Sources of kimberlitic minerals in clastic sediments of Latvia and some problems in the succession of formation of supposed kimberlites

Vija Hodireva,
Denis Korpechkov,
Nina Samburg,
Alexander Savvaitov

Hodireva V., Korpechkov D., Samburg N., Savvaitov A. Sources of kimberlitic minerals in clastic sediments of Latvia and some problems in the succession of formation of supposed kimberlites. *Geologija*. Vilnius. 2003. No. 42. P. 3–8. ISSN 1392-110X.

Minerals of kimberlitic assemblage have been found in some clastic sediments of Latvia. At present they are known from sandy deposits of the Upper Devonian Ogre Formation (outcrops in valleys of the Abava, Imula, Amula rivers) and Ketleri Formation (outcrop in the valley of the Venta River – Ketleri site, Ciecere and Paksīte rivers) in Kurzeme, from beach placers both of the Baltic Sea and the Gulf of Rīga, as well as from the alluvial deposits of the left tributaries of the Gauja River including recent alluvium. There are chrome-pyrope, chromespinelides, chrome-diopside and moissanite, which represent the indicator minerals of a kimberlitic assemblage. Kimberlitic mineral assemblages established in Latvia are subdivided into five types. Based on the distribution and composition of these types the location of supposed kimberlites is suggested.

Key words: kimberlitic mineral assemblage, chrome-pyrope, chromespinelides, chrome-diopside, moissanite, kimberlites, Latvia

Received 3 February 2003, accepted 10 March 2003
Vija Hodireva, University of Latvia, Museum of Geology, Alberta Str. 10, LV-1010, Rīga, Latvia. E-mail: vhodirev@lanet.lv
Denis Korpečkov, University of Latvia, Institute of Geology, Raiņa Blvd. 19, LV-1586, Rīga, Latvia. E-mail: geolinst@lanet.lv
Nina Samburg, University of Latvia, Institute of Geology, Raiņa Blvd. 19, LV-1586, Rīga, Latvia. E-mail: geolinst@lanet.lv
Alexander Savvaitov, University of Latvia, Institute of Geology, Raiņa Blvd. 19, LV-1586, Rīga, Latvia. E-mail: geolinst@lanet.lv

INTRODUCTION

The first data on kimberlitic assemblage minerals in Latvia were published more than ten years ago (Sorokin et al., 1992). According to them, these minerals were found in Kurzeme in sandy deposits of the Upper Devonian Ogre Formation, in outcrops along the Abava, Imula, Amula rivers, and in the Ketleri Formation cropping out in the valleys of the Venta (Ketleri site), Ciecere and Paksīte rivers, as well as in the recent alluvium. The main attention was paid to pyrope found in the Ogre and Ketleri formations. The chemical composition of numerous grains of pyrope was studied by A. Birķis, N. Samburg, L. Savvaitova and V. Sorokin in 1993 (Sorokins, 1997).

During the last decade numerous grains of minerals of kimberlitic assemblage were discovered in beach placers both of the Baltic Sea and the Gulf of Rīga and in alluvial deposits of the left tributaries of the Gauja River, and studied in detail (Savvaitovs et al., 1999; Hodireva et al., 2000; Savvaitov et al., 2000; Savvaitovs et al., 2000, etc.).

The basic minerals of kimberlitic assemblage were identified, the patterns of their distribution in Latvia and five types of kimberlitic assemblages have also been determined, and suggestions on the probable locations of kimberlite bodies were provided. The suggested kimberlite bodies could be considered as sources of kimberlitic assemblage minerals.

This article is dedicated to the memory of Prof., Dr. habil. geol. Visvaldis Kuršs and Dr. habil. geol. Ints Veinbergs who initiated detailed studies into the distribution of kimberlitic assemblage minerals in Latvia.

BASIC MINERALS OF KIMBERLITIC ASSEMBLAGE

Chrome-pyrope, chromespinelides, chrome-diopside and moissanite represent the indicator minerals of kimberlitic assemblage found in Latvia. Possibly some other minerals such as pyrope almandine, almandine pyrope, chrome-enstatite could also belong to the kimberlitic assemblage. All these minerals are found as accessories.

