DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1959
SHEET 1 OF 2
PAMPHLET ACCOMPANIES MAP

Base from U. S. Geological Survey, 1:24,000, Flagstaff East, Flagstaff West, and Mountainaire, 1962, Bellemont, Dutton Hill, Garland Prairie, and Sycamore Point, 1963, Humphreys Peak, Kendrick Peak, Moritz Ridge, O'Leary Peak, Parks, Sunset Crater West, White Horse Hills, and Wing Mountain, 1966

Geology mapped in 1971-79.
(Also see Fig. 1)

INSET MAP
(Scale 1:24,000)

LIST OF MAP UNITS

SURFICIAL DEPOSITS OF QUATERNARY AGE

Qal ALLUVIAL, COLLUVIAL, AND GLACIAL DEPOSITS (HOLOCENE AND PLEISTOCENE)
Ql LANDSLIDE DEPOSITS (PLEISTOCENE)

EXTRUSIVE AND INTRUSIVE ROCKS OF QUATERNARY AND TERTIARY AGE EXCLUSIVE OF MAJOR ERUPTIVE CENTERS

BASALT OF YOUNGER PLEISTOCENE (YOUNGER BRUNHES) AGE
Basaltic rocks of Saddle Mountain (Vent 4626)
Qbyb Flows and cinder cone
Qbybp Pyroclastic sheet deposit
EXTRUSIVE AND INTRUSIVE ROCKS OF YOUNGER PLEISTOCENE (OLDER BRUNHES) AGE
Qbb Basalt flows and cinder cones
Qbbp Basalt pyroclastic sheet deposits
Basalt of vent 5733
Qbbt Basaltic tuff
Qbbi Basalt dike
Qbab Basaltic andesite flow and vent deposits of vent 3528A
$Qbbn_2$ Benmoreite flow and cinder cone of vent 1602
Qbd Dacite pods in 1602 flow
$Qbbn_1$ Benmoreite flow and cinder cones
Qbhb Basalt flows and cinder cones of Hart Prairie
BASALT OF PLEISTOCENE (OLDER BRUNHES OR MATUYAMA) AGE
Qbmb Basalt flows and cinder cones
EXTRUSIVE ROCKS OF PLEISTOCENE (MATUYAMA) AGE
Qmbt Basaltic tuff of vent 1625
Qmb Basalt flows and cinder cones
Qmbn Benmoreite flows and vent deposits
Qmrl Rhyolite dome **l** of vent 0614
Rhyolite and dacite of vent 2506
Qmrk Rhyolite dome **k**
Qmdk Dacite **k** flow and scoria
Qmdj Dacite dome **j** of vent 0603
Qmdm Dacite dome **m** of vent 1628
Qmt Trachyte flow of Bull Basin Mesa
EXTRUSIVE ROCKS OF PLEISTOCENE OR LATEST PLIOCENE (MATUYAMA) AGE
QTmb Basalt flows and cinder cones
QTmbp Basalt pyroclastic sheet
QTmab Basaltic andesite flows and pyroclastic vent deposits
QTmbn Benmoreite flow of Horse Hill
EXTRUSIVE ROCKS OF PLEISTOCENE OR PLIOCENE (MATUYAMA OR OLDER) AGE
QTb Basalt flows and cinder cones
QTab Basaltic andesite flow of vent 4430
QTc Clay of Navajo Army Depot
BASALT OF PLIOCENE (GAUSS OR GILBERT) AGE
Tyb Basalt flows and cinder cones
Tyvb Basalt flows and vent deposits of Volunteer Mountain
Basalt fissure-vent deposits, related flows, and dikes
Tybf Fissure-vent deposits
Tybff Fissure-fed flows
Tybi Dikes
Tybt Basaltic tuff
BASALT OF PLIOCENE(?) AND MIOCENE AGE
Tob Basalt flows and vent deposits
Tobi Basalt dikes
Tocb Basalt flows and vent deposits of Cedar Ranch Mesa

