

This Supplemental Material accompanies

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## **Supplemental Material S2 – ZIRCON DESCRIPTIONS**

### **Bass River Block**

#### ***Gamble Brook Formation***

Zircon grains in samples B1 (18TM-001A), B2 (18TM-001B), and B3 (15TM-296) display wide range of sizes, morphologies, and colors. Most grains have abraded corners and edges and are rounded. The largest grains (~100-200  $\mu\text{m}$  diameter) are rounded and dark in colour. The smaller grains (50-100  $\mu\text{m}$  long) are acicular colorless crystals with sharp corners and tips, and most display internal igneous zoning.

#### ***Bass River Plutonic Suite***

Sample B4 (E11-W13-212) and sample B5 (12TM-666): abundant elongate to stubby euhedral zircon crystals with simple bipyramidal terminations and a 1:1 to 3:1 aspect ratio. The grains are typically clear with excellent igneous growth zoning.

Samples B6 and B7 (E11-W13-210B): no zircon descriptions available.

Samples B8 (12TM-777) and B9 (E11-W13-188B): abundant zircons in the 50 to 120  $\mu\text{m}$  size range that are short, rectangular, and euhedral, and most have bipyramidal terminations. Many grains are fractured, cloudy, and contain numerous inclusions; only a few grains are transparent. Sample B10 (15CEW-015A): mainly elongate zircon crystals with bipyramidal terminations and sizes ranging from 100 to 200  $\mu\text{m}$  with a 1:2 to 1:4 aspect ratio. The grains are clear and display clear oscillatory zoning (see Fig. S2-1 for CL images).

### **Jeffers Block**

#### ***Western Area***

Sample JW1 (14TM-191): clear, euhedral zircons from 20 to 150  $\mu\text{m}$  in length. Most of the grains are rectangular with bipyramidal terminations but some are more rounded. All are inclusion free and exhibit oscillatory zoning.

Sample JW2 (14TM-622): zircon grains not abundant and typically small (<50  $\mu\text{m}$ ). Most of the grains are stubby, euhedral, and clear with few visible inclusions.

Sample JW3 (14TM-070): zircon grains are not abundant and typically small (<75  $\mu\text{m}$ ). Most of the grains are elongate with 1:2 aspect ratio, euhedral, and clear with few visible inclusions.

Sample JW4 (14TM-177): zircon grains are not abundant but those present are mainly elongate crystals with bipyramidal terminations and size varies from 100 to 200  $\mu\text{m}$  with a 1:2 to 1:3 aspect ratio. The grains are clear and display clear oscillatory zoning.

Sample JW5 (14TM-045): clear, euhedral to subhedral, and range in size from 25 to 100  $\mu\text{m}$ . All are inclusion free and exhibit weak oscillatory zoning.

Sample JW6 (14TM-264B): abundant zircon grains display a variety of sizes, external morphologies, and internal textures. However, about half the grains are similar with clear, euhedral crystals containing simple bipyramidal terminations and a 1:2 aspect ratio and no larger than about 100  $\mu\text{m}$ . Oscillatory zoning is visible in most of these crystals.

Samples JW7 (14TM-040) and JW8 (14TM-106): euhedral, clear and inclusion-free, range in size from 50-150  $\mu\text{m}$  with a 1:2 aspect ratio. Most grains show oscillatory zoning.

Samples JW9 (14TM-147) and JW10 (14TM-855): euhedral, clear and inclusion-free, range in size from 100-200  $\mu\text{m}$  with a 1:1 to 1:2 aspect ratio. Most grains are fractured but still show oscillatory zoning.

### ***Central Area***

Sample JC1 (13TM-409): clear, euhedral zircons  $<150\text{ }\mu\text{m}$  with bipyramidal terminations and a 1:2 aspect ratio. All are inclusion free and exhibit oscillatory zoning.

Sample JC2 (13TM-372A): clear, euhedral zircons  $<150\text{ }\mu\text{m}$  with bipyramidal terminations and a 1:2 aspect ratio. All are inclusion free and exhibit oscillatory zoning.

