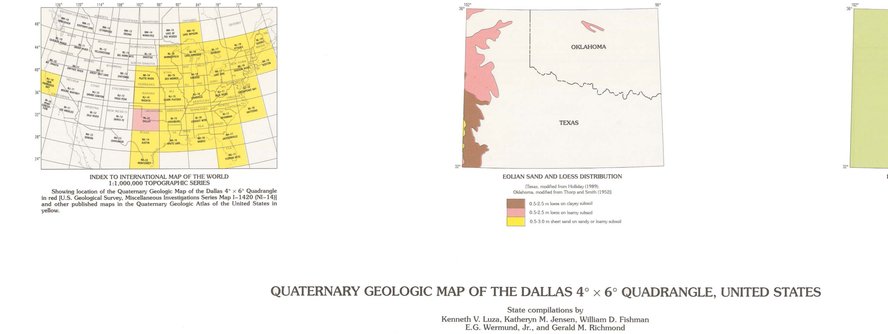
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
TEXAS BUREAU OF ECONOMIC GEOLOGY
AND THE
OKLAHOMA GEOLOGICAL SURVEY

QUATERNARY GEOLOGIC ATLAS OF THE UNITED STATES
DALLAS 4° × 6° QUADRANGLE
MISCELLANEOUS INVESTIGATIONS SERIES
MAP I-1420 (NI-14)

INDEX TO INTERNATIONAL MAP OF THE WORLD
1:1,000,000 TOPOGRAPHIC SERIES
Showing location of the Quaternary Geologic Map of the Dallas 4° × 6° Quadrangle in red [U.S. Geological Survey, Miscellaneous Investigations Series Map I–1420 (NI–14)] and other published maps in the Quaternary Geologic Atlas of the United States in yellow.



EOLIAN SAND AND LOESS DISTRIBUTION
(Texas, modified from Holliday (1989); Oklahoma, modified from Smith (1952))

RESPONSIBILITY FOR STATE COMPILATION
(1) Oklahoma Geological Survey
(2) Texas Bureau of Economic Geology
(3) U.S. Geological Survey

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

State compilations by
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Edited and integrated by
Gerald M. Richmond and Ann Coe Christiansen

1994

QUATERNARY GEOLOGIC ATLAS OF THE UNITED STATES

LIST OF MAP UNITS

HOLOCENE AND LATE WISCONSIN

- aaa ALLUVIAL SAND, SILT, CLAY, AND GRAVEL
- afe ALLUVIAL SILT AND CLAY
- afa ALLUVIAL-FAN DEPOSIT
- es EOLIAN SHEET SAND
- ed DUNE SAND

HOLOCENE TO ILLINOIAN

- aae ALLUVIAL, LACUSTRINE, AND EOLIAN DEPOSIT
- cg PLAYA CLAY
- cgs CALCRETE-CLAST LOAM TO SANDY LOAM COLLUVIUM
- cbf BOULDERY SANDY COLLUVIUM
- cbm LIMESTONE-CLAST LOAMY COLLUVIUM
- cbs LIMESTONE-CLAST SILTY CLAY COLLUVIUM
- cse RED SILTSTONE- AND SHALE-CLAST LOCALLY GYPSIFEROUS LOAMY COLLUVIUM
- csf PEBBLY SANDY CLAY LOAM COLLUVIUM
- csl QUARTZ SANDSTONE-CLAST SANDY COLLUVIUM
- csj LIMESTONE-, SHALE-, SANDSTONE-, AND CALCRETE-CLAST LOAMY COLLUVIUM
- csa SANDSTONE- AND SHALE-CLAST COLLUVIUM
- cff ACID SHALE-CHIP CLAY-LOAM COLLUVIUM
- cfl SHALE- AND SLABBY LIMESTONE-CLAST COLLUVIUM
- cbm SHALE- AND SILTSTONE-CLAST LOAMY COLLUVIUM
- csq SANDSTONE- AND SHALE-CLAST LOAMY COLLUVIUM
- cfs SHALE-CLAST CLAYEY COLLUVIUM
- cmj LIMESTONE- AND SANDSTONE-CLAST LOAMY COLLUVIUM
- xba SHALE- AND LIMESTONE-CLAST DISINTEGRATION RESIDUUM
- xab QUARTZ SAND DISINTEGRATION RESIDUUM
- xlc RED SILTY CLAY DISINTEGRATION RESIDUUM
- xld RED SILTY CLAY DISINTEGRATION RESIDUUM AND GYPSUM SOLUTION RESIDUUM
- xls FINE SANDY LOAM DISINTEGRATION RESIDUUM
- xlg CALCAREOUS SANDY LOAM DISINTEGRATION RESIDUUM
- xcb CALCAREOUS CLAY DISINTEGRATION RESIDUUM
- xsc STONY SELENITIC SILTY CLAY LOAM DISINTEGRATION RESIDUUM
- xsd SANDSTONE AND MUDSTONE CLAY LOAM DISINTEGRATION RESIDUUM
- oca LACUSTRINE SILT, SILT, AND SAND

