

MIDDLE-URALS RING STRUCTURE, USSR: DEFINITION, DESCRIPTION, POSSIBLE PLANETARY ANALOGUES; G.A.Burba, Vernadsky Institute, Moscow, 117975, USSR

The general straight linear position of Ural Mountains North to South along 60°E meridian is interrupted in the middle part of the range with an eastward facing semicircular curvature. This arc is considered here as an eastern part of a large ring structure. We called it Middle-Urals Ring Structure (MURS). The structure is located between 54/59°N, and 52/62°E. The minimal diameter of its rim is 400 km.

The eastern half of the rim is a part of Ural Range: from Yamantau Mountain on the South to the area of Kachkanar Mountain on the North. NW part of the rim is Okhanskaya Vozvyshennost (Highland) North of Kama River, western part is presented by Sarapulskaya Vozv., and SW part - by Bugulminsko-Belebeyevskaya Vozv. (South of Belaya River). There are two uprisings within the central part of MURS both elongated N to S - Tulvinskaya Vozv. and Sylvinsky Kryazh (Range). SE part of the MURS bottom is occupied by Ufimskoye Plateau.

The ring structure is outlined with a general pattern of the large river valleys (Fig.1, position 2): Chusovaya, Belaya, and Kama Rivers (a part of Kama R. valley between the mouths of Chusovaya R. and Belaya R.). A net of a smaller (intermediate-sized) river valleys also outlines a MURS concentric pattern (Fig.1, position 3). The general straight directions of the small-sized river valleys are mainly radial to MURS (Fig.1, position 4).

The hypsometric level of the eastern part of MURS rim is up to 1000-1500 m, NW part - up to 300 m, W - up to 220-250 m, SW - up to 300-350 m. The uprisings in the central part of MURS bottom are up to 400-450 m. Minimal height within the MURS is 58 m (in Kama R. valley, near Belaya R. mouth), and maximal is 1640 m (Yamantau Mnt.).

There is an isometric depression of the basement under the MURS. The depths of the depression are down to -8 km. There are two uprisings of the basement with summits located at -3 km depth [1]. This uprisings are located under the two uprisings of the surface in the central part of MURS bottom mentioned above. The depth/diameter ratio for basement depression is 1/50.

Lithological-paleogeographical maps [2] show the depression of the surface within the outlines of MURS beginning from Precambrian time. There was a shallow sea during Riphaean and Vendian times. During Cambrian there was a lowland framed with uprisings from E and W, and with an isometric uprise in the central part. This uprise corresponds the two modern central uprisings mentioned above.

The data listed give a possibility to conclude the MURS have a structure similar to a giant impact craters, similar to those on the other planets. This crater have a sharp expression in the basement topography, and not so sharp expression in surface topography. It could be connected with a thick layer of sediments filled the crater. Uprisings in the central part of MURS could be considered as places of the crater's central mountains, as they are located over the basement uprisings. It is

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suggested that geological life of the area took place within the net of faults originated during the impact event in Preriphaean time and being active during the next stages of geological history.

Another analogue of MURS could be presented by coronae on Venus - a large circular structures surrounded with a ring of ridges. The uprised topographic position of the area inside the MURS - Ufimskoye Plateau - is analogical to uprised position of central parts of coronae on Venus (higher to compare with the surrounding areas). The size of MURS is similar to the larger coronae on Venus - Nightingale, Earhart, Anahit Coronae.

References: 1. Tectonic map, in - Atlas of the USSR, Moscow, GUGK, 1984, 88-89 (in Russian). 2. Atlas of lithological-paleogeographical maps of the USSR, vol.1, Moscow, VAGT, 1968, 52 sheets (in Russian).

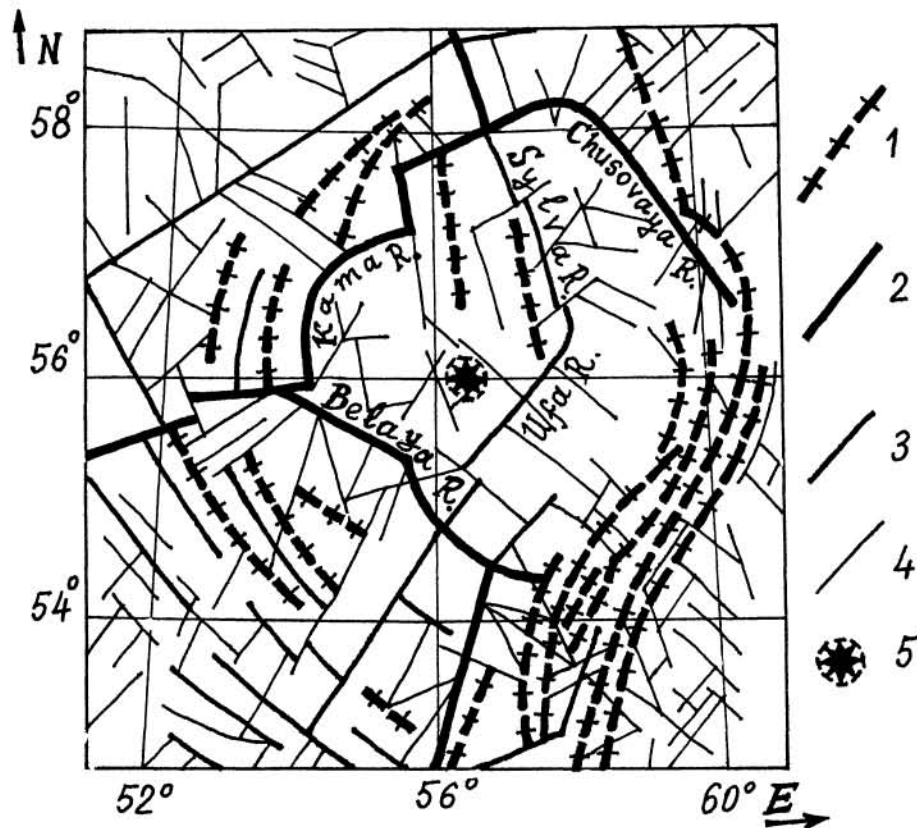


Fig.1. Scheme of Middle-Urals Ring Structure (MURS)  
 1 - crest of topographic prominence;  
 2,3,4 - general direction (approximated by a straight line) of large (2), intermediate-sized (3), and small (4) river valleys, reflecting faults;  
 5 - centre of structure