**Supplement 2**

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massif of cumulative dunite-wehrlite-olivine clinopyroxenite-gabbro, Eastern Chukotka”

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**Table 2.** Mineral compositions.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sample** | LU9-37 | LU9-38 LU9-38 | LU9-26 LU9-26 | LU9-28 LU9-28 LU9-28 LU9-28 | LU9-32 LU9-32 |
| **Mineral** | Spl | Spl Ol | Ol Cpx | Ol CpxC CpxR Mg-Hs | SplM SplS |
| **Points** | 13 | 4 3 | 12 4 | 11 9 6 6 | 9 5 |
| **SiO2**  **TiO2**  **Al2O3**  **FeO MnO MgO CaO**  **Na2O K2O Cr2O3**  **NiO**  **V2O3**  **ZnO Total** | 0.03  0.32  35.69  30.77  0.23  11.42  -  -  -  21.05  0.17  0.20  0.15  100.03 | 0.05 41.31  0.40 0.00  17.45 0.00  28.36 10.55  0.35 0.17  10.11 47.96  - 0.02  - -  - -  41.30 0.02  0.10 0.28  0.13 -  0.09 -  98.36 100.34 | 39.96 52.41  0.00 0.27  0.00 3.35  14.68 3.60  0.19 0.11  45.23 16.24  0.02 24.25  - 0.15  - 0.00  0.00 0.33  0.16 0.01  - -  - -  100.25 100.74 | 39.95 51.90 52.07 44.34  0.00 0.31 0.31 1.10  0.00 3.78 3.04 13.31  14.62 3.81 3.45 5.46  0.22 0.09 0.10 0.04  45.18 15.93 16.09 16.98  0.02 23.36 23.81 12.46  - 0.21 0.16 2.19  - 0.01 - 0.01  0.00 0.58 0.43 1.19  0.15 0.00 0.00 0.02  - - - -  - - - -  100.16 99.98 99.47 97.09 | 0.03 0.06  0.16 0.29  25.82 21.95  31.19 36.75  0.26 0.26  7.93 6.15  - -  - -  - -  33.31 32.62  0.08 0.10  0.35 0.36  0.33 0.48  99.46 99.03 |
| **Mg# Cr# Spl F# Spl xAn** | 50.2  0.284  0.131  - | 48.8 89.0  0.614 -  0.130 -  - - | 84.6 88.9  - -  - -  - - | 84.6 88.2 89.3 84.7  - - - -  - - - -  - - - - | 37.5 30.0  0.464 0.499  0.101 0.153  - - |

**Table 2.** (continue)

|  |  |  |
| --- | --- | --- |
| **Sample** | LU9-24 LU9-24 LU9-24 LU9-24 *LU9-24 LU9-24 LU9-24 LU9-24* | LU9-25 LU9-25 LU9-25 |
| **Mineral** | CpxL CpxS Prg Pl *Chl Ts Mg-Hbl Act* | CpxL CpxS Prg |
| **Points** | 4 4 4 6 *4 6 2 1* | 3 3 5 |
| **SiO2**  **TiO2**  **Al2O3**  **FeO MnO MgO CaO**  **Na2O K2O Cr2O3**  **NiO** | 51.02 52.12 43.03 48.30 *27.63 41.94 48.25 53.18*  0.58 0.43 1.57 0.02 *0.02 0.17 0.31 0.12*  3.77 3.28 13.67 32.93 *21.08 14.76 8.08 4.31*  7.10 6.58 10.88 0.22 *13.86 15.49 11.82 9.51*  0.19 0.16 0.12 0.00 *0.09 0.29 0.18 0.16*  14.18 14.38 13.90 0.01 *22.57 10.79 14.95 17.34*  22.24 22.56 11.91 15.94 *0.09 11.18 11.01 12.15*  0.37 0.39 2.31 2.55 *0.04 2.33 1.49 0.59*  0.01 0.01 0.60 0.02 *0.02 0.12 0.07 0.04*  0.07 0.06 0.05 0.00 *0.01 0.04 0.06 0.01*  0.00 0.00 0.02 0.01 *0.03 0.04 0.04 -* | 50.85 51.42 43.63  0.64 0.57 1.84  4.41 3.68 12.80  6.79 6.51 10.04  0.27 0.23 0.17  13.90 13.97 14.32  22.10 22.17 12.03  0.42 0.37 2.08  0.01 0.01 0.60  0.10 0.09 0.12  0.03 0.06 0.00 |

