Perrouty S, Gaillard N, Piette-Lauzière N, Bardoux M, Olivo GR, Linnen RL, Enkin RJ, Bouchard F, 2016, Structural controls of intrusive rocks within the Canadian Malartic gold deposit, Abstract, GAC-MAC, Whitehorse, YK

The Canadian Malartic world-class gold deposit is the only known deposit of significant size located south of the Cadillac – Larder Lake fault zone in the Val d'Or-Malartic area. Understanding the structural controls and the alteration halo(s) of this deposit is of key importance for exploration for similar systems. Previous work demonstrated that gold mineralization is intimately associated with a second order fault zone (the Sladen Fault) which is located along the margins of large monzodioritic dykes within the Pontiac meta-sedimentary rocks. The diorite-monzodiorite-monzonite intrusive rocks appear to be critical controls on the distribution of the gold mineralization at Canadian Malartic. Other intrusive rocks in the area include meta-basic dykes and felsic dykes that crosscut the monzodioritic stock and that were also altered during mineralization event(s). In this work, we investigate the structural - metamorphic setting of the Canadian Malartic area using field observations, structural measurements and airborne magnetic data, and we discuss the possible control of the intrusive rock emplacement. Preliminary results show that three structural domains can be distinguished: 1) a domain, along the Cadillac – Larder Lake fault zone and in the vicinity of the Canadian Malartic deposit, that is characterized by variable (subhorizontal to subvertical) bedding orientation, by a strongly penetrative S_2 biotite foliation and by younging directions that are mostly toward the north. 2) An intermediate domain, south of the deposit, that is characterized by homogenous subvertical bedding orientation, a less penetrative S_2 foliation and younging directions that are mostly toward the south. 3) A south domain that is characterized by homogenous steeply dipping bedding orientation and a more subtle S_2 foliation. Monzodioritic dykes appear to be spatially associated with F_1 folds. However, their west-dipping geometry suggest a syn-D_2 opening, parallel to the east-dipping L_2 stretching lineation. It is therefore proposed that the first deformation event (D_1) built the overall architecture, including fold hinges that controlled the intrusion of later plutonic rocks and subsequent mineralization(s) during the second deformation event (D_2). A structural relationship between the intrusive rocks and the F_1 folds could be a critical parameter for exploration in the Canadian Malartic area.

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