Table 1. Representative analyses (in wt.%) of clinopyroxene from gabbro-dolerite sample MIR-12-51.

	analysis no.	SiO_2	TiO_2	Al_2O_3	Cr_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	Sum
1	6	51.37	1.07	2.72	0.00	10.47	0.28	15.59	18.79	0.30	0.00	100.59
2	21	49.76	1.27	2.85	0.31	9.87	0.21	14.48	19.41	0.30	0.00	98.46
3	22	50.36	1.18	2.55	0.34	10.10	0.23	14.69	19.03	0.35	0.00	98.83
4	26	50.00	1.23	3.12	0.00	10.09	0.26	14.53	19.53	0.35	0.00	99.11
5	27	50.42	1.20	2.85	0.31	9.83	0.00	14.64	19.97	0.36	0.00	99.58
6	34	50.40	1.28	2.76	0.32	9.64	0.26	14.78	19.60	0.31	0.00	99.35
7	35	50.04	1.28	2.83	0.32	9.66	0.25	14.73	19.35	0.28	0.00	98.74
8	45	48.73	1.77	3.72	0.00	11.45	0.27	12.70	19.98	0.30	0.00	98.92
9	46	50.75	1.13	1.95	0.28	9.65	0.00	14.97	20.05	0.35	0.00	99.13
10	47	50.90	1.12	1.95	0.00	9.71	0.31	14.83	20.16	0.27	0.00	99.25
11	54	50.83	1.25	3.08	0.00	10.02	0.25	14.92	19.32	0.35	0.00	100.02
12	55	51.30	1.13	2.21	0.00	9.67	0.00	15.29	19.84	0.22	0.00	99.66
13	56	49.46	1.73	4.12	0.00	11.62	0.25	12.90	19.66	0.35	0.00	100.09
14	57	51.07	1.20	2.42	0.26	9.29	0.27	14.89	20.48	0.32	0.00	100.20
15	58	51.02	1.07	2.38	0.25	9.62	0.31	14.96	19.98	0.35	0.00	99.94
16	59	51.19	1.12	2.36	0.00	9.49	0.30	15.02	20.13	0.39	0.00	100.00
17	60	49.87	1.47	2.53	0.00	13.10	0.31	12.69	19.70	0.26	0.00	99.93
18	61	50.40	1.38	2.65	0.31	9.64	0.27	14.66	20.26	0.30	0.00	99.87
19	62	50.98	1.18	2.42	0.00	9.73	0.25	15.02	19.94	0.34	0.00	99.86
20	63	50.57	1.17	2.46	0.25	9.93	0.21	14.89	20.20	0.35	0.00	100.03
21	64	50.00	1.70	3.76	0.00	10.48	0.27	14.16	19.67	0.40	0.00	100.44
22	65	50.53	1.38	2.36	0.00	10.50	0.00	14.31	20.39	0.32	0.00	99.79
23	66	50.27	1.52	2.40	0.00	10.76	0.27	13.90	20.23	0.35	0.00	99.70
24	67	50.68	1.35	2.27	0.00	10.39	0.00	13.98	20.43	0.32	0.00	99.42
25	68	50.47	1.38	2.51	0.00	10.05	0.00	14.20	20.58	0.30	0.00	99.49
26	69	50.60	1.28	2.15	0.00	13.15	0.34	12.87	19.98	0.34	0.00	100.71
27	70	51.11	1.17	2.49	0.26	9.61	0.21	14.94	20.65	0.27	0.00	100.71
28	71	50.45	1.55	2.42	0.00	11.57	0.30	13.38	20.18	0.35	0.00	100.20
29	73	50.57	1.30	2.70	0.00	10.02	0.00	14.71	19.83	0.32	0.00	99.45
30	74	50.49	1.18	2.40	0.25	10.01	0.28	14.78	19.67	0.26	0.00	99.32
31	75	50.27	1.42	2.65	0.00	10.45	0.28	14.13	19.87	0.28	0.00	99.35
32	76	49.93	1.50	2.46	0.00	11.17	0.27	13.63	20.47	0.32	0.00	99.75
33	77	50.21	1.28	2.38	0.19	10.56	0.00	14.20	20.32	0.38	0.00	99.52
34	78	50.23	1.50	2.46	0.00	11.21	0.22	13.93	20.23	0.32	0.00	100.10
35	79	50.85	1.27	2.57	0.00	9.79	0.21	15.11	19.62	0.32	0.00	99.74
36	80	50.30	1.32	2.34	0.00	10.38	0.27	14.34	20.15	0.27	0.00	99.37
37	81	50.79	1.10	2.48	0.00	10.16	0.00	15.09	19.41	0.30	0.00	99.33
38	82	50.70	1.18	2.55	0.00	10.00	0.00	14.87	19.78	0.30	0.00	99.38
39	83	50.75	1.37	2.53	0.00	10.00	0.28	14.94	19.67	0.27	0.00	99.81
40	84	50.75	1.30	2.32	0.20	9.73	0.00	14.44	20.60	0.28	0.00	99.62
41	85	50.96	1.35	2.29	0.00	10.16	0.31	14.71	20.02	0.36	0.00	100.16
42	86	49.98	1.63	2.99	0.28	10.23	0.25	14.34	19.70	0.38	0.00	99.78
43	87	50.53	1.62	2.57	0.00	10.85	0.30	14.23	20.16	0.27	0.00	100.53
44	88	49.72	1.37	2.32	0.00	12.93	0.27	12.67	19.85	0.34	0.00	99.47