Sample JC3 (GL15-4-16): small ( $<75\text{ }\mu\text{m}$ ), clear, euhedral stubby zircon crystals and larger (100-150  $\mu\text{m}$ ), clear, euhedral, elongate (1:2 aspect ratio) crystals with bipyramidal terminations. All are inclusion free and exhibit weak oscillatory zoning.

Sample JC4 (13TM-328A): clear to slightly cloudy, euhedral zircons  $<100\text{ }\mu\text{m}$  with bipyramidal terminations and a 1:2 aspect ratio. Many are inclusion free and exhibit weak oscillatory zoning.

Sample JC5 (13TM-351): zircon grains are not abundant and are slightly cloudy, subhedral to rounded and small ( $<100\text{ }\mu\text{m}$ ). Most are inclusion free and exhibit weak oscillatory zoning.

Sample JC6 (13TM-325): euhedral, clear and inclusion-free, small ( $<100\text{ }\mu\text{m}$ ) with a 1:3 aspect ratio. Most grains still show oscillatory zoning.

### ***Eastern Area***

Sample JE1 (11TM-036A): clear to slightly cloudy, euhedral, and  $<150\text{ }\mu\text{m}$  with bipyramidal terminations and a 1:2 aspect ratio. All are inclusion free and exhibit very weak oscillatory zoning.

Sample JE2 (19CW-079C): clear to slightly cloudy, euhedral zircons 100-250  $\mu\text{m}$  with bipyramidal terminations and aspect ratios that range from 1:1 to 1:40. Most are inclusion free and exhibit oscillatory zoning (see Fig. S2-2 for CL images).

### **Mount Ephraim Block**

#### ***Mount Thom Formation***

Samples M1 (08TM-068A), M2 (08TM-068B), and M3 (08TM-016): wide range of sizes, morphologies, and colors. All grains have rounded corners and edges. The largest grains ( $\sim 200\text{ }\mu\text{m}$  long) are dark in colour whereas the smaller grains (50-100  $\mu\text{m}$  long) are typically colorless crystals and euhedral, and most display internal igneous zoning.

#### ***Dalhousie Mountain Formation***

Sample M4 (19CW-057): mostly small ( $<100\text{ }\mu\text{m}$ ) and subhedral to euhedral. Most of the grains have visible inclusions and reddish-brown staining. Some faint oscillatory zoning is visible under cathodoluminescence.

#### ***Six Mile Brook Pluton***

Sample M5 (CW19-059): small, most  $<70\text{ }\mu\text{m}$ . Most grains are acicular and euhedral, but less abundant larger grains are subhedral. The grains are mostly clear with few visible inclusions and faint oscillatory zoning is visible under cathodoluminescence.

### ***Mount Ephraim Plutonic Suite***

Sample M6 (08TM-007): abundant simple elongate prisms (<200 µm long) with a 1:2 aspect ratio. The grains are typically clear with excellent igneous growth zoning.

Sample M7 (08TM-007A): similar zircon types as sample M6.

Sample M8 (08TM-105A): small (most 50 to 75 µm). Many are euhedral and slim (1:3 aspect ratio) and cloudy.

Sample M9 (CW19-020): small, most <70 µm and subhedral but some of the smaller grains are acicular and euhedral. Some of the larger grains show faint oscillatory zoning under cathodoluminescence.

Sample M10 (08TM-021): abundant clear and inclusion-free, elongate (1:2 aspect ratio) zircon prisms, about 200 µm long.

Sample M11 (08TM-021A): zircon grains are not abundant but those present are clear with few inclusions, elongate (1:2 aspect ratio) prisms, about 100 µm long.

Sample M12 (08TM-041A): zircon grains are not abundant and those present are large (200-300 µm long), clear with few inclusions, elongate (1:3 aspect ratio) prisms.

### ***Gunshot Brook Pluton***

Sample M13 (E11W12-191): small (50-100 <100 µm), euhedral, and have a 1:2 aspect ratio.

Most grains are clear with no inclusions.

Sample M14 (19CW-035): small with most <100 µm and subhedral to euhedral. Most are clear with no visible inclusions, and faint oscillatory zoning is visible under cathodoluminescence.