

New geologic map of the Kuskokwim Bay region of southwest Alaska

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A new geologic map of the Kuskokwim Bay region of southwest Alaska was produced using new and archival materials as part of a national database of geological, geochemical, geophysical, and mineral deposit data. Digital methods were used to compile both bedrock and surficial geology and create a rich database of geologic attributes using a uniform data structure and attribution scheme. The map covers ten 1:250,000-scale quadrangles that include the Akhlun and Kilbuck Mountains of the mainland and St. Matthew, Nunivak, and the Pribilof Islands. The map area includes Quaternary volcanic centers, numerous 60 to 70 Ma plutons, a Jurassic to Triassic ophiolite complex, part of a Mesozoic mélangé, and a metamorphic complex containing the oldest (2 to 2.5 Ga) rocks yet dated in Alaska. We have updated existing maps, assigning new age or stratigraphic positions to some units and incorporating geologic features overlooked in some maps. We also compiled published and unpublished radiometric age data. This map will aid in construction of new and better tectonic models for the region because of the consistent presentation of detailed geologic data over a large area. Although mapping of surficial geology is incomplete, what is presented contributes to improved understanding of Quaternary history; however, much more mapping remains to be done.

Important new interpretations include: (1) confirmation of overthrusting of the Proterozoic Kanektok metamorphic complex over rocks as young as Albian; (2) recognition of a spatial component to the distribution of cooling ages in the metamorphic complex, where ages decrease westward and K-Ar age within-sample discordance initially increases and then decreases westward; and (3) spatial distribution of 60 to 70 Ma plutons suggests increasing potassium content eastward, a trend that continues into areas immediately east of our map area.

Geologic data for this map includes unit descriptions, original source geologic unit assignments, and source information, all recorded in a system of spatial and text databases, which allow production and analysis of derivative maps. Additional attributes correlate geologic units regionally and can be linked through related files to labels, colors, lithology, and age for each unit. Other attributes describe the nature of contact relationships between units.