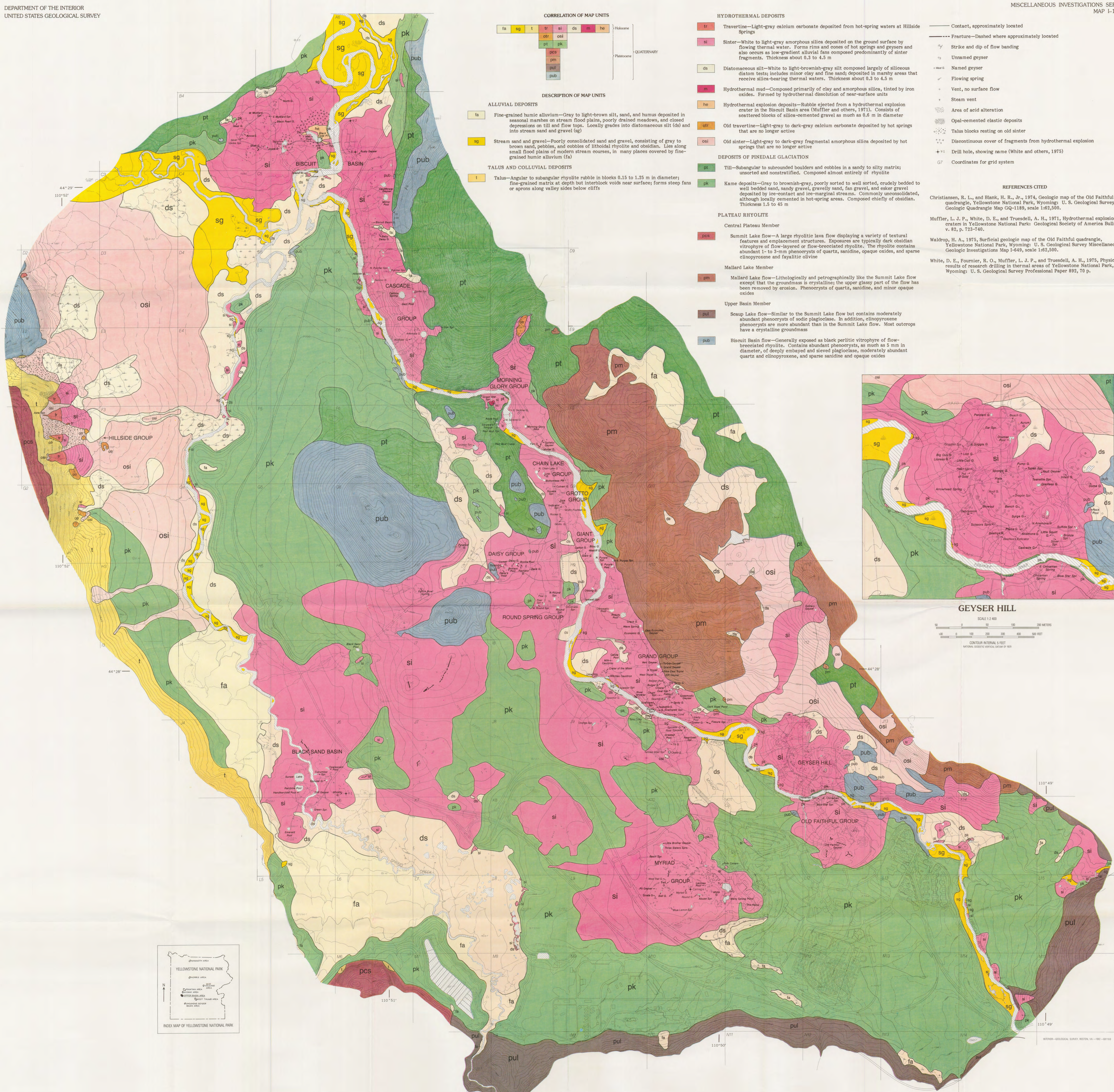
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS INVESTIGATIONS SERIES
MAP I–1371



CORRELATION OF MAP UNITS

fa	sg	t	tr	si	ds	m	he	Holocene
			otr	osi				
			pt	pk				Pleistocene
			pcs					
			pm					
			pul					
			pub					

Holocene and Pleistocene: QUATERNARY

DESCRIPTION OF MAP UNITS

ALLUVIAL DEPOSITS

fa Fine-grained humic alluvium—Gray to light-brown silt, sand, and humus deposited in seasonal marshes on stream flood plains, poorly drained meadows, and closed depressions on till and flow tops. Locally grades into diatomaceous silt (ds) and into stream sand and gravel (sg)

sg Stream sand and gravel—Poorly consolidated sand and gravel, consisting of gray to brown sand, pebbles, and cobbles of lithoidal rhyolite and obsidian. Lies along small flood plains of modern stream courses, in many places covered by fine-grained humic alluvium (fa)

TALUS AND COLLUVIAL DEPOSITS

t Talus—Angular to subangular rhyolite rubble in blocks 0.15 to 1.25 m in diameter; fine-grained matrix at depth but interblock voids near surface; forms steep fans or aprons along valley sides below cliffs

