

## Kerogen and biomarker compositions of uranium-rich coaly shales from Miocene sequence at Kanamaru, Japan

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We obtained a continuous 45 m-long core from the Miocene sedimentary sequence and basement Cretaceous granite at Kanamaru, northeast Japan. The Miocene sequence intercalates with a uranium-rich coaly shale seam (U = 25-100 ppm; Th = 23-42 ppm). We have analyzed the kerogen macerals and biomarkers in the core to characterize the organic matter in the uranium-rich seam.

Visual kerogen analysis indicated that the relative abundance of coaly and woody kerogens in total kerogen is generally high in the samples that contain high amount of uranium. The coaly and woody kerogens consist about 80% of total kerogen, and the rest 20% are herbaceous and amorphous kerogens in uranium-rich coaly shales. TMAH-pyrolysis-GC/MS analysis showed that the organic matter in pyrolysates comprises mainly alkyl-aromatic hydrocarbons (alkyl-benzenes, alkyl-indenes, alkyl-naphthalenes, etc.) and n-alkanes. Acyclic isoprenoid alkanes (mainly pristane), n-alkenes, n-fatty acids and acyclic isoprenoid acids were detected as minor components. Most of these compounds are characteristic of the type-III kerogen that derived from terrestrial higher plants. Thermal alteration index (TAI) of Pinus pollen was about 2.6, which indicates that the thermal maturation of the coaly shale reached the stage of early catagenesis. This maturity was also suggested by high abundance of diagenetically generated isomers of hopanes in TMAH pyrolysates.

A good correspondence that uranium-rich samples are always rich in type-III organic matter suggests that the type-III organic matter was able to concentrate uranium by the absorption and/or reduction of uranium during deposition and/or early diagenesis.