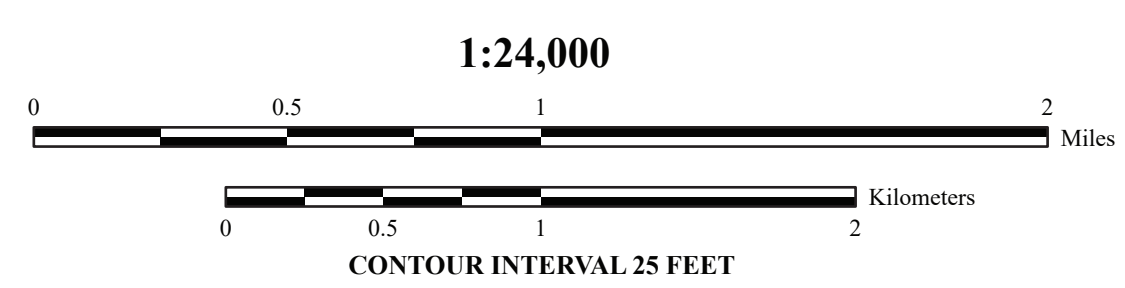
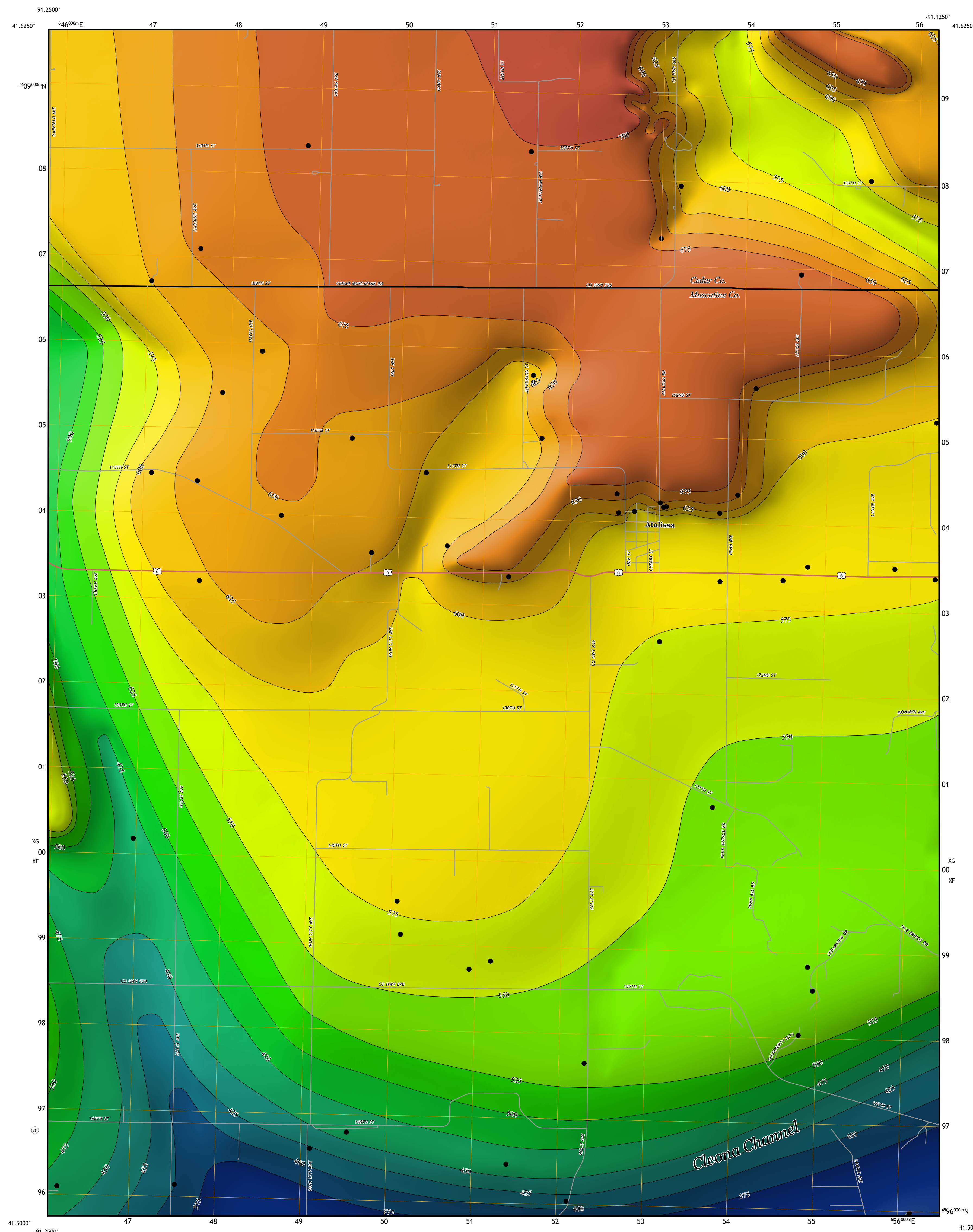