The chrome-pyrope is an important and dominant indicator mineral of the kimberlitic assemblage. It is represented mainly by violet grains with glassy lustre and indices of refraction 1.743–1.746. However, there are rare grains of chrome-pyrope which are violet-reddish, violet-brownish and crimson. The grain size often reaches 0.1–0.5 mm and rarely 0.7 mm. The grains are smoothed, the larger grains are rounded. The details on the chemical composition of chrome-pyrope grains from the Quaternary were published in several papers (Hodireva et al., 2002; Hodireva et al., 2000; Savvaitov et al., 1998). In the chrome-pyrope pyrope molecules prevail (45.8–79.8 mol.%). In all cases this mineral is rich in magnesium and poor in iron (MgO 17.42–22.98 mas.%, FeO 6.41–14.51 mas.%). The content of Cr_2O_3 is unequal and ranges from 1.29 to 10.32 mas.%. The knorringite molecule is also present in the composition of many grains, reaching 18.3 mol.%. The probable molecular composition of the chrome-pyrope grains studied is as follows: $Pyr_{45.8–79.8\%}$, $Alm_{9.1–22.8\%}$, $Spess_{0.0–1.4\%}$, $Andr_{0.0–6.6\%}$, $Uvar_{2.3–15.8\%}$, $Gross_{0.0–8.7\%}$, $Knor_{0.0–183\%}$. Knorringite molecules, especially in large quantities, are indicative of high-barometric conditions of crystallisation of chrome-pyrope, what is a typical phenomenon for kimberlitic pipes (Костровицкий, Де Бруин, 1999).

Most of the grains of chrome-pyrope studied correspond to the field of lherzolite on the plot of mas.% CaO against mas.% Cr_2O_3 (diagram of Sobolev), but there are single grains located in the field of dunite-harcburgite and in the field of diamond association.

The chemical composition of chrome-pyrope from the deposits of the Ogre and Ketleri formations slightly differs from that of chrome-pyrope of the Quaternary sediments.

According to the principal indices of chemical composition, the chrome-pyrope found in Latvia is obviously similar to those known from kimberlites of Canadian Arctic (Mitchell & Fritz, 1973) and from terrigenous Devonian deposits of Northern Timan and other regions (Илупин, Ваганов, Прокопчук, 1990; Илупин, Константиновский, Сандомирская, 1979).

Chromespinelides are represented by typical 0.1–0.25 mm octahedrons. Their chemical composition was analysed in a special article (Korpečkovs et al., 2001). Usually chromespinelide grains belong to medium and high chromium varieties. The content of Cr_2O_3 is fluctuating from 36.64 to 58.87 mas.%. However, there are some grains in which the content of Cr_2O_3 reaches more than 60.0 mas.%. As a rule, varieties of chromespinelides contain large quantities of Al_2O_3 and FeO, but small quantities of TiO_2. The content of Fe^{3+} varies from 0.0 to 20.85 mol.%. It is known that similar chromspinelides occur in the composition of kimberlite bodies (Garanin et al., 1997). Chromeshpinelides with Cr_2O_3 content more than 60 mas.% are treated as indicators of kimberlitic origin (Илупин, Ваганов, Прокопчук, 1990).

Chrome-diopside occurs very rarely and is found only in single locations. It is a typical light green monoclinic pyroxene. Its grains were found to contain Cr_2O_3 in 0.34–1.50, CaO 12.22–26.27, MgO 13.37–21.85 mas.%, Fe^{2+} / (Fe^{2+} + Mg) = 0.07–0.24. Separate chrome-diopside grains were more frequent in alluvial deposits of Vidzeme than in the composition of beach placers of the Baltic Sea and the Gulf of Rīga.

Moissanite is the rarest mineral among all minerals – indicators of kimberlitic assemblage in Latvia. It is represented by 0.25–0.3 mm grains and it has a high interference. Mineral grains of moissanite are greenish-blue and light-blue in colour. The chemical composition is simple, containing only SiC (100 per cent). Moissanite occurs in single locations only in Northern Vidzeme. According to Ilupin et al. (1990), moissanite can be considered as a possible mineral of kimberlite assemblage. This mineral is known in beach sediments of the Tersky Coast of the White Sea together with diamond and other indicator minerals of kimberlitic assemblage (Korsakova, Zozulya, 2002).

