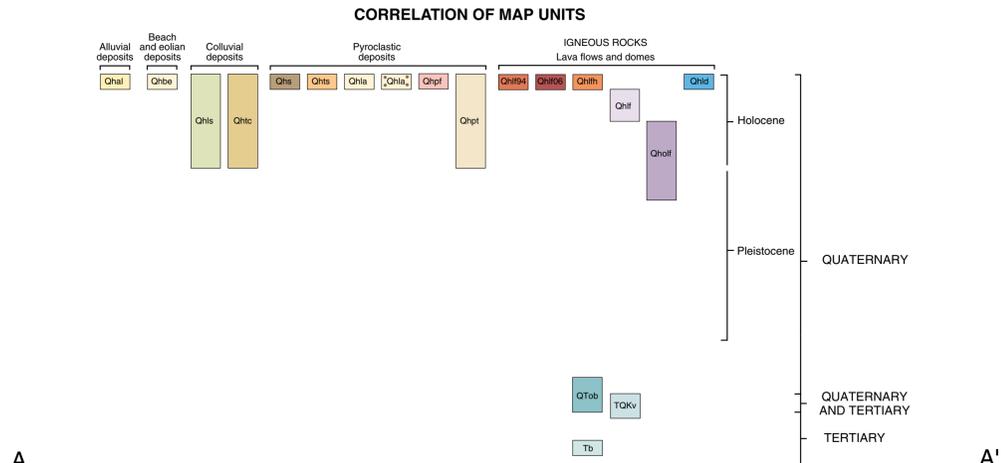
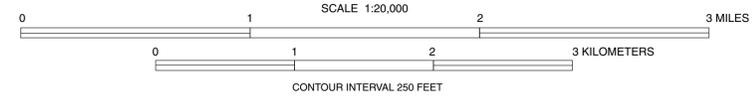


