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The relations between false gold anomalies, sedimentological processes and landslides in Harris Creek, British Columbia, Canada

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Abstract

Harris Creek is a Au-rich, cobble-gravel bed stream in southern British Columbia, Canada. A preliminary study, based on analysis of < 0.053 mm sediments and heavy mineral concentrates (SG > 3.2) from bulk sediment samples, identified accumulations of Au at breaks-in-slope of the stream gradient. This is consistent with theoretical models of heavy mineral transport by streams (Day and Fletcher, 1991). However, the breaks-in-slope also coincide with active landslides that might, because of the form of the Au anomalies, be interpreted as the source of the Au. To investigate this we have: (1) monitored erosion of the landslides and determined their Au content; and (2) used multi-element geochemistry (with Al, Mg, Na, Ba, Ti, P and Sr) to fingerprint the influence of one of the landslides on the composition of the < 0.053 mm fraction of the stream sediments.

Material eroded from the toe of the Landslide #1 forms soft clay-rich balls that are initially deposited in high-energy, bar-head environments. Observations and geochemical fingerprinting indicate that over a distance of 0.5 to 1.0 km downstream from the landslide these balls break down and release fine-grained sediment that is transferred from high- to low-energy (bar-tail) environments. Gold concentrations in the landslides are low (average 0.6 ppb) and the input of this material into Harris Creek dilutes Au values downstream from the landslide.

The combined effect of accumulation of Au at breaks-in-slope in stream gradient and gradual dilution by landslide material, is to create peak Au values and false anomaly cut-off points downstream from a landslide. It is not clear if the association of active landslides with changes in stream gradient is coincidental or linked to local or catchment basin-scale geomorphic processes. Nevertheless, for Au and other elements transported in stream sediments as heavy minerals, the presence of anomalies and anomaly cut-offs near landslides and breaks-in-slope in stream gradient should be interpreted with caution.

Keywords: geochemical exploration; streams; landslide; gold

1. Introduction

Harris Creek is a Au-rich, cobble-gravel bed stream in the southern interior of British Columbia, Canada (Fig. 1). For nearly a decade it has been the

research-observation catchment for ongoing studies into transport of gold and other heavy minerals by streams. As part of these studies, Ryder (1991) and Ryder and Fletcher (1991) showed that intermittent landslides are the principal source of new material to

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1. Geochemical studies of gold mineralizing events in the

Geochemical studies of gold mineralizing events in the Discovery-Ormsby and Clan Lake areas of the Yellowknife Greenstone Belt, Northwest Territories, Canada ... Oxygen isotope **studies** were employed to determine fluid source(s) and infer ore fluid pathways. ... Tyhee **Gold** Corporation's lithogeochemical data sets permit me to link $\delta^{18}O$ values ...

2. Public Abstract First NameEmma Middle NameGrace Last

Title:Geochemical **Studies of Gold Mineralizing Events in the** Discovery-Ormsby and Clan Lake Areas of the Yellowknife Greenstone Belt, Northwest Territories, Canada Discovery-Ormsby and Clan Lake are areas of active **gold** exploration in the north end of the Yellowknife Greenstone Belt, Northwest Territories, Canada.

3. Geochemical Exploration Case Study of Gold

Elueze and Olade (1985) carried out a **geochemical** exploration for **gold in** Ilesha northwest of Nigeria Elueze and concluded that Arsenic, which is widely used

as a pathfinder for **gold in** other...

4. MacSphere Geological and Geochemical Studies of the Gold

As a consequence, **gold** complexes were probably destabilized in the hydrothermal fluid and deposited with quartz in crack-seal veins. Lead isotope **studies of** whole rocks and galenas associated with **gold in the** Quartz-Fuchsite vein suggest a genetic link between the **gold** mineralization and the quartz-feldspar porphyries of the Dome Mine ...

5. Exploratory Geochemical Studies to Determine the

Exploratory **Geochemical Studies** to Determine the Mineralization Zones Around the Zarshuran **Gold** Mine Saeed Heidarlaki Shahrood University of Technology Shahrood, Iran ... such as **mineralizing events**, surface **geochemical** element concentrations, and surface weathering are of considerable importance [24]. ...

