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### **Precambrian gold-bearing Nemui Conglomerates, eastern Siberia: Possible analogue to the Witwatersrand Basin and a new emerging gold province**

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The Witwatersrand basin is a unique geologic structure that is believed to hold about 40% of the world's gold resources and historically produced nearly one-half of all gold ever mined on planet Earth. Witwatersrand mineralization is hosted in a system of flat-dipping reefs that originated through a prolonged accumulation of detrital gold in a major sedimentary basin, a basin also characterized by prolific volcanic activity and intense hydrothermal alteration. The sheer size of Witwatersrand gold-bearing structure suggests that such an incredible geologic phenomenon could have only been the result of a unique set of conditions that probably were never reproduced anywhere else in the course of geologic history. However, geologic basins resembling Witwatersrand, at least in some characteristics, have been described in the Amazon, Guyana, Kuloi (NW Russia), and Pilbara cratons. Possibly the closest analogue to Witwatersrand is the newly discovered, Precambrian gold-bearing Nemui sedimentary basin in eastern Siberia (Table).

<b>GEOLOGIC PARAMETERS</b>
<b>Witwatersrand (3.1-2.7 Ga)</b>
<b>Nemui (Mesoarch.-Paleoprot.)</b>
Petrographic features of sedimentary rocks
Abundant pyrite, mica in the shaly matrix
Pyrite, mica in the shaly matrix
Geochemical features of sedimentary rocks
Elevated Th, Ta, Ti, Y, W, and REE (igneous provenance)
Elevated Th, Ta, Nb, Y, Bi and REE (igneous provenance)
Associated greenstone belt and possible provenance rocks
Barberton greenstones and hydrothermally altered granitoids geochemically anomalous in Au and U
Batomga greenstones and hydrothermally altered granitoids geochemically anomalous in Au and U
Mineralization

Gold, uranium, rare diamonds
Gold, uranium, rare diamonds
Mineralized structures
Stacked, sub-horizontal reefs, late-stage faulting, mafic dikes
Stacked, sub-horizontal reefs, late-stage faulting, mafic dikes
Gold occurrence and shape
Mostly free, predominantly dislike with some toroidal forms, extreme flattening
Mostly free, re-mobilized intergrowth with quartz pebbles; predominantly dislike, flat oval, and circular with extreme flattening
Possible formation model
Detrital, syn-sedimentary and (or)hydrothermal, with inputs from ancient volcanic activity and Archean biological processes
Currently unclear, but most probably detrital (paleo-placer) with later hydrothermal alteration

Although the Nemui basin is currently experiencing early stages of exploration history, it is already famous for its modern alluvial gold operations that routinely produce unique flattened gold nuggets, the largest of which (7.6 kg) is hosted in the State Diamond Fund of Moscow Kremlin's Treasury. The current gold resource for a single isolated deposit within the Nemui paleo-clastic system stands at 14 Moz of contained gold grading 3 g/t Au or higher, with an overall potential to host several major world-class, detrital gold deposits.