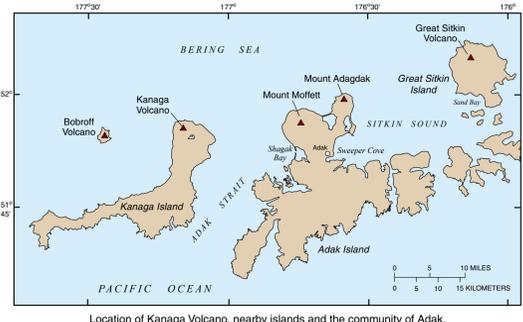
- ### DESCRIPTION OF MAP UNITS
- Unconsolidated surficial deposits**
- Qhbe** Beach and eolian deposits. Beach deposits consist of sandy pocket beaches to steep berms of rounded cobble and boulder gravel. Eolian deposits consist mostly of well-sorted medium to coarse sand.
  - Qhs** Tephra and spatter from recent eruptions. Mostly coarse near-vent ejecta, including volcanic bombs, blocks, and scoriaceous debris on and around the rim of the modern crater.
  - Qhts** Talus, avalanche debris, and tephra. Loose accumulations of poorly sorted rock rubble derived from fragmentation of lava flows and ejecta on upper slopes of Kanaga Volcano. Also includes variable amounts of reworked lapilli tephra. Lower contact gradational.
  - Qhpt** Peat, tephra and colluvium. Accumulations of peat and tephra on the slopes of ancestral Mount Kanaton typically between 1 and 5 meters thick. Tephra deposits consist of light-colored, fine silt-size ash beds to lapilli beds mostly derived from eruptions of Kanaga Volcano. Colluvial deposits consist mainly of reworked peat and tephra in solifluction lobes or colluvial aprons.
  - Qhls** Landslide deposits. Poorly sorted accumulations of gravel, sand, and silt in slumps and debris-flow deposits.
  - Qhtc** Talus and coarse colluvial deposits. Accumulations of poorly sorted, angular rock debris on hillslopes below bedrock outcrops.
  - Qhla** Lahar deposits. Poorly-sorted gravel, sand and silt in fan-shaped deposits mainly on the southeast flank of Kanaga Volcano. Products of eruptive activity and likely formed when pyroclastic flows and lava flows encountered and mixed with snow or ice on the upper flanks of the volcano. Contains juvenile material and breadcrust bombs, and may be overlain by thin mantles of volcanic ash.
  - Qhla\*** Pumice-rich lahar deposits. Massive, 10-to-20 meter-thick deposit on southwest side of volcano. Very coarse with cream-colored dacitic pumice clasts to 1 meter diameter and lava clasts 2 to 4 meters diameter. In places, deposit is composed almost entirely of pumice clasts and sandy matrix. Pumice clasts are bulbous and pillow-like suggesting a sub-aqueous origin. Pumice is moderately to strongly crystal-rich and is commonly banded. Top 5 meters of the deposit composed solely of granule to gravel size pumice clasts. Well-developed marginal levees. Overlain by 1906 lava flow (Qhif1906). Source vent not known but could be covered by younger andesitic lava flows, avalanche debris, and talus.
  - Qhpf** Pyroclastic-flow deposits. Moderate to poorly sorted, pumice- and lithic-bearing gravelly deposits with ash-rich matrix.
- Volcanic Rock Units**
- Qhif1994** Lava flows of 1994 eruption. Two-pyroxene porphyritic andesite; light to dark gray, unvegetated, fresh. Phenocrysts of plagioclase, clinopyroxene, orthopyroxene, and Fe-oxides with trace amounts of olivine and hornblende in a glassy groundmass. Abundant mafic inclusions. Forms blocky lava flows and volcanic breccias extruded in 1994 as three main channels on northwest flank of volcano from the summit vent to ocean. Flow field west of summit appears to have followed same channel as a recent flow visible on 1943 and 1974 aerial photographs. Well-developed levees. Location of contacts approximate and based chiefly on aerial observations and interpretation of oblique photographs.
  - Qhif1906** Lava flows of 1906 eruption. Two-pyroxene porphyritic andesite; light to dark gray, unvegetated, fresh. Phenocrysts of plagioclase, clinopyroxene, orthopyroxene, and Fe-oxides with trace amounts of olivine and hornblende in a glassy groundmass. Abundant mafic inclusions. Forms blocky lava flows and volcanic breccias. Well-developed levees and unvegetated surfaces with locally high, steep flow fronts. Extends from summit east for 2.5 km and from summit southwest for 2.3 km and into ocean. Age based on report from local observer.
  - Qhifm** Lava flows formed by historical eruptions. Two-pyroxene porphyritic andesite; light to dark gray, unvegetated, fresh. Phenocrysts of plagioclase, clinopyroxene, orthopyroxene, and Fe-oxides with trace amounts of olivine and hornblende in a glassy groundmass. Abundant mafic inclusions. Overlapping blocky lava flows with minor volcanic breccias. Thick lobate flows with locally well-developed levees and lobes erupted from the central summit vent form a thick lava pile ponded against caldera wall. Overlain by 1906 lava flows (Qhif1906).
  - Qhif** Lava flows of Holocene age. Two-pyroxene porphyritic andesite; light to dark gray, unvegetated to sparsely vegetated, fresh. Phenocrysts of plagioclase, clinopyroxene, orthopyroxene, and Fe-oxides with trace amounts of olivine and hornblende in a glassy groundmass. Abundant mafic inclusions. Short massive blocky lava flows with distinct levees and flow lobes. Locally mantled by talus and tephra. Flanks and termini of prominent lava lobes shown by arcuate hachured symbols; arrows show direction of travel as indicated by flow lobes and levees.
  - Qholf** Lava flows of the cone-building sequence. Two-pyroxene porphyritic andesite; light to dark gray, mostly vegetated but not extensively weathered. Phenocrysts of plagioclase, clinopyroxene, orthopyroxene, and Fe-oxides with trace amounts of olivine and hornblende in a glassy groundmass. Abundant mafic inclusions. Short massive blocky lava flows and thick-bedded volcanic breccias that form layered deposits that dip radially away from central summit vent area. Mantled by talus and tephra and best exposed in sea cliffs. Flanks and end margins of prominent lava flows shown by arcuate hachured symbols; arrows show direction of travel as indicated by flow fronts and levees. Principal cone-building unit of edifice.
  - Qhid** Lava domes. Two-pyroxene silicic andesite lava domes; highly fractured, massive, slab-like, slightly weathered. Round mafic inclusions up to 10 cm across are common. Exposed at west end of intracaldera lake and on island in the lake. Alteration and fractured character suggests an age older than pyroclastic-flow deposits (Qhpf).
  - TQKv** Mt. Kanaton volcanic rocks. Olivine and hypersthene basalt andesite flows of ancestral Mt. Kanaton volcano (Coats, 1956), erupted from flank vents on the west flank of the volcano.
  - QTob** Olivine basalt of Round Head. (Coats, 1956).
  - Tb** Basalt flows and tuff beds older than Mt. Kanaton volcano. (Coats, 1956).



