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The Newly-Discovered Ikkari Gold Deposit: Geology and Initial Insights into the Complex Controls on a Major Orogenic Gold Deposit in the Central Lapland Belt, Finland

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The Ikkari gold deposit, discovered by Rupert Resources in April 2020 in Lapland, Finland, hosts a combined Mineral Resource of 4.39 Moz. It is the most significant gold discovery in the Paleoproterozoic Central Lapland Belt (CLB) since the Kittilä (Suurikuusikko) deposit was discovered in 1986.

The deposit occurs within a 4-km-wide belt of Savukoski group sediments and volcanics, bound to the north by the mafic-dominated Kittilä suite allochthon and to the south by the Kumpu group; a younger foreland basin composed of felsic sediments.

At the deposit scale, quartzite and siltstone slivers of Kumpu group sediments, up to 20 m in width, are structurally interleaved within highly strained ultramafic komatiites, introducing both geochemical and rheological heterogeneity. Ultramafic units containing centimetre- to millimetre-scale felsic clasts represent early fault zones formed during intercalation. Together with tourmaline-matrix cataclastic breccias, these represent structures active during the pre-mineralisation phase. Gold mineralisation, as free gold and associated with pyrite, was introduced during subsequent deformation events and is preferentially localised along the margins of felsic slivers and within early cataclastic units.

Late-stage hematite-bearing carbonate breccias, with a characteristic milled texture, host high-grade native gold and record the latest phase of gold mineralisation. The presence of at least two distinct mineralisation phases, repeated hydrothermal events, and the structural pre-conditioning are interpreted to have contributed to the high grades and tonnage present in the deposit.

Alteration is characterised by a broad envelope of iron and potassic mesothermal alteration, the products of which are controlled by the host lithology. Gold mineralisation has a characteristic Mo-S-Te-U-W association, distinct from the Kittilä deposit but analogous to other sub-economic gold occurrences within the CLB. Overprinting hydrothermal fluid and alteration events, coupled with multiple deformation phases, have produced a complex orogenic gold system an order of magnitude larger than other deposits in the district.