LATE PLEISTOCENE TO MIDDLE PLEISTOCENE

- afc ALLUVIAL- AND SHEETWASH-FAN FINE SAND AND SILT
- aao CEMENTED ALLUVIAL GRAVELLY SAND
- afb ALLUVIAL-FAN GRAVELLY TO SANDY LOAM

LATE PLEISTOCENE TO EARLY PLEISTOCENE

- aag ALLUVIAL GRAVEL, SAND, SILT, AND CLAY
- esa EOLIAN SHEET SAND
- cab CEMENTED COLLUVIUM AND SHEETWASH ALLUVIUM

MIDDLE PLEISTOCENE AND EARLY PLEISTOCENE

- ngp ALLUVIAL GRAVEL AND SAND
- ocb EOLIAN AND ALLUVIAL SAND, SILT, AND CLAY

PLIOCENE

- ocC LACUSTRINE SAND, CLAY, AND LIMESTONE

DISINTEGRATION RESIDUUM

- xlm LIMONITIC SANDY DECOMPOSITION RESIDUUM
- xsb QUARTZ SAND DECOMPOSITION RESIDUUM
- xsd SANDY DECOMPOSITION RESIDUUM
- xsw CLAYEY SAND AND SANDY CLAY DECOMPOSITION RESIDUUM
- xsf FINE SANDY, SILTY CLAY DECOMPOSITION RESIDUUM
- xsl SILTY TO SILTY CLAY DECOMPOSITION RESIDUUM
- xfs FINE SANDY LOAM DECOMPOSITION RESIDUUM
- xsm CLAY LOAM AND FINE SANDY LOAM DECOMPOSITION RESIDUUM
- xfa SANDY CLAY LOAM DECOMPOSITION RESIDUUM
- xsk RED CLAY LOAM DECOMPOSITION RESIDUUM WITH CALCAREOUS GYPSIFEROUS RUBBLY
- xmb SMECTITIC CLAY DECOMPOSITION RESIDUUM
- xsc SILTY CLAY DECOMPOSITION RESIDUUM
- xsg SAND, GRAVEL, SILT, AND CLAY DECOMPOSITION RESIDUUM
- xcl CLAY AND SILTY CLAY DECOMPOSITION RESIDUUM
- xsn SANDY CLAY LOAM DECOMPOSITION RESIDUUM
- xsl SILTY CLAY DECOMPOSITION RESIDUUM AND CHERTY CLAY SOLUTION RESIDUUM
- xcl CLAY LOAM AND CHANNERY LOAM DECOMPOSITION RESIDUUM AND SOLUTION RESIDUUM
- xch CHERTY CALCAREOUS CLAY SOLUTION RESIDUUM
- xcv STONY CALCAREOUS CLAY SOLUTION RESIDUUM
- xsa FELDSPATHIC SANDY FINE GRUS

DESCRIPTION OF MAP UNITS

HOLOCENE AND LATE WISCONSIN

aaa ALLUVIAL SAND, SILT, CLAY, AND GRAVEL—Light-brown, gray, or grayish-brown sand, silt, and gravel interstratified or interbedded, commonly crossbedded. Locally includes lenses of clay and layers of sheetwash alluvium. In western part of mapped area, chiefly coarse quartzose sand containing lenses of subangular to well-rounded gravel. Clasts mostly calcrete derived from the Ogallala Formation (Miocene). Silt and clay become more abundant and gravel becomes finer and increasingly confined to lower part of deposit eastward across quadrangle. Quartzite, chert, and limestone gravel clasts become increasingly abundant eastward in deposits of secondary drainages. Thickness 3–30 m; mostly 5–6 m

afe ALLUVIAL SILT AND CLAY—Gray to yellowish-brown silt, clay, and fine sand interstratified and interbedded. Includes a few lenses of subangular to well-rounded gravel, especially in western part of quadrangle. Deposited in channels 2–4 m in diameter; part of quadrangle. Deposited areas include some sheetwash alluvium. Thickness 0.5–10 m; locally as much as 20 m

afa ALLUVIAL-FAN DEPOSITS—Light-brown, gray, or grayish-brown coarse to medium sand, and minor silt, intermixed and interbedded; structureless to poorly bedded. Clasts angular to locally subrounded pebbles and cobbles of limestone, dolomite, and chert. Forms fans, chiefly in drainage of North Fork of South Fork of Wichita River and in South Fork of Brazos River. Thickness 2–8 m

es EOLIAN SHEET SAND—Gray to yellowish- or reddish-brown, medium to very fine sand; silty, slightly clayey; mostly quartz; minor feldspar. Distinguished as a map unit only in Texas. Commonly overlies an older alluvial deposit. Mostly stabilized by vegetation. Thickness 0.5–3 m

ed DUNE SAND—Gray to yellowish- or reddish-brown, fine to medium sand, locally silty or sandy; locally poorly sorted or poorer laminae; well sorted; moderately to well rounded; generally noncalcareous. Forms dunes; relief as much as 5 m; mostly stabilized by vegetation. Commonly overlies older alluvial deposits. In Oklahoma, locally includes extensive sheet sand. Thickness 3–30 m; generally 7 m