45	89	50.77	1.33	2.36	0.26	9.94	0.21	14.64	19.88	0.26	0.00	99.65
46	90	49.85	1.57	2.78	0.00	10.43	0.23	14.29	19.87	0.35	0.00	99.37
47	91	49.89	1.62	2.82	0.00	11.27	0.26	13.93	19.55	0.36	0.00	99.70
48	92	49.74	1.60	2.59	0.00	11.94	0.25	13.86	19.36	0.38	0.00	99.72
49	93	49.89	1.60	2.40	0.00	12.84	0.32	13.61	18.81	0.34	0.00	99.81
50	94	50.08	1.37	2.42	0.00	14.09	0.25	13.40	18.43	0.27	0.00	100.31
51	95	50.17	1.37	2.17	0.00	14.82	0.34	12.97	18.02	0.31	0.00	100.17
52	96	50.13	1.40	2.17	0.00	15.73	0.39	12.39	18.33	0.22	0.00	100.76
53	99	50.85	1.47	2.49	0.00	10.96	0.21	14.39	20.05	0.36	0.00	100.78
54	100	51.19	1.07	2.40	0.20	9.51	0.00	15.02	20.32	0.34	0.00	100.05
55	101	51.67	1.08	2.21	0.20	10.12	0.00	16.17	18.82	0.35	0.00	100.62
56	102	51.37	1.25	2.63	0.22	9.83	0.00	15.09	19.99	0.40	0.00	100.78
57	103	51.92	1.28	2.08	0.20	10.10	0.30	15.41	19.87	0.26	0.00	101.42
58	104	50.68	1.48	2.87	0.20	10.02	0.22	14.68	19.97	0.32	0.00	100.44
59	105	51.32	1.33	2.42	0.00	10.37	0.00	14.71	20.04	0.23	0.00	100.42

Note. Analyses of clinopyroxene near melt inclusions (1-13) and zoned crystals (14-59).

Table s2. Representative analyses of plagioclase from gabbro-dolerite sample MIR-12-51, in wt. %.

	analysis no.	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	Sum
1	97	54.92	0.00	27.25	0.40	0.00	0.00	10.52	5.27	0.48	98.84
2	98	54.60	0.00	27.44	0.48	0.00	0.00	11.04	5.03	0.46	99.05
3	105	53.03	0.00	27.93	0.51	0.00	0.00	11.64	4.76	0.41	98.28
4	106	53.16	0.00	27.72	0.59	0.00	0.00	11.24	4.85	0.42	97.98
5	111	54.17	0.00	28.46	0.48	0.00	0.00	11.64	5.05	0.37	100.17
6	112	54.02	0.00	28.68	0.51	0.00	0.00	11.84	4.83	0.36	100.24

Table s3. Representative analyzes of homogeneous glasses of heated melt inclusions in clinopyroxene from gabbro-dolerite sample MIR-12-51, wt. %.

