# Geologic Map of the Tumamoc Hill – Sentinel Peak (A-Mountain) area, southeastern Tucson Mountains, Pima County, Arizona

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Scale 1:12,000

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 1σ analytical uncertainty, and most dates are recalculated by Reynolds et al. (1986) using newer decay and abundance constants.

## Map Units

$Tb_2$ **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 ($SiO_2$) 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 date 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).

$Tb_1$ **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 ($SiO_2$) 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 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 (2-3 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 (1σ 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 ($An_{34}$), estimated thickness 12 m. (2) Short's Ranch andesite, estimated thickness >39 m. Phenocrysts consist of plagioclase ($An_{26}$) 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 ($An_{35}$), minor biotite, sparse lithic fragments, and relict glass shards. Unit overlies Greasewood andesite of map unit TKm, 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 ($An_{50}$) and pyroxene phenocrysts, overlies sandstone of Anklam Formation.

TKtm **Mission Road Tuff (early Tertiary or late Cretaceous)—**Tuff containing biotite and plagioclase, sparse volcanic(?) lithic fragments, and relict glass shards. Estimated thickness 5 m.

TKs **Fine-grained silty sandstone and tuffaceous sandstone (early Tertiary or 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 of Mission Road andesite.

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