本相对比例的变化规律,在察尔汗高湖面前期,木本和草本相对含量变化较大,高湖面暖期相对含量变化较小。正构烷烃 L/H 、 $n\text{C}17/n\text{C}31$ 、 $n\text{C}21/n\text{C}22+$ 揭示了湖体生物变化,显示湖泊生物对气候变化的响应比陆生植被更敏感。剖面软体动物河蚬的出现与 L/H 、 $n\text{C}17/n\text{C}31$ 、 $n\text{C}21/n\text{C}22+$ 、 $n\text{C}27/n\text{C}31$ 参数的变化幅度和频率均有较好的对比性,揭示了河蚬、低等菌藻类、陆生植被对气候环境作用的协同响应。

中文关键词:[柴达木](#) [古湖相沉积](#) [正构烷烃](#) [河蚬化石](#) [古生态环境](#)

N-alkanes and Corbicula Fossils in Shell Bar Section of the Qarhan Lake, Qaidam Basin and their Paleoenvironment Significance

Abstract:The shell bar section of the Qarhan Lake in Qaidam Basin was systematically dated by means of accelerator mass spectrometry (AMS) and conventional radiocarbon dating, and the contrastive analyses of the dating results of various components from different laboratories show that the shell bar section does record the change of high paleolake level of Qarhan (39.7 ka B.P.~17.5 ka B.P.). A series of biomarkers were identified, which included n-alkanes, oxygen-containing organic compounds (fatty acid, n-alkane-2-ones), nitrogen-containing organic compounds (amide, nitrile), polycyclic aromatic compounds etc. The n-alkanes contain very essential information concerning the environment and vegetation during the lake evolution, of which the $n\text{C}27/n\text{C}31$ reveals proportionally the evolution of terrestrial woody and herbaceous vegetation, that is, the proportion of woody and herbaceous vegetation changed relatively significantly before the high paleolake level, and insignificantly during the high paleolake level. L/H , $n\text{C}17/n\text{C}31$ and $n\text{C}21/n\text{C}22+$ reveal the change of aquatic organisms in the lake, and are more sensitive to climate change than $n\text{C}27/n\text{C}31$. There exist fairly good comparability between the appearance of Mollusk *Corbicula fluminea* in the section and the changes in amplitude and frequency of L/H , $n\text{C}17/n\text{C}31$, $n\text{C}21/n\text{C}22+$, $n\text{C}27/n\text{C}31$, which must be the consequence of the Collaborative Responses between *Corbicula fluminea*, bacteria algae, terrestrial vegetation and the climate environment. On the basis of observations of biomarkers and *Corbicula fluminea* fossils, this paper has tentatively revealed the relationship between bacteria algae, terrestrial vegetation and *Corbicula fluminea* during climate change and confirmed the existence of the high paleolake level of the last glacial period.

keywords:[Qaidam Basin](#) [paleolake deposit](#) [n-alkanes](#) [shell bar](#) [paleoenvironment](#)

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