	analysis no.	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Sum
1	2	50.75	2.50	8.03	14.85	0.23	8.24	11.84	1.97	0.64	0.25	99.30
2	3	50.75	2.40	8.05	14.85	0.22	8.44	11.85	1.87	0.65	0.00	99.08
3	9	48.41	3.59	10.13	14.10	0.22	5.82	9.81	2.68	1.19	0.48	96.43
4	10	50.94	2.90	10.60	12.32	0.00	5.36	9.16	2.95	1.59	0.46	96.28
5	12	50.17	2.82	10.90	13.02	0.00	5.69	9.67	2.75	1.17	0.34	96.53
6	13	50.70	2.70	11.17	12.67	0.00	5.72	9.40	2.82	1.23	0.41	96.82
7	16	48.93	3.59	10.73	14.13	0.00	5.39	9.32	2.78	1.14	0.50	96.51
8	17	49.25	3.64	10.92	14.29	0.26	5.79	9.61	2.80	1.22	0.55	98.33
9	19	51.28	1.80	9.41	9.98	0.22	6.83	12.97	2.24	1.35	0.96	97.04
10	23	50.30	2.87	9.26	11.03	0.00	7.15	11.32	2.18	2.36	0.30	96.77
11	25	50.96	2.95	9.28	11.54	0.26	6.80	10.75	2.20	2.51	0.44	97.69
12	28	53.44	1.92	12.04	9.85	0.19	5.42	9.07	3.28	1.33	0.55	97.09
13	36	53.93	1.90	11.94	9.98	0.00	4.99	8.79	3.32	1.58	0.41	96.84
14	37	53.08	1.80	11.62	10.47	0.00	5.12	9.21	3.05	1.52	0.32	96.19
15	38	53.40	1.95	11.79	10.50	0.00	5.09	9.07	3.36	1.46	0.55	97.17
16	39	53.10	1.97	11.66	10.60	0.22	5.09	9.19	3.07	1.48	0.37	96.75
17	42	48.97	3.65	10.41	13.82	0.00	5.94	10.00	2.62	1.14	0.48	97.03
18	43	49.14	3.67	10.32	13.53	0.00	6.22	10.09	2.59	1.16	0.46	97.18
19	44	49.10	3.70	10.49	13.80	0.28	5.95	9.91	2.70	1.11	0.37	97.41
20	48	51.07	2.87	9.52	13.12	0.00	6.57	11.14	2.57	1.13	0.50	98.49
21	49	50.85	2.84	9.50	13.29	0.00	6.47	11.17	2.59	1.08	0.39	98.18
22	50	51.17	2.87	9.50	13.15	0.00	6.67	11.14	2.53	1.13	0.41	98.57

Table s4. Representative analyses (wt.%) of homogeneous glasses of heated melt inclusions in plagioclase from gabbro-dolerite sample MIR-12-51.

	analysis no.	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Sum
1	93	49.87	3.14	13.13	11.44	0.00	3.53	10.12	4.14	1.78	0.27	97.42
2	94	50.87	2.45	14.38	9.69	0.00	3.17	9.08	4.46	2.07	0.44	96.61
3	95	51.88	2.55	14.34	9.70	0.23	3.18	9.05	4.65	2.08	0.27	97.93
4	96	52.54	2.64	14.78	9.78	0.00	3.30	9.18	4.81	2.00	0.30	99.33
5	99	49.10	3.04	13.98	12.53	0.00	3.68	9.51	4.37	1.37	0.39	97.97
6	100	48.11	3.27	13.89	12.57	0.25	3.73	9.65	4.34	1.39	0.37	97.57
7	101	49.18	3.10	13.87	12.83	0.00	3.98	9.63	4.45	1.39	0.34	98.77
8	102	48.37	3.19	13.81	12.79	0.21	3.86	9.51	4.54	1.30	0.32	97.90
9	103	47.96	3.09	13.26	12.49	0.21	3.73	9.44	4.35	1.33	0.37	96.23
10	107	49.63	2.51	15.73	11.54	0.00	5.64	8.08	5.28	1.33	0.00	99.74
11	108	48.97	2.75	15.33	12.54	0.00	5.62	8.54	4.57	1.38	0.00	99.70
12	109	48.99	2.44	15.47	12.16	0.22	5.87	8.25	4.93	1.41	0.00	99.74

