



The following was presented at DMT'09 (May 10-13, 2009).

The contents are provisional and will be superseded by a paper in the DMT'09 Proceedings.

See also earlier Proceedings (1997-2008) http://ngmdb.usgs.gov/info/dmt/

MINNESOTA GEOLOGICAL SURVEY **INFORMATION SYSTEMS**

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Abstract

The Minnesota Geological Survey is conducting a systematic enhancement of information systems, starting with a recently completed inventory of every publication released since 1872, suitable for conversion into a database. Web-accessible, searchable PDF page scans-totaling 40,000 pages—are nearly completed. Web accessible raster scans of every map released since 1872—a total of 600 maps—are now online. Enhancements to maintenance and cataloging of collections and databases—such as heavilyused drillhole information—are planned and in progress. Major upgrades of state magnetic, gravity, and rock property databases are in progress, with the magnetic data completely revised. Compilation of a state geochemical database, anew, multi-layered statebedrock geology map, and a compilation of web-optimized geologic mapping layers for use with WMS and FMS servers is underway. Quantitative analysis of material characteristics of groundwater systems, such as fracture control of hydrogeologic properties, is moving ahead. Most importantly is the continuation and acceleration of the core MGS program, multi-layered County Geologic Atlases.

Enhancements of curation and cataloging of collections and databases such as heavily-used CWI drillhole information

MGS collections include hand samples, thin sections, sediment samples, geochemical samples, and cuttings. MGS contributes to the DNR drill core library and mineral exploration file archive, and the University paleontological archive. MGS databases include field notebooks, geological mapping data, karst database, sediment textural and lithological data, geochemical data, aeromagnetic database, gravity database, rock properties database, borehole geophysical logs, the water well database that MGS co-manages with the Minnesota Department of Health (MDH), and geotechnical data. Materials and data are well stored, although document collections are vulnerable to disaster. Needed actions include enhanced cataloging, scanning, more consistent and interoperable database structures, and improved web accessibility.

About

5,000

borehole

geophysica



CWI--Over 440,000 well records 195,000 located and interpreted

5,000 water well cuttings samples,

5,000 Quaternary and Giddings samples (60,000 feet of described Giddings drilling)



















THE GEOLOGY OF MINNESOTA.

ad cut shows a mixture of Cretaceous clay with the Cambrian, the top of the whole being thinl

nd irregularly covered over and chinked up with coarse drift. The Cambrian is more or less

roken and tilted, at least the bedding seems to have been cut out into huge blocks by divisional lanes, which, either by weathering or water-wearin , were widened, the blocks themselves being

absequently thrown to some extent from their ho izontality, tipping in all directions. The

pened cracks and seams were then filled with the Cretaceous clay, which is deposited between

loosened masses, and sometimes even to the depth of twenty feet below the general surface

te top of the rock. The clay sometimes occupies nooks and rounded angles, sometimes shell

d below heavy masses of the Cambrian beds. The clay is uniformly bedded, about horizon lly, with some slope in accordance with the surface on which the sedimentation took place.

it the most interesting and important feature is the condition of these old Cambrian surfaces 'hey are rounded by the action of water, evidently waves. The cavities and porous spots are

tore deeply eroded, making little pits on the face of the rock; or along the lines of section of the

edimentation planes with the eroded surface, there are furrows due to the greater effect of water. 'he rounded surface of these huge masses of limestone is coated with a thickness of about a half inch, or an inch and a half, of iron ore, which scales off easily, and is easily broken by the ham-

r. While this scale of iron ore is thicker near the top and on the upper surface of the blocks,

Another deposit of greenish clay (Fig. 25) similar to the two last described, enclosed in a

cavity of the Shakopee limestone and in part appearing to be a stratum overlain by it, was noted beside the carriage road from South Bend to Mankato close east of its bridge over the Blue Earth

FIG. 25. CRETACEOUS CLAY BENEATH THE SHAKOPEE LIMESTONE, MANKATO.

a. Shakopee limestone. b. Bedded greenish clay, weathering white, but little sandy. c. Sandy, bedded greenish clay. d. Drift, mostly coarse fragments of Shakopee limestone.

