New gold occurrences in the Scottish Dalradian, UK – nature and constraints on genesis

Nyree Hill, G. Jenkin, D. Holwell (University of Leicester), C. Sangster (Scotgold Resources Ltd), A. Boyce, D. Mark (SUERC), J. Naden, G. Gunn (BGS) and C Rice (University of Aberdeen)

1. Scottish Gold
- The Cononish gold deposit, Tyndrum, will be Scotland's first modern gold mine when it goes into production in 2013.
- Cononish is a high grade resource (11.7 g/t Au and 42 g/t Ag) of 163,000 oz gold and 596,000 oz silver.
- This work examines new gold targets to develop key indicators for mineralisation to aid exploration and improve cost-effectiveness.

2. Geological setting and new occurrences
- The Dalradian supergroup, comprising marine clastic sedimentary rocks and some volcanic units, underwent deformation during closure of the Iapetus ocean between 480 and 465 Ma.
- Between 435 and 395 Ma large granite plutons were emplaced with a series of associated dyke and sill swarms.
- Gold mineralisation is found throughout the Dalradian.
- At Cononish gold is hosted in a <6m wide steeply-dipping quartz vein running parallel to the NE-trending Tyndrum fault.
- Regional exploration has identified an area of early molybdenite mineralisation in Glen Orchy and breccia pipes at Beinn Udlaidh, as well as newly discovered gold-bearing quartz veins.

3. New gold occurrences – Glen Orchy & Beinn Udlaidh

4. Key indicators for gold

Petrography: Gold in the form of electrum (El) is intimately associated with galena (Ga), in gold veins; stage 1 gold forms as inclusions in pyrite. Stage 2 is associated with late gal and hessite (AgTe2). Breccia pipe gold is found as gold-silver tellurides in pyrite in interclast quartz.

Geochemistry: Breccia pipe Au:Ag ratio is comparable to Glen Orchy & Cononish gold but shows significant variation in key elements. Barren veins & molybdenite veins show distinct variation in key elements and Au:Ag ratios.

Sulphur isotopes: Glen Orchy gold is comparable to Cononish and is inferred to have greater sedimentary input compared to breccia pipe, barren vein & molybdenite mineralisation.

Variation in key elements by mineralisation type

Sulphur isotope ratios by mineralisation type