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BEDROCK ELEVATION

QUATERNARY THICKNESS



INTRODUCTION

The Atalissa 7.5' Quadrangle in Muscatine and Cedar counties, Iowa is located within the Southern Iowa Drift Plain (SIDP) and Iowa-Cedar Lowland (ICL) landform regions. The SIDP is an area with a topography defined by loess-mantled uplands and slopes, whereas the ICL is a low-relief floodplain consisting of sediment deposited by the Cedar River. The top of the till package of the SIDP in the map area is likely Pre-Illinoian-age diamicton of the Wolf Creek/Alburnett formations. The ICL is a broad, flat lowland that is full of outwash deposited during the Late Wisconsin Episode and the Cedar River has formed Holocene terraces in this valley. The shape of the ICL does not directly correspond with the underlying bedrock channel (Cleona Channel).

The Cleona Channel is a buried bedrock valley that trends in a southwest – northeast direction across the southeastern portion of the map area, and this channel can be up to 325 feet deep below the modern surface. Although entirely buried by Quaternary deposits, the bedrock surface of the Atalissa 7.5' Quadrangle is dominated by Middle Devonian strata of the Little Cedar Formation (Cedar Valley Group) and the Fincon Ridge Formation (Wapsipicon Group). Silurian strata of the Gower and Scotch Grove Formations make up the bedrock surface of the Cleona Channel. Just to the east of the mapping area these Paleozoic stratigraphic units are exposed in the Moscow Quarry (Wendling Quarries Inc. in the Wilton 7.5' Quadrangle).

The Bedrock Elevation and Quaternary Thickness Maps of the Atalissa 7.5' Quadrangle were produced concurrently with the Bedrock Geologic Map (Open File Map OFM-23-05). Like much of Iowa, the bedrock surface within the quadrangle is entirely concealed by glacial deposits. The boundary between Paleozoic bedrock and unconsolidated Quaternary deposits is likely just as irregular as the land surface itself, as a result, the thickness of the Quaternary varies widely across the quadrangle and ranges from 7 to 100 m (25-325 feet).

METHODOLOGY

The Bedrock Elevation and Quaternary Thickness Maps of the Atalissa 7.5' Quadrangle were constructed using the same datasets as the Bedrock Geologic Map (Open File Map OFM-23-05). Geologic information used included drilling records housed in the Iowa Geological Survey (IGS) GeoSam database, existing maps and technical reports, Iowa Department of Transportation (IDOT) data, and reports from engineering projects and quarry operators.

More than 100 boring records from the IGS GeoSam database, including both driller's logs and lithologic descriptions of well cutting samples (strip logs), were evaluated for the Atalissa 7.5' Quadrangle and the area surrounding the quadrangle. Each record was checked for locational accuracy using information from the driller's logs, historic plat books, county assessor information, and direct communication with landowners. The depth to the surficial-bedrock contact was determined for each well and assigned an elevation value by subtracting it from the surface digital elevation model (DEM). These data points provided the framework for the Bedrock Elevation Map. Additional information was gained from an assessment of the Natural Resources Conservation Service (NRCS) county soil survey by identifying soil series that indicate shallow bedrock.

To create the Bedrock Elevation Map bedrock elevation contours were digitized manually on-screen using ArcGIS Pro 3.0 software at a 25-foot contour interval. The bedrock elevation raster was generated using interpolations of the bedrock surface created with the "Fuzzy to Raster" and "Empirical Bayesian Kriging" tools in ArcGIS Pro 3.0. The Quaternary Thickness Map was created by subtracting the bedrock elevation raster values from the surficial DEM raster. The resulting surface was rounded to the nearest integer and contours were generated from this result and then smoothed.