6. Geochemical Exploration for Gold and the Association of As

[1]. Rock **geochemical** samples used to collect the composite sample. The objective of this study was to under-take a **geochemical** exploration for minerals in the plutonic rocks, which covered the area under study, in an attempt to identify the areas of **geochemical** anomalies for Au, As, Cu, Pb, Sn, Mo, Bi, W, Zn and Li. It was also

7. Geochemical studies of rare earth elements in the

This report describes **geochemical** and geological **studies** which were conducted by the U.S. Geological Survey (USGS) and the Servicos Geologicos de Portugal (SPG) in the Portuguese pyrite belt (PPB) in southern Portugal. The **studies** included rare earth element (REE) distributions and geological and **geochemical** controls on the distribution of **gold**.

8. Information Handout Carolina Slate Belt Gold Deposits

Geochemical studies of the major- and trace-element variations of rocks and minerals will also help indicate the sources and processes responsible for the accumulation of the **gold** and support investigations of environmental aspects of mineralization and mining.

9. Introduction to Geology and Resources of Gold and

A1. Chart showing **gold** production, United States consumer price index, and price of **gold**, 1845-1987 A4 A2. Schematic diagram of hydrothermal **mineralizing** environment A10 A3. Schematic diagram of generation of a **mineralizing** solution A12 A4. Schematic diagram of processes responsible for releasing **gold** to leachable sites in a source rock A12 A5.

10. Structural mineralogical and geochemical studies of the

The carbon isotopes of carbonates range between 1.7 and 4.7 per mil. The delta 18 O values of the **mineralizing** fluids vary between +5.6 and -2.7 per mil and the delta D values between -52 and +18 per mil. The isotopic composition of the hydrothermal fluids plots outside both magmatic and metamorphic water boxes, therefore suggesting a ...

11. Geochemical and geochronological constraints on the

The Cripple Creek district (653 metric tons (t) of Au) consists of Au-Te veins and disseminated **gold** deposits that are spatially related to alkaline igneous rocks in an Oligocene intrusive complex. Vein paragenesis includes quartz-biotite-K feldspar-fluorite-pyrite followed by base metal sulfides and telluride minerals. Disseminated deposits consist of microcrystalline native **gold** with pyrite ...

12. Stable isotope C

The stable isotope and **geochemical studies of the** auriferous QCVs of Ajjanahalli and Gadag indicate mantle or juvenile magmatic source. Ridley and Diamond (2000) suggested metamorphic or orthomagmatic granitic source as the two most probable sources for orogenic **gold** deposits. The results of the present work are consistent with the ...

13. Stable isotope C

Introduction. The source of low to moderate salinity H₂O-CO₂-CH₄-N₂-H₂S **mineralizing** fluids for orogenic **gold** deposits has been a debatable issue, although they have many common characters world-wide (Goldfarb et al., 2005, Goldfarb and Groves, 2015). Several models have been proposed for their origin - (i) magmatic (Burrows et al., 1986, Rock et al., 1989), (ii) mantle (Groves et al ...

14. Controls on Gold Mineralization at the Coffee Gold Deposit

The Coffee **gold** deposit, located in the Dawson Range, west-central Yukon, Canada, is an example of structurally-controlled, **gold**-only mineralization with a global resource of ~4 Moz **gold**. Establishing the controls on ore distribution enhances exploration potential, and provides implications for the tectonic and metallogenic evolution of the ...

15. PQDT Open

Geochemical studies of gold mineralizing events in the Discovery-Ormsby and Clan Lake areas of the Yellowknife Greenstone Belt, Northwest Territories, Canada by Hansen, Emma Grace , M.S., University of Missouri - Columbia , 2013, 118; 1524435

16. A Review of Granitoid

Geophysical, structural and **geochemical** data have been used to study the relationships between magmatism, tectonics, fluid circulation and **gold** mineralization in eastern Cameroon, and to provide pressure-temperature-composition-time paths constrained by the available dating. Primary **gold** mineralization displays spatial and temporal relationship with felsic to intermediate I-type granitoids ...

17. Geochemical characterization of mineralized albitite from

Hence, **geochemical studies of** albitite would help to evaluate the petrogenesis, likely magmatic affinity, tectonic setting, controls of the **mineralizing** fluid, source, and their linkage to the **gold** ($\hat{A}\pm\text{Cu}$ $\hat{A}\pm$ U) metallogeny. Bhukia albitite is characterized by Na-Al-rich and K $\hat{A}\pm$ poor compositions along with metaluminous nature.

