Geology and regional setting of the White Mountain gold deposit, Jilin Province, northeastern China*

Corresponding author: Halley A. Keevil, Department of Geology and Geological Engineering, Colorado School of Mines, hkeevil@mines.edu

Co-authors:
Thomas Monecke, Department of Geology and Geological Engineering, Colorado School of Mines, tmonecke@mines.edu
Gregory Collins, Eldorado Gold China Operations, greg.collins@cn.eldoradogold.com
Richard Goldfarb, United States Geological Survey, goldfarb@usgs.gov

The White Mountain gold deposit, owned and operated by Eldorado Gold Corp., is located in the Jilin Province of northeastern China. The deposit has been in commercial production since 2009, with total pre-mining measured and inferred resources of more than 1.6 Moz of gold and present annual production of about 75,000 oz. Despite significant gold endowment and production, currently little is known about the genesis of the deposit and the regional tectonomagmatic setting of White Mountain and other gold deposits in this part of Jilin Province. No published information is available describing key features such as the mineralization style, detailed geochemistry and alteration, and age of mineralization. Additionally, no clear deposit model has been put forward for the White Mountain deposit, which complicates both in-mine and brownfields exploration. In fact, over the years, workers in the area have referred to White Mountain as being an orogenic, epithermal, or Carlin-like deposit.

The White Mountain deposit is located along a northeast-striking regional fault zone and is hosted by silica-rich breccias, with the main ore control inferred to be the intersection of two regional faults. Gold is associated with quartz, pyrite, and barite. The new PhD research project will be one of the first comprehensive studies of the White Mountain deposit and encompassing adjacent epithermal, orogenic vein, porphyry, and polymetallic vein deposits within this highly endowed part of southern Jilin Province. Based on comprehensive field and laboratory work, a deposit model will be developed for the White Mountain deposit. Field work will be conducted at the mine site and in the surrounding area, mapping the geology and alteration of both the ore zone and the surrounding host rock succession. Laboratory work will include petrography, scanning electron microscopy, electron microprobe analyses, fluid inclusion studies, and geochronology; preliminary data from summer 2014 will be presented at the conference. The field and laboratory work conducted will place the White Mountain gold deposit within the complex Mesozoic tectonic framework for the evolution of this part of China, which is controlled by the transition from north-south compressional closure of the paleo-Asian Ocean to extension related to the onset of the paleo-Pacific subduction regime. This work will have significant exploration implications within southern Jilin Province, contributing to a better understanding of the gold metallogeny of this region.