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EVOLUTION OF U-Au ORE SYSTEMS ON PRECAMBRIAN SHIELDS

1. Ancient complex Au-U deposits on Precambrian shields (e.g. Witwatersrand, African Shield; Iron Quadrangle, East Brazilian Shield; Kuusamo, Onega Lake Region, Baltic Shield) formed in Early Proterozoic rift basins developed on weathered Archaean granite-greenstone basement which was enriched in U, Au, PGE, Ag, Ni, Co, Bi, Cu. These elements accumulated in the zones of the regional structural-stratigraphic unconformity between the crystalline basement and the Early Proterozoic volcanic-sedimentary protoplatform cover through enrichment by organic matter with a very high carbon concentration. Generally, the deposits have undergone considerable endo- and exogenic alteration, which has masked the original U and Au accumulation processes.

2. The origin and alteration of Au-U deposits have been studied in separated ore regions throughout the continental protorift, which extends from Black Sea through Krivoy Rog to Kursk-Belgorod and all over the Baltic Shield: Onega Lake Region-Kuusamo-Karasiok. The significant feature of this protorift is the development of regional intense Proterozoic Na-metasomatism, which was connected, with the uplift of large tectonic blocks of the earth crust along long-lived riftogenic structures.

3. The Na-metasomatic solutions destroy rock-forming ore minerals, oxidise organic carbonaceous matter and elements of alternative valency (U, Au, Fe, S, C), create favourable conditions for redeposition and separations of U and Au. Principally new genetic types of deposits (uraniferrous albitites) were formed instead of primary earlier Au-U deposits.