1) formed by partial melting of lower continental crust; 2) ponded at mid-crustal depths (15–25 km) as reduced, "cold-granite" magma (750–800 °C and < 6 wt% H_2O); 3) evolved a compositionally zoned, large-volume chamber (by convective fractionation) with a crystal-poor, supersaturated upper part and a crystal-rich (20–30%), relatively dry, dominant-volume lower part, including an immiscible liquid-sulphide phase; 4) erupted explosively from mid-crustal depths producing first-phase felsic volcanism, without forming a caldera complex; and 5) generated sub-volcanic sills (the so-called "Bathurst porphyries") and small-volume, upper-crustal (< 5 km depth) chambers of dominant-volume magma during the waning stages of the magmatic system. The metal-rich magma in these upper-crustal chambers, predominantly within the Miramichi Group, underwent decompression melting of phenocryst phases and experienced renewed convective fractionation, resulting in the separation of metal-rich volatile phases that fed the ore-forming hydrothermal system. Most critically, this magma had to cool *in situ* without pyroclastic eruption. Today, this *in situ* magma is represented by intrusions like the Popple Depot Granite and Little River Lake Granite. Relative to the Bathurst porphyries, these granites are depleted in Cu, Pb, and Zn by approximately 10, 20, and 60 ppm, respectively. At 10% extraction efficiency, these differences are enough to produce 0.1, 0.2, and 0.6 million tonnes of Cu, Pb, and Zn metals (not sulphides), respectively, per cubic kilometre of magma in these upper-crustal chambers.

A conceptual magmatic model for the genesis of Brunswick-type VMS deposits, Bathurst Mining Camp

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The metals in Brunswick-type, volcanic-hosted, massive sulphide deposits were largely derived from felsic magma that

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