



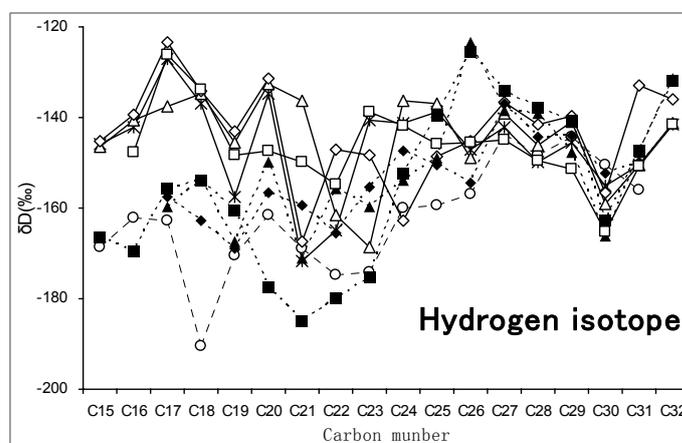
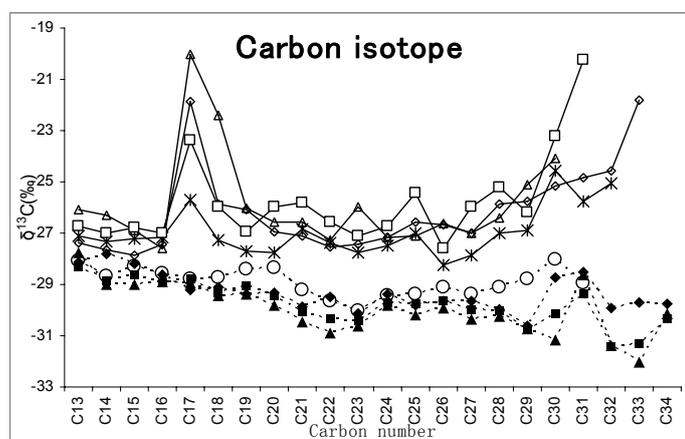
Impact of moderate and heavy weathering process on carbon and hydrogen isotopes of individual *n*-alkanes in oils

S.J. He and C.Y. Wang

Yantai Institute of Coastal Zone Research, Chinese Academy of Sciences, Yantai 264003, China. **E-mail:** yantaienv@126.com

Abstract

A simulated 300-day weathering experiment was conducted to simulate oil weathering processes to determine changes of individual carbon and hydrogen isotopes of *n*-alkanes in two oil samples. Results show there are significant differences in the distribution of these fractions in the different initial and weathered oils. Diagnostic ratios of *n*-alkane displayed obvious changes after weathering processes which suggest they are not very suitable as characteristic ratios for identification of sources of medium to serious weathered oil spills, while the trends in isotopic distribution profiles are little influenced by the processes.



Introduction

Discrimination of stable isotopes of carbon and hydrogen provides an effective tool for tracing source for oil pollutants. Previous study focused on understand the influence of short-term biodegradation on the hydrogen and carbon isotopes of individual *n*-alkanes. However, little work has been done about evaluation of the effect of moderately or highly weathered on the hydrogen and carbon isotopics distribution of *n*-alkane for oil spill identification. Thus some new efforts should be done to understand the relationship between the weathering processes and the isotopic composition of individual *n*-alkanes.

Results

Under simulated weathering conditions, in a short-term weathering process, carbon isotopes of some carbon number individual *n*-alkanes of crude oil have been significantly fractionated. Compared to the short-term weathering process, the medium-term weathering process shows a more significant effect on the carbon isotope

fractionation of individual *n*-alkanes of crude oil. The effects of the long-term weathering process show a gradually weakening trend. While the weathering process give little influence to the trends in isotopic distribution profiles.

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