

Geology of the Fort a la Corne Kimberlites, Saskatchewan

Scott Smith, B.H.¹, Orr, R.G.², Robertshaw, P.³, and Avery, R.W.³

1. Scott-Smith Petrology Inc., 2555 Edgemont Boulevard, North Vancouver, BC, Canada, V7R 2M9
2. Mindoro Resources Ltd., #1910 - 10180 101 Street, Edmonton, Alberta, Canada, T5J 3S4
3. Uranerz Exploration and Mining Limited, #1300-410 22nd Street East, Saskatoon, Saskatchewan, Canada, S7K 5T6

Introduction : The Fort a la Corne (FALC) Cretaceous (98-94Ma.) kimberlite province was discovered under 100m of glacial overburden by Uranerz Exploration and Mining Ltd. in 1988 (Lehnert-Thiel, et al., 1992). Since then evaluation of these bodies has been continuing with joint venture partners Cameco Corp., Monopros Ltd. and Kensington Resources Ltd. The province occurs 80km east of Prince Albert in Saskatchewan and includes at least 71 magnetically defined bodies which range in size to over 100ha. So far 69 of these anomalies have been confirmed as kimberlites by drilling. These bodies are located in a 45x30km zone. Significant amounts of diamonds have been recovered but no economic deposits have been found yet. This study investigated 44 drillholes containing approximately 5km of kimberlite core from 25 bodies.

Geological setting : The kimberlites were emplaced into poorly consolidated Cretaceous sediments comprising ± 100 m of clayey fine material, silts and sandstone (Mannville Formation; ± 119 -100Ma) and ± 100 m of marine shales (Ashville Formation; ± 100 -91Ma). The Mannville formed in coastal marine, subaerial flood plain and/or lacustrine environments. The shales were deposited towards the edge of the Western Interior Seaway, a broad shallow epicontinental sea with migrating shorelines. The Mannville unconformably overlies 400m of Palaeozoic sediments which are dominated by indurated carbonates below which is the Precambrian basement. The Cretaceous sediments adjacent to the main kimberlites correlate with the regional stratigraphy showing that they are in situ and undisturbed (J. Christopher, unpublished report).

Classification : These bodies are classified as crater-facies kimberlites. No hypabyssal or diatreme-facies rocks have been encountered. The FALC rocks are typical Group 1 kimberlites.

Crater size, shape and formation : The FALC kimberlites are shallow saucer to champagne-glass shaped bodies with diameters mainly of 500 to 1300m and depths ranging up to 200m. The body shapes, flaring towards surface with low depth to diameter ratios, are similar to maars and must represent explosion craters excavated into only the Cretaceous sediments. The lack of xenoliths within the crater infill show that little or none of the resulting material was deposited back within the craters. This feature is comparable to maars where most of the crater material is deposited in crater rim base surge deposits. Based on the nature of the base surge, maars are generally considered to result from phreatomagmatic processes. No extra-crater deposits have been found at FALC to allow further evaluation of the crater forming events. However, a porous sandstone unit at the base of the Mannville is a modern aquifer which probably became saturated following the marine transgression at the beginning of the Ashville. This aquifer is the point from which many of the craters appear to flare. Also in contrast to many of the kimberlite pipes in southern Africa, there is no evidence of the development of any diatremes or root zones (*sensu* Field and Scott Smith, this volume -a) below the craters. The unusual southern African diatreme emplacement processes which are driven by juvenile gases in a closed system (Field and Scott Smith, this volume - b) have not taken place at FALC. It is proposed that the FALC bodies were formed by phreatomagmatic maar-

like processes. The remarkable similarity in both the geological setting and the nature of the kimberlites at FALC and Mbuji-Mayi in Zaire (DemaiFFE et al., 1991) cannot be a coincidence. The evidence presented here for the FALC craters contradicts the Leckie et al. (1997) model which proposes that the bulk of the volcanism formed positive relief conformable tephra cones during the Mannville. The FALC craters formed during the Ashville but were preceded by common small kimberlites which comprise conformable graded beds up to 5m thick of unreworkeD pyroclastic airfall material. These kimberlites occur throughout the Mannville and were deposited onto the subaerial flood plains without the formation of craters. If the aquifer at the base of the Mannville only became saturated at the beginning of the Ashville, it is consistent with the presence of maar-like craters only being formed during the Ashville.

Age : Stratigraphic constraints suggest that all the FALC kimberlite eruptions span at least 25 Ma. The main kimberlite crater formation was probably confined to the last ± 5 -10 Ma (perhaps 98-91 Ma.; supported by isotopic data) while the small precursors formed from 119 to at least 100 Ma.

Main constituents and rock types : These loosely packed, clast supported, -poorly sorted volcanoclastic kimberlites are composed predominantly of a mixture of juvenile lapilli and single crystals which are mainly olivine (clasts mostly <10mm in size, up to 10cm). The lapilli vary in shape from spherical or ovoid to irregular-curvilinear or amoeboid showing that they formed from very fluidal magmas. The groundmasses are quenched and sometimes vesicular but no true glass is observed. The main constituents of these kimberlites formed by pyroclastic processes. The inter-clast matrix is composed of mainly serpentine, carbonate and magnetite. The proportion of juvenile lapilli to single grains of olivine varies so the main rock types range from juvenile lapilli tuffs (or coarse ash) to unusual crystal or olivine tuffs (or coarse ash). Most rocks have undergone some sorting. Overall at FALC ash and coarse ash sized clasts, comprising kimberlite matrix and often single olivine phenocrysts, are not common. Some, but not all, of the drillcores display well developed plane parallel normal graded bedding. Individual beds vary from a few millimetres to at least 90m in thickness. The latter appear to be unique in the geological record. Bedding dips vary from horizontal to 80° and some disturbed bedding is present.

Near surface emplacement : In contrast to the crater formation, the crater infilling results from magmatic eruptions. Many features show that re-sedimentation of the pyroclastic material was not an important process. These features include: the low particle density; the presence of occasional welding or molding of plastic lapilli; bomb sags and possible draping; in situ impact fragmented xenolithic bombs; the occurrence of composite lapilli showing that mixed lapilli populations result from recycling not re-sedimentation; the presence of different phases of eruption with associated marker horizons and sharp internal contacts; evidence of large scale sorting resulting in the overall paucity of ash and the presence of mega-graded beds; the very significant lack of abrasion or breakage of most and often fragile juvenile and xenolithic clasts; the lack of cross bedding and other sedimentary features; and the overall lack of incorporation of crater wall material.

The kimberlites were emplaced at a time of overall marine deposition leading to suggestions that they are likely to have erupted in submarine conditions. Features within the FALC kimberlites, however, show that most of the pyroclastic activity was subaerial. These features include the occurrence of fluidal not quenched lapilli shapes, welding and molding, vesicular lapilli, poor sorting of a wide range of clast sizes, lack of re-sedimentation and a general lack of fines. There is also stratigraphic evidence for a ± 3 Ma hiatus (approximately 94.5 - 91 Ma) in the marine

sedimentation during a regression within the upper Ashville Formation. This suggests that the main process of deposition was pyroclastic airfall. Although the eruptions were predominantly subaerial, there is evidence for some subaqueous deposition of the airfall material into small volumes of standing water which must be crater lakes.

The styles of eruption were very variable. The less explosive activity ranged from Hawaiian to Strombolian-type eruptions resulting in the formation of amoeboid lapilli tuffs with bedding up to perhaps 12-15m thick. Other much more explosive eruptive styles must be kimberlite-specific and reflect the unusual properties of these magmas, mainly their low viscosities and high carbon dioxide contents. These eruptions resulted from the rapid degassing of some of the FALC magmas above the vent, a process which is the extrusive equivalent of the intrusive diatreme formation in other kimberlites. Similar pelletal lapilli to those characteristic of diatreme-facies kimberlites were produced. These explosive eruptions must have formed high energy eruption columns. The abundant carbon dioxide in the eruption column derived from the degassing as well as the high specific gravity of the clasts must have limited the height of the column and inhibited movement of the pyroclastic material from the vent resulting in the formation of the unique mega-graded beds within the craters. The unusual olivine tuffs are thought to form by the physical separation of the crystals from very low viscosity magmas. Kimberlites, being some of the most crystal-rich and fluidal magmas known, are good candidates for the formation of such crystal tuffs. The ash produced in the higher energy eruptions was often removed, presumably by wind action.

Conclusions : The main FALC kimberlites formed by two distinct processes : crater formation and crater infilling. The crater formation is suggested to result from maar-like phreatomagmatic processes with the resulting material deposited mainly as extra-crater deposits. The craters were subsequently rapidly infilled by subaerial primary pyroclastic processes ranging from Hawaiian-Strombolian to a much more explosive kimberlite-specific eruption style. This emplacement model is different from the classic southern African diatreme model. It is suggested that the FALC model is a second model for kimberlites with the differences primarily reflecting the near surface country rock geology. The data for FALC, validate, rather than negate, the classic diatreme model (Field and Scott Smith, this volume - b). The FALC volcanism lasted at least 25Ma. but the main kimberlite crater formation was confined to the last 5-10Ma..

