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1 Geologic History

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AAPG, 1984, *Northern Great Plains Geological Highway Map* (North Dakota, South Dakota, Iowa, Nebraska, and Minnesota). AAPG: Tulsa, OK.

Websites

The Paleomap Project, Scotese, C.R., http://www.scotese.com.

Paleogeography, Blakey, R. (The older, but free, version of the site.)
https://www2.nau.edu/rcb7/RCB.html.

Reconstructing the Ancient Earth, Colorado Plateau Geosystems, Blakey, R. (Blakey's updated site.)
http://cpgeosystems.com/index.html.

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Rock and Mineral Field Guides

Dixon, Dougal, 1992, *The Practical Geologist: The Introductory Guide to the Basics of Geology and to Collecting and Identifying Rocks*. Simon and Schuster: New York.

Johnsen, O., 2002, *Minerals of the world*. Princeton University Press: Princeton, NJ.

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Books

Vernon, R. H., 2000, *Beneath our feet: The rocks of planet Earth*. Cambridge University Press: Cambridge, UK.

Websites

Atlas of Igneous and Metamorphic Rocks, Minerals and Textures, Univ. North Carolina Geology Department (Older but still useful resource.)
http://leggeo.unc.edu/Petunia/IgMetAtlas/mainmenu.html.

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General Books on the Fossil Record and Evolution

Allmon, W., 2009, *Evolution & creationism: A very short guide*. Paleontological Research Institution: Ithaca, NY.

Benton, M. J., 2008, *The history of life: A very short introduction*. Oxford University Press: Oxford, UK.

Fenton, C. L., & Fenton, M. A., 1958, *The fossil book: a record of prehistoric life* (1st ed.). Doubleday: Garden City, NY. (a well-illustrated classic)

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Anderson, W.I., 1998, *Iowa's geological past: Three billion years of change*. University of Iowa Press, Iowa City, 440 p.

Feldmann, R.M., ed., 1995, *Fossils of Ohio*. Ohio Geological Survey Bulletin 70, 577 p.

Hagadorn, J.W., R.H. Dott, and D. Damrow, 2002, Stranded on an Upper Cambrian shoreline: Medusae from central Wisconsin. *Geology*, 30: 147-150.

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Holman, J.A., 2001, *In quest of Great Lakes Ice Age vertebrates*. Michigan State University Press, East Lansing, 230 p.

Kesling, R.V. and Chilman, R.B., 1975, *Strata and megafossils of the Middle Devonian Silica Formation*. University of Michigan Museum of Paleontology Papers on Paleontology No. 8, 408 p.

Kchodl, J.J. and Chase, R., 2006, *The complete guide to Michigan fossils*. University of Michigan Press, Ann Arbor, and Petoskey Publishing Co., Traverse City, 109 p.

Meyer, D., and Davis, R.A., 2009, *A sea without fish. Life in the Ordovician sea of the Cincinnati region*. Indiana University Press, Bloomington, 346 p.

Mueller, B., and Wilde, W. H.,2004, *The complete guide to Petoskey stones*. University of Michigan Press, Ann Arbor.

Nehm, R.H., Bemis, B.E., 2002, *Common Paleozoic Fossils of Wisconsin*. Wisconsin Geological and Natural History Survey , Educational Series 45, 25 p.

Phillips, T.L., Avcin, M.J., Berggren, D., 1976, *Fossil peat of the Illinois Basin: A guide to the study of coal balls of Pennsylvanian age*. Illinois State Geological Survey, 39 p.

Rose, J.N., 1967, *Fossils and rocks of eastern Iowa. A half-billion years of Iowa history*. Iowa Geological Survey, Educational Series 1, 147 p.

Sloan, R., 2005, *Minnesota fossils and fossiliferous rocks*. Published by the author, Winona, MN, 218 p.

Shabica, C.W., and Hay, A.A. (eds.), 1997, *Richardson's guide to the fossil fauna of Mazon Creek*. Northeastern Illinois University Press: Chicago, 308 p.
Wittry, J., 2012, *The Mazon Creek fossil fauna.* Earth Science Club of Northern Illinois, in association with Northeastern Illinois University, Chicago, 202 p.
Wolf, R., 1983, *Fossils of Iowa: Field guide to Paleozoic deposits*. Iowa State University Press: Ames, 212 p.

