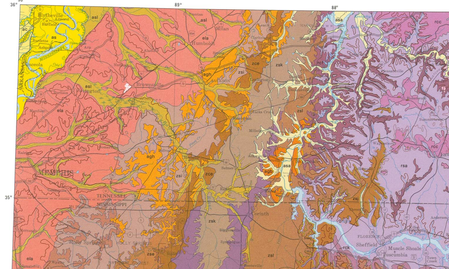
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
GEOLOGICAL SURVEY OF ALABAMA
TENNESSEE DIVISION OF GEOLOGY
GEORGIA GEOLOGICAL SURVEY
MISSISSIPPI GEOLOGICAL SURVEY
DEPARTMENT OF GEOLOGY, UNIVERSITY OF NORTH CAROLINA, AND
ARKANSAS GEOLOGICAL COMMISSION

QUATERNARY GEOLOGY OF THE UNITED STATES
LOOKOUT MOUNTAIN 4° × 6° QUADRANGLE
MISCELLANEOUS INVESTIGATIONS SERIES
MAP I–1420 (NI–16)



Base modified from U.S. Geological Survey
International Map of the World 1:1M Series, 1972
Lambert Conformal Conic Projection

INDEX TO INTERNATIONAL MAP OF THE WORLD
1:1,000,000 TOPOGRAPHIC SERIES

Showing location of the Quaternary Geologic Map of the Lookout Mountain 4° × 6° Quadrangle in red (U.S. Geological Survey, Miscellaneous Investigations Series, Map I–1420 (NI–16)) and other published maps in the Quaternary Geologic Atlas of the United States in yellow.

QUATERNARY GEOLOGIC MAP OF THE LOOKOUT MOUNTAIN 4° × 6° QUADRANGLE, UNITED STATES

State compilations by
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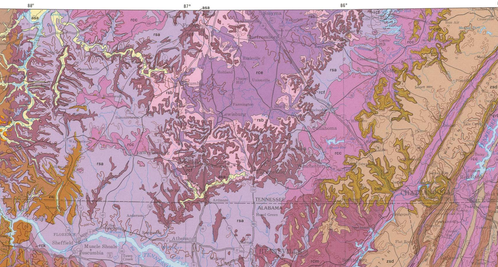
1988

QUATERNARY GEOLOGIC ATLAS OF THE UNITED STATES



Compiled in 1978–80
L. M. Richmond, cartographer

LIST OF MAP UNITS

HOLOCENE

- aaa ALLUVIAL GRAVELLY SAND
- aal ALLUVIAL SILT AND SAND

HOLOCENE AND LATE WISCONSIN

- as ALLUVIAL SILTY FINE SAND
- ac ALLUVIAL CLAY

HOLOCENE AND WISCONSIN

- cba BOULDERY COLLUVIUM
- cbb COLLUVIUM WITH HUGE BLOCKS
- csh SANDY SHALY COLLUVIUM
- cda SANDSTONE- AND SHALE-CLAST LOAMY COLLUVIUM

WISCONSIN AND ILLINOIAN

- ela COLLUVIAL AND ALLUVIAL LOESS

LATE PLEISTOCENE TO LATE PLIOCENE

- aggc ALLUVIAL QUARTZ-PEBBLE GRAVEL AND SAND
- aglch ALLUVIAL CHERT-PEBBLE GRAVEL AND SAND

EARLY PLEISTOCENE(?) TO MIDDLE PLIOCENE

- agpc ALLUVIAL PEBBLE GRAVEL AND SAND (CITRONELLE FORMATION)

PLEISTOCENE, PLIOCENE, AND MIOCENE(?)