HYDROTHERMAL DEPOSITS

tr Travertine—Light-gray calcium carbonate deposited from hot-spring waters at Hillside Springs

si Sinter—White to light-gray amorphous silica deposited on the ground surface by flowing thermal water. Forms rims and cones of hot springs and geysers and also occurs as low-gradient alluvial fans composed predominantly of sinter fragments. Thickness about 0.3 to 4.5 m

ds Diatomaceous silt—White to light-brownish-gray silt composed largely of siliceous diatom tests; includes minor clay and fine sand; deposited in marshy areas that receive silica-bearing thermal waters. Thickness about 0.3 to 4.5 m

m Hydrothermal mud—Composed primarily of clay and amorphous silica, tinted by iron oxides. Formed by hydrothermal dissolution of near-surface units

he Hydrothermal explosion deposits—Rubble ejected from a hydrothermal explosion crater in the Biscuit Basin area (Muffler and others, 1971). Consists of scattered blocks of silica-cemented gravel as much as 0.6 m in diameter

otr Old travertine—Light-gray to dark-gray calcium carbonate deposited by hot springs that are no longer active

osi Old sinter—Light-gray to dark-gray fragmental amorphous silica deposited by hot springs that are no longer active

DEPOSITS OF PINEDALE GLACIATION

pt Till—Subangular to subrounded boulders and cobbles in a sandy to silty matrix; unsorted and nonstratified. Composed almost entirely of rhyolite

pk Kame deposits—Gray to brownish-gray, poorly sorted to well sorted, crudely bedded to well bedded sand, sandy gravel, gravelly sand, fan gravel, and esker gravel deposited by ice-contact and ice-marginal streams. Commonly unconsolidated, although locally cemented in hot-spring areas. Composed chiefly of obsidian. Thickness 1.5 to 45 m

PLATEAU RHYOLITE

Central Plateau Member

pcs Summit Lake flow—A large rhyolitic lava flow displaying a variety of textural features and emplacement structures. Exposures are typically dark obsidian vitrophyre of flow-layered or flow-brecciated rhyolite. The rhyolite contains abundant 1- to 3-mm phenocrysts of quartz, sanidine, opaque oxides, and sparse clinopyroxene and fayalitic olivine

Mallard Lake Member

pm Mallard Lake flow—Lithologically and petrographically like the Summit Lake flow except that the groundmass is crystalline; the upper glassy part of the flow has been removed by erosion. Phenocrysts of quartz, sanidine, and minor opaque oxides

Upper Basin Member

pul Scaup Lake flow—Similar to the Summit Lake flow but contains moderately abundant phenocrysts of sodic plagioclase. In addition, clinopyroxene phenocrysts are more abundant than in the Summit Lake flow. Most outcrops have a crystalline groundmass

pub Biscuit Basin flow—Generally exposed as black perlitic vitrophyre of flow-brecciated rhyolite. Contains abundant phenocrysts, as much as 5 mm in diameter, of deeply embayed and sieved plagioclase, moderately abundant quartz and clinopyroxene, and sparse sanidine and opaque oxides

Contact, approximately located
Fracture—Dashed where approximately located
Strike and dip of flow banding
Unnamed geyser
Named geyser
Flowing spring
Vent, no surface flow
Steam vent
Area of acid alteration
Opal-cemented clastic deposits
Talus blocks resting on old sinter
Discontinuous cover of fragments from hydrothermal explosion
Drill hole, showing name (White and others, 1975)
Coordinates for grid system

REFERENCES CITED

Christiansen, R. L., and Blank, H. R., Jr., 1974, Geologic map of the Old Faithful quadrangle, Yellowstone National Park, Wyoming: U. S. Geological Survey Geologic Quadrangle Map GQ-1189, scale 1:62,500.

Muffler, L. J. P., White, D. E., and Truesdell, A. H., 1971, Hydrothermal explosion craters in Yellowstone National Park: Geological Society of America Bulletin, v. 82, p. 723-740.

Waldrop, H. A., 1975, Surficial geologic map of the Old Faithful quadrangle, Yellowstone National Park, Wyoming: U. S. Geological Survey Miscellaneous Geologic Investigations Map I-649, scale 1:62,500.

White, D. E., Fournier, R. O., Muffler, L. J. P., and Truesdell, A. H., 1975, Physical results of research drilling in thermal areas of Yellowstone National Park, Wyoming: U. S. Geological Survey Professional Paper 892, 70 p.

GEYSER HILL

SCALE 1:2 400
50 0 50 100 200 METERS
100 0 100 200 300 400 500 FEET
CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

INDEX MAP OF YELLOWSTONE NATIONAL PARK

Base compiled from U.S. Geological Survey aerial photographs, series GS-VBHO, 1965. Modified to reflect cultural changes as of 1976. 1000-foot grid referenced to arbitrary origin.

TRUE NORTH
MAGNETIC NORTH
16°
APPROXIMATE MEAN DECLINATION, 1982

SCALE 1:4 800
100 0 100 200 300 METERS
200 0 200 400 600 800 1000 FEET
CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology by L. J. P. Muffler, D. E. White, M. H. Beeson, and A. H. Truesdell, 1966–1978. Volcanic units and descriptions adapted from Christiansen and Blank (1974). Surficial units and descriptions adapted from Waldrop (1975). Drafting of thermal features and geology by A. L. Cook.

GEOLOGIC MAP OF UPPER GEYSER BASIN, YELLOWSTONE NATIONAL PARK, WYOMING

By

L. J. P. Muffler, D. E. White, M. H. Beeson, and A. H. Truesdell

1982

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