

# Bedrock Geologic Map of Sentinel Peak (A-Mountain) and Tumamoc Hill, Pima County, Arizona

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Scale 1:12,000

## Introduction

Tumamoc Hill and Sentinel Peak form a group of hills at the western edge of Tucson in southeastern Arizona, and comprise a small part of the Tucson Mountains. Sentinel Peak, also known as A-Mountain, is a prominent landmark near downtown Tucson. The geology of Tumamoc Hill and Sentinel Peak is dominated by 20 to 30 million year old (Ma) volcanic rocks, unlike most of the rest of the Tucson Mountains which are composed primarily of much older volcanic rocks that were largely produced during a single enormous eruption (Lipman, 1993; Kring, 2002).

This map is simplified from the map of Phillips (1976, University of Arizona M.S. thesis). It was created so that the geology of the Tumamoc Hill - Sentinel Peak area can be readily discerned from an available color map, and includes a description of map units and their approximate ages.

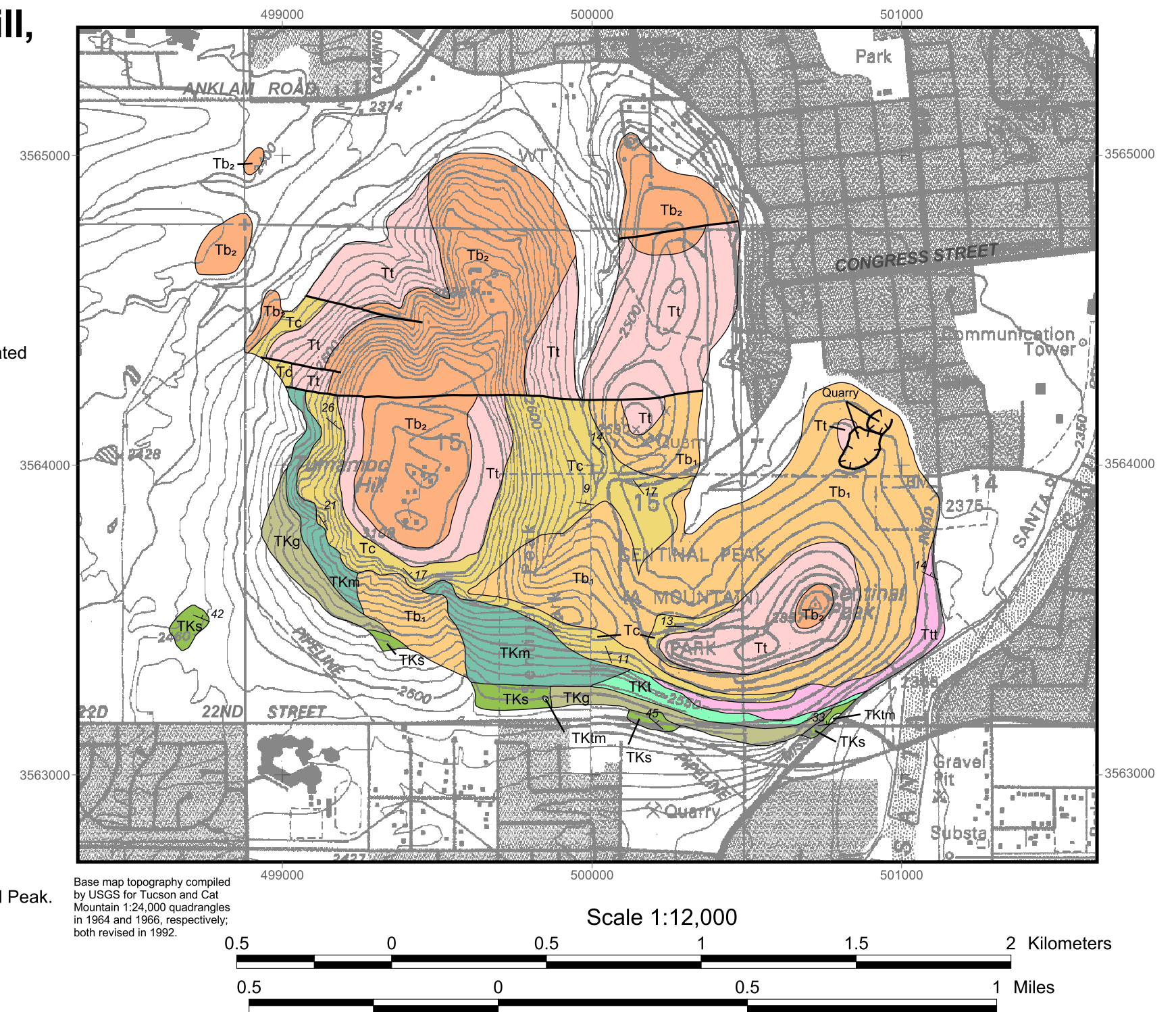
Potassium-argon (K-Ar) radiometric dates are given with 1-sigma analytical uncertainty (one standard deviation). Dates from older analyses are recalculated by Reynolds et al. (1986) using newer decay and abundance constants.

