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[Start](#) | [Grid View](#) | [Author Index](#) | [View Uploaded Presentations](#) | [Meeting Information](#)

Cordilleran Section - 116th Annual Meeting - 2020

Paper No. 24-13

Presentation Time: 9:00 AM-6:00 PM

METAMORPHIC ROCKS OF THE BOUNDARY BLOCK PROVIDE A LINK TO THE CHUGACH-PRINCE WILLIAM TERRANE ACROSS THE FAIRWEATHER FAULT, ALASKA

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The Boundary Block terrane is a narrow NNW striking slice of continental crust (~10 by 120 km) defined by the Fairweather and Boundary faults near Yakutat, Alaska. The Boundary Block (BB) is composed of the Schist of Nunatak Fiord (SNF), a sequence of greenschist facies sandstones and shale locally metamorphosed to amphibolite facies. These rocks are intruded by the Mt. Stamy and Mt. Draper plutons (51 and 53-54 Ma) of the Sanak Baranof Plutonic Belt (SBPB), and a younger, unrelated granite south of Harlequin Lake, known as the Brabazon pluton. The SNF has been considered to be a part of the Yakutat terrane, with the terrane boundary marked by the strike-slip Fairweather fault. Based on field relationships and mineral assemblages, previous studies also propose that the BB is tilted to the NNW exposing deeper, higher grade metamorphic rocks in the south.

To the north in Nunatak Fiord, most of the SNF is composed of greenschist facies rocks with a well-developed slaty cleavage. Sample RF16-29B from a narrow zone of contact metamorphism adjacent to the Mt. Draper pluton contains garnet, biotite, muscovite, and staurolite. Sample HL19-11B, collected 40 km to the south near Harlequin Lake, contains garnet, biotite, cordierite, and sillimanite; the SNF in this area is metamorphosed to the amphibolite facies and is locally migmatitic with felsic injections and pegmatite of eutectic compositions (1-2 mm to 2 m thick). Both samples record similar peak temperatures of ~600°C, but RF16-29B records a pressure of 8.1 kbar (~30 km depth), and HL19-11B records a pressure of 4.2 kbar (~16 km depth).

A 2-m thick pegmatite collected adjacent to HL19-11B yields a concordant U/Pb zircon crystallization age of 46.1 ± 0.5 Ma, and the Brabazon pluton, a leucocratic granite, yields a concordant U/Pb age of 39.5 ± 0.3 Ma. Thus, the age of the Mt. Draper pluton in Nunatak Fiord is ~7 Myr older than metamorphism in the south at Harlequin Lake. This relationship shows that metamorphism in the BB is diachronous and occurred at significantly different depths suggesting that the BB is composed of tectonic slivers with different tectonometamorphic histories. The intrusive and metamorphic history of the BB contrasts sharply to rocks of the Yakutat terrane, but is similar to those of the Chugach-Prince William terrane, including the Chugach Metamorphic Complex.

Session No. 24--Booth# 57

[T25. Undergraduate Research \(Posters\)](#)

Wednesday, 13 May 2020: 9:00 AM-6:00 PM

Fountain Ballroom (The Westin Pasadena)

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[Back to: T25. Undergraduate Research \(Posters\)](#)

[<< Previous Abstract](#) | [Next Abstract >>](#)