

Are Tertiary Coals from Central and Southern Alaska Source Rocks for Oil?

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ABSTRACT

In order to determine whether Tertiary coals from central and southern Alaska are potential sources of oil, hydrous pyrolysis (HP) experiments (360 °C/72 hours) were performed on two samples of Miocene Suntrana Formation from Nenana basin and two samples of Paleogene Chickaloon Formation from Matanuska Valley, Alaska. The hydrogen index values of the coals, prior to the HP experiments, range from 152 to 330 mg S₂/g total organic carbon (TOC) and the maceral composition is dominantly huminite/vitrinite (~ 90% by volume). The HP experiments increased the thermal maturity of the coals from immature-early mature (0.46 to 0.69% vitrinite reflectance, and 394 to 423 °C Tmax) to late mature-postmature (1.48 to 1.71% vitrinite reflectance, and 464 to 499 °C Tmax). All four coals generated waxy, low-sulfur (less than 0.2 wt% S) oil with yields ranging from 59.5 to 101.4 mg expelled oil/g TOC, similar to an Upper Cretaceous to Tertiary Latrobe Group coal from Gippsland Basin, Australia (82 mg oil/g TOC). Gas chromatograms of the oils show strong odd carbon preference of the normal alkanes (n-C₂₃ to n-C₃₃) and high pristane/phytane values (>4) typical of oils generated from humic coal. Although HP exaggerates oil expulsion by as much as 50%, given sufficient burial history (time-temperature) these Alaska coals could generate and expel waxy oil.