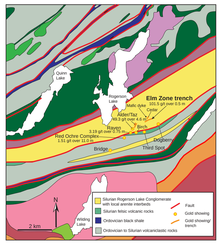
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THE WILDING LAKE GOLD PROSPECT, CENTRAL NEWFOUNDLAND: A LITHOLOGICAL AND STRUCTURAL SYNTHESIS

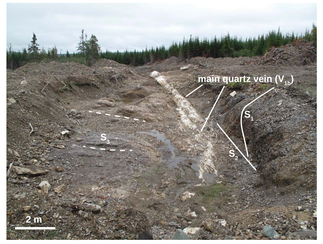
I.W. Honsberger[1], W. Bleeker[1], H.A.I. Sandeman[2], D.T.W. Evans[3], and S.L. Kamo[4]

Overview

The Elm Zone trench consists of a ~230 m long, structurally controlled quartz vein shear system that cuts an early axial-planar cleavage in Rogerson Lake Conglomerate. At a distance away from the main vein, early foliation strikes in an easterly direction and dips steeply to the south (S_1), but rotates to northeast-striking (S_2) along and subparallel to the main vein. The main laminated fault-fill quartz vein (V_{1b}) is up to 2.5 m wide, dips moderately to the southeast, and contains slickenlines that plunge moderately to the south-southwest. Stacked, extensional veins (V_{1a}) emanate from the main vein and dip moderately to shallowly to the south, or east-northeast if rotated, consistent with oblique sinistral reverse shear. The main vein system is cut by a chalcopyrite-rich vein set (V_2) that dips steeply to the north, and also by a moderately to steeply northwest-dipping set of tourmaline-rich veins (V_3). Conjugate sets of extension fractures/joints that contain vuggy quartz cut V_1 and V_2. The northwest-dipping joint set is subparallel to both V_3 and a siderite/ankerite-sericite-altered mafic dyke adjacent to Elm. A late set of steeply south-dipping extension veins consistent with dextral strike-slip (V_4) cuts the older vein and fracture sets. Minerals associated with gold include chalcopyrite, pyrite, tourmaline, bismuth-tellurides, rutile, geothite after pyrite and chalcopyrite, and malachite. The system is locally folded into late open to tight reclined folds that plunge shallowly to the southeast.

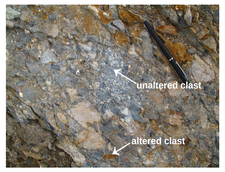


Geological map, Wilding Lake area. Map adapted from Valverde-Vaquero et al. *(2005) and Antler Gold Inc., press release, December 13, 2017*

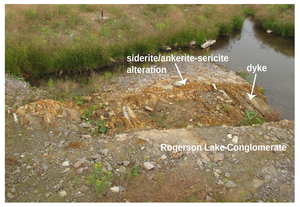


Main shear vein V_{1b} and foliation in Rogerson Lake Conglomerate, Elm Zone trench, looking northeast

Rogerson Lake Conglomerate



Weakly altered conglomerate



Mafic dyke cutting Rogerson Lake Conglomerate adjacent to Elm Zone

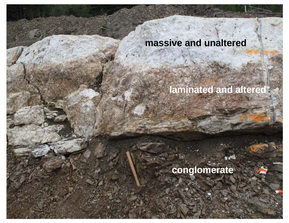


Strongly altered conglomerate

Vein Sets



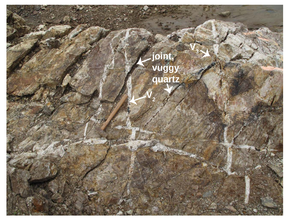
Rotated V_{1a}



Laminated main vein V_{1b}



Mineralized chalcopyrite-rich V_2



Tourmaline-bearing V_2 and V_3 and joints

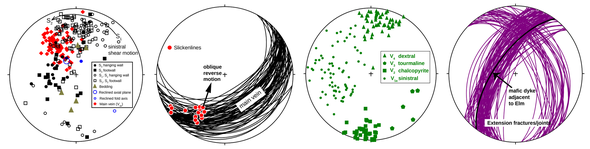


Extensional dextral vein V_4

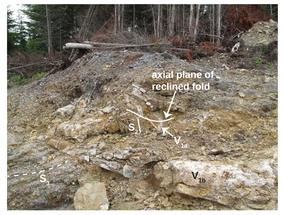


Goethite after pyrite in rutile-bearing V_4

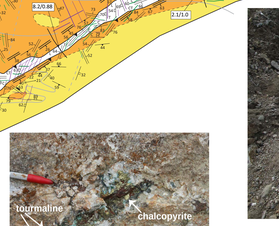
Structural Data



Lower-hemisphere equal-area projections, Elm Zone. Poles to planar features plotted except in the second and fourth diagrams, from left to right, where great circles are plotted



