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## **Early Cretaceous (Aptian) provenance and tectonic response in Songliao Basin, NE China: Evidence from detrital zircon U-Pb ages from the Shahezi Formation**

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In Early Cretaceous, Shahezi Formation developed in syn-rift stage which belongs to the deep strata of the Songliao Basin, China. Due to the poor outcrop development, there is no previous study or report on the provenance of detrital zircons from Shahezi Formation before. The Songke 2 well is a part of Songliao Basin drilling project which belongs to the International Continental Scientific Drilling Projects (ICDP). The conduct of this scientific drilling is to obtain a nearly complete Cretaceous terrestrial sedimentary record, as determined from basin-filling history. Therefore, this research will focus on the sample from Songke 2 well. This study based on continuous and complete sampling which are unique research materials. What's more, Songliao Basin is one of the largest continental sedimentary basins in the world, which holds the most important reserves of Chinese oil and natural gas. Consequently, this study is a kind of significance for oil and natural gas prospects of deep strata in Songliao Basin.

Through the detailed description about cores, fan delta facies and lacustrine facies can be identified in this study. Also, the detailed information and sedimentary environment at Early Cretaceous can be clarified. The upper member of Shahezi formation shows the characteristics of fan delta facies intersecting shore-shallow lakes, reflecting the multistage cyclicity changes under the sufficient source supply during the syn-rift stage. In order to define the provenance of the upper member of Shahezi Formation in the north-central area of the Songliao Basin, five sandstone sample (DZ01~05) of the upper member of Shahezi Formation were continuous sampling from Songke 2 well. U-Pb dating was performed on detrital zircons separated from the five sandstone samples. Detrital zircons from DZ01 to DZ05 has dominant ages of 105~140 Ma (268 grains), 155~200 Ma (160 grains), and 220~260 Ma (44 grains). This paper demonstrates that the provenance of the upper member of Shahezi Formation is came from the Central Great Xing'an Range. The depositional period of the Shahezi Formation constraints of maximum sedimentary age and reached to 111-115 Ma. At the same time, the Great Xing'an Range also provides sediments for the western Hailar Basin, which indicates that the Great Xing'an Range uplift and denudation during this period. The closure and collision of the Mongolia-Okhotsk ocean to the north and Pacific Plate subduction beneath the Asian continent to the east were the major tectonic events affecting the tectonic environment of the Great Xing'an Range.