

Annual Summary of Research Activities - 2023

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Research work for 2023 consisted of laboratory-based work and writing, and the planned field work has been postponed to 2024 and possibly 2025. A manuscript on the trace element composition and colour of Baffin Island spinel has been written and we are waiting on collection of Raman inclusion data by a collaborator at the Gübelin Gem Lab in Switzerland. Our study compares cobalt-blue spinel from Kimmirut to other Baffin Island spinel as well as cobalt-blue spinel from Tanzania, Pakistan, and Vietnam. We plan to submit this manuscript to a peer-reviewed scientific journal in 2024. Master's student Gokhan Keser joined Dr. Belley's research group in May 2023 to conduct research on Beluga sapphire (corundum). He has flat-polished a number of corundum crystals from the 2022 field trip, on which we have collected electron microprobe data. Trace element concentrations were measured with laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) and using special matrix-matched corundum standards for high accuracy. We are currently processing and interpreting this data. We foresee needing a second set of samples from different zones within the pit for additional comparisons. These samples will be collected in either 2024 or 2025. Mr. Keser and Dr. Belley's research has already yielded important results: the sapphires formed earlier than previously thought. The evidence for this was only apparent in rare inclusions of scapolite and phlogopite in corundum crystals. The strong late-stage metamorphic overprint has largely destroyed these minerals in the corundum-bearing zones which obscured this relationship. This new discovery helps better constrain regions with potential for sapphire in South Baffin, and better understand the causes of sapphire formation in this rock. Our research group collaborated with researchers from the Czech Republic who determined the crystal structure of tourmaline from the Beluga sapphire deposit. It is one of the purest known examples of the tourmaline species oxy-dravite, and the results were published in the journal "Mineralogical Magazine." For the 2024/2025 field work, we plan to stay in the Kimik COOP hotel for as many nights as our budget allows and are dedicated to working in partnership with local businesses and individuals as much as possible within budgetary constraints.