Together with the above characterised minerals, pyrope almandine and almandine pyrope, chrome-enstatite, magnetite and ilmenite with some increased contents of Cr_2O_3 and very rarely olivine with

an increased content of forsterite molecules were found.

TYPES OF KIMBERLITIC ASSEMBLAGE

The kimberlitic mineral assemblage established in Latvia is subdivided into five types. Two of them are reflected in the composition of the kimberlitic assemblage occurring in the Upper Devonian deposits: the first one in **the Ogre Formation** and the second in **the Ketleri Formation**. As mentioned above, only chrome-pyrope from the kimberlitic mineral assemblage of these two types has been investigated in detail (Sorokins, 1997; Сорокин и др., 1992). The chrome-pyrope from these types of the assemblage in comparison with the chrome-pyrope from the other types of kimberlitic assemblage is more magnesian and is characterized by a higher content of pyrope molecules. The chrome-pyrope occurring in the Ketleri Formation, in contrast to the chrome-pyrope from the Ogre Formation and from the other types of assemblage, is characterized by a low content of chrome. Besides, the chemical composition of the chrome-pyrope from the Ketleri Formation differs by absence of the knorringite molecule. A few grains of the chrome-pyrope from this formation are located in the field of the dunite-harcburgite association (according to Cr_2O_3–CaO diagram of Sobolev). Chromespinelides are also found in deposits of the Ketleri and Ogre formations, but no varieties with the content of Cr_2O_3 more than 60% have been found among them until now, except chromespinelides from these deposits, which have been studied a little. In accordance with the opinion of Dr. Hab. Geol A. Birķis, chromespinelides are represented by two varieties: (1) ferrochromepikotite (Ketleri Formation) and (2) chromepikotite (Ogre Formation) (Sorokins, 1997).

Three other types of kimberlitic mineral association are reflected in the composition of the Quaternary sediments. Each identified type of kimberlitic assemblage observed in the Quaternary sediments has its own zone of distribution. Three zones were recognised: (1) the Western Kurzeme zone, (2) the zone of the Gulf of Rīga and (3) the Northern Vidzeme zone.

The Western Kurzeme zone is characterised by minerals of kimberlitic assemblage found in the composition of beach placers of the Baltic Sea. This zone is characterized by a higher content of chrome-pyrope grains. Chrome-pyrope, in contrast to chrome-pyrope from the Ogre and Ketleri formations, is less magnesian and the content of the pyrope molecules is lower. In addition, the chrome-pyrope from this area is rich in chrome. Chrome-diopside was found on the coast of the Baltic Sea in the vicinities of Ulmale and Labrags. In the Western Kurzeme zone chromespinelides are rather rare. Beach placers in the coastal area of the Baltic Sea are richer in olivine, pyroxene, magnetite than in other sites where kimberlitic minerals have been found.

The zone of the Gulf of Rīga is characterised by minerals of kimberlitic assemblage found in the composition of beach placers of the Gulf of Rīga. Here the content of chrome-pyrope is lower than in the Western Kurzeme zone. Chrome-pyrope, in contrast to the Western Kurzeme zone, contains increased amounts of magnesia, chrome, knorringite molecules and a decreased number of pyrope molecules. It is important that a few grains of chrome-pyrope correspond to field (Cr_2O_3–CaO diagram) of dunite-harcburgite and diamond associations. Among heavy minerals, the content of chromespinelides is higher than in the Western Kurzeme zone. Some grains of chromspinelides contain more than 60 mas. % of Cr_2O_3. Chrome-diopside occurs only near Timmāji and Gauja.

The Northern Vidzeme zone is characterised by minerals of kimberlitic assemblage contained in the composition of alluvial deposits of the left tributaries of the Gauja River. Here the list of kimberlitic minerals is longer, including chrome-pyrope, chromespinelides, chrome-diopside and moissanite. Grains of chrome-pyrope in this zone often are dark-violet and crimson. Chrome-pyrope usually is characterised by a higher content of chrome and knorringite molecules, but the grossular molecule is absent. The content of pyrope molecules is decreased. Some grains of chrome-pyrope correspond to the field of dunite-harcburgite and diamond associations on the Cr_2O_3–CaO diagram. Chromespinelides, in contrast to the other zones, are more abundant, and some grains contain more than 60 mas.% of Cr_2O_3. Chrome-diopside has been found here more often than in the other zones. The finds of chromspinelides with higher contents of Cr_2O_3, chrome-diopside and moissanite in the Northern Vidzeme zone concur with the halos of chrome-pyrope in the same area.