In the S. W. 1 of section 20, Lime, the quarry of J. R. Beatty & Co. exhibits a thickness of

pllowed in shallow pot-holes. Near the middle of the quarry face, as it was at the time of exam-

ation, these waterworn cavities reach to a depth of fifteen feet, their sides being in part en-

rusted with an iron-rusty scale, an eighth to a half of an inch thick. They are filled with very

nches in diameter are almost perfectly spherical. In some of these crevices scanty traces of whi

lay occur with the gravel, the former being probably Cretaceous, while the latter seems to be ider than the glacial drift, and may be Cretaceous or of earlier date, possibly representing the

period in which these hollows were eroded. Close west of this quarry is found a thick bed of whitish, very fine earth (analysis 2, page 488), containing too little clay for brick-making.

Professor Winchell writes as follows respecting these probably Cretaceous deposits at locali

ties recently examined by him near Mankato. "At the quarry of the Standard Cement company lately opened in the east bank of the Blue Earth river about a third of a mile south of the rail

road bridge, the Shakopee limestone is separated from the Jordan sandstone by a course of ligh green or often nearly white shale or clay, highly siliceous and aluminous, having a thickness of

about three feet. The hydraulic qualities of the Shakopee limestone seem to be associated with

he occurrence of this bed of shale, and to be altogether an accidental and local character. The formation has before been known to be somewhat hydraulic, but here this quality is so far

extended as to make a valuable source of hydraulic lime. In the Shakopee limestone here are also numerous pits and gorges, rounded off with age and crusted over with a ferruginous scale

y to twenty-five feet of the Shakopee limestone. The top of this ledge is waterworn and

'erruginous gravel, much waterworn, so that sometimes its pebbles up to three or four

et it runs down between the Cretaceous clay and the body of the rock."

Web accessible rasters of every map released since 1872

Since 1872, MGS has published over 600 maps. These were scanned as one batch with support from University of Minnesota Libraries Digital Collections Unit. Jpg2000 files are now web accessible and pdf files are available for download. There will be ongoing effort to optimize searchable OCR content. Folded inserts from reports are included among these maps.

