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SYDNEY MINERAL EXPLORATION DISCUSSION GROUP

NOTICE OF MEETING

DATE: Thursday 15th September 2005 - 5.30pm for 6pm

VENUE: 1st Floor, Rugby Club, Rugby (Crane) Place, Sydney

SPEAKER: Stew Hamilton

TOPIC: "Forest rings" and their implications for mineral exploration

"Forest rings" have been an enigma for 50 years since they were first identified in air photos of northern Canada. They usually occur as large, near-perfect circles in boreal forest that range in diameter from 30 m to almost 2 km. They are not the product of glacial processes, but are post-depositional, nor do they result from paludification of lakes or meteorite impact. Clusters of similarly sized rings are common and sometimes form linear trends in the direction of presumed geological structure. Similar structures occur in farm fields in southern Ontario, although the only feature they have in common with the popular "crop circles" is their shape. They do not form suddenly but are permanent features in both forest and field.

A strong depletion of carbonate occurs in soils underlying the rim of the ring, which supports the OGS theory that the rings are centres of negative redox charge and form according to a published redox gradient transport model developed to account for geochemical processes over mineral deposits and other reduced features. The theory proposes that a chemically reduced source in bedrock or overburden maintains Fe in reduced form within the ring. Outward migration Fe²⁺ within a redox gradient followed by Fe oxidation at the edge of the ring, one of the products of which is H⁺, dissolves carbonate creating a physical depression in the soil and a circular peaty area that is visible from the air.

Work is underway to understand the remarkable physical and chemical features associated with the rings including temperature anomalies, water level "bulges", apparent magnetite formation and the metal mobility mechanism itself, which at first glance appears to contradict physics. It is estimated that > 80% of the 1600 rings identified in the study area have CH₄ in overburden as the source of negative charge. One ring is known to be H₂S sourced and other reduced sources are possible. In addition to their potential for indicating resources of economic interest, the rings are excellent case study areas for redox anomalies in overburden. Similar "reduced chimneys" have been reported over mineral deposits, kimberlites and oil & gas fields and work carried out at the rings suggests that many of the geochemical phenomena documented over these features may be linked to redox gradient transport and related secondary processes.

Stew Hamilton is with the Ontario Geological Survey and is an AAG Distinguished Lecturer. For more information see the following web site <http://www.appliedgeochemists.org/lecturer.html>

Future meetings: 27th October – Gary Lowder – Tooloom Gold Project, Northeastern NSW

Web page: Check the SMEDG web page for more details <http://smedg.org.au>

Organising Committee:

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