## Geologic Map Units

- Tb<sub>2</sub>** **Tumamoc basaltic andesite (middle Tertiary: ~23-24 Ma)**  
Basaltic andesite lava flows with total thickness of > 60 m that form the top of Tumamoc Hill and Sentinel Peak (A-Mountain). Includes scoriaceous, vesicular, and brecciated basalt. Silica (SiO<sub>2</sub>) content is about 59% (one analysis from Eastwood, 1970). A sample of this rock yielded a whole-rock K-Ar date of 23.7 ± 0.5 Ma (Shafiqullah and others, 1978).
- Tt** **Tumamoc tuff (middle Tertiary: ~26-28 Ma)**  
A 30 to 36 m thick tuff consisting of three members. Almost all of the tuff consists of the highest, gray tuff member, which contains sanidine and lithic fragments. The basal white tuff yielded a feldspar K-Ar age of 27.4 ± 0.9 Ma, while the upper gray tuff yielded a sanidine K-Ar date of 26.4 ± 0.9 Ma (Bikerman and Damon, 1966).
- Tb<sub>1</sub>** **Basaltic andesite (middle Tertiary: ~26-28 Ma)**  
Basaltic andesite, with olivine phenocrysts, locally vesicular to scoriaceous. Includes Cholla basaltic andesite, Grande basaltic andesite, and A-Mountain basaltic andesite as defined by Phillips (1976). The Grande basaltic andesite yielded a K-Ar date of 27.6 ± 1.2 Ma (Bikerman and Damon, 1966). The A-Mountain basaltic andesite yielded a whole-rock K-Ar date of 24.2 ± 0.52 Ma (Shafiqullah and others, 1978), but this date appears to be erroneously young because the rock underlies the Tumamoc tuff which yielded two older dates. Silica (SiO<sub>2</sub>) content of the A-Mountain basaltic andesite was determined to be 53.75% and 55.03% (two samples from Eastwood, 1970).
- Tc** **Conglomerate (middle Tertiary: ~26-28 Ma)**  
Pebble to cobble conglomerate, locally with boulders up to 70 cm in diameter. Clasts consist primarily of mafic volcanic rocks and could all be locally derived.
- Ttt** **Turkey Track andesite (middle Tertiary: ~27-28 Ma)**  
Unit contains abundant, large (1-3 cm) plagioclase phenocrysts, sparse pyroxene, and rare olivine phenocrysts. Presumed to consist of lava flows; total thickness > 45 m. A sample of this unit yielded a plagioclase K-Ar date of 28.6 ± 2.7 Ma (Bikerman and Damon, 1966). The weighted mean of three dates of an identical-appearing rock unit in the Del Bac Hills, located 12 km to the south, is 27.5 ± 0.5 Ma (1-sigma weighted analytical uncertainty, see Long and Rippeteau [1974] for calculation method; data from Percious, 1968), which is interpreted as the likely age of this unit at Sentinel Peak.
- TKm** **Mafic volcanic rocks (early Tertiary or late Cretaceous)**  
Unit includes two map units identified by Phillips (1976): (1) Tumamoc andesite, massive, with euhedral plagioclase phenocrysts (An<sub>34</sub>), estimated thickness 12 m. (2) Short's Ranch andesite, estimated thickness > 39 m. Phenocrysts consist of plagioclase (An<sub>34</sub>) and biotite and possibly rare quartz (Brown, 1939). Biotite from Short's Ranch andesite yielded a K-Ar date of 58.1 ± 1.7 Ma (Bikerman and Damon, 1966).
- TKt** **Sentinel Tuff (early Tertiary or late Cretaceous)**  
Tuff is < 6 m thick, contains abundant plagioclase phenocrysts (An<sub>35</sub>), minor biotite, sparse lithic fragments, and relict glass shards. Unit overlies Greasewood andesite of map unit TKg, and is overlain by Tumamoc andesite of map unit TKm, and Turkey Track andesite.
- TKg** **Greasewood andesite (early Tertiary or late Cretaceous)**  
Andesite, < 10 m thick, with plagioclase (An<sub>50</sub>) and pyroxene phenocrysts, overlies sandstone of Anklam Formation.
- TKtm** **Mission Road Tuff (early Tertiary to late Cretaceous)**  
Tuff containing biotite and plagioclase, sparse volcanic(?) lithic fragments, and relict glass shards. Estimated thickness is 5 m.
- TKs** **Fine-grained silty sandstone and tuffaceous sandstone (early Tertiary or late Cretaceous)**  
Unit correlated by Phillips (1976) with the Anklam Formation of Bikerman and Damon (1966). Includes a small exposure of Mission Road andesite at the south foot of Sentinel Peak.

