



Geology and Mineral Deposits of Finland May 27-June 11

Finland is the 7th largest European country, but ranks as one of the most important in terms of mining. It produces a variety of industrial, base, and precious-metals commodities. Deposit types include, but are not limited to, volcanogenic massive sulfide, Kiruna-type apatite-iron, orogenic Au, epigenetic Cu-Au, diamond, mafic/ultramafic-hosted Cr, Ni, PGE, and banded iron formation types. With such diverse geology concentrated in a small compact peninsula, Finland provides a great opportunity for both students and industry persons alike to be exposed to multiple deposit types along with their associated mining, milling, and in some cases exploration techniques over a 17 day trip held May 27nd-June 11th.



Key Information

Total Cost USD \$4,300

(covers lodging, ground transport, and most meals) (additional cost for private room)

USD \$500 due to reserve a seat

(non-refundable)

Final Total Balance due <u>March 31st</u>

Must be in Helsinki on or by May 27th

(<u>Airfare to and from Finland</u> the responsibility of attendee)

Contact Us:

Academic Advisor- Dr. Mike Ressel- mressel@unr.edu Industry Advisor- Dave Shaddrick- dave@dshaddrick.com Chapter President- Elizabeth Hollingsworth- hollingsworther@gmail.com

University of Nevada, Reno Society of Economic Geologists **Student Chapter**



Overnight: Main Itinerary:

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- Helsinki
- Helsinki
- Varkas
- Joensuu
- Joensuu
- Sotkamo
- Sotkamo
- Oulu
- Oulu
- Kemi
- Rovaniemi
- Rovaniemi
- **Kitilla**
- Oulu
- Helsinki
- Travel

• May 26th – Travel Day for those not already in Helsinki

- May 27th- Arrive Helsinki for pre-trip meeting, culture day, and rest
- May 28th- University of Helsinki, research, facilities and Finland geology lectures
- May 29th- World-class Waiborg Rapikivi granite quarries
- May 30th- Kylylahti mine; active mine (Cu-Co-Zn)
 - May 31st- Pampalo mine; active orogenic mine (Au)
- June 1st- Sillinjarvi mine; active carbonatite mine (phosphorous and industrial acids)
- June 2nd- KIM diamond indicator minerals & Setapera exploration property (diamonds)
- June 3rd- Pyhasalmi mine; active VMS mine (Cu-Zn)
- June 4th- Cultural Day in Oulu
- June 5th- Ferrochrome steel works tour
- June 6th- Rompas Exploration; (Au-U) Exploration Project
- June 7th- Cultural Day Rovaniemi
- June 8th- Kolari-Kitilla mines; active IOCG and orogenic Au (Au-Cu-Fe) mine
- June 9th- Cultural Afternoon Oulu; Option for industry participants to fly out early
- June 10th- Drive and Cultural Afternoon Helsinki- Explore more of Helsinki
 - June 11^{th-} Travel Day for remainder of the group back to Reno

Nordic Saami or Laplanders



TERMS AND CONDITIONS

Inclusions: ground transportation from trip origin in Helsinki to either departure in Oulu or Helsinki, lodging from May 27th to June 10th, lunches and dinners. Not Included: airfare, transportation to May 27th meeting place, entry visa(s), reciprocity fee(s), wire transfer/bank fees, foreign exchange fees, travel/cancellation insurance, health insurance, medical/emergency insurance, and personal costs. Participation is at the risk of each individual. All participants must sign a waiver to release the UNR SEG Student Chapter from all liability associated with participation in this field trip. We strongly recommend you purchase medical and travel insurance in case of emergency. Itinerary, mine visits, and guest speakers are subject to change without notice. Field trip deposits are not refundable. Please contact us for further details.

CONTACT: Mike Ressel – mressel@unr.edu





Brief Geologic History:

Finland provides a great opportunity for both students and industry geologists alike to be exposed to multiple deposit types, many of which are unfamiliar to those working in the relatively young Cordilleran margin of North America. Finland is composed of six main tectonic regimes each with different ore deposit styles and all part of the very old 3.1-0.9 Ga Fennoscandian Shield:

- 1) The initial assembly and deformation of the Archean (2.5-3.1 Ga) basement (Karelian craton) which includes some of the world's oldest carbonatites (e.g. Siilinjaavi).
- 2) A subsequent period of rifting and generation of Paleoproterozoic greenstone belts (e.g. Kittila).
- 3) Closure of the extensional event marked by the exhumation of mantel material containing numerous ultramafic associated PGE, Cr, Ni, and Fe deposits (e.g. Kemi and Suhanko).
- 4) A period of compressional tectonics and arc magmatism during the Paleoproterozoic (1.75-2.0 Ga) Svecofennian orogeny (forming the larger part of Finland's southeastern landmass) and formation of orogenic Au +/- IOCG deposits (e.g. Pampalo).
- 5) Another period of extension and partial melting that resulted in the emplacement of the world famous A-type Rapakivi granites, also of latest Paleoproterozoic (~1.64 Ga) age.
- 6) Lastly, intrusion of early Paleozoic (Cambrian to Silurian) alkali/carbonatitic intrusions and kimberlite pipes into the margins of the Karelian craton (e.g. Seitepara).



Historic Uspenski Cathedral, Helsinki



Suomenlinna World Heritage Site, Helsinki

Trip Advisor: Mike Ressel- Mike has a B.S. in Geology from California State Polytechnic University, Pomona (1989) and M.S. and Ph.D. degrees in Geology (1996 and 2005, respectively) from the University of Nevada, Reno. His graduate studies were Nevada-focused and broadly covered aspects of Tertiary volcanic geology, igneous petrology, regional magmatism, ore deposits, and tectonics. A major focus of his Ph.D. work was on the relationships between magmatism and Carlin-type gold mineralization on the Carlin Trend, Nevada. Since 2000, Mike has not only worked in mining and exploration for gold and copper across North America, but also in Africa, Australia, and South America for several companies involving a variety of deposit styles. Mike has served on several academic research boards including the Precambrian Research Center at the University of Minnesota, Duluth, the Lowell Institute for Mineral Resources at the University of Arizona, and the Center for Research in Economic Geology at the University of Nevada, Reno as well as being an industry liaison for advisory boards of NBMG and the Geological Sciences Department at UNR. Mike is currently a tenure-track faculty member of the Nevada Bureau of Mines and Geology.

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