

ON A POSSIBLE ASSOCIATION OF GIANT ORE DISTRICTS WITH MARKS OF METEOROID IMPACTS ON THE EARTH'S SURFACE. A.N. Danilin, Karpinsky Geological Research Institute (VSEGEI), St. Petersburg, Russia.

Impacts of large (more than one kilometer) meteoroids (asteroids and nuclei of large comets) on the surface of continental Earth's crust in different geological epochs were accompanied by intense fragmentation of rocks below the floor of the explosion-generated crater attenuating with depth and sideways. Post-impact recoil of socle rocks caused their additional fragmentation; moreover, as a result of isostasy, the Earth's crust area emerged, its lower boundary uplifted relative to the environment as well. In a meteorite crater (astrobleme), the Earth's crust is thinned, crushed and easily penetrable. Subsequent geological processes distorted the primary picture of the astrobleme structure. Only preservation of its crushed "roots" often overlapped by deposits of different age is most probable.

It is known that formation of various mineral deposits is more easily realized in a permeable environment with large deposition surface, as each rock degradation has a catalytic effect, reducing the activation energy in solutions saturated with mineral components. It is obvious that all other conditions being equal, both endo- and exogenic fluids, crustal and mantle magmatism centers – ancestors of mineral deposits – prepared or taking place in crustal migration "life" of the given territory will use the preserved space impact mark. In the areas of hydrocarbons formation, the latter will prefer to form accumulations in prepared (crushed) cavities of the Earth's crust.

Thus, socle astrobleme complexes represent giant chemical reservoirs-reactors, where intense processes of hydrothermal synthesis take place, extraction and concentration of migration-capable occurrence forms of different atoms is in progress. The most well-known and characteristic example of such synthesis is Witwatersrand gold-uranium deposits located in fractured rocks of Vredefort astrobleme (South Africa) socle.

In our opinion, the Olympic Dam (Australia) group of deposits and their genetic analog the Central Aldan District (Russia) could be associated to a set of giant deposits formed in a sequence of fractured rocks of the socle complex of ancient astroblemes.

Intensely crushed "roots" of the Polar Urals (Russia) circular structure assigned by us to astroblemes comprise a number of so far discovered deposits of different minerals. The territory is estimated as very prospective for discoveries of new large deposits – construction of a branch railway is planned here under the federal program.