

## OVERVIEW OF THE GEOLOGY OF THE MURZINSKOE GOLD DEPOSIT

The Murzinskoe gold deposit is located along the main fault of the Akimovka zone, where sandstones, siltstones, mudstones, and limestones of the Lower Devonian Baragash Formation are in contact with terrigenous sediments of the Lower Silurian Gromotukha Series and volcanic rocks of the Middle Devonian Kuyagan Formation (Fig. 3). A rubble-ochre-clay crust, formed during Cretaceous and Paleogene weathering, occurs along the fault.

The deposit formed during four stages.

During the first stage, quartz diorite and granodiorite of the Ust-Belov Complex were emplaced and caused intense contact metamorphism of Silurian to Devonian terrigenous country rocks resulting in the formation of skarn and hornfels and pervasive silicification.

During the second stage, veinlet-disseminated sulfide mineralization occurred.

During the third stage, the intrusion of dolerite and porphyritic dolerite dykes into older rocks, led to the formation of gold-bearing quartz-carbonate veins and metasomatic rocks.

During the fourth and last stage, a supergene zone was formed consisting of a weathering crust of silicate rocks and ore oxidation zone (Babich *et al.*, 2008; Gusev, 2014; Murzin *et al.*, 2015).

Garnet-diopside, garnet, and epidote-garnet skarns, epidotes, and partly epidote- and skarn-altered rocks are common within the zone revealed in the open pit. These rocks occur as northwest-striking lenticular bodies. Skarns and epidotes are cut by mineralized quartz veins and veinlets in which chalcopyrite, chalcocite, covellite and fahlores are the major ore constituents and sphalerite, pyrite, and galena are minor constituents. Quartz veins up to 700 m long and 0.2 to 3 m in thickness are observed. The veins dip to east-north-east at 45–80° (Gusev, 2014; Murzin *et al.*, 2015; Gusev and Tabakaeva, 2017).

The gold-bearing weathering crust is linear at the Murzinskoe deposit. According to Gusev (2014) and Murzin *et al.* (2015), it extends along a submeridional fault for 1–1.2 km, is more than 100 m wide and extends down to 150–180 m below the surface. The major constituents of the supergene mineralization are iron (goethite and hematite) and manganese oxides and hydroxides as well as clay minerals (aluminum silicates, smectites and hydromica). The occurrence of oxidized mineralization at depth was facilitated by abundant steep fractures through which oxygen-saturated surface waters migrated. According to Gusev (2014), the oxidation zone at the deposit extends to a depth of 130 m.

3. Simplified geological sketch map of the Murzinskoe deposit, according to Murzin *et al.* (2015).