DISCUSSION ON THE PROBABLE LOCATION OF KIMBERLITE BODIES AND THEIR GEOLOGICAL AGE

The differentiation of the features of the composition of kimberlitic assemblage in the area allows to suggest the possible location of kimberlitic bodies. The principal scheme of the distribution of kimberlitic minerals and the supposed location of kimberlites in Latvia is shown in Figure.

One of the fields of the distribution of kimberlitic bodies may occur on the bottom of the Baltic

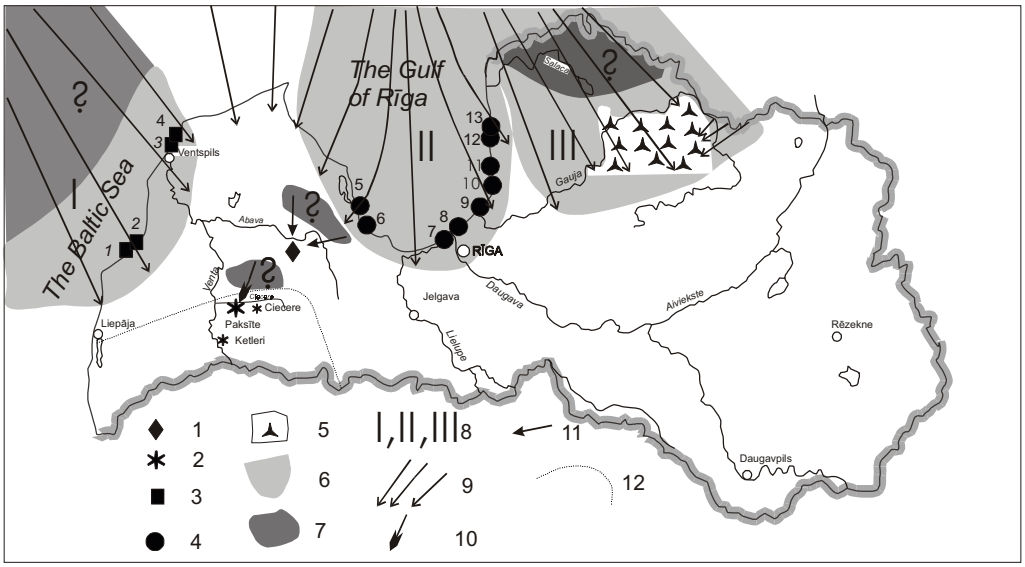

Figure. Scheme of distribution of kimberlitic minerals and supposed distribution of kimberlites in Latvia. *1* – sites of kimberlitic minerals in the Ogre Formation, *2* – sites of kimberlitic minerals in the Ketleri Formation, *3* – beach placers of the Baltic Sea containing kimberlitic minerals (*1* – Ulmale, *2* – Labrags, *3* – Staldzene, *4* – Liepene), *4* – beach placers of the Gulf of Rīga containing kimberlitic minerals (*5* – Engure, *6*–Ķesterciems, *7* – Buļļusala, *8* – Mangaļsala, *9* – Gauja, *10* – Timmāji, *11* – Korbiņi, *12* – Ķurmrags, *13* – Ežurga), *5* – region of left tributaries of the Gauja River, where in alluvium kimberlitic minerals have been found, *6* – supposed zones reflecting the drift of kimberlitic minerals, *7* – regions of distribution of supposed kimberlites, *8* – indices of zone of kimberlitic minerals: I – Western Kurzeme, II – Gulf of Rīga, III – Northern Vidzeme, *9* – directions of glacial drift, *10* – direction of transportation of kimberlitic minerals in the Ketleri basin, *11* – directions of transportation of kimberlitic minerals by rivers and along nearshore streams in the Ogre basin, *12* – northern boundary of the distribution of Ketleri deposits Pav. Kimberlitų mineralų paplitimas ir galimi paplitimo plotai Latvijoje. Kimberlitų mineralų radimvietės: *1* – Ogrės svitoje, *2* – Ketlerių svitoje, *3* – Baltijos jūros paplūdimio sąnašynuose (*1* – Ulmalė, *2* – Labrags, *3* – Staldzeme, *4* – Liepene), *4* – Rygos įlankos paplūdimio sąnašynuose (*5* – Engurė, *6* – Kesterciems, *7* – Bullusala, *8* – Mangalsala, *9* – Gauja, *10* – Timmāji, *11* – Korbini, *12* – Kurmrags, *13* – Ežurga), *5* – Gaujos upės kairiųjų intakų regionas, kurio aliuvyje buvo surasti kimberlitų mineralai, *6* – kimberlitų mineralų pernešimo zonos, *7* – kimberlitų uolienų paplitimo galimi regionai, *8* – kimberlitų mineralų paplitimo zonų indeksai: I – Vakarų Kurzemė, II – Rygos įlanka, III – Vakarų Vidzemė, *9* – ledynų slinkimo kryptys, *10* – kimberlitų mineralų pernešimo kryptys Ketlerių baseine, *11* – kimberlitų mineralų pernešimo kryptys upėmis ir išilgai Ogrės baseino priekrantės srovėmis, *12* – Ketlerių nuosėdų paplitimo šiaurinė riba