- lgsh UPLAND CHERT-PEBBLE GRAVEL AND SAND

QUATERNARY AND OLDER CENOZOIC

- zsd LIMONITIC SANDY DECOMPOSITION RESIDUUM
- zsd SANDY DECOMPOSITION RESIDUUM
- zsa CLAYEY FINE TO MEDIUM SAND DECOMPOSITION RESIDUUM
- zsf MEDIUM TO COARSE SAND AND SANDY CLAY DECOMPOSITION RESIDUUM
- zcg SANDY CLAY AND FERRUGINOUS CLAYEY COARSE SAND DECOMPOSITION RESIDUUM
- zsh SILTY MEDIUM TO FINE SAND AND SANDY CLAY DECOMPOSITION RESIDUUM
- zsc CLAYEY FINE SAND DECOMPOSITION RESIDUUM
- zcf CHERT GRAVEL AND SAND DECOMPOSITION RESIDUUM
- zgs FERRUGINOUS SAND DECOMPOSITION RESIDUUM
- zsf MEDIUM TO COARSE SAND DECOMPOSITION RESIDUUM
- zcs CLAYEY SILT AND VERY FINE SAND DECOMPOSITION RESIDUUM
- zsd SANDY SHALY DECOMPOSITION RESIDUUM
- zsa SANDY CLAY DECOMPOSITION RESIDUUM
- zcb SMECTITIC CLAY DECOMPOSITION RESIDUUM
- zcs SILICEOUS CLAY DECOMPOSITION RESIDUUM
- zcm MASSIVE CLAY DECOMPOSITION RESIDUUM
- zcb SILTY SANDY DECOMPOSITION RESIDUUM AND CHERTY CLAY SOLUTION RESIDUUM, UNDIFFERENTIATED
- zcb CHERTY CLAY SOLUTION RESIDUUM, SANDY CLAY DECOMPOSITION RESIDUUM, AND SILTY CLAY DECOMPOSITION RESIDUUM, UNDIFFERENTIATED
- zcm CHERT FRAGMENT SOLUTION RESIDUUM
- zsb PHOSPHATIC SANDY SOLUTION RESIDUUM
- zcc CLAYEY SAND SOLUTION RESIDUUM WITH CHERT CLASTS
- zcc CHERTY CLAY SOLUTION RESIDUUM
- zcm THIN CLAYEY SOLUTION RESIDUUM
- zcb CHERTY SILTY CLAY, LOCALLY PHOSPHATIC, SOLUTION RESIDUUM
- zcg DARK-GRAY CLAY SOLUTION RESIDUUM
- zcg RED-CLAY SOLUTION RESIDUUM
- zcc CLAYEY SAND TO SANDY CLAY SOLUTION RESIDUUM
- zcb CHERTY SILTY CLAY SOLUTION RESIDUUM
- zcb PLASTIC-CLAY SOLUTION RESIDUUM WITH COLLUVIAL CHERT
- zcb SILTY TO CLAYEY SANDY SAPROLITE, ROCK TORS, AND JOINT-BLOCK BOULDERS
- zcb SILTY TO CLAYEY SANDY SAPROLITE
- zsc MICACEOUS, CLAYEY, AND SANDY SAPROLITE, UNDIFFERENTIATED
- zsm QUARTZ-RICH SAPROLITE
- zls ARGILLACEOUS SAPROLITE
- zls MICACEOUS SAPROLITE

CONTACT

MARGIN OF FLOOD PLAIN OF MISSISSIPPI RIVER

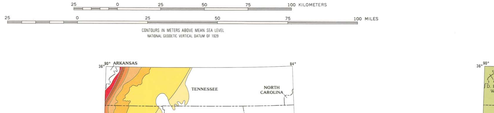
NOTE: This map is the product of collaboration of State geological surveys, universities, and the U.S. Geological Survey, and is designed for both scientific and practical purposes. It was prepared in two stages. First, separate maps and map explanations of the parts of States included in the quadrangle were prepared by the State compilers. Second, these maps were reviewed, integrated, locally supplemented, and related to a uniform map symbol classification by the editors. The map unit descriptions were also reviewed, supplemented, and coordinated with those of other maps of this series so that individual unit symbols have consistent meanings throughout the 30 maps of the series. The historical stratigraphic units proposed by S. T. Cleaves, Maryland Geological Survey, and R. B. Daniels, North Carolina State University, Diagrams accompanying the map were prepared by the editors.

Differences in mapping or interpretation in different areas were resolved by correspondence to the extent possible. Most simply reflect differences in available data and differences in philosophies of mapping. Such differences serve to encourage further investigation.