References

- Demaiffe, D., Fieremans, M., and Fieremans, C., 1991, The kimberlites of central Africa: A review. In A.B. Kampunzu and R.T. Lubala, Eds., Magmatism in extensional structural settings. The Phanerozoic Plate, p.537-559. Springer Verlag.
- Leckie, D.A., Kjarsgaard, B.A., Bloch, J., McIntyre, D., McNeil, D., Stasiuk, and Heaman, L., 1997, Emplacement and re-working of Cretaceous diamond-bearing crater-facies kimberlite of central Saskatchewan, Canada. GSA Bulletin, v. 109, p. 1000-1020.
- Lehnert-Thiel, K., Loewer, R., Orr, R., and Robertshaw, P., 1992, Diamond-bearing kimberlites in Saskatchewan, Canada: the Fort a la Corne case history. Exploration and Mining Geology, v. 1, p. 391-403.
- Scott Smith, B.H., Orr, R.G., Robertshaw, P., and Avery, R.W., 1995, Geology of the Fort a la Corne kimberlites, Saskatchewan. Extended Abstracts of the 6th International Kimberlite Conference, Novosibirsk, Russia, Siberian Branch of Russian Academy of Sciences, p. 543-545.

This abstract is based on the same study and similar to that of Scott Smith et al. (1995).

SEVENTH INTERNATIONAL KIMBERLITE CONFERENCE

Cape Town, April 1998

EXTENDED ABSTRACTS

All extended abstracts in this volume were submitted by the authors in camera ready form. There has been no editing of the extended abstracts and they have not been subject to review. The Organising Committee of the 7th International Kimberlite Conference takes no responsibility for authors' errors and omissions.

SOUTH AFRICA

	Page No
Abrdrakhimov, M.Z., Kouznetsova, E.I., Traskin, V.Yu.	1
Abe, N., Arai, S., Yurimoto, H.	4
Afanasiev, V.P., Pokhilenko, N.P., Logvinova, A.M., Yefimova, E.S.	7
Agashev, A.M., Fomin, A.S., Watanabe, T., Pokhilenko, N.P.	9
Agashev, A.M., Watanabe, T., Kuligin, S.S., Pokhilenko, N.P., Orihashi, Y.	11
Ananiev, V.A., Kuligin, S.S., Reimers, L.F., Khlestov, V.V.	14
Andre, L., Shatsky, V.S., De Corte, K., Sobolev, N.V., Navez, J., Jagoutz, E.	17
Andronikov, A.V., Foley, S.F., Melzer, S.	20
Antonyuk, B.P., Mironov, V.P.	23
Araujo, A.L.N., Gaspar, J.C., Bizzi, L.C.	26
Araujo, D.P., Gaspar, J.C., Garg, V.K.	29
Arima, M.	32
Ashchepkov, I., Salters, V., Andre, L.	35
Bailey, L., Helmstaedt, H.H., Peterson, R.C., Mandarino, J.A., Latendre, J.P.	37
Barashkov, Y.P., Talnikova, S.B.	40
Barron, K.M., Logvinova, A.M., Sobolev, N.V.	43
Barron, L.M., Lishmund, S.R., Oakes, G.M., Barron, B.J.	48
Barry, T.L., Kempton, P.D., Saunders, A.D., Windley, B.	49
Barth, M.G., Rudnick, R.L., Spicuzza, M.J., Valley, J.W., Haggerty, S.E.	52
Baumgartner, M.C., Neuhoﬀ, L.	55
Beard, A.D., Mason, P.R.D., Downes, H.	58
Beard, A.D., Milledge, H.J.	61
Bell, D.R., Mofokeng, S.W.	64
Belousova, E.A., Griffin, W.L., O'Reilly, S.Y.	67
Ben Ismail, W., Mainprice, D.	70
Ben Ismail, W., Mainprice, D., Barruol, G., Boyd, J., Vauchez, A.	73
Berg, G.W.	76
Berg, G.W.	79
Berg, G.W., Carlson, J.A.	81
Berryman, A.K., Stiefenhofer, J., Shee, S.R., Wyatt, B.A.	84
Bizzi, L.A., Pimentel, M.	87
Bordon, V.	89
Bordon, V., Astapenko, V.	90
Bovkun, A.V., Garanin, V.K., Kudriavtseva, G.P., Possukhova, T.V.	91
Bovkun, A.V., Garanin, V.K., Kudriavtseva, G.P., Possukhova, T.V.	94
Bovkun, A.V., Garanin, V.K., Kudriavtseva, G.P., Possukhova, T.V.	97
Boyd, F.R., Pearson, D.G., Mertzman, S.A.	100

Author	Title	Page No's
Brown, J.W., Butcher, A.R.	Textural and Petrological Variation Within the Crater Facies Kimberlite Bodies of the Fort à la Côme Province, Saskatchewan, Canada.	103
Brown, R.W., Gallagher, K., Griffin, W.L., Ryan, C.G., de Wit, M.C.J., Belton, D.X., Harman, R.	Kimberlites, accelerated erosion and evolution of the lithospheric mantle beneath the Kaapvaal craton during the mid-Cretaceous.	105
Budaev, D.A.	<<Populational>> model of kimberlites: an application to diamondiferous kimberlites of regions with various geodynamic history.	108
Budaev, D.A., Dolgunin, A.V. Fomin, A.S.	An algorithm of kimberlite diamondiferousness estimations.	111
Butanova, G.P., Griffin, W.L., Kaminsky, F.V., Davies, R., Ryan, C.R., Andrew, A., Spetsius, Z.V., Zahkarchenko, O.D.	Diamonds from Zarnitsa and Dalnaya kimberlites (Yakutia): Their nature, growth history, and lithospheric mantle source.	113
Butanova, G.P., Shelkov, D.	Nature of eclogitic diamonds from Yakutian kimberlites: evidence from isotopic composition and sulphide inclusion chemistry.	116
Burgess, R., Phillips, D., Harris, J.W., Robinson, D.N.	Antarctic diamonds in South-Eastern Australia? Hints from ⁴⁰ Ar/ ³⁹ Ar Laser probe dating of clinopyroxene inclusions from Copeton diamonds.	119
Burgess, S.R., Harte, B.	Tracing Lithosphere Evolution through the analysis of Heterogeneous G9/G10 Garnets in Peridotite Xenoliths.	122
Carlson, J.A. Kirkley, M.B., Thomas, E.M. Hillier, W.D.	Recent major kimberlite discoveries in Canada.	127
Carlson, R.W., Irving, A.J., Hearn, B.C.Jr.	Peridotite Xenoliths from the Williams Kimberlite, Montana: Implications for Delamination of the Wyoming Craton Lithosphere	132
Carlson, R.W., Pearson, D.G., Boyd, F.R., Shirey, S.B., Irvine, G., Menzies, A.H., Gurney, J.J.	Regional Age Variation of the Southern African Mantle: Significance for Models of Lithospheric Mantle Formation	135
Carlson, S.M., Hillier, W.D., Hood, C.T., Pryde, R.P., Skelton, D.N.	The Buffalo Hills Kimberlite Province, North-central Alberta, Canada.	138
Cartigny, P., Harris, J.W., Javoy, M.	Eclogitic, Peridotitic, Metamorphic Diamonds and the Problems of Carbon Recycling.	141
Channer, D.M.deR., Cooper, R.E.C., Kaminsky, F.	The Guaniamo diamond region, Bolivar state, Venezuela: a new kimberlite province.	144
Cherny, S.D., Fomin, A.S., Yanygin, J.T., Banzeruk, V.I., Kornilova, V.P.	Geology and composition of the Nakyn field kimberlite pipes and diamond properties (Yakutia).	147
Chesley, J.T., Rudnick, R.L., Lee, C.-T.	Longevity of Cratonic Mantle Beneath an Active Rift: Re-Os evidence from Xenoliths from the Tanzanian East African Rift.	149
Chinn, I.L., Gurney, J.J., Harte, B., Fitzsimmons, I.C.W., Milledge, H.J.	Nitrogen contents of diamond plates: a comparison of FTIR and SIMS analyses	152
Chinn, I.L., McCallum M.E., Harris C., Milledge, H.J., Gurney, J.J.	C02 - bearing diamonds in eclogite xenoliths from the Sloan 2 kimberlite, Colorado	155
Chinn, I.L., Milledge, H.J., Gurney, J.J.	Diamonds and inclusions from Jagersfontein kimberlite	156
Clarke, J., Sobie, P.A., Wilkes, T.A., Zweistra, P.	The Geology and Economic evaluations of the Lihobong kimberlites, Lesotho.	158
Cookenboo, H.O.,	Emplacement history of the Jericho kimberlite pipe, northern Canada.	161
Cookenboo, H.O., Kopylova, M.G., Daoud, D.K.	A chemically and texturally distinct layer of diamondiferous eclogite beneath the central Slave craton, northern Canada.	164
Corbett, I.B., McMillan, I.K.	From Shore to Shelf and Back Again.	167
Davies, R., Griffin, W.L., Pearson, N.J., Andrew, A., Doyle, B.J., O'Reilly, S.Y.	Diamonds from the Deep: Pipe DO-27, Slave Craton, Canada.	170
Davies, R.M., O'Reilly, S.Y., Griffin, W.L.	Characteristics of Alluvial Diamonds from Bingara and Wellington, Eastern Australia.	173
Davies, R.M., O'Reilly, S.Y., Griffin, W.L.	Dynamic Growth Structures in Diamonds from Bingara, NSW, Australia.	176
Dawson, J.B.	Melting and Metasomatism in Upper Mantle Peridotite Xenoliths from Labait, North-central Tanzania, and contrasting Metasomatic styles in the Tanzanian Lithospheric Mantle.	179
de Bruin, D.	Inclusion Bearing Cr-poor and Cr-rich Garnet Megacrysts from the Group II Swartruggens Kimberlite.	181
De Corte, K., Cartigny, P., Shatsky, V.S., De Paepé, P., Sobolev, N.V., Javoy, M.	Microdiamonds from UHP Metamorphic rocks of the Kokchetav Massif, Northern Kazakhstan: FTIR spectroscopy, C & N Isotopes and Morphology.	184
Deines, P.	Intra- and Inter-Mineral Oxygen Isotope Variations in Kimberlitic Zircons.	187
Demaiffe, D., El Fadli, S., Andre, L.	Geochemical and isotopic (Sr, Nd) study of eclogite nodules from the Mbujji Mayi kimberlite, Kasai, Congo. Nature of the protoliths and evidence for mantle metasomatism.	190
De Meillon, L., Bristow, J.W.	Some Characteristics of High Level Tertiary Age Alluvial Terraces along the Orange River between the towns of Douglas and Prieska, Northern Cape Province, South Africa.	193
De Wit, M.C.J., Morelli, C., Skinner, C.P.	A reinterpretation of the Lichtenburg diamond deposits.	195
Dmitriev, A.N., Dyatlov, V.L., Litasov, K.D.	Physical model of kimberlite pipes formation: new constraints from theory of non-homogenous physical vacuum.	196
Doyle, B.J., Kivi, K., Scott Smith, B.H.	The Tii Kwi Cho (DO27 and DO18) Diamondiferous Kimberlite Complex Slave Craton, Northwest Territories, Canada	199
Edler, E., Winter, F., Edwards, R.	The Rosario do Sul Kimberlitic Province, Rio Grande do Sul State, Southern Brazil.	202
El Fadli, S., Demaiffe, D.	Petrology, mineral chemistry and thermobarometry of eclogite nodules from the Mbujji Mayi kimberlite, Kasai, Congo: significance of kyanite-cpx intergrowths.	205