Sea in the area to the north-west from the recent shoreline. This field of kimberlites is probably located not far from Latvia. Therefore the concentration of chrome-pyrope in the composition of beach placers in the coast of the Baltic Sea is rich. The second supposed field of kimberlites, relatively close to the finds of kimberlitic minerals, is located in the area of Northern Vidzeme. Here the supposed field of kimberlitic bodies is situated to the north and north-west from the finds of kimberlitic assemblage minerals in the alluvium of left tributaries of the Gauja River. The finds of chrome-diopside in the Quaternary sediments both in the Western Kurzeme and especially in the Northern Vidzeme zones of kimberlitic assemblage are important signs of a relatively close location of kimberlites. The third field of kimberlites is located not far from the Paksīte River containing the highest amounts of chrome-pyrope grains in the Ketleri Formation. This field is situated in the central part of Eastern Kurzeme. It is difficult to determine the location of kimberlites, the material of which has been reflected in the composition of kimberlitic association from deposits of the Ogre Formation cropping out along the Abava, Imula, Amula rivers. However, the area of the distribution of kimberlitic bodies could be situated north and north-east from the mentioned outcrops, in the space between the Abava River and the western shore of the Gulf of Rīga (Sorokins, 1997). Kimberlitic minerals that were found in the zone of the Gulf of Rīga have been transported from remote regions, probably including regions of the Fennoscandian Shield. Fields of kimberlite distribution are known in Finland.

At present, it is difficult to determine the geological age of the formation of supposed kimberlite bodies. However, it is known that abundant concentrations of minerals of kimberlitic assemblage are

found only in the Devonian Ogre and Ketleri formations. Besides, there are clear differences between them in the chemical composition of chrome-pyrope. Taking into account these data, it is posible to maintain that supposed kimberlite bodies on the area of Latvia could be formed twice: first in the pre-Ogre time, but later than in the Gauja time, approximately during the early-middle Frasnian, and second in the pre-Ketleri time, but after the Ogre time, approximately in the late Frasnian – early-middle Famennian.

ACKNOWLEDGEMENTS

The authors wish to thank Prof., Dr. habil. geol. Igors Danilāns, Dr. geol. Austra Stinkule, Dr. geol. Ģirts Stinkulis, Dr. geol. Ervīns Lukševičs and M. geol. Uldis Nulle for constant help and important advice during the investigations. Our thanks are due to Mr. Valdek Mikli (Estonia) for electron microprobe analysis. The help and technical assistance of Mrs. Renāte Riņķe, Ms. Māra Rēpele, Ms. Agnese Miķelsone are acknowledged with gratitude. Support from Latvian Council of Science (Grants No. 960011 and No. 01.0095) is gratefully acknowledged.

References

Garanin V. K., Kudryavtseva G. P., Posukhova T. V. 1997. Indicators of diamond preservation in kimberlite. *Mineral Deposits*. Balkema, Rotterdam. 767–770.