|  |  |  |
| --- | --- | --- |
| **V2O3**  **ZnO Total** | - - - - *- - - -*  - - - - *- - - -*  99.53 99.96 98.08 99.98 *85.44 97.16 96.26 97.43* | - - -  - - -  99.51 99.06 97.63 |
| **Mg# Cr# Spl F# Spl xAn** | 78.1 79.6 69.5 - *74.4 55.4 69.3 76.5*  - - - - - - - -  - - - - *- -* - -  - - - 77.4 *- - - -* | 78.5 79.3 71.8  - - -  - - -  - - - |

**Table 2.** (continue).

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample** | LU9-25 *L* | *U9-25* | LU9-33 LU9-33 LU9-33 LU9-33 LU9-33 *LU9-33 LU9-33 LU9-33 LU9-33* |
| **Mineral** | Pl | *Prg* CpxL CpxMS Mg-Hs Pl *Ilm Ep\* Chl Prg Act* | |
| **Points** | 4 | *1* 3 5 6 6 *5 2 3 3 2* | |
| **SiO2**  **TiO2**  **Al2O3**  **FeO MnO MgO CaO Na2O K2O Cr2O3**  **NiO**  **V2O3**  **ZnO Total** | 47.86  0.02  33.30  0.21  0.01  0.00  16.19  2.36  0.05  0.00  -  -  -  99.99 | *43.21* 50.18 51.54 42.32 46.83 *0.06 39.07 26.57 41.66 54.11*  *0.86* 0.90 0.57 2.37 0.01 *49.58 0.04 0.15 0.39 0.03*  *15.03* 4.53 3.26 13.38 33.53 *0.02 27.53 19.62 11.93 1.89*  *10.55* 6.43 6.35 9.99 0.22 *43.74 8.00 18.84 17.52 10.21*  *0.19* 0.28 0.25 0.19 0.01 *2.30 0.10 0.19 0.22 0.27*  *13.34* 14.32 14.91 14.29 0.01 *0.11 0.00 19.26 9.01 17.41*  *12.10* 22.37 22.34 11.91 17.06 *0.20 23.72 0.26 12.19 12.73*  *2.47* 0.40 0.35 2.59 1.96 *- 0.02 0.04 2.00 0.30*  *0.23* 0.01 0.01 0.24 0.01 *- 0.00 0.04 0.21 0.03*  *0.07* 0.02 0.03 0.03 0.01 *0.07 0.01 0.04* - *0.03*  - 0.01 0.00 0.004 0.00 *0.00 - 0.00 0.01 0.01*  - - - - - *0.15 -* - - -  - - - - - *0.01 -* - - -  *98.06* 99.44 99.62 97.31 99.64 *96.24 98.49 85.02 95.14 97.02* | |
| **Mg# Cr# Spl F# Spl xAn** | -  -  -  78.9 | *69.3* 79.9 80.7 71.8 - - - *64.6 47.8 75.3*  - - - - - - - - - -  - - - - - - - - - -  - - - - 82.7 - *-* - - - | |

**Table 2.** (continue).

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample** *L* | *U9-34a* LU9-34a *LU9-34a LU9-34a LU9-34a* | *LU9-34b LU9-34b LU9-34b* | LU9-39 LU9-39 |
| **Mineral** | *Mg-Hbl Ilm Mg-Hbl Act Czo* | *Mg-Hbl Mg-Hbl Czo* | CpxL CpxM |
| **Points** | *3 3 1 3 2* | *3 1 2* | 4 6 |
| **SiO2**  **TiO2**  **Al2O3**  **FeO MnO MgO CaO Na2O K2O Cr2O3**  **NiO**  **V2O3**  **ZnO** | *46.17 0.03 50.11 54.20 39.60*  *1.47 50.01 0.80 0.07 0.10*  *10.90 0.01 7.38 2.66 30.70*  *10.06 41.14 10.79 12.56 4.04*  *0.21 4.95 0.19 0.20 0.05*  *15.01 0.07 15.22 15.16 0.00*  *12.02 - 12.59 12.83 24.24*  *1.99 - 1.58 0.22 0.00*  *0.04 - 0.02 0.05 0.00*  *0.01 0.02 0.03 0.02 0.01*  *- 0.00 - - -*  *- 0.00 - - -*  *- 0.02 - - -* | *46.86 50.01 39.40*  *1.17 0.62 0.07*  *8.60 5.52 30.80*  *14.46 13.77 4.15*  *0.31 0.27 0.19*  *12.95 13.97 0.01*  *11.70 12.34 23.85*  *1.55 1.00 0.00*  *0.24 0.11 0.00*  *0.01 0.00 0.01*  *- - -*  *- - -*  *- - -* | 50.80 52.31  0.50 0.42  4.70 3.61  6.63 5.89  0.22 0.27  15.25 15.30  20.22 21.68  0.59 0.46  0.04 0.02  0.12 0.10  0.02 0.01  - -  - - |