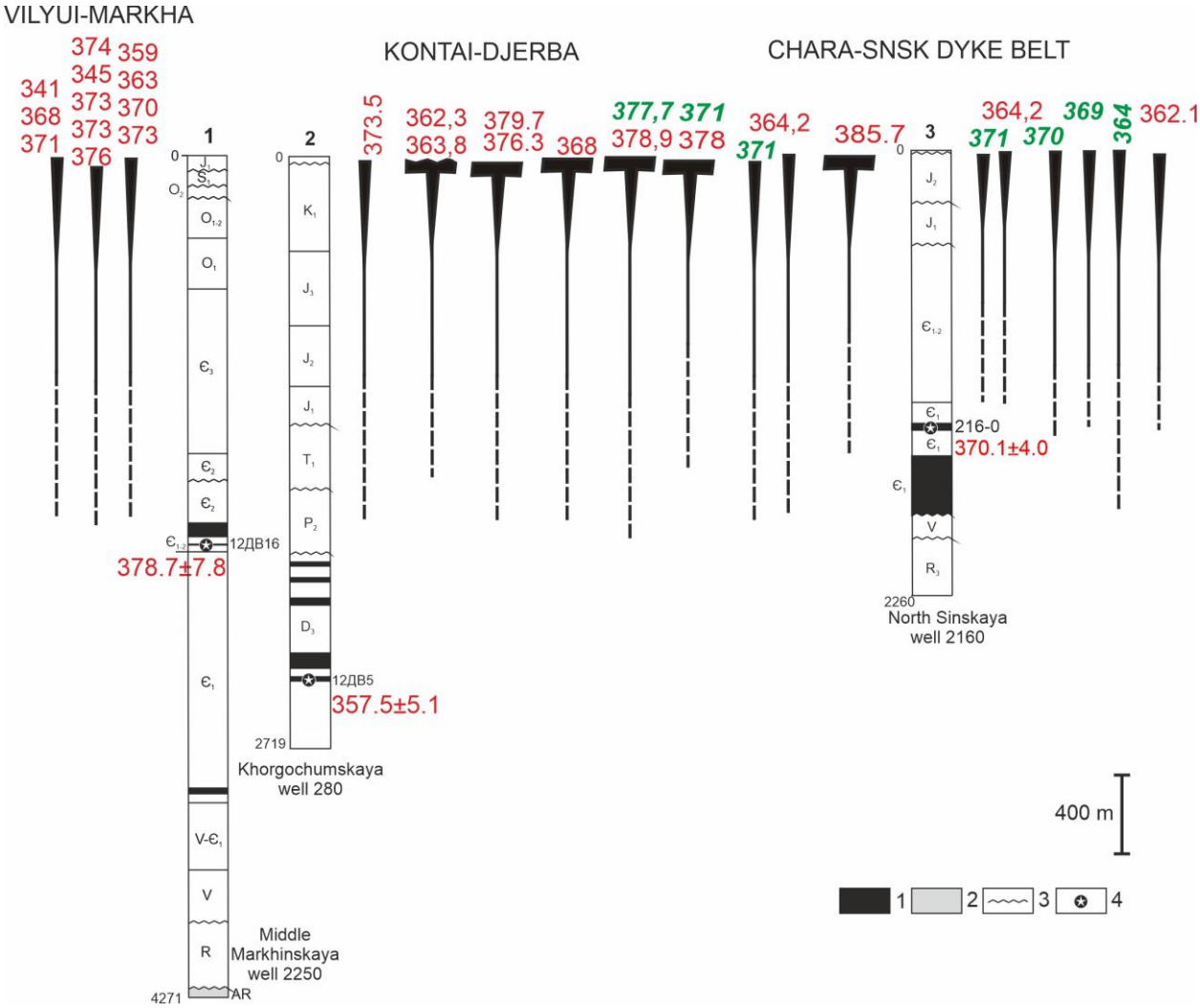

Fig. s1. Summary diagram showing the age of emplacement of intrusive bodies and the relative position of the studied dikes (vertical wedges) and sills (horizontal stripes). A combined section (NW-SE) transverse to the rift is shown. U-Pb age determinations for zircon are shown in italics, Ar-Ar ages are red. 1 – sills on stratigraphic columns 1-3 correspond to Fig. 1; 2 – basement; 3 – stratigraphic unconformities; 4 – points of sampling for dating**.**