Erinchek, Y.M., Milshtein, E.D., Saitkyov, O.G., Verzhak, V.V.	Local depressions in Country Rock of Kimberlites as a New Exploration Criteria (by the Example of Zolotitsa Field, Arkhangelsk, Russia).	208
Field, M., Scott Smith, B.H.	Near surface emplacement of kimberlites: contrasting models and why.	211
Field, M., Scott Smith, B.H.	Textural and Genetic Classification schemes for kimberlites: a new perspective	214
Foley, S.F., Glaser, S.M., Andronikov, A.V.	Non-cratonic garnet peridotites from rifted continental settings in Vitim, Siberia (Baikal Rift and East Antarctica) (Lambert-Amery Rift).	217
Foley, S.F., Mussewhite, D.S., van der Laan, S.R.	Melting processes in veined lithospheric mantle in cratonic and non-cratonic settings.	220
Friese, A.E.W.	Structural control on kimberlite genesis and crustal emplacement within South Africa and the Kaapvaal Craton during the Cretaceous	224
Friese, A.E.W.	Tectonic evolution and intra-cratonic alkaline magmatism within the central Kaapvaal Craton during the Mesoproterozoic.	227
Fung, A.T.	Petrochemistry of upper mantle eclogites from the Grizzly, Leslie, Pigeon and Sable kimberlites in the Slave Province, Canada.	230
Garanin, V.K., Kudriavtseva, G.P., Possukhova, T.V.	Diamonds of Arkhangelsk kimberlite province (review).	233
Garanin, V.K., Kudriavtseva, G.P., Vasilyeva, E.R.	The fundamental study of garnets: application for prospecting and economical estimation of diamond bearing kimberlites.	236
Gaspar, J.C., Araujo, D.P., Melo, M.V.L.C.	Olivine in Carbonatitic and Silicate Rocks in Carbonatite Complexes	239
Gaspar, J.C., Teixeira, N.A., Steele, I.M.	Cathodoluminescence of Juina Diamonds.	242
Gaul, O., O'Reilly, S.Y., Griffin, W.L.	Lithosphere Mapping in Eastern Australia.	245
Geiger, C.A.	Could the Effect of Order-Disorder in Garnet be Important for Upper Mantle Petrology?	248
Gibson, S.A., Thompson, R.N., Dickin, A.P.	Subcontinental mantle plume impact and kimberlite genesis.	250
Girnis, A.V., Stachel, T., Brey, G.P., Harris, J.W., Philips, D.	Internally consistent geothermobarometers for garnet harzburgites.	253
Gonzaga, G.M., Gaspar, J.C., Araujo, D.P.	³ He and ¹⁰ Be Isotopes as a Diamond Exploration Tool: Some thoughts Based on Literature Data	256
Graham, I., Burgess, J.L., Bryan, D., Ravenscroft, P.J., Thomas, E., Doyle, B.J., Hopkins, R., Armstrong, K.A.	The Diavik Kimberlites - Lac de Gras, Northwest Territories, Canada.	259
Graham, S., Lambert, D.D., Shee, S.R., Smith, C.B., Hamilton, R.	Re-Os and Sm-Nd Isotope Systematics of Alkaline Ultramafic Rocks, Xenoliths and Macrocrysts from the Earraheedy Basin, Yilgarn Craton.	262
Graham, S., Lambert, D.D., Smith, Chris.B., Shee, S.R., Reeves, S.J.	Re-Os Isotope Systematics of Oxide Xenocrysts and Peridotite Xenoliths from the Kimberlites and the Argyle Lamproite, Kimberley Block, Australia: Implications for the Evolution of the Continental Lithospheric Mantle.	265
Greenwood, J.C., Gibson, S.A., Thompson, R.N., Weska, R.K., Dickin, A.P.	Petrogenesis of Cretaceous Kimberlites from the Paranatinga Region, Central Brazil.	268
Griffin, W.L., Doyle, B.J., Ryan, C.G., Pearson, N.J., O'Reilly, S.Y., Natapov, L., Kivi, K., Kretschmar, U., Ward, J.	Lithosphere Structure and Mantle Terranes: Slave Craton, Canada.	271
Griffin, W.L., Win, T.T., Davies, R., Wathanakul, P., Andrew, A., Metcalfe, I.	Diamonds from Myanmar and Thailand: Characteristics and Possible Origins.	274
Grütter, H.S.	Chrome-calcium, Magnesium-number and Yttrium characteristics of garnets in depleted Lherzollitic, Harzburgitic and Dunitic mantles.	277
Grütter, H.S., Apter, D.B.	Kimberlite-and lamproite-borne chromite phenocrysts with "diamond-inclusion"-type chemistries.	280
Grütter, H.S., Apter, D.B.	Garnet xenocryst chemistries in a traverse from Eendekuil to Kimberley over the south-western margin of the Kaapvaal craton.	283
Grütter, H.S., Quadling, K.E.	Some comments on the (ab)use of sodium in garnet to predict eclogitic diamond potential.	287
Gurney J.J., Moore R.O., Bell D.R.	Mineral associations and compositional evolution of Monastery kimberlite megacrysts	290
Haggerty, S.E., Fung, A.T.	Orbicular Oxides in Carbonatitic Kimberlites: High Pressure Autoliths or Low P Liquid Immiscibility?	293
Hamilton, M.A., Pearson, D.G., Stern, R.A., Boyd, F.R.	Constraints on MARID petrogenesis: SHRIMP II U-Pb zircon evidence for pre-eruption metasomatism at Kampfersdam.	296
Harlow, G.E.	Interpretation of Kcpx and CaEs in Clinopyroxene from Diamond Inclusions and Mantle Samples.	299
Hammer, R.E.	Carbonatite magmas in the mantle: Evidence and relationship to kimberlites, orangeites and lamproites.	302
Harris, P.D., Courtnege, P.M.	The effects of Regolith-Landform development in diamond exploration: spectral investigation.	305
Harte, B., Hutchison, M.T., Lee, M., Harris, J.W.	Inclusions of (Mg,Fe)O in Mantle Diamonds	308
Halton, C.J.	The Difference between Sheared and Granular Peridotites.	311
Halton, C.J.	The Kimberlite-Megacryst link at Monastery Mine.	314
Hauri, E.H., Pearson, D.G., Bulanova, G.P., Milledge, H.J.	Microscale variations in C and N isotopes within mantle diamonds revealed by SIMS.	317
Hausel, W.D., Kucera, R.E., McCandless, T.E., Gregory, R.W.	Mantle-Derived Diatremes in the Southern Green River Basin, Wyoming, USA	320
Heaman, L., Teixeira, N.A., Gobbo, L., Gaspar, J.C.	U-Pb Mantle Zircon Ages for Kimberlites from the Juina Paranatinga Provinces, Brazil.	322

