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Stromatolite-bearing carbonate rocks: influence from the 3.0 Ga submarine hydrothermal activities

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3.0 Ga igneous and sedimentary rocks are widely distributed at the Steep Rock district in Canada. Carbonate rocks containing stromatolite, unusual at 3.0 Ga, are significant rock types at Steep Rock. Massive sulfides containing a stromatolite texture are found at the top of the thick carbonate unit. The 3.0 Ga submarine hydrothermal activities were probably responsible for the massive sulfides. Basement rocks of the carbonate are also altered and carbonated by hydrothermal processes. Kuroko-type massive sulfide ores were also found adjacent to the Steep Rock area, suggesting submarine hydrothermal activities were ubiquitous in this area at 3.0 Ga.