Petrography, geochemistry, age, and stratigraphic significance of the Boyd Creek tuff, Mississippian, New Brunswick, Canada

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The Boyd Creek tuff consists of a pair of pyroclastic flow deposits and a more widespread air-fall tuff within a Mississippian redbed sequence encountered in outcrop and boreholes around Weldon and Gautreau, Westmorland and Albert counties, New Brunswick. Long recognized as an important stratigraphic marker, this tuff has been placed in the Tournaisian Weldon Formation and Viséan Hillsborough Formation by previous workers, with a position in the upper Tournaisian Weldon Formation being the most recent understanding. However, U–Pb zircon ages obtained of 337.1 ± 1.9 Ma from the tuff place the unit firmly in the Viséan, suggesting that it is part of the Windsor Group in a fine-grained red sequence of the Hillsborough Formation. Palynomorphs from the sedimentary rocks beneath the tuff are Tournaisian, implying that the tuff lies on an unconformity. Petrography and geochemical analysis of the tuff confirms a rhyolite or dacite source, despite extensive alteration and the presence of abundant xenoliths and xenocrysts. Composition and age suggest that the Boyd Creek tuff is contemporary with the rhyolitetrachyte lavas of Cumberland Hill, dated tuffs within the Windsor Group carbonate-evaporite sequence at Picadilly Mine (Penobsquis), and the red bed Shin Formation at Hurley Creek near Minto. Locating and dating other "ash beds" in the Windsor Group may offer a way to resolve longstanding issues of correlation in the Windsor Group of New Brunswick and Nova Scotia.

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