	Title	Page No's
Heaman, L.M., Creaser, R.A., Cookenboo, H.O.	Zircons from eclogite in the Jericho Kimberlite Pipe, northern Canada: Evidence for Proterozoic High Pressure Metamorphism Beneath the Slave Province.	325
Hearn, B.C. Jr	Peridotite xenoliths from Porcupine Dome, Montana, USA: Depleted subcontinental lithosphere samples in an olivine-phlogopite-carbonate magma.	328
Helmstaedt, H.H., Harrap, R.M.	Tectonic Aspects of the Kimberlite - Diamond - Upper-Mantle-Sample Connection: Does a coherent Model evolve?	331
Hutchison, M.T., Cartigny, P., Harris, J.W.	Carbon and Nitrogen Compositions and Cathodoluminescence Characteristics of Transition Zone and Lower Mantle Diamonds from Sao Luiz, Brazil.	336
Ionov, D.A., Griffin, W.L., O'Reilly, S.Y.	Garnet peridotite xenoliths in alkali basalts from Siberia and Mongolia: a comparison of lithospheric mantle compositions in cratonic and younger terrains.	339
Iouchko, N.A., Kremenetsky, A.A., Kouznetsov, I.I.	Nature of Diamonds, Melts and Fluids in the Ring Structures: Endogeneous Explosion vs. Impact Process.	342
Irvine, G.J., Pearson, D.G., Carlson, R.W., Boyd, F.R.	Platinum Group Element Constraints On The Origin Of Cratonic peridotites: A Study Of Kimberley Peridotite Xenoliths.	346
Irving, A.J., Kuehner, S.M.	Petrology and Geochemistry of the Ruby Slipper Lamproite, Western Montana: A Leucite-Bearing, Ultrapotassic Magma in an Eocene Continental Arc.	349
Izraeli, E., Schrauder, M., Navon, O.	On the Connection between Fluid and Mineral-Inclusions in Diamonds.	352
Izraeli, E., Wilcock, I.C., Navon, O.	Raman Shifts of Diamond Inclusions - A Possible Barometer.	355
Jacob, D.E., Foley, S.F.	Evidence for Archean Ocean Crust with Island Arc Signature from Diamondiferous Eclogite Xenoliths.	358
Jacob, D.E., Kjarsgaard, B., Horn, I.	Trace element concentrations by Laser Ablation ICP-MS in subcalcic garnets from Saskatchewan and Somerset Island, Canada.	361
Jacob, D.E., Mathey, D.P.	Geochemistry of layered kyanite-bearing eclogites from the Roberts Victor Mine, South Africa.	364
James, D.E., van der Lee, S., Gao, S., Silver, P., VanDecar, J., Kuehnel, R., Jordan, T.H., Saltzer, R., Gaherty, J., Gore, J., Zengeni, T., Nguun, T., Wright, C., Webb, S., Burford, D., Doucoure, M., Mollisana, M., Green, R., Robey, J., Harvey, J., Kostlin, E., Reichardt, F.	Review of Seismic Structure of the Continental Lithosphere with Results from the Southern Africa Seismic Experiment	366
Janney, P.E., le Roex, A.P.	Causes of Compositional Diversity in the Olivine Melilitites of Namaqualand-Bushmanland, South Africa.	371
Janney, P.E., le Roex, A.P., Viljoen, K.S.	Trace Element and Isotopic Characteristics of Olivine Melilitites from the Western Cape, South Africa: Implications for the Sources of Group 1 Kimberlites.	374
Janse, A.J.A.	Archons, Protons and Tectons: an update.	377
Johnson, L.H., Burgess, R., Turner, G., Milledge, H.J.	Fluids trapped within diamond: clues to mantle geochemistry.	380
Johnson, L.H., Burgess, R., Turner, G., Milledge, H.J.	Noble gas and halogen systematics of fluids within diamond coats from Canada and Africa.	383
Jones, A.P., Dobson, D., Milledge, H.J., Taniguchi, T., Litvin, Y., Genge, M.J., Rabe, R.	Experiments with low-T potassic carbonatitic melts, fluids and diamonds.	386
Kaminsky, F.V., Gorzynsky, G., Sablukova, L.I., Sablukov, S.M., Zakharchenko, O.D.	Primary Sources of Diamonds in the Birim Area, Ghana.	389
Kaminsky, F.V., Sablukov, S.M., Sablukova, L.I., Shpanov, V.E., Zhuravlev, D.Z.	Diamondiferous Minette Dykes from the Parker Lake Area, N.W.T., Canada.	392
Kaminsky, F.V., Zakharchenko, O.D., Channer, D.M., DeR., Blinova, G.K., Maitsev, K.A.	Diamonds from the Guaniamo area, Venezuela.	395
Kelemen, P.B.	One view on the genesis of cratonic mantle peridotites.	398
Keller, R.A., Remley, D.A., Snyder, G.A., Taylor, L.A., Sobolev, N.V.	Mantle Xenoliths from the Obnazhennaya Kimberlite, Yakutia.	402
Keller, R.A., Taylor, L.A., Snyder, G.A., Sobolev, V.S., Carlson, W.D., Sobolev, N.V., Pokhilenko, N.P.	3-D Petrography of a Diamondiferous Eclogite from Udachnaya, Siberia.	405
Kempton, P.D., Hawkesworth, C.J., Lopez-Escobar, L., Ware, A.J.	Geochemistry of spinel ± garnet lherzolite xenoliths from Pali Aike: Implications for evolution of mantle lithosphere beneath southern Patagonia	408
Kent, R.W., Paul, D.K., Basu, A., Ghose, N.C., Kempton, P.D.	Mafic alkaline intrusions in the Damodar Valley, India: the micaceous kimberlite - lamproite connection revisited.	411
Kepezhinskias, K., Kepezhinskias, P.	Ultramafic - Mafic rocks of the Eastern European Craton and Their Diamond Potential.	414
Kepezhinskias, P., Defant, M.J., Maury, R., Clague, A., Joron, J.-J., Cotten, J., Kilty, S.J.	Composition of Island-Arc Mantle and its Bearing on the Origin of Cratonic Lithosphere.	417
Kinny, P.J., Trautman, R.L., Griffin, B.J., Harte, B.	Airborne Electromagnetic and Magnetic Surveying in the Search for Kimberlites.	420
Kinny, P.J., Trautman, R.L., Griffin, B.J., Harte, B.	Carbon isotopic analyses of microdiamonds.	423
Kinzler, H.J., Grove, T.L.	Origin of Depleted Cratonic Harzburgite by Deep Fractional Melt Extraction and Shallow Olivine Cumulate Infusion.	426

