



A DIGITAL GEOLOGIC MAP DATABASE FOR THE STATE OF OKLAHOMA

Compiled by

William D. Heran¹, Gregory N. Green², and Douglas B. Stoesser²

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¹ U.S. Geological Survey, MS 964, Box 25046, Denver CO 80225

² U.S. Geological Survey, MS 905, Box 25046, Denver CO 80225

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ABSTRACT

This report consists of a compilation of twelve digital geologic maps provided in ARC/INFO interchange (e00) format for the state of Oklahoma. The source maps consisted of nine USGS 1:250,000-scale quadrangle maps and three 1:125,000 scale county maps. This publication presents a digital composite of these data intact and without modification across quadrangle boundaries to resolve geologic unit discontinuities. An ESRI ArcView shapefile formatted version and Adobe Acrobat (pdf) plot file of the compiled digital map are also provided.

INTRODUCTION

The purpose of this report is to release a digital geologic map database for the state of Oklahoma. This database was compiled for the U.S. Geological Survey (USGS) Minerals Program, National Surveys and Analysis project, whose goal is a nationwide assemblage of geologic, geochemical, geophysical, and other data. This part of the project is to prepare a national geologic map database for the U.S. utilizing digital state geologic maps. This dataset was developed to provide a digital geologic map database for Oklahoma for the project since no such database was publicly available.

A 1:500,000-scale surficial geologic map of Oklahoma has been published (Miser, 1954), but this map is not available in digital form. However, the state had also been mapped more recently as part of a series of extensive ground water studies, done in cooperation with the Oklahoma Geological Survey, and these maps had been digitized by the USGS (Cederstrand, J.R., 1996a-1). These previously published reports contain information on surficial geologic units, in addition to geologic structure. The reports for three counties of the Oklahoma panhandle are based on 1:125,000-scale Hydrologic Information Atlases published by the USGS. The reports for the other nine (1 by 2 degree) quadrangles are based on 1:250,000-scale Hydrologic Atlases published by the Oklahoma Geological Survey. Figure 1 presents an index map to the quadrangles and counties and associated USGS Open-File Report. Links to all of these digital maps and accompanying files can be found online at "Data and Metadata for: Digital Geologic Maps of Oklahoma, U.S. Geological Survey Open-File reports 96-370 through 96-381: <http://www.ok.cr.usgs.gov/gis/geology/index.html>. The references used for this digital compilation are cited in the references section below.



Figure1. Map showing county and quadrangle names, and associated USGS Open-File Report numbers used in this compilation.

The present database is a synthesis of the existing twelve databases to produce an integrated geologic map database for the state. The OK_map.pdf file supplied with this report presents a graphical representation of the composite digital data. These data are presented intact as is and without modification to resolve geologic unit discontinuities at quadrangle boundaries. However, some adjustments were necessary to create a composite database. These include:

- (1) Unit symbols - in some cases in the source maps unit symbols change from quadrangle to quadrangle so we have created a unified set of map symbols such that the same stratigraphic unit has the same map symbol in all quadrangles where it is found.
- (2) Unit names - in some cases in the source maps a map unit changes name from quadrangle to quadrangle so we have created composite unit names (for example, in one or more reports we find the “Antlers Sand” unit whereas elsewhere we have the “Antler sandstone” and therefore we assign a composite unit name of “Antlers Sand or Antlers Sandstone”).
- (3) Unit descriptions - we have not created unified map unit descriptions such that each unit has a single description but rather we have compiled the unit descriptions quadrangle by quadrangle retaining the individual unit descriptions from each quadrangle in which the unit occurs (see OK_legend file).
- (4) Quadrangle boundary discontinuities – these data from the twelve original sources are pieced or composited together and we did not attempt to modify or fix boundary discontinuity problems at quadrangle joins (i.e. where contacts fail to meet exactly, or where there are stratigraphic unit differences between quadrangles). The geologic data from the nine quadrangles and three

counties were mostly contiguous, but map unit anomalies do occur where the quadrangles are joined. For example a polygon labeled “alluvial” may terminate abruptly against a quadrangle boundary or a unit that was undivided in one quadrangle joins against a subdivided unit in the adjacent quadrangle such that the contacts of the latter unit terminate abruptly at the quadrangle boundary. These kinds of problems arise due to differences in how units were compiled or defined in the different quadrangles and cannot be properly resolved without additional field mapping and interpretation.

(5) Surficial alluvium – in the source data all quadrangles but the Admore-Sherman sheet show mapped surficial alluvium. The Admore-Sherman quadrangle map, however, did contain a 1:600,000 scale alluvial map that was digitized and added to the digital data for the quadrangle.