Less than forty percent of the surficial deposits of the United States have been mapped and described. Traditionally, mapping of surficial deposits has been focused on glacial, alluvial, eolian, lacustrine, marine, and landslide deposits. Slope and upland deposits have been mapped in small areas mainly where they are involved in the extraction of amount of engineering construction and many important problems of land use and land management are inseparable from slope deposits that have extensive slope and upland deposits (colluvium, residuum, and saprolite, for example). These predominate in many different physical characteristics. Therefore, an effort has been made to classify, map, and describe these deposits. This map sheet is part on unpublished interpretations of individuals, published and unpublished subsurface data, and the distribution of bedrock-parent materials. The accompanying text is crude, but represents a first step toward a more refined and useful classification.

For scientific purposes, the map differentiates Quaternary surficial deposits on the basis of a combination of criteria, such as lithology, texture, genesis, stratigraphic position, and geologic history and mode of correlation diagram and indicated in the map unit descriptions. Geomorphic features, such as stream terraces, are not distinguished, as map units, and differentiation of sequences of alluvial deposits of different ages is rarely possible at a scale of 1:1,000,000. Most landslide deposits also are too small to be shown at this scale.

For practical purposes, the map is a surficial-materials map, on which materials are distinguished on the basis of texture, composition, and local specific characteristics, such as swelling clay. It is not a map of soils as soils are recognized and classified in pedology or agronomy. Rather it is a generalized map of soils as recognized in engineering geology, or of subsoils or parent materials from which pedologic or agronomic soils are formed. As a materials map it serves as a base from which a wide variety of derivative maps for use in planning engineering, land use, or land management projects can be compiled.



LOESS DISTRIBUTION AND THICKNESS, IN METERS

<0.5 m | 0.5–1.0 m | 1.0–2.5 m | 2.5–5.0 m | 5.0–10.0 m | 10.0–20.0 m | >20.0 m

RESPONSIBILITY FOR STATE COMPILATIONS

(1) GEOLOGICAL SURVEY OF ALABAMA
(2) TENNESSEE DIVISION OF GEOLOGY
(3) GEORGIA GEOLOGICAL SURVEY
(4) MISSISSIPPI GEOLOGICAL SURVEY
(5) DEPARTMENT OF GEOLOGY, UNIVERSITY OF NORTH CAROLINA
(6) ARKANSAS GEOLOGICAL COMMISSION

DESCRIPTION OF MAP UNITS

HOLOCENE

aaa ALLUVIAL GRAVELLY SAND—Light-gray, yellowish-gray, or brownish-gray, coarse to fine sand and subangular to rounded pebble to cobble gravel; reddish-orange to reddish-brown in parts of Tennessee, Georgia, and Alabama. Poorly to well-sorted, poorly to well-stratified, locally clayey. Interbedded with alluvial silt and sand in Tennessee River in Tennessee. Gravel component sparse in Mississippi. Deposits include varying amounts of interbedded or admixed silt and clay, especially in flood plains along lower parts of regional drainage in Georgia and Alabama and along Tennessee River in Tennessee. Gravel in Tennessee, Mississippi, and western Alabama is chiefly chert and minor amounts of quartz. Gravel in central and eastern Alabama and in Georgia is chiefly quartz. Clay balls and lenses, commonly basinlotic, occur locally in deposits in Georgia. Mapped areas include organic muck and swamp deposits on flood plains, and local colluvium along margins of valley floors. Thickness generally 5–10 m

aal ALLUVIAL SILT AND SAND—Grayish-tan to brown, locally clayey, silt and fine to very fine quartz sand; poorly sorted, irregularly bedded. Some interbedded or intermixed chert-pebble gravel, especially in eastern headwaters of Tennessee and northern Mississippi, silt derived mainly from older colluvium and alluvium composed chiefly of loess. Eastern Mississippi, deposit derived from local residuum and is more clayey. Mapped areas include organic muck and swamp deposits of flood plains. Thickness 3–8 m