Kirkley, M.B., Kolebaba, M.R., Carlson, J.A., Gonzales, A.M., Dyck, D.R., Dierker, C., Kiviets, G., Phillips, D., Shee, S.R., Vercoe, S.C., Barton, E.S., Smith, C.B., Fourie, L.F., Kjarsgaard, B.	Kimberlite Emplacement Processes Interpreted from Lac de Gras Examples. 40Ar/39Ar Dating of yimengite from the Turkey Well kimberlite, Australia: The oldest and the rarest. Compositional trends of spinel and mica in alkali minettes, southern Alberta, Canada.	429 432 435
Klemme, S., O'Neill, H.St.C.	The partitioning of Chromium between orthopyroxene and spinel in the system MgO-Al ₂ O ₃ -SiO ₂ -Cr ₂ O ₃ : implications for geothermobarometry for Upper Mantle rocks.	438
Klump, J., Gurney, J.J.	A Pilot Study of the Swartuggens Kimberlite Dyke Swarm.	441
Koga, K.T., Shimizu, N., Grove, T.L.	Disequilibrium trace element re-distribution during garnet to spinel facies transformation.	443
Kong, J.M., Boucher, D.R., Scott-Smith, B.H.	Exploration and Geology of the Attawapiskat kimberlites, James Bay Lowland, Northern Ontario, Canada.	446
Kopylova, M.G., Russell, J.K., Cookenboo, H.	Petrography and Chemistry of the Jericho kimberlite (Slave Craton, Northern Canada).	449
Kopylova, M.G., Russell, J.K., Cookenboo, H.	Upper mantle stratigraphy and thermal regime of the north central Slave Craton, Canada.	452
Kopylova, M.G., Russell, J.K., Cookenboo, H.	Unique chemical features of the peridotitic mantle below the Jericho kimberlite (Slave Craton, Northern Canada).	455
Kornilova, V.P., Safronov, A.F., Philippov, N.D., Zayzev, A.I.	The garnet of diamond association in lamprophires from the Anabar massif.	458
Kostrovitsky, S.I., Pavlova, L.A., Suvorova, L.V.	Preliminary information about the first finding of Ti-bearing kirschsteinite (Fe-monticellite) in kimberlites.	460
Kostrovitsky, S.I., de Bruin, D.	Ultramafic association of minerals (garnet-ureyite diopside-chromspinelid) in micaous kimberlites of Yakutian province.	463
Kostrovitsky, S.I., Morikiyo, T.	Sr,Nd isotopic data of kimberlites and related rocks from North of Yakutian kimberlite province (Russia).	466
Kouznetsova, E.I., Galdin, N.E.	Continental lithosphere deep structure researches on the base of scientific deep drilling	469
Kravchenko, S.M.	Kimberlite Types IA, IB, and II as Series from Different Mantle Depths.	471
Kryoshlyk, I.N.	Brief Review of the Theory of Liquid Immiscibility of Kimberlite Magma.	473
Kuehner, S.M., Irving, A.J.	Corundum-kyanite Eclogite, Groszpydite and Epidote Amphibolite of Probable Subducted Slab Origin from Paleogene Diamondiferous Pipes in SW Wyoming	475
Kukkonen, I.T., Peltonen, P.	Geotherm and a rheological profile for the central Fennoscandian lithosphere.	478
Kuligin, S.S., Pokhilenko, N.P.	Mineralogy of xenoliths of garnet pyroxenites from kimberlite pipes of Siberian Platform.	480
Kurszlaukis, S., Lorenz, V., Zimanowski, B., Büttner, R.	Experiments on explosive interaction of molten kimberlite with injected water.	483
LeCheminant, A.N., Heaman, L.M., Kretschmar, U., LeCouteur, P.C	Complex Origins and Multiple Ages of Mantle Zircon Megacrysts from Canadian and South African Kimberlites.	486
Lee, C.T.	Are inflected geotherms real?	489
Lee, C.T., Rudnick, R.L.	The origin and demise of cratonic lithosphere: a geochemical perspective from the Tanzanian craton.	492
Leggatt, P.B., Klunkert, P.S.	The application of Airborne Electromagnetic methods in the search for buried Kimberlites and Diamondiferous Gravels.	495
Leluyh, M.I., Kostrovitsky, S.I., Bezborodov, S.M., Nikulin, V.I., Prokopyev, S.A., Serov, V.P., Tolstov, A.V., Zuev, V.M.	Kimberlites and related rocks of Anabar region (Yakutia, Russia).	497
Letendre, J., McCandless, T.E., Eastoe, C.J.	Morphology and Carbon Isotope Composition of Microdiamonds from Dachine, French Guiana.	500
Litasov, K.D., Kostrovitsky, S.I., Litasov, Yu.D	Comparison of ilmenite-clinopyroxene symplectites from Vitim alkaline basalts and Yakutian kimberlites (Siberia, Russia).	503
Litasov, K.D., Litasov, Yu.D	Reactional and differentiated pyroxenite xenoliths from alkaline basalts of the Vitim volcanic field (East Siberia): their role in metasomatism and position in mantle magmatic system.	506
Litasov, Yu.D., Niida, K., Litasov, K.D	Reactional modification of the primitive mantle by basaltic melts: an evidence from mantle-derived xenoliths of the Vitim Plateau (Russia).	509
Logvinova, A.M., Fedorova, E.N., Sobolev, N.V	Microdiamonds from the Yubileynaya kimberlite pipe, Yakutia: morphology, physical properties, and mineral inclusions	512
Luk'yanova, L.I., Lobkova, L.P., Zhukov, V.V., Rybal'chenko, A.Y., Ostromov, V.P	Diamonds of the Urals Mobile Belt and Source Rocks for the Uralian (Brazilian) type Diamond Placers.	515
Lütjen, H., Blume, J., Pretorius, C.C.	Geophysical survey over the Elizabeth Bay Mine, Namibia.	518
Mabuza, M., Viljoen, K.S., Majola, S	New diamond-bearing xenoliths from the Orapa Mine, Botswana.	521
Machin, K.J., Barton E.S	The petrology of the Rex Mine kimberlite fissures, central Free State, South Africa.	524
Magee, C.W., Taylor, W.R	Constraints on the history and origin of carbonado from luminescence studies.	527
Mahotkin, I.L	Petrology of Group 2 Kimberlite - Olivine lamproite (K2L) from the Kostomuksha area, Karelia, N.W. Russia.	529
Mahotkin, I.L., Skinner, E.M.W	Kimberlites from the Archangelsk region - A rock type transitional between kimberlites, melnoites and lamproites.	532
Mainprice, D., Barruol, G., Ben Ismail, W., Lloyd, G	Automatic crystal orientation mapping of Kimberlite nodules using electron back scattered diffraction in the scanning electron microscope.	535

Mal'kov, B.A.	The Cosmic Cycles of Kimberlite Volcanism: New Data.	537
Mal'kov, B.A., Malyshev, N.A.	Diamond Occurrences in Kimberlites and Lamproites from Phanerozoic Mobile Belts on Example of the Timans, Urals and Ouachita.	540
Malkovets, V.G., Ionov, D.A., Griffin, W.L., O'Reilly, S.Y., Pokhilenko, N.P., Litasov, K.D.	A-P-T-composition cross-section of spinel and garnet facies lithospheric mantle in the Minusa region SW of the Siberian craton.	543
Marakushev, A.A., Bobrov, A.V.	Crystallization of Eclogite and Pyroxenite Magmas in the Diamond Depth Facies: Evidence from Garnet-Clinopyroxene Association.	546
Mason, P.R.D., Downes, H., Jarvis, K., Vannucci, R.	An investigation of incompatible trace elements in Massif Central mantle xenoliths by laser ablation ICP-MS: a new tool for investigating mantle geochemistry.	549
Massonne, H.J.	A new occurrence of microdiamonds in quartzofeldspathic rocks of the Saxonian Erzgebirge, Germany, and their metamorphic evolution.	552
McCammon, C.A.	Methods for Determination of Fe ³⁺ /SFe in Microscopic Samples.	555
McCandless, T.E.	Kimberlites: the Products of Deep-Seated Subduction.	558
Mc Dade, P., Harris, J.W.	Syngenetic inclusion bearing diamonds from Letseng-la-Terai, Lesotho.	561
McKinlay, F.T., Scott Smith, B.H., de Gasparis, S., Kong, J.	Geology of the Recently Discovered Hardy Lake Kimberlites, NWT	564
Mendelssohn, M., Milledge, H.J.	Characterisation of diamonds by infrared spectroscopy.	567
Menzies, A.H., Baumgartner, M.C.	Application of garnet geothermobarometry to southern African kimberlites.	570
Menzies, A.H., Gurney, J.J., Harte, B., Hauri, E.	REE patterns in diamond bearing eclogites and diamond bearing peridotites from Newlands Kimberlite	573
Menzies, A.H., Milledge, H.J.M., Gurney, J.J.	Fourier Transform Infra-red (FTIR) Spectroscopy of Newlands diamonds	576
Menzies, A.H., Shirey, S.B., Carlson, R.W., Gurney, J.J.	Re-Os isotope systematics of diamond-bearing eclogites and peridotites from Newlands Kimberlite	579
Mikhailov, M.V., Kuznetsova, M.Yu., Kuzmina, T.S., Polyakov, A.A., Lukyanova, L.I.	New data on potential diamond presence in Western Russia.	582
Milashov, V.A.	Energy of kimberlite formation.	584
Milledge, H.J., Sutherland, F.L., Kennewell, P.	Further studies of Copeton Diamonds.	587
Milledge, H.J., Woods, P.A., Beard, A.D., Shelkov, D., Willis, B.	Cathodoluminescence of polished carbonado.	589
Miller, A.R., Sella, M.H., Armitage, A.E., Davis, W.J., Barnett, R.L.	Late Triassic kimberlitic magmatism, western Churchill Structural Province, Canada.	591
Milshstein, E.D., Ennchek, Yu.M., Egorkin, A.V., Parasotka, B.S.	The structure of the Lithosphere in Diamond-Bearing Kimberlite Areas. The Siberian Platform.	594
Mironov, V.P.	Internal Morphology of Diamonds from Pipe Udachnaya According to the Data of Luminescence Tomography Method.	597
Mitchell, R.H., Scott Smith, B.H., Larsen, L.M.	Mineralogy of Ultramafic Dikes from the Sarfartoq, Sisimiut and Manlitsoq areas, west Greenland: Kimberlites or Melnoites?	600
Mitioukhine, S.I.	Chief Feature of Rocks of the Earth's crust within Kimberlite Provinces - Moderation of their Petrochemical Indicators.	603
Mitioukhine, S.I., Manakov, A.V., Poltaratskaya, O.L., Romanov, N.N.	New Data about the Structure of the Earth's crust according to Regional Geophysical Investigations' Results within Yakutian Kimberlitic Subprovince.	606
Moser, D.E., Hart, R.J.	Neoproterozoic and Paleoproterozoic re-activation of the crust-mantle transition beneath the central Kaapvaal craton, Laca kimberlite.	609
Nassichuk, W.W., Dyck, D.R.	Fossils Recovered from Kimberlite Pipes in the Lac de Gras Field, Slave Province, Northwest Canada: Geological Implications.	612
Natapov, L., Griffin, W.L.	Geodynamic controls on the distribution of diamondiferous kimberlites.	615
Navon, O.	Diamond formation in the Earth's mantle	618
Nguno Muatara, A.	Indicator minerals in kimberlites and their respective stream sediments. Gibeon Kimberlite Province, Namibia.	622
Nixon, P.H., Pearson, D.G.	Ultra-magnesian komatiites of Phanerozoic age, from SE Spain.	625
Nowell, G.M., Kempton, P.D., Pearson, D.G.	Hf-Nd Isotope Systematics of Kimberlites: Relevance to Terrestrial Hf-Nd systematics.	628
Nowell, G.M., Kempton, P.D., Pearson, D.G.	Trace Element and Isotope Geochemistry of Siberian Kimberlites.	631
Nowell, G.M., Pearson, D.G.	Hf Isotope Constraints on the Genesis of Kimberlitic Megacrysts: Evidence for a Deep Mantle Component in Kimberlites.	634
Nowell, G.M., Pearson, D.G., Kempton, P.D., Irving, A.J., Turner, S.	A Hf Isotope Study of Lamproites: implications for their Origins and Relationship to Kimberlites	637
Nowell, G.M., Pearson, D.G., Kempton, P.D., Noble, S.R., Smith, C.B.	The source regions/components of kimberlites: Constraints from Hf-Nd isotope systematics.	640
O'Brien, H.E., Tyni, M.	Mineralogy and geochemistry of Kimberlites and related rocks from Finland.	643
O'Reilly, S.Y., Griffin, W.L., Poudjorm Djomani, Y.	Are Lithospheres forever?	646
Pal'yanov, Yu.N., Gusev, V.A., Kupriyanov, I.N., Borzdov, Yu.M., Sokol, A.G., Khokhriakov, A.F., Sobolev, N.V.	The effect of growth rate on formation of nitrogenous defects in diamond.	649
Panina, L.I.	Genesis of Cocites from North Vietnam: Results of Melt Inclusions Studies in Minerals.	652
Panina, L.I., Usoltseva, L.M.	The Role of High-Calcium Alkaline Sulfate-Carbonate Melts in Formation of Melilitite-Monticellite Rocks and Carbonatites of the Mal'yi Murun Massif (Aldan, Russia).	655