## References cited

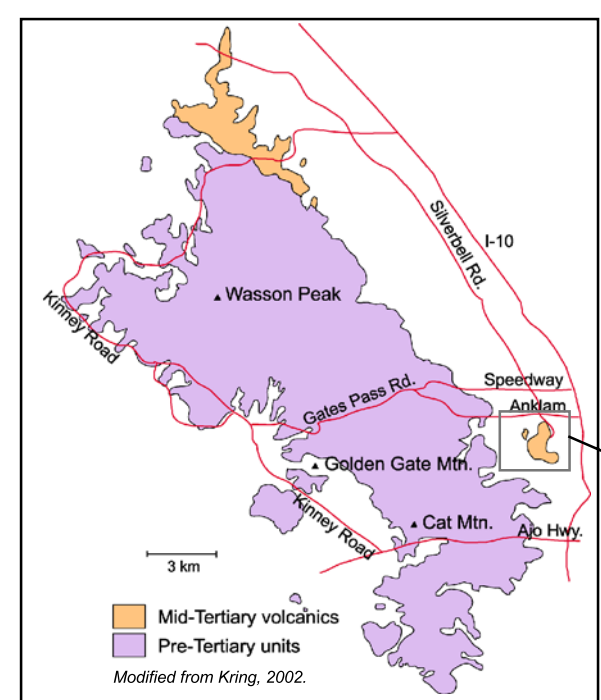
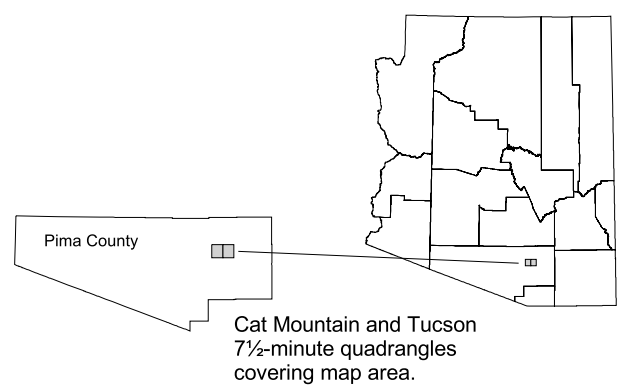
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Base map topography compiled by USGS for Tucson and Cat Mountain 1:24,000 quadrangles in 1964 and 1966, respectively; both revised in 1992.

## Geologic Map Symbols

- Orientation of bedding
- Depositional or intrusive contact  
Dashed where approximated, dotted where concealed
- Fault  
Dashed where approximated, dotted where concealed
- Quarry walls



Gray box corresponds to detailed map area above.