

## Field Seminar

### The Jura Creek field trip: the drowning unconformity and anoxic sediments at the Devonian-Carboniferous boundary

Leader: Dr. Pavel Kabanov, Geological Survey of Canada

Location: Jura Creek, near Exshaw, AB (Kananaskis)

June 22, 2024, 9am-4pm

**Logistics:** Registrants will be responsible for transportation to the hike start point and back to Calgary. Carpooling can be arranged amongst group members- a conservation pass is recommended. This is an **easy** hike, please wear hiking boots, and weather appropriate clothing. Hand lens recommended.

Please bring a bagged lunch and water.

#### Overview



In the front ranges of the SW Rocky Mountains near the village of Exshaw, the hanging wall of the McConnell thrust sheet exhibit stratigraphic successions of the Devonian-Carboniferous boundary interval. Starting from parking lot, the trail winds along the Jura Creek gravel bed for 3.2 km to see the Devonian/Carboniferous boundary in the so-called middle canyon, where the Famennian platform carbonate of the Palliser Formation are overlain abruptly by the black pyritiferous shale of the Exshaw Formation, one of major

sourcerocks in the subsurface Alberta. The two way trip is 6.4 km. Besides being popular among geoscientists, the Jura Creek hike is loved by Calgarians for easy hiking and dog walking. The nature of drowning surface in top of the Palliser Formation is debatable and referred in the literature to as the hardground, shoreface ravinement, or drowning unconformity. A review of this knowledge will be provided in the field guidebook. There are indications of paleokarst development at this surface in other localities. The surface is phosphatized and contains volcanoclastic material. It is overlapped by thin (1.4 m) black laminated pyritiferous shale of the lower member of the Exshaw Formation. The upper Exshaw Formation is a dark grey, weathering yellow, laminated siltstone. A lot of data have been published on the absolute dating and conodont biostratigraphy of this interval, allowing to pinpoint the Devonian-Carboniferous boundary inside the black shale of the lower Exshaw member. A number of sedimentary features within the upper Palliser Formation, such as stromatolites and various carbonate-platform facies, can be seen in creekside exposures between the creek delta and the type Exshaw section in the middle canyon.

## Objectives

Full-day (approx. 9AM-4PM) easy hike to explore the Upper Devonian benthic carbonates of the Palliser Formation, the drowning unconformity in its top, and the Exshaw Formation with its lower member composed of laminated, organic rich siliceous shale providing the outcrop analogue for the Exshaw and Bakken sourcerocks of Western Canada. This black shale includes the Devonian-Carboniferous boundary coincident with one of major biotic extinctions in Earth's history.

## Who Should Attend?

Geoscientists, managers, petroleum geologists with experience in shale hydrocarbon exploration; academic scientists with interests in sedimentary archives, oceanic anoxic events of the deep geologic Past; stratigraphers; geoscience students.



### **Pavel Kabanov Biography:**

I graduated from Moscow State University in 1994 and defended my PhD thesis in Alma Mater in 2000. During early career, I upgraded the facies and stratigraphic framework of the Carboniferous strata of Russia and worked for industry. Moved to Canada in 2010 and joined GSC in 2012. My projects are on the Devonian System of Western Canada with most work done to date in the northern extension of WCSB. I am currently working on the Elk Point Group of WCSB as part of the new line of GSC research directed towards preparing the subsurface for use in carbon-zero energy technologies. My achievements are in various aspects of sedimentary geology, geochemistry of sedimentary rocks, and Earth-surface processes of the Paleozoic Era, on sedimentary carbonates, black shales, and paleosols. ORCID: <https://orcid.org/0000-0002-6289-5351>