

Abitibi Metallogeny Field Trip Report

March 26th to March 30th, 2017

SEG Student Chapter

Laval University – INRS-ETE

Student chapter



Preissac Lake. Photo by A. Fontaine.

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Introduction

The *Society of Economic geologists* student chapter at Laval University and INRS-ETE (Institut national de la recherche scientifique, Centre Eau Terre Environnement) is active since 2001 thanks to motivated undergraduate and graduate students from the geology departments of both institutions and continuous support from the industry.

The Abitibi greenstone belt, the largest greenstone belt in the world (310 km × 720 km), is located in western Quebec. This greenstone belt host majors VMS deposits, Ni-Cu-PGE magmatic deposits, and orogenic gold deposits. A trip was scheduled by the SEG student chapter from March 25th to March 30th 2017. It was a great opportunity for students to learn about the geology of a major mining camps such as central Noranda camp, Doyon-Bousquet-La ronde and Val d'or camps. In addition, the group met geologists from the MERN (Ministère de l'Énergie et des Ressources Naturelles) to learn about mapping program (Patrice Roy and Anne-Marie Beauchamp) and quaternary geology (Hugo Dubé-Loubert).

The group was composed of graduate students from INRS-ETE (Alexandre Krushnisky, Benjamin Latutrie, Pier Paolo Comida and Arnaud Fontaine). The field trip was planned by Arnaud Fontaine (PhD, INRS-ETE).

Goals

The main goal of this field trip was to understand the metallogeny of Au mineralization associated with volcanism and tectonic evolution of the Abitibi subprovince. The field trip was focused on surface observations (outcrops) as well as drill holes observations to identify key features for the understanding of the metallogeny of the Abitibi subprovince. Second objective was to meet professional geoscientists working in the Rouyn-Noranda and Val d'or area including mining companies and geological surveys.

Pre-departure activities

A talk given by Patrick Mercier-Langevin at INRS was done on the Doyon-Bousquet-La Ronde mining camp. A Geological survey guide book about the Geology of Blake River

Group (OFR6243) with a series of papers on the volcanology of the Abitibi greenstone belt was sent to all participants and printed for the excursion.

Field trip day-by-day

Monday March 27th

The first day of the field trip began with a series of introduction conference by Jean Goutier, regional geologist at MERN. He gave a summary on the extensive work done by MERN and universities on the understanding on the volcanology architecture and VMS deposits.

In the afternoon, the group moved to Falco's office in the old Noranda near the Glencore's smelter. A corporate presentation by Claude Bernier gave major insights and updates on the development of the Horne project.



Alexandre Krushnisky (MSc. Student at INRS-ETE) giving some details about the footwall volcanoclastic unit near the Horne 5 massive sulphide lens. Photo by A. Fontaine.

Afterwards, we moved to the Falco's coreshack to observe drillcores. Alexandre presented us a poster with a drillhole geology and geochemistry illustrating stratigraphic unit and the location of massive lens from the Horne 5 deposit. Massive sulfide lenses are located in a volcanoclastic felsic unit and sulfide clasts are also found in the surroundings host rocks. Finally, We stopped near the Horne smelter where Jean goutier gave us some details about processing and facilities.



Jean Goutier explained the Horne copper smelter operated by Glencore Canada. Photo by P. Comida

Tuesday March 28th

The group moved from Rouyn-Noranda to Val d'Or and stopped near Cadillac Moly (discovered in 1906) and Preissac Moly (discovered in 1909) old mines to observe an outcrop showing key features of molybdenum mineralisation associated with late magmatic stage. This mineralization is associated with the Preissac pluton (2680-2660 Ma). Microcline, quartz and molybdenite (1 to 5 mm) veins are hosted by biotite or biotite-muscovite monzogranite and associated with a pegmatitic to aplitic swarm injected within the batholith. Fluorite, dark chlorite and pervasive microcline alteration are developed in vein selvages.



Observation of the La Motte outcrop (18km north on 395 road; UTM, NAD83, zone 17, 693460 mE, 5355600 mN). Photo by A. Fontaine

Afterwards, we drove to Rivière-Héva in order to observe the Spinifex Ridge outcrop located few km to the north. This well famous outcrop permit to observe a series of cumulate texture on a komatiitic lava flow. The komatiitic lava belongs to the La Motte Vassan Formation dated at 2714 Ma.



Spectacular spinifex texture at the base of a komatiitic lava flow. Photo by A. Fontaine.

In the afternoon, the group visited the Abitibi-Temiscamingue mineralogical museum in Malartic. We observed historical samples from several gold mines. At the end of the day, we met Anne-Marie Beauchamp and Hugo Dubé-Loubert at Microbrasserie le prospecteur in Val d'or.