(6) Lithologic coding - as part of the national geologic map compilation referred to above, a standard lithologic coding scheme was applied to the database and is presented in the OK_legend files. The geologic unit lithology is subdivided by abundance of rock type into major; 33% or greater; minor; 10-33%, and incidental; <10%, based on the original map descriptions.

The formats for the data are ARC/INFO interchange (e00) format, and ESRI shapefile format. The map may be plotted or viewed using the provided Adobe Acrobat .pdf file (OK_map.pdf). The OK_map.pdf plot file lists the map unit symbol and name but lacks geologic unit descriptions, because the Oklahoma digital map has approximately 170 units whose descriptions are too voluminous to present on the map. These unit descriptions are available as separate Microsoft Word and Adobe Acrobat files (OK_legend.doc and OK_legend.pdf) that can be printed as an accompaniment to the OK_map.pdf plot file. These data are suitable for plotting at 1:250,000-1:500,000 scale and use at scales significantly different is not recommended, especially at larger scales because significant locational error can occur. The Adobe Acrobat Reader software for viewing pdf files can be downloaded from <http://www.adobe.com/>.

MAP LEGEND FORMAT

Individual geologic unit descriptions are compiled from the source data for each quadrangle in which they occur and are presented in the OK_legend.doc and OK_legend.pdf files. The units are listed from youngest to oldest (approximate chronostratigraphic order) and in approximate stratigraphic position. The map legend format is as follows:

- (a) general unit information:
 - unit geologic symbol
 - unit name
 - unit age (Series) and age range
 - unit lithology subdivided by abundance of rock type (major; 33% or greater; minor; 10-33%, and incidental; <10% - note that this lithologic subdivision is the only interpreted part of the legend and is based on the original map descriptions);
- (b) unit description (for each quadrangle that the unit occurs in):
 - quadrangle name
 - unit lithologic description (as given on the source map)
- (c) comments:
 - for some units, additional descriptive comments obtained from the USGS Stratigraphic Nomenclature Database (Mac Lachlan and others, 1992)

An example of a map legend entry follows:

Kgb- Grayson Marl and Bennington Limestone

Series: Cretaceous
Maximum Age: Early Cretaceous
Minimum Age: Early Cretaceous
Lithology:
Major: marl
Minor: limestone
Incidental:

ARDMORE-SHERMAN- "Grayson Marl," marl, olive-gray, weakly indurated; thickness, about 25 feet. "Bennington Limestone" at base is moderately indurated, medium bedded; thickness, about 10 feet.

McALESTER TEXARKANA- "Grayson Marl," olive-gray, weakly indurated; with *Texigryphaea roemeri*;" thickness, about 25 feet. "Bennington Limestone" at base, limestone, gray to gray-brown, sandy, fossiliferous, overlapped eastward by Woodbine; thickness, 6 to 18 feet.

Comments: marl refers to loosely consolidated calcareous clays, silts and sands containing glauconite

SPECIAL SYMBOLS

The legend.doc file included with this publication utilizes a special font, GeoAgeFullAlpha, to properly display special symbols for Mesozoic, Triassic, Pennsylvanian, and Cambrian map units. For these symbols to appear properly the GeoAge font must be installed in system font directory. Installation of the GeoAge font is not critical but without this font being installed these symbols will appear instead as a } for the Mesozoic (Mz) symbol, ^ for Triassic, * for Pennsylvanian, and _ for the Cambrian (e.g *ht = Pennsylvanian Hilltop Formation). Installation instructions for the GeoAge font is found in the GeoAge1.1 directory included with the files for this publication.

Having this font installed also means that you can use this font for your own purposes. Also included in the GeoAge directory is the GeoAge_char_table.pdf that shows you the key substitutions for use of the font (i.e. with the font installed and selected you can use the font in your own programs to produce these special symbols. With the GeoAge font selected just type the keyboard character indicated in the table, e.g. typing an cap (^) character will give you the Triassic symbol).

INCLUDED FILES

The following files are included with this publication.

- Introduction.pdf - description and purpose of this publication in Adobe Acrobat .pdf format
- Introduction.doc - description and purpose of this publication in Microsoft Word .doc format
- OK_legend.pdf - geologic map unit descriptions in Adobe Acrobat .pdf format
- OK_legend.doc - geologic map unit descriptions in Microsoft Word .doc format
- OK_metadata.txt – metadata text file describing the ARC/INFO database
- ESRI ARC/INFO files [directory]
- ArcView ESRI shapefile [directory]
- OK_map.pdf – graphic representation of the digital geologic map in Adobe Acrobat .pdf format

OK_color.txt - tab delineated text file of color values used for pdf plot file in *cymk* format
Geoage font directory – Truetype font for displaying geologic age symbols in OK_legend.doc

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