# Geology of the northern extension of the Rock Creek graben (082/E10) Boundary District, southern British Columbia

# Regional metallogeny

#### Mineralization

Several occurrences of Cu-Pb-Zn mineralization have been explored for in the Copper Creek area based, in large part, on the successful exploitation of base- and precious-metal deposits in the Beaverdell camp to the southwest and the Greenwood camp farther south.

Regional controls on the distribution of these deposit types, based mainly on work to the south in the Almond Mountain map area include 1. In the hangingwall of Eocene extensional faults 2. Within or closely associated with north-trending Eocene grabens 3. Along prominent northwest trending structures.

However, most past exploration in the western part of the Christian Valley map area has focused on uranium mineralization that occurs in poorly consolidated conglomerate and sandstone that have been preserved below a cap of Pliocene basalt of the Kallis Formation. In 2008, the provincial government re-instated a moratorium on U exploration in the province that had been in effect from 1980-1987.



### The Eocene epoch: global events



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Spectacular wire silver, Highland Bell





phalerite, galena, ruby silver vein

The Highland Bell mine in the Beaverdell camp was one of the largest and richest vein deposits in the district. From 1896-1991, it produced 34.7 m oz of silver from east-west trending rich Ag-Pb-Zn veins. Based on Pb-Pb isotopic studies of mineralization (Watson et al., 1982) and Ar-Ar dating of host intrusions (this study) the age of mineralization in the camp is determined to be Eocene.

## Highland Bell Beaverdell camp



The Chicxulub crater records the impact of a large comet or asteroid in Yucatan ca. 66 Ma. It coincides exactly with the Cretaceous-Paleogene boundary, and undoubtably caused the world wide climate change and the extinction of 75% of the animal species on earth, including dinosaurs.



#### Rock Creek Graben Compilation map











## 2016: Christian Valley project

Project Summary

The project includes the geological mapping, compilation and mineral potential evaluation of the Penticton 1:250,000 east-half sheet in southern BC. In 2016, this work involved mapping of the northern extension of the Rock Creek graben in the 1:50,000 Christian Valley map sheet. The project focuses mainly on the structural, stratigraphic and magmatic controls of precious and base-metal mineralization in areas dominated by Tertiary extensional tectonics.

The Penticton east-half project extends west from Arrow Lake to the Beaverdell camp. The Greenwood mineral camp occurs in the southern part of the area, the Rossland camp immediately to the east, and the Republic District in Washington state to the south.

The area has been mapped and compiled at 1:100,000 scale by Tempelman-Kluit (1989), with more recent work at 1:50,000 scales concentrated along the east edge of the map sheet. The geology of the Christian Valley sheet is based mainly on geological mapping in 2015-2016 (Hoy, 2016) and compilation of more detailed mapping, most notably by Christopher (1978) and Massey and Duffy (2008).

#### Regional geology Location map

Tectonic assemblage map southern British Columbia, showing mineral deposits and camps, major faults, and location of the Christian Valley map sheet (082E/10) scheduled for publication in 2017 (Hoy and Jackaman, 2017).

The Almond Mountain map sheet (082E/07) has been published recently (Hoy and Jackaman, 2016).

underlies Marron Formation

Paleocene megacrystic granite unconformably underlies Kettle River

#### Age Dating:

A collaborative program with UBC (J. Gabites) includes Ar-Ar dating of selected samples within the Penticton East map sheet. Prelim data, as well as previously published data, are shown at left and plotted on the compilation map. The data, and geological mappi constrains the evolution of the Rock Creek graben as well as associated mineralization

Megacrystic granite (Eg) has been dated at ca. 56.0+/-1.0 Ma (U/Pb (Parrish, 1992) to 63.6 Ma (Ar-Ar, Table 1) where it unconformably underlies Marron Fm in the Rock Creek graben. Coryell syenite is dated at ca. 51-52 Ma (Parrish, 1988). Coreyll dykes intrude the Marron Fm in the graben, restricting the age of the Marron to ca. 57-52 Ma. This age span is tentatively corroborated by Ar-Ar Marron Fm plagioclase dates of ca. 57.8-59.2 Ma (Table 1).