

## **Snapshots of New Geological Framework and Energy Resource Studies in the Frontier Bowser and Sustut Basins, North-Central British Columbia**

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### **Abstract**

New research in the frontier Bowser and Sustut interior basins of British Columbia includes geological mapping and thematic studies. Apatite fission track (AFT) data are consistent with regional levels of thermal maturation based on reflectance studies, which show that large areas were above AFT resetting temperatures. The primary cooling histories recorded by AFT data are Cenozoic. Similarly, paleomagnetism reveals latest Cretaceous or Paleogene post-tilting remagnetization. Thermal maturity is highly variable. The northern Bowser Basin and western Sustut Basin are in the early oil to condensate-dry gas generation stage of thermal maturation. Fieldwork and analysis of molecular crude oil samples has identified at least 3 effective petroleum systems in the basins, with sub-Bowser strata as one of the sources. Interpretation of regional potential field data and measurements of rock density and magnetic susceptibility provide insight on the depth to basement and possible basement structures. Tomographic methods applied to parts of the LITHOPROBE SNORCLE deep reflection profile are used to estimate bulk P-wave speed within the uppermost 2 km of crust. Geological mapping has revised the distribution of Bowser Lake Group units and style of deformation in the southern Bowser Basin. The shallow marine and submarine fan assemblages, widespread in the central basin are present in the south, as are folds and thrust faults involving Stikinia strata, overturned folds, and development of cleavage. Analysis of detrital zircons from Bowser Basin strata show that it was receiving detritus from magmatic sources of Triassic age up to the depositional age of the rock.