Pearson, D., Carlson, R.W., Boyd, F.R., Shirey, S.B., Nixon, P.H.	Lithospheric mantle growth around cratons: A Re-Os isotope study of peridotite xenoliths from East Griqualand.	658
Pearson, D.G., Shirey, S.B., Bulanova, G.P., Carlson, R.W., Milledge, H.J.	Dating diamonds using the Re - Os isotope technique: A study of sulfide inclusions in Siberian diamonds.	661
Pearson, D.G., Davies, R.M., Shirey, S. B., Carlson, R.W., Griffin, W.L.	The age and origin of eastern Australian diamonds: Re-Os isotope evidence from sulfide inclusions in two diamonds from Wellington, New South Wales.	664
Pearson, D.G., Milledge, H.J.	Diamond growth conditions and preservation: Inferences from trace elements in a large garnet inclusion in a Siberian diamond.	667
Pearson, N.J., Griffin, W.L., Doyle, B.J., O'Reilly, S.Y., van Achterbergh, E., Kivi, K.	Xenoliths from kimberlite pipes of the Lac de Gras area, Slave Craton, Canada.	670
Pearson, N.J., Griffin, W.L., Kaminsky F.Y., van Achterbergh, E., O'Reilly, S.Y.	Trace element discrimination of garnet from diamondiferous kimberlites and lamproites.	673
Peltonen, P.	Silicification of Garnet Peridotite Xenoliths from the Lahtojoki Kimberlite Pipe, Eastern Finland.	676
Peltonen, P., Huhma, H., Tyni, M., Shimizu, N.	Garnet Peridotite Xenoliths from Kimberlites of Finland: Nature of the Lithospheric Mantle at Archaean craton - Palaeoproterozoic mobile belt transition.	678
Pendock, N.	Breaking the Nyquist Barrier: Superresolution Magnetic Imaging from Gradient Data.	681
Pereira, R.S., Wheelock, G., Bizzi, L., Silva, H., Leite, A.	Alluvial diamond potential of Paleo-Drainage systems in the Headwaters of the Sao Francisco River, Minas Gerais, Brazil	684
Phillips, D., Harris, J.W., Kiviets, G.B., Burgess, R., Fourie, L.F.	40Ar/39Ar Laser Probe Analyses of Clinopyroxene Diamond Inclusions from the Orapa and Mbuyi-Miya Mines.	687
Phillips, D., Kiviets, G.B., Barton, E.S., Smith, C.B., Viljoen, K.S., Fourie, L.F.	40Ar/39Ar Dating of Kimberlites and Related Rocks: Problems and Solutions.	690
Pizzolato, L.A., Schulze, D.J.	Preliminary investigations of megacrysts and peridotite xenoliths from the Kelsey Lake kimberlite, Colorado-Wyoming, USA.	693
Podvysotsky, V.T., Zuev, V.M., Nikulin, V.I., Lelyoukh, M.I., Bezborodov, S.M.	Conception of Formation of Magmatogenic and Terrigenous Diamondiferous Formations of Ancient Platforms as the basis of deposits' forecast.	696
Pokhilenko, N.P., McDonald, J.A., Melnyk, W., Hall, A.E., Shimizu, N., Vavilov, M.A., Afanasiev, V.P., Reimers, L.F., Irvin, J., Pokhilenko, L.N., Vasilenko, V.B., Kuligin, S.S., Sobolev, N.V.	Kimberlites of Camsell Lake field and some features of construction, and composition of lithosphere roots of southeastern part of Slave Craton, Canada.	699
Pokhilenko, N.P., Sobolev, N.V., Kuligin, S.S., Shimizu, N.	Peculiarities of pyroxenite paragenesis garnets distribution in Yakutian kimberlites and some aspects of the Siberian craton lithospheric mantle evolution.	702
Presnall, D.C., Walter, M.J.	High pressure phase equilibrium constraints on the origin of eclogites.	705
Pretorius, C.C., Blume, J., Lütjen, H., Trofimczyk, K.	Results of Geophysical trials to profile the Kimberlite/Host rock contacts at Venetia Mine and the BK-9 Pipe.	708
Pretorius, W., Barton, J.M., Jr.	The Use of Amphibolite Melting Experiments in Constraining Conditions of Melting in Natural Amphibolite Nodules from the Venetia Kimberlite Pipes.	710
Pretorius, W., Leahy, K.	Implications for diamond prospectivity from comparisons of diamond-bearing lithosphere in two Proterozoic orogenic belts.	713
Prikhodko, V.S., Zemlyanukhin, V.N.	Petrology of spinel Peridotite Xenoliths from Cenozoic Basaltoids in the Khanka Craton's Terrain (East Russia)	716
Pybus, G.Q.J., Hussey, M.C., Linton, P.L.	Spectral investigations of a variety of magnesium-bearing rock types: Implications for kimberlite exploration.	717
Rapp, R.P., Shimizu, N.	Subduction and Slab Melting in the Archean: Experimental Constraints and implications for Development of Cratonic Lithosphere.	720
Rass, I.T., Gerasimov, V.Yu., Laputina, I.P., Ilupin, I.P.	Diamond occurrence in kimberlites dependent on melting depths and rates of cooling of parental mantle magmas.	723
Rass, I.T., Kravchenko, S.M.	Melilite-Bearing Rocks within Alkaline-Ultrabasic Complexes: Derivatives from SiO ₂ -Poor, Ca-Rich Mantle Magma?	725
Reid D.L., Cooper A. F.	Carbonatite and silicate magmas at Dicker Willem, southern Namibia: their origin and source region characteristics	727
Reimers, L.F., Pokhilenko, N.P., Yefimova, E.S., Sobolev, N.V.	Ultramafic mantle assemblages from Sytykanskaya kimberlite pipe (Yakutia).	730
Rice, A.	Can the blasting excavation engineering sciences provide insight into the processes of kimberlite emplacement and eruption?	733
Richardson, S.H., Chinn, I.L., Harris, J.W.	Age and Origin of Eclogitic Diamonds from the Jwaneng Kimberlite, Botswana.	734
Robinson, D.N., Ferraris, R., Anderson, V.G., Parker, G.M., Van Blerck, E., Hart, D.	Colour, Morphological and Surface Textural Characteristics of the Diamonds in Venetia Kimberlites.	737
Roden, M.F., Laz'ko, E.E., Jagoutz, E.	Petrology and Geochemistry of Peridotite Inclusions from the Mir kimberlite, Siberia	740
Rodionov, A.S., Viljoen, K.S.	Venetia megacrysts, Northern Province, South Africa.	743
Romashkin, A.I.	Potassium Alkaline Magmatism in the Russian Far East.	746
Romashkin, A.I., Kukhtina, L.M.	Mineralogy of Ingilite.	749
Rombouts, L.	Extreme Value Analysis of Diamond Sizes and Values.	752
Rudnick, R.L., Ireland, T.R., Gehrels, G., Irving, A.J., Chesley, J.T., Hanchar, J.M.	Dating Mantle Metasomatism: U-Pb Geochronology of zircons in cratonic mantle xenoliths from Montana and Tanzania.	754
Ruiz, J., McCandless, T.E., Heimstaedt, H.H.	Eclogites from the Colorado Plateau: A Phanerozoic Record of Subduction beneath North America.	757