EXTRUSIVE AND INTRUSIVE ROCKS OF QUATERNARY AND TERTIARY AGE OF MAJOR ERUPTIVE CENTERS

Sitgreaves Mountain and outlying rhyolite domes

RHYOLITE AND BRECCIA OF PLEISTOCENE (MATUYAMA) AGE
Qsr Rhyolite summit dome
Qsbc Breccia collar
DACITE OF PLEISTOCENE OR PLIOCENE (MATUYAMA) AGE
QTsd Dacite dome of southern Sitgreaves Mountain
RHYOLITE AND PUMICE OF PLIOCENE (MATUYAMA) AGE
Tgmr Rhyolite dome of Government Mountain
Tsrc Rhyolite dome **c** of Sitgreaves Mountain
Tsre Rhyolite dome and flows of Eagle Rock
Tsp Pumice and ash
DACITE OF PLIOCENE (MATUYAMA OR OLDER) AGE
Tsd Dacite of northern Sitgreaves Mountain
RHYOLITE AND TUFF OF PLIOCENE (GAUSS) AGE
Tsrb Rhyolite flow **b** of Sitgreaves Mountain
Tsrv Rhyolite vitrophyre flow
Tsra Rhyolite dome **a** of Sitgreaves Mountain
Tst Tuff of Sitgreaves Mountain
Tghr Rhyolite dome of Government Hill
Twhr Rhyolite dome of Wright Hill
Trsr Rhyolite dome of RS Hill

Kendrick Peak and outlying rhyolite and andesite domes and flows

EXTRUSIVE AND INTRUSIVE ROCKS OF PLEISTOCENE (MATUYAMA) AGE
Qka Andesite flows of Kendrick Peak
Qkai Andesite dikes of Kendrick Peak
Qkdi Dacite dike of Kendrick Peak
Qkdc Dacite flow **c** of Kendrick Peak
Qkrc Rhyolite dome **c** of Kendrick Peak
Qkbr Breccia of Kendrick Peak
Qkdg Dacite flow **g** of Kendrick Peak
Rhyolite of Slate Mountain
$Qslr_2$ Rhyolite dome complex
$Qslr_1$ Older rhyolite dome
DACITE AND RHYOLITE OF PLEISTOCENE OR PLIOCENE (MATUYAMA) AGE
QTkdf Dacite dome **f** of Kendrick Peak
QTkda Dacite dome **a** of Kendrick Peak
QTkdb Dacite dome **b** of Kendrick Peak
QTkra Rhyolite dome **a** of Kendrick Peak
QTma Andesite domes and flows of Moritz Ridge
QTslr Rhyolite obsidian flow of Slate Mountain
DACITE AND RHYOLITE OF LATEST PLIOCENE (MATUYAMA) AGE
Tkde Dacite dome **e** of Kendrick Peak
Tkdh Dacite dome **h** of Kendrick Peak
Tkpr Rhyolite dome of Kendrick Park
Tkdd Dacite dome **d** of Kendrick Peak
Tkrb Rhyolite dome **b** of Kendrick Peak
RHYOLITE OF PLIOCENE (MATUYAMA OR GAUSS) AGE
Tkrd Rhyolite dome **d** of Kendrick Peak
RHYOLITE OF PLIOCENE (GAUSS) AGE
Tkre Rhyolite dome **e** of Kendrick Peak