Guides to Collecting and Identifying Fossils

Arduini, P., Teruzzi, G., & Horenstein, S. S., 1986, *Simon & Schuster's guide to fossils*. Simon and Schuster: New York.
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Murray, M., 1967, *Hunting for Fossils: A Guide to Finding and Collecting Fossils in All Fifty States*, The Macmillan Company: Toronto, Canada.
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Walker, C., Ward, D. & Keates, C., 2009, *Smithsonian Handbook of Fossils*. Dorling Kindersley Coven Garden Books: New York.

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Wyckoff, J., 1999, *Reading the Earth: landforms in the making*. Adastra West, Inc.: Mahwah, NJ.

Websites

Color Landform Atlas of the US (Low resolution shaded relief maps of each state.)
http://fermi.jhuapl.edu/states/states.html.

[Wisconsin] Major landscape features. Wisconsin Geological & Natural History Survey.
http://wgnhs.uwex.edu/wisconsin-geology/major-landscape-features/.

[Wisconsin] Karst and sinkholes. Wisconsin Geological & Natural History Survey.
http://wgnhs.uwex.edu/water-environment/karst-sinkholes/.

Mineral Resources

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Books

Skinner, Brian J., 1989, *Mineral Resources of North America*, vol. A, The Geological Society of America: Denver, CO.

State-based Resources

USGS Minerals Yearbook, Volume II – Area Reports: Domestic, State and Territory chapters, http://minerals.usgs.gov/minerals/pubs/state/index.html#pubs. (State-by-state information about mineral mining and production.)
Minerals of Wisconsin, Wisconsin Geological and Natural History Survey. http://wgnhs.uwex.edu/wisconsin-geology/minerals-wisconsin/.

Economic Minerals Prominent in the Midwest

Fluorite: The Illinois State Mineral, Illinois Department of Natural Resources. http://dnr.state.il.us/mines/education/indus2.htm.
Gypsum the Commodity, Indian Geological Survey. http://igs.indiana.edu/MineralResources/Gypsum.cfm.
Rock Salt Mining, Michigan State University. http://web2.geo.msu.edu/geomich/saltminingM.html.
Salt Mining, How Stuff Works. http://science.howstuffworks.com/innovation/edible-innovations/salt.htm.
Iron mining. http://wgnhs.uwex.edu/wisconsin-geology/iron-mining.

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Alley, R. B., 2000, The two-mile time machine: ice cores, abrupt climate change, and our future. Princeton University Press: Princeton, NJ.

Benn, D. I., & Evans, D. J.,2010, Glaciers & glaciation, (2nd ed), Arnold: London.

Fagan, B. M., 2009, The complete Ice Age: how climate change shaped the world. Thames & Hudson: New York.

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Ruddiman, W. F., 2001, *Earth's climate: past and future*. W.H. Freeman: New York.

White, C., 2013, *The Melting World: A Journey Across America's Vanishing Glaciers.* St. Martin's Press: New York.

State-focused Resources

Glacial Deposits of Wisconsin, Sand and Gravel Resource Potential, 1976, Map #10, WGNHS Publications.

[Illinois] Quaternary Deposits Map, Illinois State Geological Survey. (Map showing the extent of the Quaternary glacial deposits covering Illinois.) http://isgs.illinois.edu/sites/isgs/files/maps/statewide/quaternary-deposits-8x11.pdf.

Iowa Pleistocene Snail (*Discus macclintocki*) Fact Sheet, US Fish and Wildlife Service, Midwest Region. http://www.fws.gov/midwest/endangered/Snails/iops_fct.html.

Landscapes of Wisconsin, 2001, Map #142, Wisconsin Geological and Natural History Survey Publications.

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Bird, Kenneth J., 1989, North American Fossil Fuels. In: *The Geology of North America*, vol. A, The Geological Society of America: Denver, CO.

Duggan-Haas, D., R. M. Ross, and W. D. Allmon, 2013, *The Science Beneath the Surface: A Very Short Guide to the Marcellus Shale*. Paleontological Research Institution (Special Publication 43), Ithaca, NY, 252 p.

Hinrichs, R., & Kleinbach, M. H., 2012, *Energy: its use and the environment* (5th ed.). Thomson, Brooks/Cole: Belmont, CA.

Nye, D. E.,1998, Consuming power a social history of American energies. MIT Press: Cambridge, MA.

Richards, J., 2009, *Wind energy.* Macmillan Library: South Yarra, Victoria.

Smil, V., 2006, *Energy: a beginner's guide.* Oneworld: Oxford, UK.

