

Horn River Group of central Mackenzie Plain, NWT: new data from the cored section of Husky Little Bear N-02 well

Damien Weleschuk & Pavel Kabanov
Geological Survey of Canada

Summary

The cored section of Husky Little Bear N-02 well is being analyzed using ICP-MS/ES data for major, minor and trace elements to determine depositional environments, redox/anoxic conditions and influence of clastic/terrigenous input versus pelagic components.

Introduction

The Horn River Group black shale located in the Central Mackenzie plain of the Northwest Territories is a significant unconventional reservoir (Hayes, 2011; Gal and Pyle, 2012). The Horn River Group contains two organic rich units, the Bluefish Member of the (Hare Indian Formation and the Canol Formation. The Canol Formation is the thickest (up to 180 m) organic-rich unit and is estimated to be a significant unconventional oil reservoir. There is industrial interest focusing on the oil potential of the Horn River Shales. The Husky Little Bear N-09 well was drilled in 2012, and cores and data have recently been released from the confidentiality period.

Method

The core has been visually measured (Fig. 1; Kabanov, in press). The core to borehole correlation was conducted by gamma core logging (RS-230 scintillometer) and fitting to borehole gamma (Fig. 1). The core is sampled for TOC and pyrolysis parameters using Rock-Eval 6 instrument (OgPet Lab, GSCC). Bulk geochemical composition is studied based on ICP-MS/ES analytical data performed at Acme Labs. Sampling of the core was done every 50 cm; the samples were 5.5-6.5 g each for ICP-MS/ES and under 0.1 g for Rock-eval 6. In order to reduce/avoid any small-scale anomalies, each geochem sample was averaged (ground) from several (no less than 5) rock chips taken over an approximate range of 10 cm across the labeled sample depth. The core samples were taken from the back of the core abiding NEB protocol. Sample depths were calculated by comparing the total cored length to the recovered core length along with physical measurements to obtain accurate sampling depths. The Rock-eval 6 pyrolysis is accomplished by heating a small rock sample in an inert atmosphere to determine the free hydrocarbons contained. ICP-MS/ES is used to measure the amount of metallic and non-metallic elements down to very low concentrations (usually 1-10 ppm). This is achieved by ionizing the sample with inductively coupled plasma and then using a mass spectrometer to measure the ions.

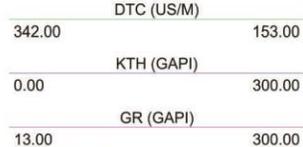
Discussion

The available wirelogs having lithostratigraphic resolution and the lithofacies log of the studied core section is shown on Figure 1. The geochemical and Rock-Eval 6 data are being processed.

300/N-09-6500-12630/0

CORE EXAMINATION STRIPLLOG

Well Name: HUSKY ET AL LITTLE BEAR N-09



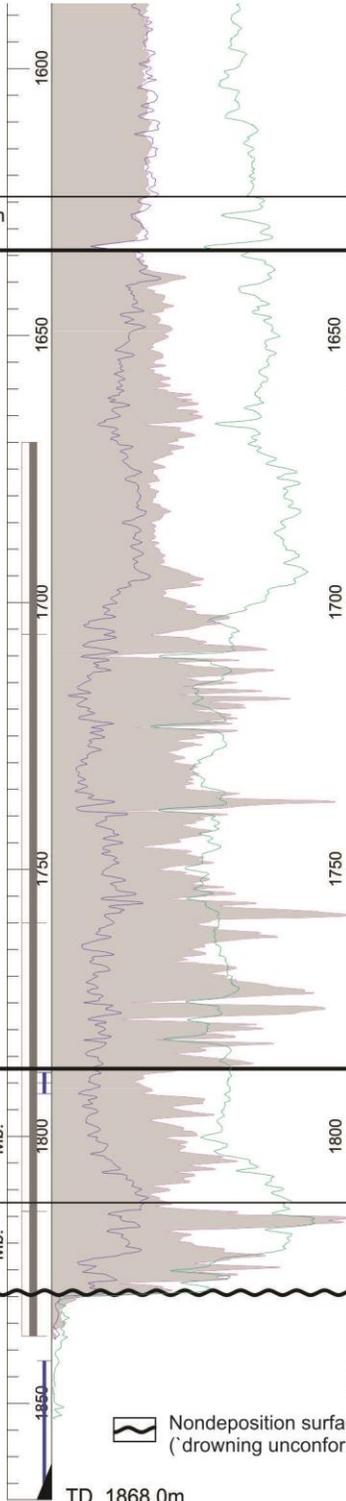
Imperial Fm.

Canyon Mb.

Canol Fm.

Hare Indian Fm.
Bluefish Mb.
"Bell Creek" Mb.

Hume Fm.