Hodireva V., Korpečkovs D., Samburga Ņ., Savaitovs A. 2002. Kimberlītu minerālu asociācija aluviālos nogulumos centrālajā Vidzemē. *LU 60. zin. konf., Ģeogrāfija, Ģeoloģija, Vides zinātne, referātu tēzes.* Rīga. 150–153.

Hodireva V., Nulle U., Samburg N., Savvaitov A., Veinbergs I. 2000. Minerals of probably kimberlitic assemblage in the beach placers of Latvija. *The sixth Baltic Marine Geologic Conference, Abstracts.* Hirtshals, Denmark. 34–34.

Hodireva V., Samburga Ņ., Savvaitova L., Savvaitovs A., Veinbergs I., Nulle U. 2000. Hrompiropi Latvijas pludmales kliedņos. *LU 58. zin. konf. Zemes un vides zinātņu sekcijas, tēzes.* Rīga. 64–65.

Mitchell R.-H. & Fritz P. 1973. Kimberlite from Somerset Island, District of Franklin, N. W. T. *Can. J. Earth Sci.* ***10***. 384–393.

Korsakova O. P., Zozulya D. R. 2002. Quaternary sediments of Tersky Coast, Kola Peninsula and their diamond potential. *Field symposium on Quaternary geology and geodinamics in Belarus. Abstract Volume.* Minsk: Institute of Geological Sciences of Academy of Sciences of Belarus, the Peribaltic Group of INQUA Commission on Glaciation, Belarussian National Committee of INQUA, Friends of Baltic Quaternary. 37–38.

Korpečkovs D., Samburga Ņ., Savvaitovs A., Hodireva V., 2001. Hromšpinelīdi Latvijas terigēnajos nogulumos. *LU 59. zin. konf., Ģeogrāfija, Ģeoloģija, Vides zinātne, referātu tēzes.* Rīga. 86–89.

Savvaitov A., Veinbergs I., Nulle U., Samburg N. and Stinkulis Ģ. 1998. New data on the mineral composition of Latvian beach placers. *Baltica.* ***11***. 52–58.

Savvaitovs A., Savvaitova L., Veinbergs I. 1999. Kimberlītu asociācijas minerāli Latvijas terigēnajā sedimentoģenēzē. Zinātniskie un praktiskie aspekti. *LU 57. zin. konf. Zeme, Daba, Cilvēks, Ģeogrāfijas un zemes zinātņu sekcija, tēzes.* Rīga. 119–120.

Savvaitov A., Veinbergs I., Samburg N., Hodireva V., Nulle U. 2000. Kimberlitic assemblage in mineral composition of beach placers and its meaning in the problem of diamond prospecting in Latvia. *Natural and technogenic placer and weathered rock deposits at the turn of the millennium. XII Internatiol Symposium on Placer and Weathered Rock Deposits. Abstracts*. Moscow. 169–170.

Savvaitovs A., Veinbergs I., Samburga Ņ., Hodireva V., Nulle U. 2000. Kimberlītu asociācijas minerāli Latvijas pludmales nogulumos. *Latvijas Ģeoloģijas vēstis.* ***9.*** 31–34.

Sorokins V. 1997. Dimantu meklēšanas ģeoloģiskie priekšnoteikumi Latvijā. *Latvijas Ģeoloģijas vēstis.* ***2.*** 34–38.

Илупин И. П., Ваганов В. И., Прокопчук Б. И. 1990. Кимберлиты. Москва. 248 с.

Илупин И. А., Константиновский А. А., Сандомирская С. М. 1979. Новые данные о хромшпинелидах, пиропах и своеобразном цирконе из среднедевонских терригенных отложений Северного Тимана. *ДАН СССР.* ***249****(3)*. 687–691.

Костровицкий С. И., Де Бруин Д. 1999. Особенности состава минералов пород Дюкинского кимберлитового поля. *Минералогическое общество и минералогическая наука на пороге XXI века. Тезисы докладов к IX съезду минералогического общества при РАН.* Санкт-Петербург. 141–142.

Сорокин В.С ., Кривопалов Ю. А., Мурниекс А. Э., Савваитова Л. С., Самбург Н. К. 1992. Событийная стратиграфия и перспективы алмазоносности западной Латвии. *Палеонтология и стратиграфия фанерозоя Латвии и Балтийского моря*. Рига: Зинатне. 77–84.