HOLOCENE TO ILLINOIAN

aae ALLUVIAL, LACUSTRINE, AND EOLIAN DEPOSIT (Lingos Formation (Caran and Baumgardner, 1990) in Texas)—Buff, grayish- to yellowish-brown or pinkish-gray sand, silt, and clay. Sediments consist of basal sand and gravel overlain by fine-grained sediments of quasi-lacustrine and marl; and ion upper deposit consisting of eolian sheet sand and dunes. Gravel is chiefly of chert and quartz. Fine-grained sediments are paleosols and alluvial silt and clay. Locally overlain by a paleosol developed on Permian siltstone. Basal gravel contains Bancholabrean vertebrate fauna. Forms extensive deposits in Texas Panhandle. Thickness characteristically 30–40 m; thickness varies abruptly and is as much as 75 m where deposit has filled depressions formed by solution of the beds following dissolution of the underlying gypsum bedrock

cg PLAYA CLAY—Light-gray, light-olive-gray, light-brown, and brownish-gray sandy clay and silt; massive, calcareous; hard when dry, sticky and plastic when wet. Films, lenses, and masses of calcium carbonate comprise about 5–8 percent of volume. Occurs in circular to oval closed depressions, many of which have a salt-encrusted playa lake bottom. Thousands of the depressions exist, most too small to show on map, but some in the northwest part of quadrangle are 200 m to several kilometers across. Many depressions, especially those in eolian sand, are formed by deflation and (or) dissolution of near-surface caliche by infiltrating ground water. Others are formed by subsidence resulting from deep solution and collapse of bedrock gypsum. Depressions in loess deposits are rimmed by a low circular mound of brown loam about 1 m thick that overlies white indurated pedogenic carbonate (caliche). The nearly flat surface of some deposits is characterized by pimple mounds and intervening shallow undrained depressions. Thickness 1–3 m

cgs CALCRETE-CLAST LOAM TO SANDY LOAM COLLUVIUM—Reddish- to yellowish-brown, brown, or pinkish-gray sand, silt, and clay. Poorly sorted; nonbedded to thin bedded. Clasts mostly pebble to cobble size; a few are boulders. Most are fragments of caliche. Sand is fine to medium; quartzose; forms bulk of deposit; includes admixed silt and clay. Moderately to extremely calcareous. Forms deposits on Caprock Escarpment that dissect the Ogallala Formation (Miocene). Mapped areas include bedrock outcrops and areas of less than 1 m; locally 2–4 m at base of slopes

cbf BOULDERY SANDY COLLUVIUM—Tan to brown, locally grayish-brown, or yellowish-brown, fine sand, silt, and minor silty clay. Contains sandstone boulders; poorly sorted; nonbedded. Forms veneer on bedrock surface. Developed on moderate to steep slopes underlain by highly folded Cretaceous sandstone beds. Occurs in Arbuckle Mountains, Oklahoma. Thickness 0.5–1.5 m

cbm LIMESTONE-CLAST LOAMY COLLUVIUM—Dark-grayish-brown to light-brown, locally reddish brown, moderately alkaline clay loam and loam containing scattered to abundant limestone gravel, cobbles, and boulders of hard limestone, shale chips, particles of calcium carbonate cement, and, locally, coarse chert. Nonbedded to thin bedded. Deposited on slopes of hard limestone, shale chips, particles of calcium carbonate cement, and, locally, coarse chert. Nonbedded to thin bedded. Deposited on slopes of hard limestone, shale chips, particles of calcium carbonate cement, and, locally, coarse chert. Nonbedded to thin bedded. Deposited on slopes of hard limestone, shale chips, particles of calcium carbonate overlying limestone bedrock; elsewhere, the hard calcium carbonate is a cavity-filling and fracture-filling cement in bedrock fragments overlies fragmented limestone. On steep slopes, commonly contains more than 50 percent limestone and locally is a limestone rubble with very little matrix. Mapped areas include abundant bedrock outcrops. In valley bottoms, consists of angular to subangular coarse sheetwash alluvium, but along valley of Red River is chiefly sandy to silty and thin bedded. Thickness 0.5–1.5 m; on steep slopes, commonly less than 0.5 m

cbs LIMESTONE-CLAST SILTY CLAY COLLUVIUM—Reddish-gray to pale-brown, locally reddish brown, moderately alkaline clay loam and loam containing scattered to abundant limestone gravel, cobbles, and boulders of hard limestone, shale chips, and particles of calcium carbonate cement. Nonbedded to thin bedded. Deposited on slopes