	The model of buried kimberlite field based on its reflection in postkimberlite reservoir rocks (by the example of the Yakutian province).	760
Saparn, G.V., Obyden, S.K., Titkov, S.V.	Use of Cathodoluminescence Scanning Electron Microscope with Color TV Display for Study of Natural Diamonds Internal Structure.	763
Schmitz, M.D., Bowring, S.A., Robey, J.V.A.	Constraining the thermal history of an Archean craton: U-Pb thermochronology of lower crustal xenoliths from the Kaapvaal craton, southern Africa	766
Schulze, D.J., Valley, J.W., Bell, D.R., Spicuzza, M.	Significance of Oxygen Isotope Variations in the Cr-Poor Megacryst Suite.	769
Scott Smith, B.H., Orr, R.G., Robertshaw, P., Avery, R.W.	Geology of the Fort A La Corne Kimberlites, Saskatchewan.	772
Seggie, A.G., Hannweg, G.W., Colgan, E.A., Smith, C.B.	The Geology and Geochemistry of the Venetia Kimberlite cluster, Northern Province, South Africa.	775
Seitz, H.M., Woodland, A.B.	Lithium and Beryllium abundances in peridotitic, pyroxenitic and eclogitic mantle assemblages.	778
Selfe, G.R., Trofimczyk, K.K.	Recent developments in the application of Borehole Geophysical logging techniques in Diamond Mining and exploration - some case studies.	781
Shamshina, E.A., Zaitsev, A.I.	New age of Yakutian kimberlites.	783
Sharygin, V.V.	Melt inclusions and Chromite in Lamproites from Smoky Butte, Montana.	785
Sharygin, V.V., Golovin, A.V., Smirnov, S.Z., Malkovets, V.G.	Relationship between Websterite Xenolith and Host Basanite (Pipe Bele, Khakasia, Russia): Evidence from Fluid and Silicate-Melt Inclusions in Minerals.	788
Sharygin, V.V., Litasov, K.D., Smirnov, S.Z., Kuzmin, D.V., Reutsky, V.N., Ivanov, A.V.	Fluid and Silicate-Melt Inclusions and Interstitial Glass in Mantle Xenoliths from Melanephelinites of the Udokan Lava Plateau, Russia.	791
Sharygin, V.V., Pospelova, L.N.	Sulphide inclusions in Early Lamproite Minerals.	794
Shatsky, V.S., Zedgenizov, D.A., Yefimova, E.S., Rylov, G.M., De Corte, K., Sobolev, N.V.	A comparison of morphology and physical properties of microdiamonds from the mantle and crustal environments.	797
Shee, S.R., Vercoe, S.C., Wyatt, B.A., Campbell, A.N., Colgan, E.A., Hwang, P.H.	Discovery and Geology of the Nabberu Kimberlite Province, Western Australia.	800
Shimizu, N., Pokhilenko, N.P., Boyd, F.R., Pearson, D.G.	Trace element characteristics of garnet dunites/harzburgites, host rocks for Siberian peridotitic diamonds.	803
Shimizu, N., Pokhilenko, N.P., McDonald, J.A.	Geochemical characteristics of the Slave craton lithosphere: A view from heavy mineral concentrate garnets.	805
Shimizu, N., Sobolev, N.V., Yefimova, E.S.	Trace element heterogeneities in-situ diamond inclusion garnets from Siberia	807
Shirey, S.B., Carlson, R.W., Gurney, J.J., van Heerden, L.	Re-Os isotope Systematics of Eclogites from Roberts Victor: Implications for Diamond Growth and Archean Tectonic Processes.	808
Shiryaev, A.A., Galimov, E.M., Sobolev, N.V., Kolesov, G.M., Zakharchenko, O.D.	Trace Elements in Inclusion-free Diamonds from Venezuela and Arkhangelsk Deposits.	811
Simakov, S.K.	Garnet - clinopyroxene geobarometry of deep mantle eclogites and eclogite paleogeotherm	814
Skinner, E.M.W., Mahotkin, I.L., Grütter, H.S.	"Mellilite" in Kimberlites:	817
Smith, S.C., Ihinger, P.D.	Geochemical evolution of the New England lamprophyre suite: a hotspot signature preserved in the continental crust?	820
Snyder, G.A., Keller, R.A., Taylor, L.A., Remley, D., Halliday, A.N., Sobolev, N.	The Origin of Ultramafic (Group A) Eclogites: Nd & Sr Isotopic Evidence From the Obnazhennaya Kimberlite, Yakutia.	823
Snyder, G.A., Taylor, L.A., Beard, B.L., Halliday, A.N., Sobolev, N.V.	The Diamond-Bearing Mir Eclogites, Yakutia: Nd And Sr Isotopic Evidence for Continental Crustal Input In An Archean Oceanic Environment.	826
Sobolev, N.V., Yefimova, E.S., Channer, D., Anderson, P.F.N., Barron, K.M.	A unique eclogitic source of Guianamo diamonds. Guyana shield, Venezuela.	829
Sobolev, N.V., Yefimova, E.S., Koptil, V.I.	Crystalline Inclusions in Diamonds in the Northeast of the Yakutian Diamondiferous Province.	832
Sobolev, V.N., Taylor, L.A., Snyder, G.A., Jerde, E.A., Neal, C.A., Sobolev, N.V.	Metasomatism of the Mantle Beneath Yakutia: A Quantitative Study of Secondary Chemistry and Mineralogy in Udachnaya Eclogites.	835
Sokolovsky, A.K., Serokurov, Yu.N., Kalmykov, V.D.	System analysis of remote sensing data on structural control of diamondiferous areas	838
Solovjeva, L.V., Barankevich, V.G., Bayukov, O.A., Glazunov, O.M.	Polychrome olivines in coarse grained lherzolites from the Udachnaya pipe - possible fine indicators of reduced metasomatism	841
Spetsius, Z.V.	Two Generations of Diamonds in the Eclogite Xenoliths.	844
Spetsius, Z.V., Bezborodov, S.M.	Compositional variations and floatability of Kimberlite Ores of Russia	847
Spetsius, Z.V., Griffin, B.J.	Secondary phases associated around diamonds in eclogites from the Udachnaya kimberlite pipe: Implications for diamond genesis.	850
Spetsius, Z.V., Griffin, W.L.	Trace element composition of garnet kelyphites in xenoliths from Udachnaya as evidence of their origin.	853
Spetsius, Z.V., Taylor, W.R., Griffin, B.J.	Major and trace element partitioning between mineral phases in diamondiferous and non-diamondiferous eclogites from the Udachnaya kimberlite pipe, Yakutia.	856
Stachel, T., Harris, J.W., Brey, G.P.	Inclusions in diamonds from Mwadui (Tanzania) - chemical mush in the source.	859
Stachel, T., Vlijoen, K.S., Harris, J.W., Brey, G.P.	REE patterns of garnets from diamonds and diamondiferous peridotites - geochemical signatures of the diamond source.	862
Stasiuk, L.D., Lockhart, G.D., Nassichuck, W.W., Carlson, J.A., Tomica, M.	Kimberlite emplacement temperatures derived from the thermal history of Organic matter, Lac de Gras, Canada.	865