BEDROCK ELEVATION



MAP SYMBOLS

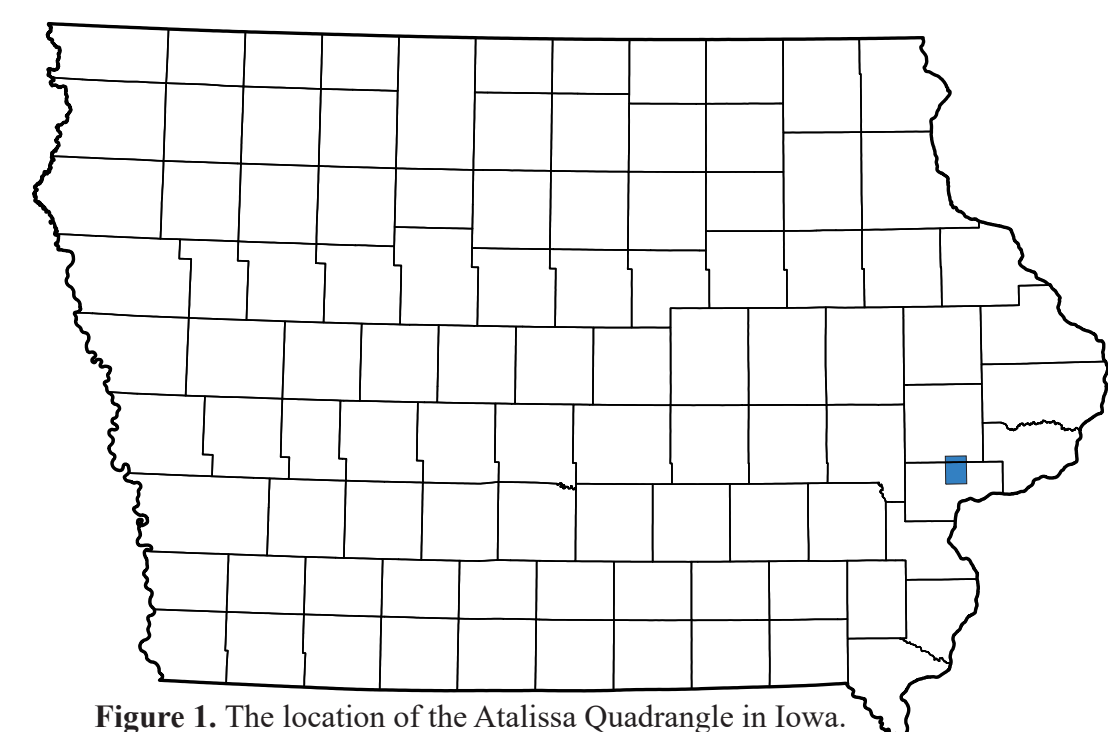
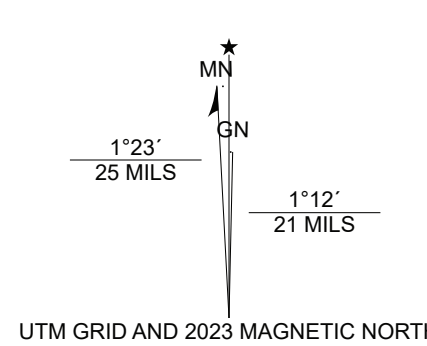
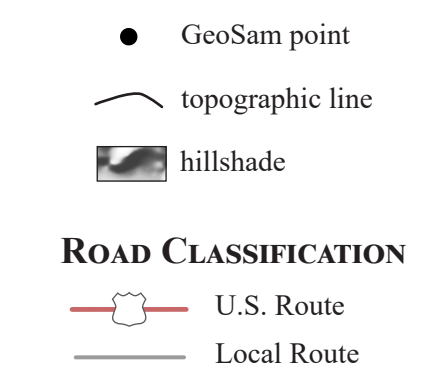


Figure 1. The location of the Atalissa Quadrangle in Iowa.

ADJOINING QUADRANGLES		
1	2	3
4	5	6
7	8	

ACKNOWLEDGEMENTS

We sincerely appreciate John Tahill and Drew Frey (Wendling Quarries) for providing us with access to quarries in and around the mapping area. University of Iowa (UI) Department of Earth and Environmental Sciences (EES) students Dan Bloch helped with updating well locations. Special thanks to Joseph A. Devera (Illinois State Geological Survey) for ongoing discussions about the Paleozoic stratigraphic succession in Muscatine County, Iowa across the Mississippi River in western Illinois (Rock Island and Mercer counties). Thanks to Richard (Risk) J. Langel of the Iowa Geological Survey (IGS) for managing the Iowa geologic sampling database (GeoSam). Additional funding for students was provided by the National Science Foundation (NSF) Award #2119888 (NSF IUSE-GEOPATHS, GP-GO: Iowa Environmental Internship Pathways Program). Administrative support was provided by Suzanne G. Doenshak, Melissa S. Eskrich, Teresa R. Gaffey, Caren M. Langel, and Rosemary T. War.

Base map from U.S. Geological Survey (USGS) Atalissa 7.5' Quadrangle map, published by the USGS in 2022. Bedrock topography raster created internally for this map project. Atalissa_8R_20a.mxd, version 7/01/23 (ArcGIS Pro 3.0). Map projection and coordinate system based on Universal Transverse Mercator (UTM), Zone 18N, datum NAD83. The maps are based on interpretations of the best available information at the time of mapping. Map interpretations are not a substitute for detailed site-specific studies. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

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