HOLOCENE AND LATE WISCONSIN

as ALLUVIAL SILTY FINE SAND—Gray to brown, silty fine sand intermixed and interbedded with silt and clay. Poorly to well sorted, poorly to well stratified. Represents channel meander and, locally, overbank deposits of Mississippi River. Mapped areas include swamp deposits, muck of oxbow lakes, and some areas of dark-brown to black organic clay and humic silt. Overlies older alluvium consisting of intermixed and interbedded gravel, sand, silt, and clay that become coarser with depth and rests on bedrock at 40 to 60 m. Thickness commonly 1–2 m

ac ALLUVIAL CLAY—Gray to reddish-brown, poorly to well-bedded clay; contains some intermixed and interbedded fine sand and, locally, layers and lenses of dark-brown to black organic clay. Unit is an overbank deposit of Mississippi River. Mapped areas include swamp deposits and muck of flood-plain channels and lakes. Overlies older alluvium consisting of intermixed and interbedded gravel, sand, silt, and clay that become coarser with depth. Rests on bedrock at 40 to 60 m or more in places. Thickness commonly 1–2 m

HOLOCENE AND WISCONSIN

cba BOULDERY COLLUVIUM!—Grayish-yellow, bluish-yellow, or buff, poorly sorted, silty to very sandy clay; contains variable amounts of angular to subangular pebble to boulder-size clasts of hard conglomerate composed chiefly of quartz and feldspar pebbles. Occurs on mountain slopes underlain by massive, resistant sandstone beds. Mapped areas of saprolite (zsa), and boulderly alluvial-fan deposits in valleys at edge of mountains. Chiefly the product of decomposition of sandstone, conglomerate, crag, and possibly solifluction. In places it overlies unmapped terrace deposits of alluvial colluvial origin. Thickness ranges from about 2 m to as much as 30 m, but is most commonly 3–6 m on slopes

cbb COLLUVIUM! WITH HUGE BLOCKS—Light-gray to pale-yellowish-brown poorly sorted, sandy, silty clay loam; contains chips of siltstone and shale and angular slabby blocks of sandstone ranging from a few cm to 10–15 m in diameter. Occurs on steep slopes at margins of flat to gently sloping plateau uplands in Tennessee and locally in northern Alabama. As mapped, includes local small areas of cherty clay solution residuum (tcb). Thickness commonly 3–15 m, but may be as thick as 30 m

csh SANDY SHALY COLLUVIUM!—Gray, blotchy, poorly sorted, sandy, commonly stony loam, locally clayey or silty; contains abundant chips of shale, particles of clay, and small fragments of sandstone. Boulders lacking. Most mostly quartz. Present only on northwest slopes of foothills in Tennessee in northeast part of map

cda SANDSTONE- AND SHALE-CLAST LOAMY COLLUVIUM!—Light-gray, brownish-gray, or yellowish-brown, poorly sorted, sandy loam to clay loam; contains angular to subround, commonly slabby, pebble to boulder-size clasts of sandstone and chips of shale. Present in mountainous northeastern part of map area in Tennessee. Locally overlies older residuum (tcb). Thickness commonly 1–3 m, but may be unstable on steep slopes and where clayey. Thickness less than 2 m to 7 m

WISCONSIN AND ILLINOIAN

ela COLLUVIAL AND ALLUVIAL LOESS (in part)—Stratigraphically equivalent to the Peoria Loess and Roxana Silt of Illinois and, in places, to the Loveland Loess of Iowa!—Grayish-brown to yellowish-brown, silty fine sand to clayey silt; massive to indistinctly bedded. Unmapped loess extends east of map unit limit as thin, patchy deposits commonly mixed with locally derived colluvium and alluvium. Thickness ranges from 3 m at eastern limit of map unit to maximum of 30 m along Mississippi River

LATE PLEISTOCENE TO LATE PLIOCENE

aggc ALLUVIAL QUARTZ-PEBBLE GRAVEL AND SAND—Reddish-brown, slightly iron stained, well-rounded to subround, fine to coarse gravel, in matrix of coarse to fine sand to clayey sand. Clasts are subangular to subround, and range from granules to medium-size pebbles; rarely contains cobbles. Quartz. Deposit contains some admixed loess in places. Mapped areas include some alluvial gravelly sand (asa) and colluvium. The Citronelle Formation, as mapped, includes local small areas of gravelly terrace of red to dark red, sandy, clay. Clasts are subangular to subround, and range from granules to medium-size pebbles; rarely contains cobbles. Quartz. Deposit contains some admixed loess in places. Mapped areas include some alluvial gravelly sand (asa) and colluvium. The Citronelle Formation, as mapped, includes local small areas of gravelly terrace of red to dark red, sandy