The characteristics of fluid inclusion from Ordovician carbonate reserviors in Western Ordos Basin

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The study area is located in the western thrust belt region of the Ordos Basin, China. Due to the multi-period tectonic movement and evolution of mechanical mechanism, It resulted in complicated block structure and complicated geological conditions. For western Ordovician reservoir, when were the oil and gas filling accumulation? How many times filling had It experienced? These issues will directly affect effectiveness of the trap and the exploration.

In this study, we respectively carried out samplings of the fluid inclusions in reservoirs of Zhuoxishan group and Kelimoli group Ordovician of QT1, YT1 wells in the Western Basin, made microscopic petrography analysis, homogenization temperature test and microscopic laser Raman microprobe analysis of samples. we analyzed reservoir characteristics of the fluid inclusions of kelimoli and Zhuozishan groups in Ordovician.

There are 4 views: bitumen, hydrocarbon residues, as well as a large number of hydrocarbon fluid inclusions were prevalent in cracks and pores in reservoir of kelimoli group and Zhuozishan group Ordovician which fully shows that oil-gas migration and filling have occurred within the Ordovician reservoirs. Inclusions of microscopic petrography analysis shows 2 issues were prevalent in hydrocarbon filling in Ordovician limestone reservoir. The 1th hydrocarbon inclusions in the Ordovician period were dominated by the dark brown and brown liquid hydrocarbon inclusions, capturing hydrocarbons maturity is relatively low; the 2nd grey-gaseous hydrocarbon inclusions were in the hydrocarbon inclusions, capturing hydrocarbons maturity is relatively high. The first homogenization temperature distribution has a bimodal characteristics of kelimoli group Ordovician;The second homogenization temperature distribution has an asymmetrical single peak, Wide at front and rear is narrow.

Oligocene – Early Miocene North Pacific temperatures based in clumped isotopes in Kamchatka Bivalves

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The Oligocene through early Miocene was an important transitional interval in the development of the Neogene "Icehouse World". However, very little is known about the details of ocean temperature evolution at that time, particularly in high-latitude areas. We use clumped-isotope based paleotemperature reconstructions derived from the Oligocene - early Miocene shallow water molluscan faunas coupled with the MBT/CBT-based soil temperataure reconstruction and $^{87}Sr/^{86}Sr$ dating to examine North Pacific paleoceanography. Fossil mollusks were collected from the Cape Ugol'nyi section in northwestern Kamchatka Peninsula. Sample minerology and seasonal signals in $\delta^{18}O$ along bivalve growth axis suggest that these samples have not experienced significant diagenetic alterations during burial.

Clumped isotope analyses were applied to 2 modern samples and 16 fossil samples, with $^{87}Sr/^{86}Sr$ ages range from ~32.6 to 19.9 Ma. In the modern samples, clumped isotopes derived growth temperature is 10-12°C, consistent with satellite-based summer temperatures. Fossil samples have a larger temperature variability, between 21°C and 7°C. Both early Oligocene and early Miocene are warm (~16°C), with the coldest temperature (9°C) found in the late Oligocene, slightly lower than the modern growth season temperature at the same location. This late Oligocene cooling event was obtained from a stratigraphic horizon with $^{87}Sr/^{86}Sr$ age of 27.8-29.1 Ma, coinciding with the marine benthic $\delta^{18}O$ positive excursion Oi2b-Oi2c. Organic biomarkers extracted from a rock sample at the same horizon give a MBT/CBT-based soil temperature estimate of 6°C, in support of a prevailing cold temperature both on land and in the ocean.

The colder-than-today temperatures in the late Oligocene is intriguing because the Oligocene world is thought to be warmer, as suggested by lower global benthic $\delta^{18}O$ stack and higher atmospheric CO_2. The dramatic cooling during Oi2b may be a consequence of reorganization of surface circulation patterns in the North Pacific, with the cold North Pacific becoming a major source for bottom-water production during this time interval.

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