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Age and provenance of cover strata to the Paleocene Resurrection Peninsula ophiolite, Seward, Alaska

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The southern margin of Alaska is defined by a late Mesozoic to Cenozoic accretionary complex that comprises the Upper Cretaceous to Eocene Chugach-Prince William (CPW) terrane. The Upper Cretaceous Valdez Group and the Paleocene to Eocene Orca Group define the bulk of the Chugach-Prince William terrane in the Kenai Peninsula and western Prince William Sound area. Sandstones of the Campaniam-Maastrichtian Valdez Group and the Paleocene Orca Group consist of lithologically similar feldspathic and volcanic-lithic sandstones. During the Paleocene to early Eocene, ridge subduction led to the formation and emplacement of the Resurrection and Knight Island ophiolites and subsequent intrusion of the Sanak-Baranof belt (SBB) plutons along the 2200 km length of the CPW accretionary complex.

Controversy surrounds the age of the ophiolites and the age and stratigraphic relationship of adjacent clastic strata (see Bradley and Miller, 2006). Original mapping of the Resurrection Ophiolite indicated it was associated with the Cretaceous Valdez Group, and hence was thought to be Cretaceous in age (Tysdal and Case, 1979). A U/Pb zircon date from an intrusive plagiogranite from Killer Bay on the east side of the Resurrection Peninsula constrains the age of the ophiolite at 57 ± 1 Ma; the Knight island Ophiolite (in Prince William Sound) is undated but assumed to be the same age (Nelson et al., 1989). On the northeastern side of Resurrection Peninsula, a thrust fault is mapped between the ophiolite and Upper Cretaceous Valdez Group. However, on the western side, there is controversy about the stratigraphic affinity of clastic strata (cf. Bradley and Miller, 2006; Kusky and Young, 2004), with the crux of the issue as to whether the strata are Cretaceous Valdez Group and fault bounded, or whether they are Paleocene and essentially in stratigraphic continuity with the ophiolite.

To determine the age, provenance and stratigraphic affinity of the clastic rocks interbedded with (and stratigraphically above) the Resurrection Peninsula Ophiolite, we collected U/Pb detrital zircon dates from four samples (n=404) from Thumb Cove, Humpy Cove, and Nash Road, across the bay from Seward. One sample (RB12-04), collected at the end of Humpy Cove, is from a thin-bedded, medium-grained sandstone interbedded with (and cross-cut by) basaltic rocks and thus this sample provides a key tie to the ophiolite. The maximum depositional age of this sample is 57 Ma given by a robust mode formed from the youngest four zircons. The grain-age distribution includes modes at 73, 109, 159, and 188 Ma, and is essentially identical to the other three samples.

Because of the similar grain age distributions of the four samples from Resurrection Bay, we group them together and compare them to strata of the Orca Group 70-80 km to the NE in Prince William Sound: 1) All samples from Resurrection Bay, and those of the Orca Group in western Prince William Sound (inboard of Montague Island), are dominated by a young population of grain ages between 57 and 75 Ma. 2) All samples have a minor fraction of grain ages dispersed between 100 - 225 Ma, and these grain ages occur in two primary populations. One between 100 - 115 Ma, and the other 155 - 225 Ma. 3) Comparing the Resurrection Bay samples directly to samples from different tectonostratigraphic belts in the Western PWS defined by Kveton (1989), they most closely resemble those of the Whale Bay Belt.

A Kuiper's statistical test shows that the Resurrection Bay samples and Orca Group in the Whale Bay Belt, and correlative units along strike, are identical (i.e., the null hypothesis that they are the same cannot be disproved with 95% confidence). Thus we conclude that the sandstones interbedded with the Resurrection Peninsula Ophiolite are stratigraphically correlative to the Orca Group. Because the clastic strata of the Orca Group are definitively tied to the ophiolite, these results breath new life into the paleomagnetic data obtained from the Resurrection Peninsula ophiolite that indicate a paleolatitude 13 ± 9° south of the present location to near present day northern Washington (Bol et al., 1992). Together, these results support large coast parallel transport of the CPW terrane since the Paleocene and the search for the original source of the clastic rocks may include terrains now far to the south.

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^{40}Ar/^{39}Ar Dating and Characterization of Hornblende from the Nelson Plutonic Suite, Southern Kootenay Arc, SE B.C.

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The Kootenay Arc located in SE B.C. has experienced more than one episode of tectonism, metamorphism and plutonism. The Mid-Jurassic to Eocene thermal history of the area has been investigated using K-Ar and 40/39 dating of biotite and muscovite, however there are no reliable hornblende dates from this area. This study will investigate the two most easterly stocks of the Nelson Plutonic Suite in the area. The Mine and Wall stocks have U-Pb zircon ages between 171 and 168 Ma but record a wide range of mica cooling and overprinting dates between 166 Ma in the west and 67 Ma in the east. 40Ar/39Ar age spectra for hornblende from 11 rocks in these stocks comprising a transect of the area, will aid in defining the higher temperature part of the thermal history.

Previous attempts to prepare bulk hornblende separates were unsuccessful due to overgrowths and intergrowths of biotite, chlorite, plagioclase and K-feldspar. Part of this study involves testing the efficiency of SELFRAG disaggregation. The SELFRAG uses pulses of electrostatic power to break apart the rock along mineral cleavage planes and grain boundaries and should lead to higher purity mineral separates and better dates. Scanning Electron Microscopy (SEM) confirms that the separates sent for irradiation are free of K-rich inclusions and that hornblendes from the two plutons show little variation in chemistry. Ca/K ratios are typical of igneous amphibole. Electron microprobe analyses are planned.

Combined with previous published and unpublished K-Ar and 40/39 results for micas these hornblende dates should provide some insight into the history of the enigmatic Next Creek fault. This is a zone of low-temperature alteration and brittle faults near the eastern margin of the Mine stock that has not yet been mapped into the country rock, but marks a major change in K-Ar and 40/39 mica dates. East of the fault, Late Cretaceous-to-Eocene dates predominate; west of the zone, mid-Jurassic to early-Cretaceous dates with no evidence of Eocene overprinting are typical. Petrography reveals that part of the "Jersey Creek Phase" of the Mine stock is a biotite granodiorite in marked contrast to the biotite-hornblende-epidote granodiorite of the Mine and Wall stocks.