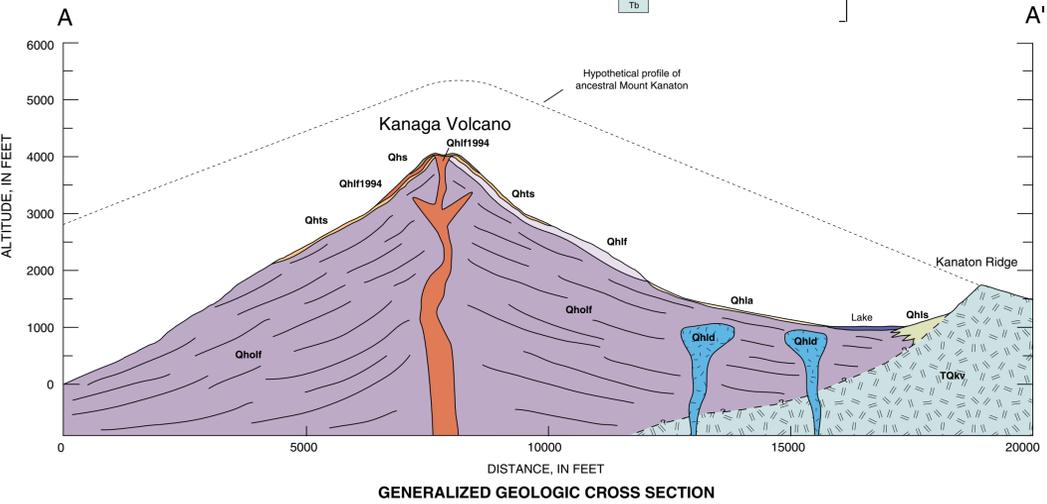
Base from Adak C-4 NW and Adak C-4 NE, 1:25,000 scale U.S. Army Map Service, 1955.



Geology mapped in 1999 and 2000; Geology of Kanaton Ridge and adjacent areas modified from R.R. Coats, 1956  
This map is preliminary and has not been reviewed for conformity with USGS editorial standards or the North American Stratigraphic Code.



- ### EXPLANATION OF SYMBOLS
- Contact, known, approximate, or inferred
  - Caldera margin
  - Margin of summit crater
  - Fumaroles
  - Hot spring
  - Lava flow levees, only most prominent shown
  - Lava flow lobes and fronts
  - Lava flow fronts, only most prominent shown
  - Flank vent



# PRELIMINARY GEOLOGIC MAP OF KANAGA VOLCANO, ALASKA

By  
**T.P. Miller, C.F. Waythomas, and C.J. Nye**  
Alaska Volcano Observatory  
2003

