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Structural Model of the Drazhnoe Gold Deposit, Yakutia, Russia

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The Drazhnoe deposit is situated in Yakutia, Russia. It is an orogenic-type gold deposit with a structural-lithological control of ore mineralization (Fig. 1A). The deposit is localized in the Adicha-Taryn regional-scale fault zone, along which gold deposits are concentrated. The deposit is confined to the northeast limb and hinge of the Taryn syncline, which is composed of the Upper Triassic silty sandstones and siltstones.

Four gold-bearing stockwork systems within the NNW left-lateral shear zone were recognized and explored. This zone crosses the Adicha-Taryn Fault by angle 20° clockwise.

The contours of the stockwork systems correspond to the areas of pyritization. Linear flat horizontal and low-angled quartz stockworks are grouped in arc-like systems (Fig. 1B).

Highest gold grades were discovered in cores of some quartz stockworks in the pyrite-arsenopyrite reach areas where NW oblique-slip faults and later transverse folds and dextral strike-slip faults intersects.

There are two stages of deformation distinguished. First (pre-ore) stage includes multiordinal cleavage folds F1 and ductile cleavage faults with S-C fabrics. Faults planes dip to the SW and NE at medium to steep angles. Transverse and diagonal strike-slip faults that are part of the structural paragenesis of the first stage of deformation are also distinguished

At the second (ore-bearing) stage of deformation under the conditions of horizontal compression-vertical extension, extended inclined quartz stockworks of overthrust kinematics and the associated subhorizontal stretching stockworks were formed. Veins with rich gold mineralization are often visible in core parts of stockworks (Fig. 1C).

The mineralogical study of sulfide mineralization was carried out on samples by the methods of computer tomography and microtomography. Mismatching of structural plans of gold and arsenopyrite distribution in quartz veins was revealed. Microstructural trends affecting gold distribution were visible in different stress fields, then quartz veinlets were formed.

Axes of folds F1 of the early substage $D\text{-}1^1$ of the first stage of deformation extend northwestward bend smoothly and slightly in the plan due to shear deformation at the late substage $D1^2$ of the first stage in the Adicha-Taryn Fault destroyed zone. The fault is probably formed in the late of the first stage of deformation as a wide zone of thickening of viscous reverse-sinistral strike-slip faults R extending NW. At the same stage conjugated dextral strike-slip faults R' were formed. Points where R and R' intersect predetermined the position of future ore-bearing stockworks. At the second (ore-bearing) stage of deformation D2 the direction of the horizontal compression vector has changed to SE. The mineralized sinistral strike-slip fault zone with regular distributed of gold-bearing stockwork systems was formed. Folds F2 of northeastern extension were formed within the zone in a transtention environment. In this superimposed mineralized shear zone, the ore-bearing stockwork systems like push-up structures between sinistral strike-slip faults R were formed (Fig. 1-D).

Fig.1. A-Drazhnoe deposit location; B-Cross-section of the arc-like stockwork system. The Gold Channel indicates concentration of highest gold grades; C-structural stereogram of the poles to gold bearing veinlets, lower hemisphere; D-structural model of the Drazhnoe deposit.