Smil, V., 2010, *Energy myths and realities: bringing science to the energy policy debate.* AEI Press: Washington, DC.

Websites

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Energy literacy: Essential principles and fundamental concepts for energy education at Energy.gov, http://www1.eere.energy.gov/education/energy_literacy.html.

History of Energy Use in the United States, by Hobart King at Geology.com. http://geology.com/articles/history-of-energy-use/.

US Energy Information Administration (EIA), http://www.eia.gov/.

US Energy Information Administration (EIA), by state, http://www.eia.gov/state/.

USGS Energy Resources Program, http://energy.usgs.gov/.

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Lindbo, D. L., & Mannes, J., 2008, *Soil!: Get the inside scoop*. Soil Science Society of America: Madison, WI.

Lindbo, D. L., 2012, *Know soil, know life*. Soil Science Society of America: Madison, WI.

Logan, W. B.,1995, *Dirt: the ecstatic skin of the Earth.* Riverhead Books: New York.

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Soil Survey Staff, 2014, Illustrated guide to soil taxonomy. US Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska (Available for download at http://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=stelprdb1247203&ext=pdf.)

Websites

K-12 Soil Science Teacher Resources, Soil Science Society of America. http://www.soils4teachers.org/.

Soil Sustains Life, Soil Science Society of America, https://www.soils.org.

The Twelve Soil Orders Soil Taxonomy, University of Idaho College of Agricultural and Life Sciences, http://www.cals.uidaho.edu/soilorders/.

USDA Natural Resources Conservation Service—Soils. http://www.nrcs.usda.gov/wps/portal/nrcs/site/soils/home/.

Soil surveys by state, USDA Natural Resources Conservation Service http://www.nrcs.usda.gov/wps/portal/nrcs/soilsurvey/soils/survey/state/.

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Books

Allmon, W.D., Smrecak, T.A., and Ross, R.M., 2010, *Climate Change - Past Present & Future: A Very Short Guide*, Paleontological Research Institution: Ithaca, New York, 200 p.

Melillo, J.M., Richmond, T.C., and Yohe, G.W. (eds.), 2014, Climate Change Impacts in the United States. The Third National Climate Assessment. US Global Change Research Program, 841 p.
Available online at http://www.globalchange.gov/nca3-downloads-materials.

Ruddiman, W.F., 2014, *Earth's Climate: Past and Future*, W.H. Freeman and Company: New York, NY

Committee on the Importance of Deep-Time Geologic Records for Understanding Climate Change Impacts, 2011, Understanding Earth's deep past lessons for our climate future. 2011, Washington, D.C.: National Academies Press.
Available online at http://www.nap.edu/download.php?record_id=13111.

Websites

Climate Impacts in the Midwest, EPA, 2013.
http://www.epa.gov/climatechange/impacts-adaptation/midwest.html.

Climate Literacy & Energy Awareness Network (CLEAN). (A rich collection of resources for educators.)
http://www.cleanet.org.

Envisioning Climate Change Using a Global Climate Model, by Youngman, B., Chandler, M., Sohl, L., Hafen, M., Ledley, T., Ackerman, S., and Kluge, S., SERC Earth Exploration Toolkit, http://serc.carleton.edu/eet/envisioningclimatechange/index.html.

Global Climate Change: Vital Signs of the Planet, NASA. (Climate data particularly from satellite-based remote sensing)
http://climate.nasa.gov.

Global Warming and Hurricanes, Geophysical Fluid Dynamics Laboratory, 2013.
http://www.gfdl.noaa.gov/global-warming-and-hurricanes.

Intergovernmental Panel on Climate Change, Fifth Assessment Report (AR5).
http://www.ipcc.ch/.

National Climate Assessment. (Reports summarizing impacts of climate change)
http://nca2014.globalchange.gov.

National Hurricane Data Center, NOAA. (News on current hurricane forecasts.)
http://www.nhc.noaa.gov.

National Weather Service, NOAA, http://www.weather.gov.

Regional Climate Trends and Scenarios for the US National Climate Assessment, NOAA.
http://www.nesdis.noaa.gov/technical_reports/142_Climate_Scenarios.html.

Weather Base. (Weather and climate data by country, state, and city.)
http://www.weatherbase.com.

Weatherunderground maps. (Variety of types of weather maps, including surface, temperature, moisture, wind, cloud cover, precipitation.)
http://www.wunderground.com/maps.

