

Geochemistry of Lower and Middle Jurassic Organic-Rich Sediments within the Intermontane Basins of British Columbia: A Potential Regional Source Horizon?

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Summary

During the waning of Early and Middle Jurassic arc volcanism, and prior to the influx of Jurassic coarse clastics defining Intermontane Basin development, volcanic and sedimentary rocks containing dark, fine grained clastic sediments were deposited over large portions of the Intermontane Belt. In northern and central BC, these rocks belong to the Hazelton Group and are termed the Salmon River and Spatsizi formations around the rim of Bowser Basin, and the Entiako Formation in central Nechako. Further south, analogous sequences belong to the Ashcroft, Junction Creek, Nemaia and Last Creek formations, and the Lillooet Group.

Toarcian to Aalenian sedimentary sections are characterized by dark grey to black, carbonaceous siltstone and shale together with sandstone. These are commonly succeeded by Bajocian to Callovian dark grey siliceous siltstone interbedded with lighter tuffaceous beds ('pyjama beds'). Carbonaceous successions can be several hundred metres thick and can laterally interfinger with coeval coarse clastic and volcanic rocks. Coarse clastics belonging to Jurassic overlap assemblages (Bowser Lake, Relay Mountain groups, the Ashcroft Formation) overlie these rocks.

Rock Eval analyses of carbonaceous sections indicate residual organic contents as high as 6%, with averages approaching 2%. Some data suggests Type III kerogens. The overmaturity of most sampled sections indicates that TOC contents were originally higher.

These rocks may have sourced possible Mesozoic-age oil inclusions present in Jurassic Bowser Lake Group sediments. This, together with the widespread nature, thickness and organic content suggests these Early to Middle Jurassic carbonaceous sedimentary rocks may have been a potential source horizon within the Intermontane Basins of British Columbia.