18. Gold uranium thorium and rare earth mineralization in

Stable Isotope (C-O-S) and **Geochemical studies of** auriferous quartz carbonate veins, Neoproterozoic Orogenic Ajjanahalli and Gadag **Gold** Field, Chitradurga Schist Belt, Dharwar Craton, Southern India ...

19. Gold mineralization at the Hardrock orogenic gold deposit

research found that **gold-mineralizing** hydrothermal processes were active over at least two deformation **events** and resulted in both strongly folded and linear auriferous veins, yet the mineral assemblages and **geochemical** footprints associated with the two stages of mineralization are similar.

20. Mineralogical and geochemical fingerprints of alteration

The Cripple Creek alkaline-magmatic Au-Te deposit, located in southern Colorado, USA, represents a world-class **gold** deposit. The deposit formed within an alkaline volcanic complex dominated by a central diatreme that records a complex history of brecciation, alteration and **mineralizing events**.

21. Recherche uO Research Petrographic and geochemical

Petrographic and **geochemical studies of the** alteration zones associated with **gold** mineralization at the Holloway mine, southwestern Abitibi Greenstone Belt, Canada. Authors: Ropchan, Jean Claudia. Date: 2000: Abstract: The Holloway mine is an Archean lode **gold** deposit hosted within the southwestern Abitibi greenstone belt.

22. Geochemical and Geochronological Constraints on the

studies were initiated to locate low-grade **gold** that could be mined from the surface. The linear northwest-trending shape of the largest **geochemical** anomaly (Gott et al., 1969) supported the earlier conclusion that the distribution of **gold** deposits was controlled by a deep-rooted northwest-trending fissure zone.

23. Physicochemical Parameters and Geochemical Features of Ore

This paper reviews data from numerous publications focused on the physicochemical parameters and chemical composition of ore-forming fluids from orogenic **gold** deposits formed during various geological epochs. The paper presents analysis of the distribution of the principal parameters of **mineralizing** fluids depending on the age of the mineralization.

24. Au

Geochemical evidence is presented that the auro-ferriferous (Au-Fe) mineralized belt of southcentral Mexico (Sierra Madre del Sur-Mezcala region) is directly linked to a regional post-Laramidic tectono-magmatic **event**, which was the product of interaction between the Farallon oceanic plate and the North America continental plate during the Middle to Late Tertiary.

25. Gold in the Northern Yellowknife Greenstone Belt Canada

Abstract. Numerical and **geochemical studies** were performed in this thesis to investigate the formation of ores in (1) the **gold**-bearing northern Yellowknife Greenstone Belt (YGB), Canada and (2) the southeastern Missouri Mississippi Valley-type (MVT) Pb-Zn-Cu district.

26. Mineralogical and geochemical characterization of gold

The quartz veins containing **gold** occur in association with metamorphosed rocks ranging in composition from semipelitic to pelitic and mafic. Primary **gold** mineralization produced chemical signature in the overburden and surrounding soil probably through weathering processes.

27. Minerals Free Full

The detailed petrological features and **geochemical** effects of the Pinglidian **gold** deposit were presented above, providing vast quantities of information regarding the alteration-mineral assemblages and physicochemical conditions of the **mineralizing** fluids, which revealed that these ore-forming fluids interacted with the surrounding rocks in ...

28. Geologic Geochemical and Geophysical Characterization of

Mapping, **geochemical** and geophysical data strongly suggest the controlling factor in mineralization location and geometry is the underlying structural framework of the system. Based on these geometries and orientations, a dextral Riedel shear array oriented 070° is proposed to adequately model the structural architecture controlling ...

29. Geochemical and Mineralogical Characteristics of

The petrographic and mineralogical **studies of the** deposits of magnesite of Bou Azzer, reveal mainly two different mechanisms: The replacement metasomatic in situ of the serpentine and the filling of fracture by circulation of a hydrothermal **mineralizing** fluid. A **geochemical** study of magnesites and serpentinites of Bou Azzer showed magnesite ...

30. The Dae Hwa tungsten

The deposit is composed of numerous fissure-filling quartz veins contained within Precambrian granitic gneiss adjacent to a contact with a granitic stock of Mesozoic age. $\delta^{34}\text{S}$ values of 2.4 to 4.4 per mil suggest that the source of sulfur was igneous. Carbon and oxygen isotopic analyses suggest that the hydrothermal system was dominated by meteoric fluids at temperatures below 240 ...

31.

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