

## EXTRATERRESTRIAL IMPACT STRUCTURES IN THE USSR

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On the territory of the USSR at the present moment are recognized 21 impact craters (astroblemes). Part of them were known before, but only special investigations of shock metamorphism led to the conclusion about the extraterrestrial origin of these circular morphostructures.

Most of these structures are discovered in European part of the USSR where their frequency 3,2 per  $10^6$  km<sup>2</sup> with the same size distribution approaches this frequency for the territory of Canada, thoroughly investigated in this respect. By those frequency the whole number of the preserved astroblemes on the territory of the USSR may be estimated at more than 80.

Diameters of known objects measure from 100 km (Popigay) to 1,4 (Zeleny Gay) more than 2/3 of them belong to the Mesozoic and Cenozoic. Craters are partly eroded and usually concealed under sediments. The discovery of these structures is due to boring and geophysical works. Craters with diameters more than 3 km are usually complex. In the majority of the circular basins, explosion breccias (authigenic and allogenic) and impactites (fragmental — suevites and massive — tagamites) are preserved. Impactites are usually present in the craters formed in crystalline rocks. Even in the largest impact structures trigger magmatism is absent. Droplike particles of rapidly cooled impact glass, found near Zamanshin crater are thought to be tektites by some authors.

Shock metamorphism patterns are found in all the structures: shatter cones, diaplectic minerals and glasses. In the Popigay, Kara and some other impact structures high pressure phases are recognized (coesite, stishovite and others). In the impactites of the Popigay and Obolon structures tiny particles of troilite and iron with high nickel content, native nickel are found. In these and some other craters impactites contain abnormal quantities of dispersed nickel according to the geochemical investigations. Petrological analysis reveals minor changes in the impactite composition in comparison with the target rocks which points to partial evaporation of the impact melt.

The investigation of composition and inner structure of breccias and impactites, filling in craters, enables us to reconstruct the condition of their origin and, in particular, the properties of fluidized multiphase systems spreading radially from the explosion centre.

## MINERALOGY AND PETROLOGY OF HEATED MURCHISON: A PROGRESS REPORT

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To examine thermal metamorphic effects we studied the mineralogy and petrology of Murchison (C2) samples heated for 1 week at low pressures