



**Canadian Institute of Mining and Metallurgy
Thunder Bay Branch**

CIM Guest Lecturer



Dr. Steve Barnes

*(Office of the Chief Executive Science Leader, Commonwealth Scientific and Industrial Research Organisation (CSIRO) Mineral Resources Flagship;
The University of Western Australia)*

**7:00 p.m., Thursday, September 10, 2015
Tony & Adams, 45 South Court Street**

Ore-Forming Processes in Magmatic Nickel Sulfide Deposits, or, Why Sword Blades, Fire Hoses, Salad Dressing and Mayonnaise Might Help You Find Ore Deposits

Nickel sulfide deposits hosted by komatiites on the one hand and mafic-ultramafic intrusions on the other have some important similarities and differences. The essential common feature is the necessity for prolonged flow-through in a long-lived feeder conduit, being major lava tubes or distributor channels in the komatiite case, or tube-like chonoliths and/or conduit dyke-sill systems in mafic settings.

Viscosity is one of the key differences between komatiitic and basaltic systems, but there are others potentially just as important. We suggest that the greater complexity and variability of mafic systems is due to two major factors: overlapping melting ranges of silicate and sulfide liquids, and the formation of mafic systems as components of extensive trans-crustal magma conduits with a large vertical component. In mafic systems ore formation occurs at multiple levels within magma transport networks of large vertical as well as horizontal extent, whereas ore formation in komatiites is essentially confined to horizontal systems within lava flows, and hence is driven purely by thermal energy. Mafic systems have the additional driver of gravitational potential energy of dense sulphide liquid accumulations.

In this talk, I illustrate these principles with reference to a wide range of deposit examples, drawing on observations from the diversity in size and shape of ore-hosting intrusions down to micro-scale features of the ores themselves. These will be illustrated using a number of cutting-edge imaging techniques including x-ray microtomography and microbeam XRF element mapping. I argue that understanding the fluid dynamics and heat transfer processes in these systems is the key to understanding them. And I promise to explain the title.

Free Admission

Cash Bar

All are welcome!

***For further information, please contact:
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