Wednesday March 29th

The group moved to the MERN office in Val d'or. Three talks were given in the morning. The first one was given by Patrice Roy on current mapping program and also a summary of recent activities by MERN teams. Then, Hugo Dubé-Loubert, geologist and also PhD student at UQAM gave a talk on late-glacial dynamics and implications for exploration particularly in the Ungava Bay area. This talk gave an overview of the typical landscape and quaternary geology in northern Quebec. Finally, Anne-Marie Beauchamp, MERN geologist and also MSc student at INRS-ETE, present preliminary results on a mapping program started last year located in the Upper Eastmain River greenstone belt near the Mont Otish area.

Afterwards, we moved to Integra Gold Corp.'s office in Val d'or. Luc Theberge, senior geologist, gave us a corporate presentation on the Lamaque-South project with many insights on the geology and current drilling program.



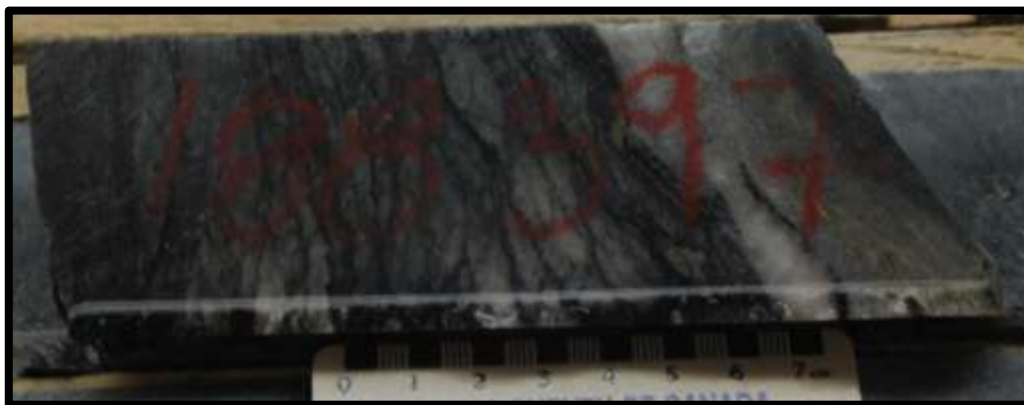
Proximal alteration composed of sericite, chlorite, and pyrite at the contact with dioritic plug and lapilli tuff of the Val d'or Formation. Photo by A. Fontaine.

The group observed some mineralized drill holes from Triangle and Plug No. 4 zones in order to observe host rocks, alteration assemblages and gold-bearing veins. Host rocks are lapilli or block tuff of the Val d'or Formation. Interestingly, location of dioritic plug represent a potential syn-volcanic fault.



Core observations of the plug No. 4 ore zone of the Lamaque Sud project with Luc Théberge (Integra Corp.). Photo by A. Fontaine.

The afternoon was the opportunity to learn more about the different vein type associated with the Cadillac-Larder Lake fault zone, the major break in the area. Laminated veins are associated with tourmaline veinlets occurring within the vein or in their selvages.



Laminated quartz-tourmaline shear vein of the Triangle zone. Photo by A. Fontaine.

Learning opportunity

All of the participants could make link from what they learned during their internships or past field trips and the numerous observations done. This fieldtrip was a great opportunity for discussion on various topics such as volcanism (e.g. The Horne 5 exploration project), magmatism (e.g. Preissac pluton and Mo-rich veins), metamorphism, hydrothermalism, geochemistry and structural geology (e.g. The Lamaque Sud exploration project).

Socializing events

The trip was an opportunity for students to meet geologists from mining industry and MERN. The group took the opportunity to socialize with David Yergeau (PhD student at INRS-ETE until 2015), Chloé Esnault (Services Techniques Technominex) and MERN geologists and discuss about our excursion and activities through the SEG student chapters.

Recommendations

Future organizers would pay attention to the following points:

- Careful introduction on the geology of the Abitibi subprovince and the Blake River Group at the beginning of the field trip, is needed to totally understand the associated metallogeny. A visit of Rouyn-Noranda outcrops with talks by Jean Goutier (MERN) is critical for the rest of the field trip as it helps to constrain stratigraphy and relationships between units in term of magmatic evolution.
- Some deposits present in the Rouyn-Noranda and Val d'or camp are quickly observed and more focus is needed to understand the variety of mineralization styles and deposit types
- Organizer tried to plan a tour with Ron Leber (Chief geologist at Westwood Mine) and Richard Dubuc (La Ronde mine) without success.
- A budget of 1500\$ (cars, gasoline and accommodation) is requested for a group of 4 people.

Acknowledgments

We would like to express our deepest gratitude to the numerous guides who gave some of their precious time and knowledge: Claude Bernier Jean Goutier, Patrice Roy, Anne-Marie Beauchamp, Hugo Dubé-Loubert and Luc Théberge. Those passionate people gave us their time, answering our questions on the geology of the Abitibi-subprovince. We also would like to thank Philippe Edwin-Belanger and the Services des études supérieures et post-doctorales at INRS for supporting this field trip.

Visit partners

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