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## Structural Controls and Paragenesis of Mineralization at the Juomasuo Gold-Cobalt deposit, Kuusamo Schist Belt, northeastern Finland

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The Juomasuo Au-Co deposit is the largest known mineral deposit in the Paleoproterozoic Kuusamo Schist Belt. It is situated at a prominent flexure within the ~30km long, NE-SW-striking Käylä-Konttiahö Antiform, a structural corridor that hosts several Au-Co-Cu deposits. The host rocks comprise a highly deformed, upper greenschist metamorphosed package of sedimentary, mafic volcanic and mafic-ultramafic rocks.

Five major deformation events ( $D_{1-5}$ ) are recorded in the host rocks of Juomasuo. Earliest deformation ( $D_1$ ) is represented by poorly defined folds ( $F_1$ ) and faults, and  $V_1$  veins containing albite±quartz±carbonate. The Käylä-Konttiahö Antiform is interpreted to have developed during  $D_1$ .

The  $D_2$  event was multi-staged and resulted in an early, regional penetrative  $S_2$  foliation and tight  $F_2$  folds and late brittle-ductile shear zones. The major Au-Co mineralization event of the Juomasuo deposit occurred during the late stages of  $D_2$  and is mainly associated with NW-striking, SW-dipping shear zones. Veins are rare in ore zones but, where observed comprise quartz-chlorite-pyrrhotite-pyrite±muscovite ( $V_2$ ) and form crack-seal types in competent rocks or deformed sigmoidal or boudinaged types in shear zones. Peak metamorphism coincides with  $D_2$ .

$D_3$  structures include NE-SW-trending open folds,  $S_3$  foliation, NW- to SE-dipping faults and  $V_3$  veinlets containing pyrite-carbonate. Minor Au mineralization took place during  $D_3$ .

Seven distinct hydrothermal alteration assemblages are recognized throughout the deposit and are linked to the deformation events and associated structures. Early, pre-ore formation stages resulted in Na-(Ca), Mg-Fe-Ca and Mg-Fe-K metasomatism. Intense albite alteration of the Na-(Ca) stage created extreme competency contrasts within the stratigraphy, which localised deformation and subsequent hydrothermal fluid flow during  $D_2$ .

Hydrothermal alteration assemblages of the late  $D_2$  major Au-Co mineralization event are divided into: chlorite-pyrrhotite-biotite-quartz-apatite-rutile-chalcopyrite-pyrite±gold assemblages, and muscovite-quartz-pyrite-pyrrhotite-apatite-rutile-cobaltite-linnaeite-cobaltpentlandite-gold assemblages.

Characteristic structural, hydrothermal alteration and mineralization features of Juomasuo are interpreted to be similar to those of metasedimentary rock-hosted cobalt deposits of Blackbird district, Idaho.