San Francisco Mountain and peripheral rhyolite domes

EXTRUSIVE AND INTRUSIVE ROCKS OF YOUNGER PLEISTOCENE (OLDER BRUNHES) AGE
Rhyolite of Sugarloaf
Qsgr Dome
Qsgp Pyroclastic deposits
Qlmd Dacite flows of Lockett Meadow
Dacite and andesite of Doyle Peak
Qdd_3 Younger dacite flows
Qdd_2 Middle dacite flows
Qda Andesite flows
Qdd_1 Older dacite flows
Qwhr Rhyolite dome of White Horse Hills
Qhdi Dacite pluton of Humphreys Peak
Qa_2 Younger andesite flows and flow breccias of San Francisco Mountain
Qmi Quartz-monzodiorite dike of Core Ridge
Dacite of Elden Mountain
Qed_3 Autoclastic flow breccia
Qed_2 Domes
Qepb Pyroclastic flow breccia
Qed_1 Flow breccia
Qedi Dacite and tuffisite dikes
Qsfd Dacite flows and autoclastic flow breccias of San Francisco Mountain
Dacite of Humphreys Peak
Qhdf Dacite block flows
Qhd Dacite dome
Qapd Dacite flow, welded tuff, and tuff breccia of Aubineau Peak
Dacite of Reese Peak
Qrd_2 Dome and flows
Qrd_1 Flow
Andesite of Agassiz Peak
Qaa_2 Flows
Qaa_1 Dome
Qca Andesite flows and vent deposits of Core Ridge
Dacite of Fremont Peak
Qfdf Flows
Qfpb Pyroclastic flow breccia
Qfd Dome
Qdr Rhyolite flows of Doyle Saddle
Qdsr Rhyolite dome of Doyle Spring
Dacite of Schultz Peak
Qsd_2 Block flow
Qsd_1 Dome, block flows, and breccias
Qdld Dacite domes and flows of Dry Lake Hills
EXTRUSIVE AND INTRUSIVE ROCKS OF PLEISTOCENE (OLDER BRUNHES AND MATUYAMA) AGE
Qa_1 Older andesite flows, breccias, and tuffs of San Francisco Mountain
Qc Central complex
Qsfp Dacite and rhyolite pumice
Qai Andesite dikes and sill of San Francisco Mountain
Qdi Dacite dikes of San Francisco Mountain
INTRUSIVE ROCK OF PLEISTOCENE (OLDER BRUNHES OR MATUYAMA) AGE
Qdii Diorite plug of Core Ridge
EXTRUSIVE AND INTRUSIVE ROCKS OF PLEISTOCENE (MATUYAMA) AGE
Qad Dacite flows of Agassiz Peak
Rhyolite and microgranite of Core Ridge
Qcr Rhyolite flow
Qgi Microgranite plug
Qri Rhyolite dike
Qhr Rhyolite dome of Hochderffer Hills
Rhyolite of Raspberry Spring
Qrr_2 Rhyolite plug
Qrr_1 Rhyolite dome
DACITE OF PLEISTOCENE OR PLIOCENE (MATUYAMA OR OLDER) AGE
QThpd Dacite block flow of Hart Prairie
QThd Hornblende dacite block flow
DACITE OF PLIOCENE (GAUSS) AGE
Tnsd Dacite dome of North Sugarloaf

SEDIMENTARY ROCKS OF MESOZOIC AND PALEOZOIC AGE

₮m MOENKOPI FORMATION (MIDDLE? AND LOWER TRIASSIC)
Pk KAIBAB FORMATION (LOWER PERMIAN)
Ptc TOROWEAP FORMATION AND COCONINO SANDSTONE, UNDIVIDED (LOWER PERMIAN)
P₽tcs TOROWEAP FORMATION, COCONINO SANDSTONE, AND SUPAI FORMATION, UNDIVIDED (LOWER PERMIAN AND PENNSYLVANIAN)
P₽s SUPAI FORMATION (LOWER PERMIAN AND PENNSYLVANIAN)
MDrt REDWALL LIMESTONE AND TEMPLE BUTTE FORMATION, UNDIVIDED (MISSISSIPPIAN AND UPPER? DEVONIAN)
Єt TAPEATS SANDSTONE (MIDDLE AND LOWER CAMBRIAN)

EXPLANATION FOR MAP A

CONTACT--Distinguishes between geologic units and between individual flows and vent deposits in chronostratigraphic groups. Where known, relative ages of adjacent volcanic units are interpreted from field relations: o, older; y, younger

PERIMETER OF CINDER CONE--Shown where flanks of cinder cones are buried by pyroclastic sheet deposit of Saddle Mountain (Qbybp)

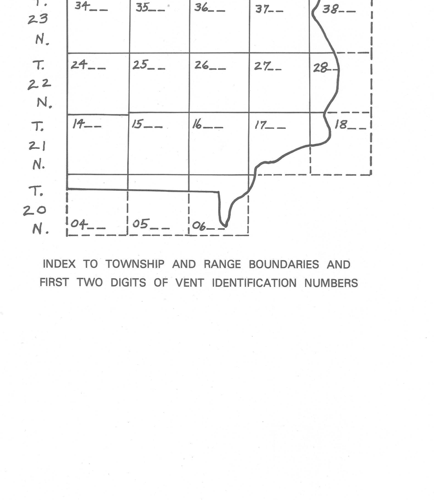
FAULT--Dashed where approximately located or inferred; dotted where concealed. Bar and ball on downthrown side

LIMIT OF GEOLOGIC MAPPING

•1.61±0.05 SAMPLE LOCALITY FOR K-Ar AGE DETERMINATION--Showing age of rock sample in Ma (mega-annum) and analytical precision (one standard deviation)

