N. V. Sobolev¹, E. S. Yefimova¹ and E. I. Shemanina²

 Institute of Geology & Geophysics, Siberian Division of Academy of Science, Novosibirsk, USSR
All-Union Geological Institute (VSEGEI), Leningrad, USSR

Diamonds from alluvial sources of the northern Urals have been known since 1829 but no kimberlites have yet been found there. Most of the finds are located within the area of the Vishera River. Most of the diamonds are represented by rounded dodecahedra typical of alluvial deposits of Brazilian type.

Protogenetic and/or syngenetic inclusions have been recovered from more than 200 diamonds of variable size. The included minerals are olivine, chromite, chrome pyrope, chrome diopside, enstatite, Mg-Fe-garnet, omphacite, kyanite, coesite, rutile, sulphides.

The majority of the primary inclusions have an eclogitic suite affinity. Garnets of that type are the most common inclusions. They are represented by a wide series of compositions with Fe/Fe+Mg ratios mainly ranging from 30% to 60% and of Ca-component contents varying from 10 to 55 mol % but mostly lying between 20 and 35 mol %.

Clinopyroxenes of the eclogitic suite contain from 2.13 up to 9.59% Na₂O, i.e. from 14 to 72% of jadeite. A stable impurity of K_2O (up to 0.38 wt %) is fixed in them. In addition to these major minerals, coesite, kyanite, rutile and low Ni sulphides have been found. The most interesting polymineralic inclusion found in the single diamond is a garnet-coesite intergrowth.

Ultramafic suite inclusions are represented by high chrome pyrope (up to 15.6 wt % Cr₂O₃), forsteritic olivine, enstatite, chromite (more than 62 wt % of Cr₂O₃) and chrome diopside.

The studies of carbon isotopic composition have been undertaken by E. M. Galimov on about 90 diamonds, most of which contain inclusions. Fifteen diamonds of the ultramafic suite show small negative δ'^3 C ratios typical of diamonds from this type of all known localities (from -7.94 up to -2.10 ‰). Eclogitic suite diamonds based on study of more than 70 crystals have a wide range of δ'^3 C (from -22.20 up to -4.16 ‰) which is a typical feature of most known eclogitic suite diamonds.

The abundances of syngenetic inclusions in the diamonds from the Urals indicate a predominance of the eclogitic suite diamonds. The evaluation of more than 200 diamonds with inclusions of primary minerals indicate the following percentage; 75% eclogitic and 25% peridotitic. All sulphides analysed (about 10) are related to the eclogitic suite.