

## **The unusually high abundance of rearranged hopanes in crude oils from the Southwest Depression of the Tarim Basin, China**

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Although high concentrations of rearranged hopanes have been reported in crude oil samples taken from the Kekeya Oil Field in the Tarim Basin, there is no research on the relationship between the rearranged hopanes and other geochemical biomarkers that can help determine favourable conditions for the formation of rearranged hopanes. In this context, we collected crude oil samples from the Southwest Depression of the Tarim Basin and analysed them using the gas chromatography–mass spectrometry technique in terms of hopane compositions, combined with the Pearson correlation analysis (PCA), to understand the reason for the unusually high abundance of rearranged hopanes.

Three series of rearranged hopanes were detected in the samples: 17 $\alpha$ (H)-diahopanes (C<sub>29</sub> and C<sub>30</sub> rearranged hopanes), 18 $\alpha$ (H)-neohopane (Ts and C<sub>29</sub>Ts), and C<sub>30</sub> early-eluting rearranged hopanes (30E). The high contents of these rearranged hopanes relative to hopanes correlated well with each other, indicating that they were derived from the same source. The related ratios of the rearranged hopanes and other saturated biomarkers suggest that the unusually high abundance of rearranged hopanes in the crude oil samples is closely related to the redox condition, whereas other biomarkers, representing the water salinity condition, thermal maturity, and biological sources, are weakly correlated with the rearranged hopane series relative to hopanes. More importantly, the sedimentary facies and redox conditions are the controlling factors of the high abundance of rearranged hopanes in the crude oils from the Southwest Depression of the Tarim Basin using Pearson correlation analysis (PCA).