

# SEG 2022 Conference: Minerals For Our Future

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## Unraveling the Geological History of the Fenelon Gold Deposit, Québec

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The Fenelon Gold Deposit is located in west-central Quebec, within the northern Abitibi Greenstone Belt. It is situated along the northern margin of the Sunday Lake Deformation Zone, a major east-west structural corridor that also hosts the Detour Lake Gold Mine. Until recent years, there has been little research and exploration conducted along the Sunday Lake Deformation Zone in comparison to its southern counterparts, the Cadillac-Larder and Porcupine-Destor Fault Zones. The Wallbridge Mining Company Ltd. acquired the Fenelon Property in 2018 and has since delineated significant gold systems along the margin of the Jeremie Diorite and hosted within crosscutting veins. The initial resource estimate of the Fenelon Gold Deposit was announced in November 2021, yielding 3.58 Moz gold in the indicated and inferred categories. This research project, one of the first undertaken at Fenelon, utilizes a combination of geochronology, whole-rock geochemistry, and sulfide mineral chemistry to characterize and unravel the timing of the formation of the host rocks and mineralization at the Fenelon Deposit.

This presentation discusses the results from TIMS and LA-ICP-MS analyses of zircons from the Jeremie Diorite and the surrounding sedimentary rocks, as well as Re-Os dating of a gold-bearing vein. These results are combined with observations from drill core to establish the chronology, and aid in the modeling of the deposit. Seequent's Leapfrog Geo software was used to model a geochemically distinct mafic phase of the Jeremie Diorite which may constrain mineralization toward the northeast. Lastly, LA-ICP-MS analyses of pyrite from the mineralized zones establish a relationship between sulfide and gold precipitation. These results enhance the geological understanding of the Fenelon deposit and will significantly contribute to resource expansion and exploration in the surrounding belt.