Vija Hodireva, Denis Korpečkovas, Nina Samburg, Aleksanderis Savvaitovas

LATVIJOS NUOTRUPINIŲ NUOGULŲ KIMBERLITINĖS ASOCIACIJOS MINERALŲ ŠALTINIAI IR KAI KURIE SPĖJAMŲ KIMBERLITŲ SUSIDARYMO AMŽIAUS KLAUSIMAI

S a n t r a u k a

Kimberlitinės asociacijos mineralai pasitaiko kai kuriose Latvijos nuotrupinėse nuogulose. Jų susitelkimų dabar yra surasta Kuržemėje viršutinio devono Ogrės svitos smėlio nuogulose (Abavos, Imulos ir Amulos upių atodangos) ir Ketlerių svitoje (Ventos upės slėnio atodangos – Ketlerio, Ciecerės ir Paksitės telkiniai). Jie surasti taip pat Rygos įlankos ir Baltijos jūros pakrantės paplūdimių sąnašynuose, taip pat Šiaurės Vidzemėje Gaujos upės kairiųjų intakų aliuvyje. Kimberlitinės asociacijos mineralų indikatoriai yra chrompiropas, chromšpinelidai, chromdiopsidas ir muasonitas. Latvijoje surasta kimberlitinė mineralų asociacija pagal indikatorių kiekį ir chrompiropo bei chromšpinelidų cheminės sudėties ypatybes skirstoma į penkias grupes. Kiekvieno tipo paplitimo ir sudėties diferenciacija

leidžia juos susieti su kimberlitų vamzdžių paplitimu Latvijoje.

Spėjama, kad du kimberlitų paplitimo laukai lokalizuojasi rytinėje Kuržemėje: 1) į šiaurę nuo Ciecerės upės, 2) tarp Abavos upės ir Rygos įlankos vakarinės pakrantės, o dar vienas – Šiaurės Vidzemėje. Prognozuojama, kad kimberlitai gali būti paplitę ir Baltijos jūros dugne. Matyt, jie susidarė per du kartus: 1) iki Ogrės laikotarpio, tačiau vėliau Gaujos laiko, ir 2) iki Ketlerių laiko, tačiau vėliau Ogrės laikotarpio.

Вия Ходырева, Денис Корпечков, Нина Самбург, Александр Савваитов

ИСТОЧНИКИ МИНЕРАЛОВ КИМБЕРЛИТОВОЙ АССОЦИАЦИИ ОБЛОМОЧНЫХ ОТЛОЖЕНИЙ ЛАТВИИ И НЕКОТОРЫЕ ВОПРОСЫ ВОЗРАСТА ОБРАЗОВАНИЯ ПРЕДПОЛАГАЕМЫХ КИМБЕРЛИТОВ

Р е з ю м е

Минералы кимберлитовой ассоциации содержатся в составе некоторых обломочных отложений Латвии. В настоящее время находки их скоплений известны в составе песчаных отложений Огрской свиты (обнажения в долинах рек Абава, Имула, Амула) и Кетлерской свиты (обнажения в долинах рек Вента – местонахождение Кетлери, Циецере и Паксите) верхнего девона в Курземе, в составе современных пляжевых россыпей побережья Балтийского моря и побережья Рижского залива, а также в составе аллювия левых притоков реки Гауя в Северной Видземе. Индикаторными минералами кимберлитовой ассоциации являются хромпироп, хромшпинелиды, хромдиопсид и муассонит. Кимберлитовая минеральная ассоциация, установленная в Латвии по количественным содержаниям индикаторных минералов и по особенностям химического состава хромпиропа и хромшпинелидов, подразделяется на пять типов. Особенности дифференциации в распространении и составе каждого из них позволяют связывать их с различными полями распространения предполагаемых кимберлитов. На территории Латвии предполагаются три поля распространения кимберлитовых тел: два в восточной Курземе – (1) к северу от реки Циецере и (2) между рекой Абава и западным берегом Рижского залива и одно поле распространения кимберлитовых тел в (3) Северной Видземе. Кроме того, предполагается поле распространения кимберлитов на дне Балтийского моря. Образование кимберлитов, по-видимому, происходило дважды – в доогрское время, но позже гауйского времени, и в докетлерское время, но позже огрского времени.