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Cordilleran Section - 116th Annual Meeting - 2020

Paper No. 9-11

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

AGE AND PROVENANCE OF DETRITAL ZIRCONS OF THE YAKUTAT GROUP AT HARLEQUIN LAKE, ALASKA

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The Paleocene-Maastrichtian Yakutat Flysch and Mélange (YFM) are stratigraphic units that are a part of the Yakutat terrane, and are newly exposed at Harlequin Lake due to rapid retreat of ice. The Yakutat Group (YG) has long been correlated to the Chugach-Prince William (CPW) terrane based on the inferred age of the flysch and mélange units. The flysch is comprised of interbedded sandstone and shale turbidites, and the mélange consists of disrupted turbidites, metavolcanics, carbonates, and metaplutonics. Recent work has shown that the arkosic sandstones of the YFM are the same – with the Mélange incorporating some older elements. Zircons from six flysch (2824 grains) and three mélange samples (1454 grains) were U/Pb dated at the University of Arizona. Eight of nine samples yield maximum depositional ages (MDA) of 61-67 Ma, and one mélange sample has a MDA of 86 Ma. Sandstones of all flysch and two mélange samples are essentially identical, with primary populations at ~70-75 Ma and ~91 Ma, and distinctive Precambrian populations at ~1385-1390 Ma and ~1710-1745 Ma, which make up 23-36% of the sample. The mélange sandstone with the 86 Ma MDA is different, with older Phanerozoic populations at ~110 Ma and ~157 Ma, and only 1% Precambrian grains at ~545 Ma and ~1340 Ma. Shale trace-element geochemistry reveals distinctive differences between the YFM and CPW, and they can be distinguished by a number of trace elements and their ratios (esp. Ti, Cr, Zr, Th, and Sc) that suggest that the source of the YFM is slightly more continental, compared to the CPW, which is more volcanic. The provenance of the arkosic sandstones of the YFM is identical, and it appears to represent erosion of an active arc built on older basement rocks. A ~74 Ma tuff in the sequence indicates that the youngest populations were part of a volcanic arc with a metaplutonic basement consisting of older arc rocks and sedimentary units. The basement includes a Mesozoic arc (~90, 157, and 185 Ma) and a distinctive source of Precambrian zircons (~1385 and ~1720 Ma). The zircon ages of this unit are essentially identical to correlative rocks of the Nanaimo basin on Vancouver Island, and the Yakutat Group is likely displaced from the PAC NW since 50 Ma.

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