	MAP DESCRIPTION					
	Tite	Creator	Contributor	Description	Date of Creation	Publishing Agency
	Geologic map of the Sherry Lake	Jirsa, Mark A.		Interpretations of bedrock geology (distribution of	1988	Minnesota Geological
	duadrangie, itasca County, Minnesota, M-64.			sediments) of the Sherry Lake quadrangle, scale		Survey
1	0	N/8		1:24,000	1000	M
2	Geologic map of the Silver Bay and Split Rock Point NE quadrangles, Lake County, Minnesota, M&S	Miller, James D., Jr.		rock at the land surface and beneath surface sediments) of the Silver Bay and Split Rock Point	1988	Minnesota Geological Survey
-	Geologic map of the Illgen City	Miller, James D., Jr.; Green,	Dept. of Geology	Interpretations of bedrock geology (distribution of	1989	Minnesota Geological
	quadrangle, Lake County, Minnesota, M-66.	John C.; Boerboorn, Terrence J.	University of Minnesota, Duluth,	rock at the land surface and beneath surface sediments) of the Illgen City quadrangle, scale		Survey
3	Bedrock geologic man of parts of	ling a Mark A · Doorboom		1:24,000	4000	Minnegota Goologias!
74	Eeurock georogic map of parts of Koochiching, Itasca, and Beltrami Counties, north-central Minnesota, M-67.	Jiisa, maik A.; Boerboom, Terrence J.		rock at the land surface and beneath surface sediments), north-central Minnesota, scale 1:250.000	1990	Survey
	Bedrock geologic map of northeastern Itasca County, Minnesota, M-68.	Jirsa, Mark A.		Interpretations of bedrock geology (distribution of rock at the land surface and beneath surface sediments), northeastern Itasca County, scale	1990	Minnesota Geological Survey
75	Geologic mans of the Late	Setterholm Dale R		1:48,000	1000	Minnesota Geological
6	Cretaceous rocks, southwestern Minnesota, M-69, Plate 1.	Settemoin, Pale K.		rock at the land surface and beneath surface sediments) of Cretaceous age rocks, southwestern Minnesota, scale 1:750.000	1880	Survey
	Geologic maps of the Late Cretaceous rocks, southwestern Minnesota, M-69, Plate2.	Setterholm, Dale R.		Bedrock topography (elevation of the bedrock surface) of the sub-Cretaceous surface; Bedrock topography of the sub-Guaternary surface; Isopachs (thickness) of residual Cretaceous strata; Isopachs (thickness) of Quaternary strata, scale	1990	Minnesota Geological Survey
	Distribution of arsenic in ground water and rocks, southwestern	Morey, G.B.; Setterholm, Dale R.; Kanivetsky, Roman		Map showing the distribution of Arsenic in ground water and rocks in southwestern Minnesota, scale	1990	Minnesota Geological Survey
10	Minnesota, M-70. Geologic map of the North Shore of Lake Superior, Lake and Cook Counties, Minnesota: Part 1. Little	Green, John C.	Dept. of Geology University of Minnesota, Duluth,	1 inch = 7.5 miles Interpretations of bedrock geology (distribution of rock at the land surface and beneath surface sediments), North Shore of Lake Superior, scale	1992	Minnesota Geological Survey
79	Marais to Tofte, M-71. Geologic map of the Dode Lake	Miller James D. Jr.: Green	Dept. of Geolom	1:24,000	1993	Minnesota Geological
0	and Finland quadrangles, Lake County, Minnesota, M-72.	John C.; Boerboom, Terrence J.; Chandler, Val W.	University of Minnesota, Duluth,	rock at the land surface and beneath surface sediments) of the Doyle Lake and Finland guadrangles scale 1:24.000		Survey
31	Bedrock geology of Waseca County, Minnesota, M-73, Plate 1.	Bloomgren, Bruce A.		Interpretations of bedrock geology (distribution of rock at the land surface and beneath surface sediments), scale 1:82,500, Waseca County	1993	Minnesota Geological Survey
82	Bedrock geology of Waseca County, Minnesota, M-73, Plate 2.	Bloomgren, Bruce A.		Structure (recognizable features produced by deformation of rocks) maps of the St. Peter Sandstone, Prainie du Chien Group, and Jordan Sandstone: Isopach (thickness) maps of the St. Peter Sandstone: Isopach (thickness) maps of the St. Peter Sandstone and Prainie du Chien Group and aeromagnetic anomaly data (relative to the earth's magnetic field interpretation of magnetic data collected from airborne surveys indicating the distribution and concentration of magnetic minerata (primarily iron-bearing) within the upper crust of the earth, scale 1/125,000	1993	Minnesota Geological Survey
3	Bedrock geology of Waseca County, Minnesota, M-73, Plate 3.	Bloomgren, Bruce A.		Cross sections and structure (recognizable features produced by deformation of rocks) map of the Mt. Simon Sandstone, extending into Le Sueur and Rice Counties, scale 1:100,000; water quality- chemistry from bedrock wells, scale 1:125,000	1993	Minnesota Geological Survey
	Reconnaissance geologic map of the Northwest quadrangle, Lake of the Woods County, Minnesota,	Zamzow, C.E.; Morey, G.B.		Interpretations of bedrock geology (distribution of rock at the land surface and beneath surface sediments), Northwest Angle, scale 1:48,000	1991	Minnesota Geological Survey

An up-to-date inventory and database of every publication released since 1872

Databases of MGS publications previously maintained in multiple and varying formats are being consolidated into a comprehensive master listing, and plans call for enhancing arrangements for submission of the listing and updates to the USGS, Georef, and the University of Minnesota Library system.



New multi-layered state bedrock geology map

Having conducted much new geologic mapping since the last update in 2000, and having reprocessed the aeromagnetic data, a new State Bedrock Geologic Map will be produced in 2009. In GIS format, the map will have separate layers for water, Quaternary, Mesozoic, Paleozoic, and four late Precambrian units. Archean and other basement rocks will comprise the basal layers of the rock GIS themes. Additional themes will include diabase dikes and metamorphic grade, bedrock topography, outcrops and overburden thickness.





3-Dimensional models of buried sand layers