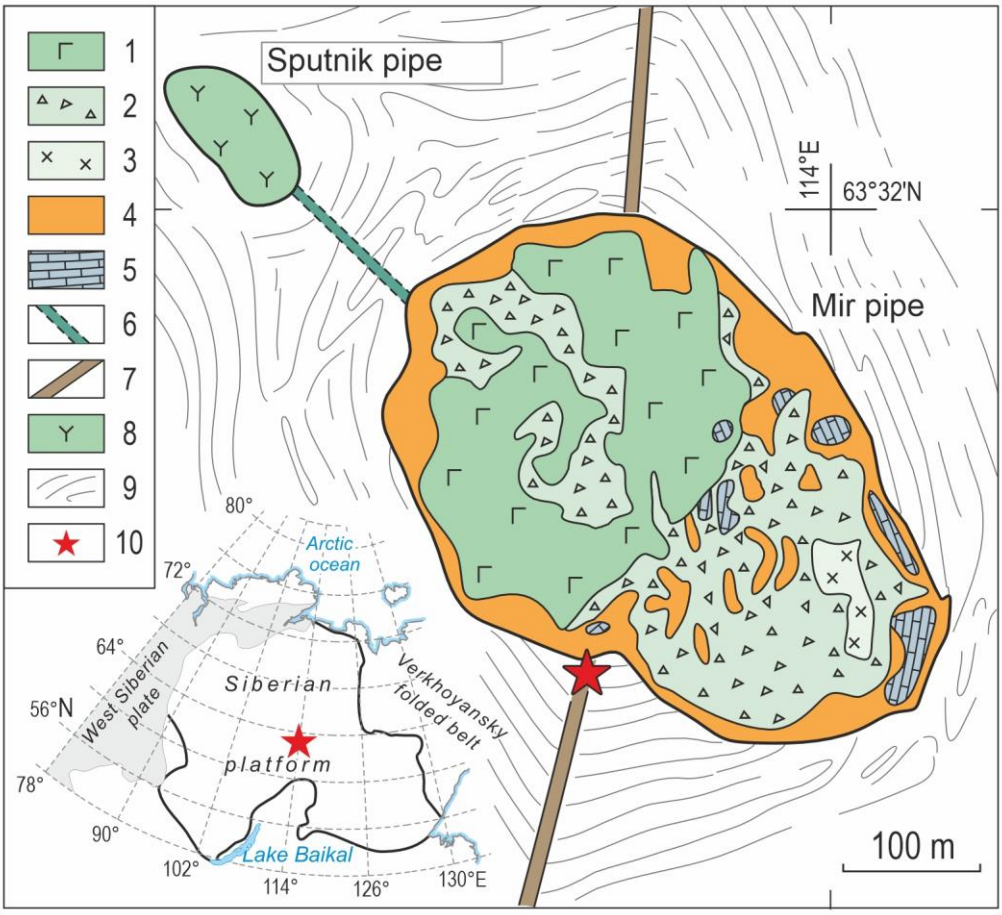

Fig. s2. Geological structure of the Mir pipe and the associated Sputnik pipe according to [Prokopyev, 2001], as amended. The location is shown in the inset.

1-3 - kimberlites of the Mir pipe of different phases of penetration: 1 - first, 2 - second, 3 - third; 4 - endocontact zone, 5 - xenoliths of sedimentary rocks, 6 - kimberlite dike, 7 - dolerite dike, 8 - Sputnik pipe, 9 - quarry-opened layers of host carbonate rocks, 10 - location of the studied sample MIR-12-51.

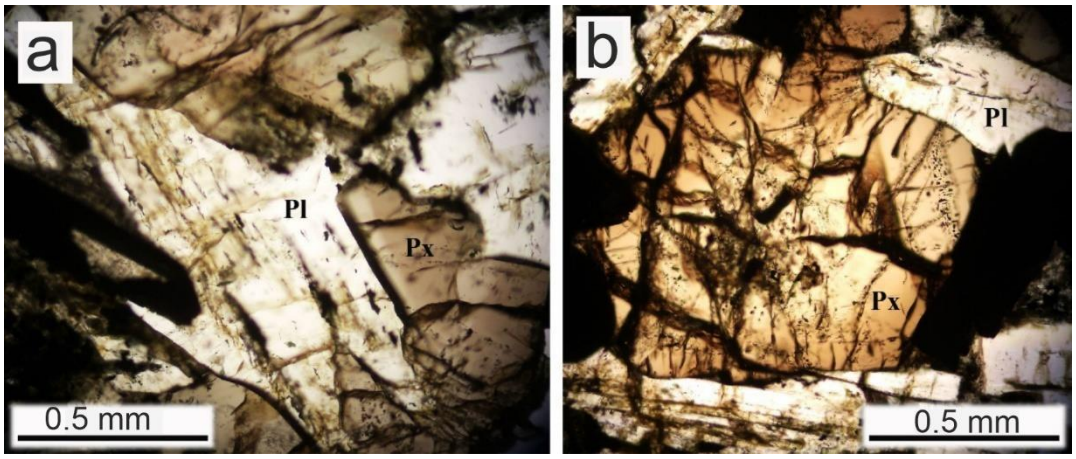

Fig. s3. Structure of gabbro-dolerites of the Vilyui paleorift (transmitted light).