Nondeposition surface ('drowning unconformity') in top of Hume Formation

TD 1868.0m

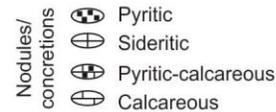
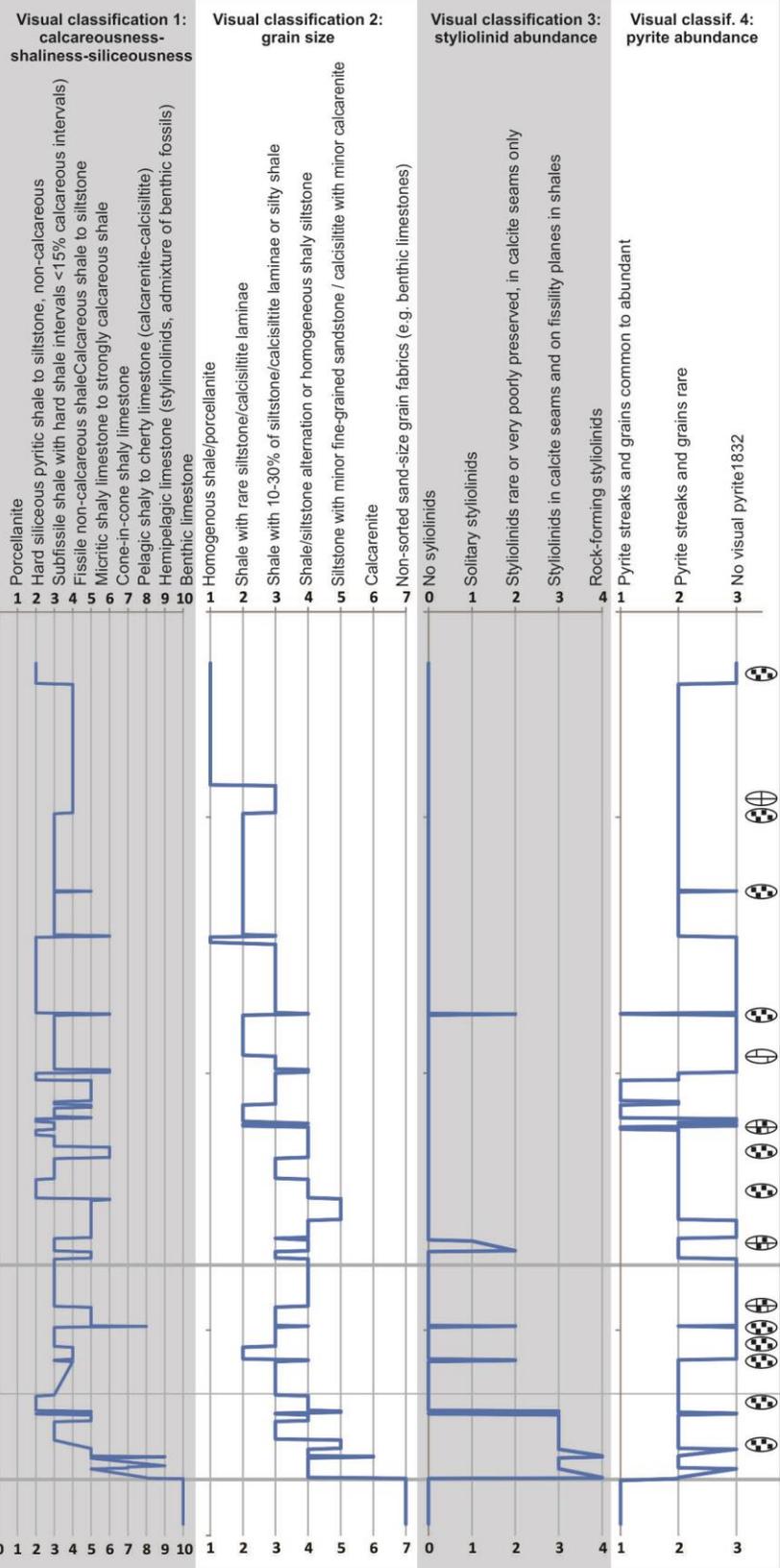


Fig. 1 Lithostratigraphic and wirelog information and core coverage for Husky Little Bear N-09 well (Kabanov, in press).

Acknowledgements

This work is a contribution to the Mackenzie Project of the Geomapping for Energy and Minerals Program. We thank National Energy Board (NEB) for lending core for examination and granting permission to sample. Richard Fontaine and William Dwyer of Core and Samples repository of NEB (located at GSCC) are cordially thanked for help with core displays and sampling.

References

Kabanov, P. In press. Geological and geochemical data from Mackenzie Region. Part 1. Devonian cored sections and new geochemical, $\delta^{13}\text{C}$ - $\delta^{18}\text{C}$, and pyrolysis data. *Geological Survey of Canada Open File*