

A Characterization of Two Western Wrangell Volcanic Debris Flows, Alaska

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This report provides stratigraphic, sedimentary, and lithologic details from two volcanic debris flow deposits in the Copper River basin, Alaska. Characterization of these and other volcanoclastic deposits in the Wrangell Mountains help to assess the historic volcanic activity of the Wrangell Volcanic Complex.

The Sanford debris flow deposit is discontinuously exposed in bluffs along the Sanford and Copper Rivers for a distance of approximately 100 km from its source volcano, Mt. Drum. The deposit thickness ranges from centimeters to six meters forming a conspicuous pink band occurring between gray Pleistocene strata. Prior to the last major glaciation in Alaska, a dacite dome on the east flank of Mt. Drum experienced mature explosive activity subsequently initiating a monolithic debris flow. Grain-size analysis and sedimentary characteristics suggest that this deposit represents a non-cohesive lahar.

The Cheteslina debris flow deposit is exposed in bluffs in the Copper River basin south and southwest of Mt. Drum and Mt. Wrangell, a distance of approximately 50-60 km from these volcanoes. Exposures of this deposit are characterized by massive heterolithic megablocks and a high occurrence of hydrothermally altered clasts. This deposit is classified as a cohesive volcanic debris avalanche based on the clay rich matrix resulting from hydrothermal alteration at the source volcano. Deposit thickness ranges from tens of meters to over one hundred meters. Many debris-avalanche blocks are poorly consolidated, yet have remained intact during flowage. An extremely sharp basal contact, as well as the preservation of unconsolidated blocks, suggest emplacement over frozen terrain. Mt. Drum and Mt. Wrangell are located adjacent to exposures of the debris avalanche deposit and either could be the source volcano. Mt. Wrangell is most likely the source based on exposures in nearby drainage valleys, but Mt. Drum can not be ruled out based on its large south-facing amphitheater. Petrologic comparison between clast lithologies of the deposit, Mt. Drum, and Mt. Wrangell will ultimately determine the source volcano.