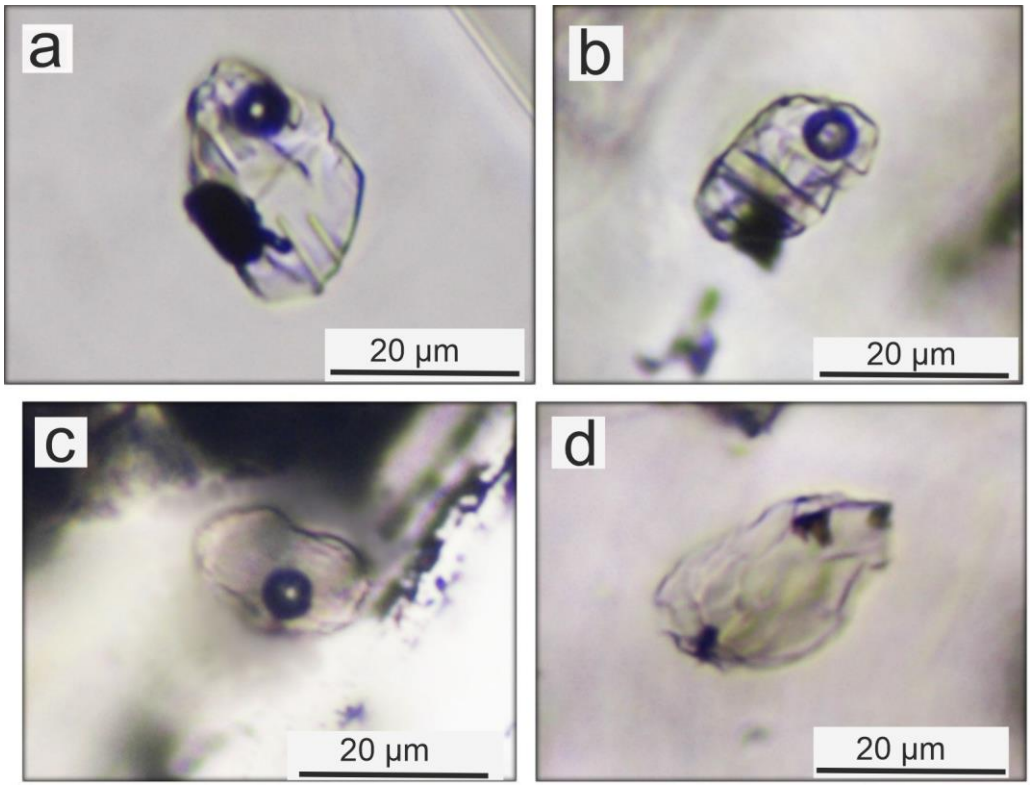

Fig. s4. Melt inclusions in clinopyroxene from gabbro-dolerite of the Vilyui paleorift. a, b - before high-temperature experiments. c, d – after heating and quenching (Transmitted light).