R., Hannweg, G.W	The petrology of a mantle xenolith suite from Venetia, South Africa.	868
St Pierre, M., Wynne, P.J., Counts, B.	Paleomagnetisation of Kimberlites on the BHP/Dia Met Diamond Project.	871
Sweeney, R.J., Konzett, J., Prozesky, V.M.	The determination of hydrogen in peridotitic minerals by nuclear methods.	874
Sweeney, R.J., Winter, F.	Kimberlite as high-pressure melts: the determination of segregation depth from major element chemistry.	877
Tainton, K.M., Seggie, A., Bayly, B.A., Tomlinson, I., Quadling, K.E.	Regional variation in mantle heat flow within the Tanzanian Craton.	880
Taylor, L.A., Bulanova, G.P., Snyder, G.A., Keller, R.A	Multiple Inclusions In Diamonds: Evidence For Complex Petrogenesis.	883
Taylor, W.R., Bristow, J	Cyclicality of Continental Alkaline Magmatism in the Geological Record.	886
Taylor, W.R., Jaques, A.L	Crystallization history of the Argyle and Ellendale olivine lamprolites: constraints from spinel-olivine thermometry and oxygen barometry.	888
Taylor, W.R., Kamperman, M., Hamilton, R	New thermometer and oxygen fugacity sensor calibrations for ilmenite- and chromian spinel-bearing peridotitic assemblages.	891
Taylor, W.R., Kingdom, L.	Mineralogy of the Jagersfontein kimberlite - an unusual Group I micaceous kimberlite - and a comment on the robustness of the mineralogical definition of 'orangeite'.	892
Taylor, W.R., Matveev, S	Recalibration of the 5-parameter MRK equation of state for C-O-H fluids under upper mantle conditions and some experimental tests.	895
Taylor, W.R., Nimis, P	A single-pyroxene thermobarometer for lherzolitic Cr-diopside and its application in diamond exploration.	897
Taylor, W.R., Reddcliffe, T.H., Jakimowicz, J	Thermobarometry of peridotitic Cr-diopside from the Merlin kimberlites, Northern Territory, Australia - nature of the upper mantle beneath the Proterozoic North Australian craton.	899
Teixeira, N.A., Gaspar, J.C., Oliveira, A.L.A.M., Bitencourt, R.M., Yeda, B.	Morphology of the Juina Maars	902
Teixeira, N.A., Gaspar, J.C., Weissel, O., Almeida, A.J., Belther, J.A., Gobbo, L.	Geology of the Juina Diamondiferous Province	905
Thomas, R.D., Novak, N.A., Janse, A.J.A.	Diamonds in ultrabasic rock near Wawa, Ontario, Canada.	908
Titkov, S.V., Bershov, L.V., Scandale, E., Saparin, G.V., Chukichev, M.V., Speranskiy, A.V.	Nickel Structural Impurities In Natural Diamonds.	911
Titkov, S.V., Gorshkov, A.I., Vinokurov, S.F., Bershov, L.V., Solodov, D.I., Sivtsov, A.V.	Carbonado from Yakutian diamond deposits (Russia): microinclusions, impurities, and paramagnetic centers.	914
Tompkins, L.A., Meyer, S.P., Han, Z., Hu, S.	Petrology and Geochemistry of Kimberlites from Liaoning and Shandong Provinces, China.	917
Tompkins, L.A., Taylor, W.R., Ramsay, R.R., Armstrong, R.	The Mineralogy and Geochemistry of the Kamafugitic Tres Barras Intrusion, Mata da Corda, Minas Gerais, Brazil.	920
Tomshin, M.D., Fomin, A.S., Oleinikov, B.V.	Basites of the Vilyui - Markha zone (Siberian platform).	923
Trautman, R.L., Griffin, B.J., Bulanova, G.P	Growth features and nitrogen aggregation properties of microdiamonds derived from kimberlite diatremes.	926
Tsyganov, V.A., Kontarovich, R.S	Target-specific airborne geophysical forecast-exploration technology for diamond deposits <Field - Cluster - Pipe>.	929
Ulmer, G.C., Grandstaff, D.E., Göbbels, M., Woermann, E.	An Experimental Delineation of the Oxygen Fugacity of Moissanite (SiC) bearing Silicate Systems	932
Van Acherbergh, E., Griffin, W.L., Shee, S.R., Wyatt, B.A., Sharma, A.L	Natural Trace Element Distribution Coefficients for Garnet, Clinopyroxene and Orthopyroxene: Variations with Temperature and Pressure.	934
Van Acherbergh, E., Griffin, W., Stiefenhofer, J	Xenoliths from the Letlhakane Kimberlite: Geochemistry and Implications for Mantle Processes.	937
Verichev, E.M., Sablukov, S.M., Sablukova, L.I., Zhuravlev, D.Z.	A new type of diamondiferous kimberlite of the Zimny Bereg area (pipe named after Vladimir Grib).	940
Viljoen, K.S., Phillips, D., Harris, J.W., Robinson, D.N.	Mineral inclusions in diamonds from the Venetia kimberlites, Northern Province, South Africa.	943
Vladykin, N.V., Lelyukh, M.I., Tolstov, A.V	Lamprolites of the Anabar region, Northern rimming of the Siberian platform.	946
Voinova, I.P., Prikhodko, V.S	Post-accretionary stage in the evolution of ultramafic magmatism in accretionary prisms: rock types, diamond potential (on example of East Russia).	949
Vouiko, V	Method of Quantitative Evaluation of Kimberlite Pipes' Productivity.	950
Ward, J.R., Norman, D.I.	Geochemical and Physical Aspects of Diamonds from the Akwatia and Tarkwa Diamondfields in Southern Ghana, West Africa	953
Williams, C.M., Robey, J.v A., Abson, J.P.	Petrography and Mineral Chemistry of the Mwenezi-01 Kimberlites, Zimbabwe.	955
Woermann, E., Göbbels, M., Ulmer, G.C., Grandstaff, D.E.	Moissanite and its bearing on the oxygen fugacity of the deeper regimes of the Earth's upper mantle	958
Wood, B.D., Scott Smith, B.H., de Gasparis, S.	The Mountain Lake Kimberlitic Pipes of NW Alberta: Exploration, Geology and Emplacement Model.	960
Woodland, A.B., Peltonen, P.	Ferri/Ferrous Iron Contents of Garnet and Clinopyroxene and Calculated Oxygen Fugacities of Peridotite Xenoliths from the Eastern Finland Kimberlite Province.	963
Wyatt, B.A., Ma Wenyun, Li Ziyun, Joyce, J., Colgan, E.A., Smit, D., De Bels, M	The Ningxiang Lamprolites, Hunan Province, China: Petrology and Mineral Chemistry.	965
Wyatt, B.A., Morfi, L., Gumey, J.J., Pearson, N.J., Griffin, W.L.	Garnets in a Polymict Xenolith from the Bultfontein Mine, South Africa: New Preliminary Geochemical and Textural Data.	968

	Title	Page No's
Wyatt, B.A., Sumpton, J.D.H., Shee, S.R., Smith, T.W	Kimberlites in The Forrest River Area, Kimberley Region, Western Australia.	971
Wyllie, P.J., Lee, W.J.	Kimberlites, carbonatites, peridotites and silicate-carbonate liquid immiscibility explained in parts of the system $\text{CaO}-(\text{Na}_2\text{O}+\text{K}_2\text{O})-(\text{MgO}+\text{FeO})-(\text{SiO}_2+\text{Al}_2\text{O}_3)-\text{CO}_2$	974
Yamashita, H., Arima, M., Ohtani, E.	Melting experiments of kimberlite compositions up to 9GPa: Determination of melt compositions using aggregates of diamond grains.	977
Yao, S., Griffin, W.L., O'Reilly, S.Y	Trace Elements in Chromites from Kimberlites and Related Rocks: Relation to Temperature and Mantle Composition.	980
Yaxley, G.M., Green, D.H.	Phase relations of carbonated eclogite under upper mantle PT conditions - implications for carbonatite petrogenesis.	983
Zack, T., Brumm, R	Ilmenite/liquid partition coefficients of 26 trace elements determined through ilmenite/clinopyroxene partitioning in garnet pyroxenites.	986
Zartman, R.E., Richardson, S.H., Gurney, J.J., Moore, R.O.	U-Th-Pb Ages of Megacrystic Zircon from the Monastery Kimberlite, Free State, South Africa.	989
Zhang, A., Griffin, W.L., Ryan, C.G., Andrew, A	Conditions of Diamond Formation beneath the Sino-Korean Craton: Paragenesis, Temperatures and the Isotopic Composition of Carbon.	992
Zhang, Y	Mechanical equilibria in inclusion-host systems	995
Zhao, D., Essene, E.J., Zhang, Y., Pell, J.A	Mantle Xenoliths from the Nikos Kimberlites on Somerset Island, and the Zulu Kimberlites on Brodeur Peninsula, Baffin Island, Canada.	998
Zhao, L., Zhang, P., Huang, X., Li, Y	Deep Mantle Fluids and Their Products in Kimberlites from China.	1001
Zheng, J.	Phanerozoic Evolution of the Subcontinental Lithospheric Mantle, Eastern North China Block: Mantle Xenolith Evidence.	1004
Zichella, V., de Gasparis, A.A., Pendock, N.E.	Mineral mapping with hyperspectral data. A case study over the Moses Rock Dyke and Mule Ear Diatreme (UTAH,USA)	1007
Zintchouk, N	New Data about Crusts of Weathering on Kimberlites of Diamondiferous Territories.	1009
Zintchouk, N.N., Boris, Y.I	Erosional Section of Kimberlite Bodies and the Scales of Placer Diamondiferousness.	1013
Zintchouk, N.N., Boris, Y.I., Stegnitsky, Y.B	Specific Features of Kimberlite Prospecting in Various Landscape-geological Conditions.	1017
Zintchouk, N.N., Dukardt, Y.A., Boris, Y.I	Specific Features of Zoning of Ancient Platforms' Territories According to the Degree of Perspectiveness of Diamondiferous Kimberlites' Intrusion.	1020
Zintchouk, N.N., Koptil, V.I., Boris, Y.I	Ancient Platforms' Diamond Typomorphism (on the example of Siberian Platform).	1024
Zintchouk, N.N., Zuev, V.M., Mitioukhine, S.I	Regional Zoning of Territories According to the Level of Primary Diamond Sources' Diamondiferousness.	1028
Zuev, V.M., Bezborodov, S.M., Chyerny, S.D., Yanygin, Y.T., Molchanov, Y.D	The Structures which Control the Location of Kimberlites of Middle-Markhinsky Region.	1031
Zuev, V.M., Serokurov, Y.N., Kalmykov, V.D	Assessment of Diamondiferous Perspectives of East-European Platform according to the Data of Sounding from Space.	1034
Zweistra, P., Jarvis, W., McGeorge, I.B.	The Geology of Micaceous Kimberlite Intrusives, Khutse, Botswana	1037