Muon Tomography in the N. Cascades, Canada: A case for imaging the Mt. Meager Volcanic Complex

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The Mount Meager Volcanic Complex, 150 km north of Vancouver, forms part of the Garibaldi Volcanic Belt which is the northernmost segment of the Cascade Volcanic Belt. A calc–alkaline composite stratovolcano, Mount Meager (2645 m a.s.l.) overlies well exposed basement rocks of the southern Coast Belt. Volcanism (from 2.2 Ma to 2360 B.P.) ranges from basaltic and andesite lava flows to rhyodacite domes, flows, and pyroclastic units. The most recent explosive eruption produced rarely observed welded block and ash flow deposits that temporarily dammed the Lillooet River and led to a catastrophic flood (total volume reached ~10^9 m^3). This variable and long-lived volcanism has also resulted in a structurally unstable complex that experiences frequent significant landslides (~40 x 10^6 m^3, August 2010). Furthermore, due to this recent volcanism, Mount Meager was the target of extensive geothermal energy exploration, with three large wells (900-1300 m) drilled which detected temperatures >200°C. Given the complexity of the geology, extensive volcanic history, ongoing and future hazards as well as the potential for alternative energy exploration, the Mount Meager Volcanic Complex is an excellent site to both test and refine geophysical muon tomography.