|  |  |  |  |
| --- | --- | --- | --- |
| **Total** | *97.89 96.25 98.71 97.98 98.73* | *97.85 97.61 98.49* | 99.08 100.07 |
| **Mg# Cr# Spl F# Spl xAn** | *72.7* - *71.5 68.3* -  - - *- - -*  - - *- - -*  *-* - *- - -* | *61.5 64.4* -  *- - -*  *- - -*  *- - -* | 80.4 82.2  - -  - -  - - |

**Table 2.** (the end).

|  |  |
| --- | --- |
| **Sample** | LU9-39 LU9-39 LU9-39 *LU9-39 LU9-39 LU9-39 LU9-39* |
| **Mineral** | CpxS *Mg-Hbl* Pl *Chl Mg-Hbl Mg-Hbl Act* |
| **Points** | 2 5 6 *4 3 2 4* |
| **SiO2**  **TiO2**  **Al2O3**  **FeO MnO MgO CaO Na2O K2O Cr2O3**  **NiO**  **V2O3**  **ZnO Total** | 51.58 45.11 47.47 *28.86 45.85 49.69 54.03*  0.26 1.25 0.01 *0.06 0.34 0.34 0.22*  2.38 11.27 33.09 *19.96 11.44 7.68 3.70*  6.59 11.56 0.36 *12.27 10.15 8.80 9.36*  0.22 0.21 0.00 *0.44 0.22 0.19 0.35*  14.27 13.98 0.20 *23.29 15.03 17.08 17.69*  22.61 12.17 16.29 *0.19 11.72 12.24 12.33*  0.27 1.71 2.05 *0.13 1.72 1.21 0.56*  0.01 0.38 0.10 *0.05 0.22 0.13 0.06*  0.06 0.08 0.00 *0.06 0.04 0.06 0.06*  0.04 0.04 0.01 *0.02 0.02 0.06 0.02*  - - - *- -* - *-*  - - - *- -* - *-*  98.28 97.74 99.57 *85.33 96.75 97.48 98.39* |
| **Mg# Cr# Spl F# Spl xAn** | 79.4 68.3 - *77.2 72.5 77.6 77.1*  *- -* - *- - -* -  - - - *- -* - -  - - 81.0 *- -* - *-* |

Note. "-" – not determined, not calculated. Compositions of metamorphic minerals are shown in *italic*. Mg# = 100\*Mg/(Mg+Fe); Cr#Spl = Cr/(Cr+Al+Fe3+); F#Spl = Fe3+/(Cr+Al+Fe3+); xAn is the anorthite content in plagioclase. Act – actinolite, Chl – chlorite, Cpx – clinopyroxene, Czo – clinozoisite, Ep – epidote, Ep\* – vein epidote, Ilm – ilmenite, Mg-

Hbl – magnesiohornblende, Mg-Hs – magnesiohastingsite, Ol – olivine, Prg – pargasite, Pl – plagioclase, Spl – spinel, Ts – tschermakite. L – large, M – medium, and S – small grains. С – core, R – rim.

Major-mineral compositions were studied by X-ray electron-microprobe analysis on a Jeol JXA 8200 SuperProbe at the Max Planck Institute for Chemistry (Mainz, Germany) and on a Cameca–SX100 electron microprobe at the V.I. Vernadsky Institute of Geochemistry and Analytical Chemistry of the Russian Academy of Sciences (Moscow, Russia). Element

abundances were measured at an accelerating voltage of 20 kV and a beam current of 80 nA in Max Planck Institute and at an accelerating voltage of 15 kV and a beam current of 30 nA in Vernadsky Institute. Standard mineral samples were used for calibration. The analytical errors are listed in [13].