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NOVEMBER SUMMARY

SAMATOSUM RESEARCH PROJECT

Fieldwork in preparation for the Minnova-NSERC-McGill research project on the genesis of the Samatosum deposit was completed on November 30, 1990.

During the month, 41 diamond drill holes from the Sam deposit area (between sections 100+00W and 94+00W) were relogged, and approximately 750 samples were collected. In addition, 5 holes from the Rea deposit, one hole from the 266 zone, 7 holes through the "argillite wedge/remnant and barite horizon", and 7 non-mine area holes containing Ag intersections were relogged and sampled (approximately 250 samples). Limited mapping and sampling was also conducted in the Sam open pit, and in the Rea trenches.

The extensive relogging of Sam drill core has enabled substantial revision to be made to geological sections through the mine area. The following preliminary conclusions can be drawn from the emerging lithological, structural, alteration and mineralization patterns:

(a) Three distinct lithological assemblages occur in the mine area. The oldest assemblage consists of mafic pyroclastic and minor volcaniclastic rocks ("Sam mafics"), which are overlain by a diverse group of chert-bearing rocks including siltstone-chert, argillite-chert, mafic volcaniclastics-chert-argillite, chert, and chert-dominant breccias ("Sam sediments"). These sediments are overlain by turbiditic argillite, siltstone, sandstone, wacke, and conglomerate/debris flows ("argillite wedge/remnant"). The "Sam sediments" appear to be related to the underlying mafic volcanics, whereas the turbiditic rocks in the minea area may have a quite different provenance (i.e., no significant mafic component). Each of the main assemblages contains units that can be correlated locally between drill holes, and that can be used to assess fault offsets.

(b) K. Glover's regional structural model appears to be consistent with detailed sections in the mine area. The "Sam sediments" are separated from the "Sam mafics" by a thrust fault, and the "Sam sediments" and the everlying turbiditic rocks have been isoclinally folded into an overturned syncline. The fold axis of the syncline may itself be refolded (z-folds?). The area appears to have undergone several phases of folding, a thrust faulting event, and a relatively late normal faulting event. At least two phases of folding, and both the faulting events appear to have affected the distribution of ore in the deposit.

(c) Two main styles of hydrothermal alteration and Ag mineralization occur in the deposit. In general, the earlier phase consists of quartz stringers containing pyrite, base metal sulfides, and Ag-bearing tetrahedrite. The stringers are surrounded by successive alteration zones ("MUT") of quartz-pyrite-sericite ($\pm$ Ag and base metal mineralization) and sericite-pyrite. Pyritic alteration is extensive and may not always be accompanied by significant grades of mineralization. At depth, this pyritic style of mineralization is base metal-rich and relatively Ag-poor. Pyritic alteration oocurs in both the "Sam sediments" and the turbiditic rocks. Determination of the protolith is usually difficult, and is dependent on the presence or absence of bedded chert that is often obscured by silicification.

The second style of mineralization is associated with quartz-carbonate veins and stockworks that contain pyrite, base metal sulfides, and Ag-bearing tetrahedrite. These veins generally occur at or near the contact of the "Sam sediments" and the turbiditic rocks, and within the turbidite sequence. In general, the veins are enclosed by envelopes of predominantly sericitic ("SERT") alteration (n.b., "SERT" is used for all sericite-dominant, non-pyritic rocks in the mine area, and not exclusively for the alteration described herein). The finer grained turbiditic rocks alter in a distinctive yellow and grey banded pattern composed of sericite and sericite-pyrite respectively, that probably reflect primary compositional layering. The coarser grained turbiditic rocks (especially sandstone-wackes) are generally sericitized near the veins, but are locally silicified, carbonatized and sulfidized, and may contain high grade mineralization. "Sam sediments" become sericitized near the veins, but the chert component is relatively unaffected. Barite at Sam appears to occur exclusively as veins, with identical alteration haloes as the quartz-carbonate veins, and locally carries significant Ag-bearing tetrahedrite.

The various Ag-bearing vein styles are probably related to one another in a genetic sense, but actual timing remains equivocal.

(d) All Ag and base metal mineralization at Sam appears to be epigenetic. Quartz stringer mineralization and associated pyritic alteration cross-cut the "Sam sediments" through most of the deposit area, but are locally concordant with the "Sam sediment"-turbidite contact. Quartz-carbonate veining and associated sericitic alteration is locally concordant with the "Sam sediment"-turbidite contact, but also cross-cuts the turbiditic rocks both in the nose of the syncline and in the limbs of the fold. Quartz-carbonate veining is best developed near the intersection of the hinge zone and the "Sam sediment"-turbidite contact. However, quartz stringer mineralization also extends below the "Sam sediment"-turbidite contact, along the hinge zone of the syncline. Since quartz-carbonate and barite veins occur at or near the "Sam sediment"-turbidite contact on both limbs of the fold, either the mineralizing system consisted of a two-component, orthogonal "T-shaped" structure that was subsequently folded, or a one-component, "Y-shaped" structure which was syn-to post-deformation (D1, isoclinal?). In the latter scenario, the hydrothermal conduit (or conduits, as there appears to be two closely spaced, subparallel conduits) followed the hinge zone through the "Sam sediments", and bifurcated at the nose of the turbidite contact. Subsequent folding and faulting events could be responsible for deformation observed in the veins.

As noted above, these conclusions are both grossly simplified and very preliminary, and are based entirely on drill core and mine area observations. The research part of the project has yet to begin, and the collection of laboratory data should establish much better constraints on the genesis of the deposit.

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