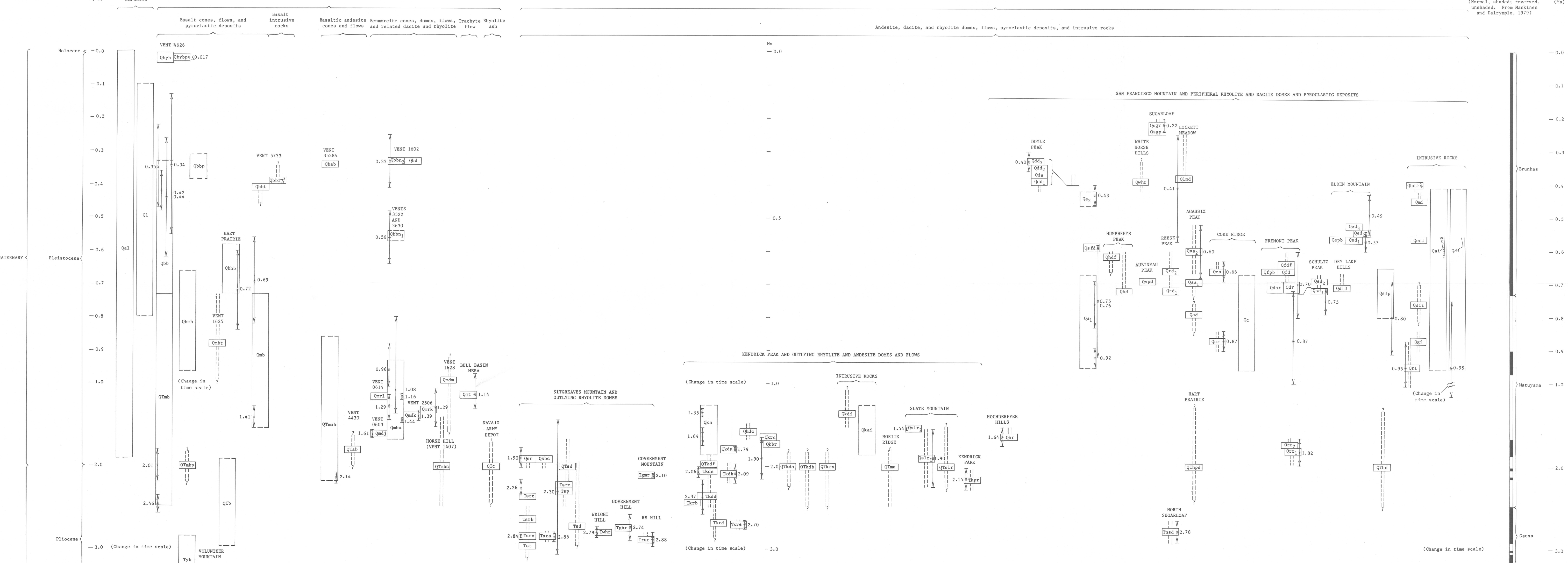
V1505A VENT NUMBER--See "Mapping and Map Conventions" for explanation of numbering system

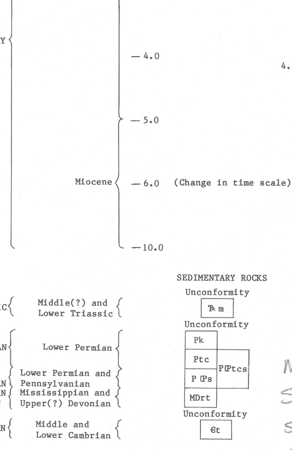
1505A FLOW OR PYROCLASTIC DEPOSIT FROM VENT 1505A--See "Mapping and Map Conventions" for explanation of numbering system. Queried where source inferred



INDEX TO TOWNSHIP AND RANGE BOUNDARIES AND FIRST TWO DIGITS OF VENT IDENTIFICATION NUMBERS

CORRELATION OF MAP UNITS





EXPLANATION FOR CORRELATION OF MAP UNITS

[Since preparation of this map, the age of the Pleistocene-Pliocene boundary has been revised to 1.64 m.y. (Aguirre and Pasini, 1985)]

SINGLE VOLCANIC EVENT--Showing stratigraphic position of a map unit formed by an individual eruption. Dashed vertical bar shows inferred absolute age range over which unit may occur. Query indicates uncertain limit of absolute age range

MULTIPLE VOLCANIC EVENTS--Showing inferred temporal duration and stratigraphic position of a map unit representing several depositional events. Dashed horizontal boundary indicates uncertainty in position in top or bottom of unit

K-Ar AGE IN Ma (MEGA-ANNUM)--Showing limits of precision (one standard deviation)

GEOLOGIC MAP OF THE CENTRAL PART OF THE SAN FRANCISCO VOLCANIC FIELD, NORTH-CENTRAL ARIZONA

By

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