

SEG 2022 Conference: Minerals For Our Future

Depositional History and Gold Potential of the Ament Bay Assemblage in the Sturgeon Lake Greenstone Belt, Northwestern Ontario, Canada

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Evaluating the sedimentology, provenance and stratigraphy of the Ament Bay assemblage can provide insights into the geologic history of the Sturgeon Lake greenstone belt and the metallogeny of Archean extensional basins. The Sturgeon Lake greenstone belt makes up the easternmost portion of the western Wabigoon terrane of the Superior craton, and is comprised of mostly Neoarchean volcanic assemblages, minor siliciclastic successions, and calc-alkalic to alkalic intrusions. The Ament Bay assemblage is the youngest supracrustal assemblage of the Sturgeon Lake greenstone belt and dominantly consists of polymictic conglomerates, subarkosic to arkosic arenites and greywacke-mudstone sequences. These lithofacies are intruded by alkalic porphyritic rocks, which are also incorporated as clasts in Ament Bay assemblage conglomerates, indicating a coeval relationship between sedimentation and magmatic activity. Features such as abundant planar bedding, spatially associated faults and locally derived debris suggest that Ament Bay assemblage sedimentation occurred in a subaqueous setting within a transtensional pull-apart basin. The lithofacies of the Ament Bay assemblage resemble the auriferous 2670-2680 Ma Timiskaming assemblage, a prominent regional exploration target for gold in the Abitibi greenstone belt. In the Timiskaming basin, alkalic magmatism and coeval deep-reaching extensional faults are critical factors for gold metallogeny. Because these mechanisms are postulated to have occurred during the formation of the Ament Bay assemblage, this study provides insights into its gold potential and considers possible factors which may have impeded metal endowment.