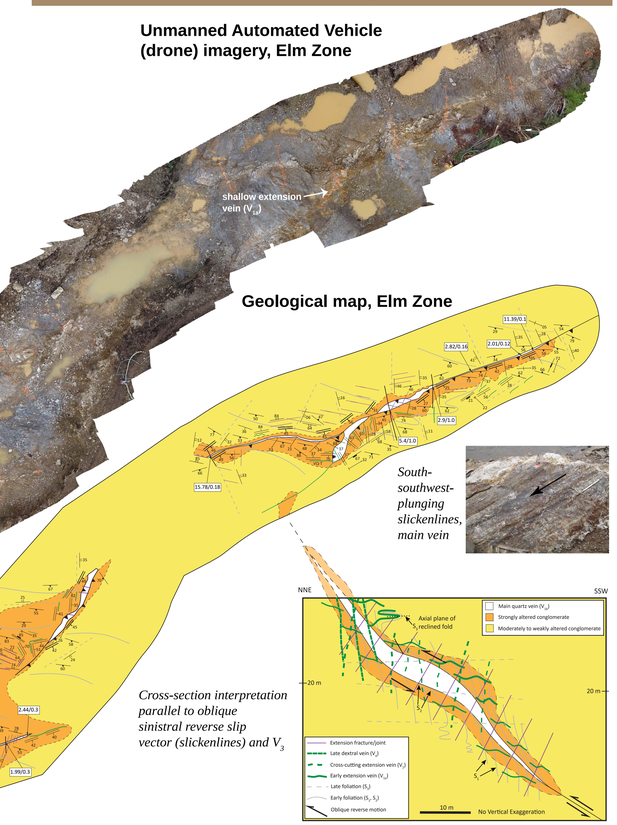
Shallowly-dipping extension veins (V_{1a}) folded into reclined folds in the hanging wall of the main vein system. Late clevage (S_3) is well developed in the footwall



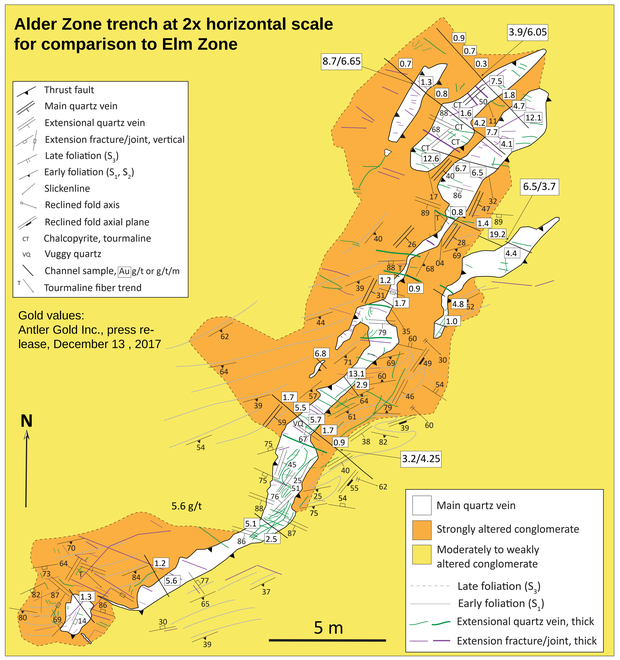
Mineralized extension fractures/joints (V_3) cutting main vein

Mineralized V_3 cutting main vein

Trench Maps



Cross-section interpretation parallel to oblique sinistral reverse slip vector (slickenlines) and V_3



Gold values: Antler Gold Inc., press release, December 13, 2017

Synorogenic Evolution

The main gold-bearing quartz vein system (V_1) of the Elm Zone is structurally controlled by an oblique sinistral reverse shear zone displaying hanging wall motion towards the north-northeast. V_{1a} and V_{1b} represent an extensional vein (V_{1a}) and dilational fault-fill vein (V_{1b}) shear system characteristic of lode gold systems formed via progressive fluid pressure cycling along faults under prehnite-pumpellyite to greenschist facies conditions (*e.g.*, Sibson *et al*., 1988). Overprint of V_1 by steep, chalcopyrite-bearing veins (V_2) suggests rotation of the principal stress axes during progressive shearing and the onset of transient north-south-oriented subhorizontal extension. Subsequent overprint by tourmaline-rich V_3 and extension fractures/joints is consistent with renewed oblique compression oriented north-south. The system then devolved into dextral strike-slip to form V_4. V_{1-4} are all prospective for gold mineralization, arguing for multiple gold-forming episodes. The polymetallic nature (Cu-Au-Ag-W-Mo-Bi-Sb) along with the presence of bismuth-tellurides in veins throughout the Elm Zone suggests that synorogenic magmatism within the Rogerson Lake Conglomerate structural corridor may have contributed fluids to the system. Future exploration could target the unexposed southwestern continuation of the main Elm shear vein towards the deformation zone between conglomerate and mineralized felsic volcanic rocks. Latest Silurian to Early Devonian crustal-scale faults may have controlled the formation and preservation of gold in the Wilding Lake area.

Acknowledgments

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