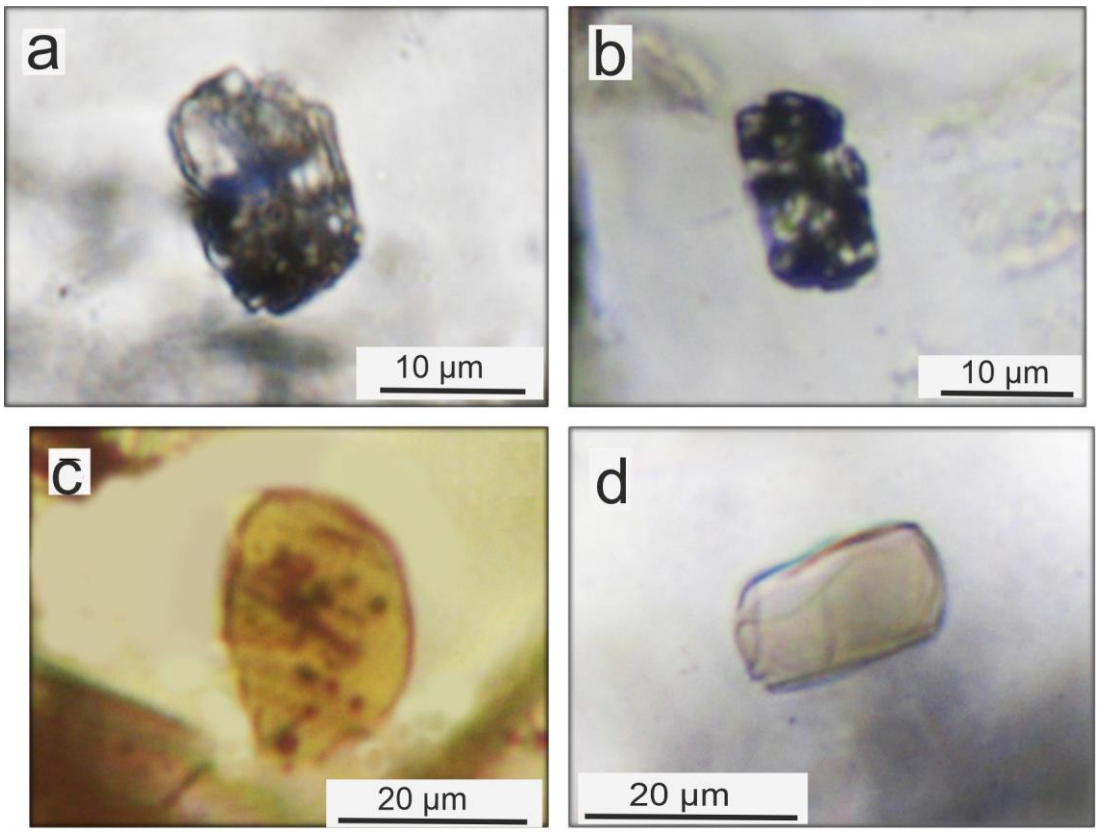

Fig. s5. Melt inclusions in plagioclase from gabbro-dolerite of the Vilyui paleorift. a, b - before high-temperature experiments. c – at 1140ºC with several undermelted phases in the light melt. d – after heating and quenching with homogeneous glass (Transmitted light).

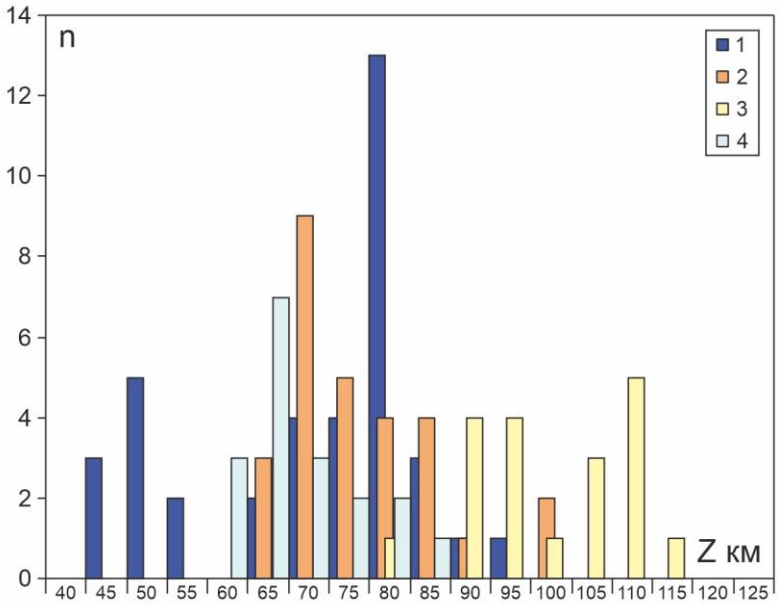

Fig. s6. Generation depths (Z, km) of mafic melts.

1-4 – estimates of magma generation depths: for Devonian gabbro-dolerites of the Vilyui paleorift (1, inclusions in clinopyroxene and plagioclase); for Permo-Triassic flood basalts of the Siberian platform (2, inclusions in plagioclase); for Late Jurassic basalts of the arch. Franz Josef Land – inclusions in plagioclase (3) and clinopyroxene (4) of one sample.