Why Does the U.S. Midwest Get So Many Severe Thunderstorms?, Cliff Mass Weather Blog Monday, 23 May 2011.
http://cliffmass.blogspot.com/2011/05/why-does-midwest-us-get-so-many-severe.html.

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Books

Macdougall, J. D., 2011, *Why geology matters decoding the past, anticipating the future.* University of California Press: Berkeley, CA

Websites: Storms

(See also resources on climate change in Chapter 9: Climate)

What is a tropical disturbance, a tropical depression, or a tropical storm?, NOAA Hurricane Research Division Frequently Asked Questions, 2011. http://www.aoml.noaa.gov/hrd/tcfaq/A5.html.
Thunderstorms and Flying. National Weather Association, 2003. http://www.nwas.org/committees/avnwxcourse.teachl1.htm.
TWC's Exclusive Tor:Con Index [tornado forecast] by Forbes, G., Weatherunderground, 2014. http://www.wunderground.com/news/tornado-torcon-index.
About Derechos, by Corfidi, S.F., Evans, J.S., and Johns, R.H., NOAA-NWS-NCEP Storm Prediction Center. http://www.spc.noaa.gov/misc/AbtDerechos/derechofacts.htm.
The Derecho of June 29, 2012, by Zubrick, S. National Weather Service, 2012. http://www.erh.noaa.gov/lwx/events/svrwx_20120629/.
Hazards Associated with Flooding, by Nelson, S., 2012. http://www.tulane.edu/~sanelson/Natural_Disasters/floodhaz.htm.
Floods: Recurrence Intervals and 100-year Floods, US Geological Survey, 2014. http://water.usgs.gov/edu/100yearflood.html.
Effects of Urban Development on Floods, USGS Fact Sheet FS-076-03, 2012. http://pubs.usgs.gov/fs/fs07603/.
What is the Polar Vortex?, NASA Ozone Watch, 2013. http://ozonewatch.gsfc.nasa.gov/facts/vortex_NH.html.
What's a Polar Vortex? The Science Behind Artic Outbreaks, by Erdman, J., 2014. http://www.wunderground.com/news/polar-vortex-plunge-science-behind-arctic-cold-outbreaks-20140106.

Websites: Earthquakes

USGS National Earthquake Information Center, USGS. http://earthquake.usgs.gov/regional/neic/.
US Earthquake monitor, USGS, http://earthquake.usgs.gov/earthquakes/map/.
Incorporated Research Institutions for Seismology (IRIS) education and public outreach. http://www.iris.edu/hq/programs/epo.
IRIS Seismic monitor, IRIS, http://www.iris.edu/seismon/.
Facts about the New Madrid Fault Zone, Missouri Department of Natural Resources. http://www.dnr.mo/gov/geology/geosrv/geores/techbulletin1.htm.

Websites: Radon

Radon: Health Risks, EPA, 2013, http://www.epa.gov/radon/healthrisks.html.
Radon Fact Sheet, Air Check, Inc., 2009, http://www.radon.com/radon/radon_facts.html.
Radon information, EPA, http://www.epa.gov/radon/index.html.
Radon Potential of the Upper Midwest, USGS, 1995. http://energy.cr.usgs.gov/radon/miswest4.html.

Websites: Sinkholes

The Science of Sinkholes, US Geological Survey, 2013.
http://www.usgs.gov/blogs/features/usgs_top_story/the-science-of-sinkholes.
Sinkholes in Missouri, Missouri Department of Natural Resources.
http://www.dnr.mo.gov/geology/geosrv/envgeo/sinkholes.htm.

Websites: Teaching Resources

Impact of Natural Disasters on the Earth by J. Radke, Hamline University Graduate School of Education MnSTEP Teaching Activity Collection.
http://serc.carleton.edu/sp/mnstep/activities/19789.html.
Investigating Speed and Acceleration Using Tornado Tubes, Hamline University Graduate School of Education MnSTEP Teaching Activity Collection.
http://serc.carleton.edu/sp/mnstep/activities/27202.html.
Karst Formation, City of Austin Youth Education resources.
http://austintexas.gov/sites/default/files/files/Watershed/youth_education/karst_lesson_high_school.pdf.
Natural Hazards and Risks: Hurricanes by Gilbert, L., Galster, J., and Ramage, J., SERC module on hurricane hazards.
http://serc.carleton.edu/integrate/teaching_materials/hasards/index.html.
Landslide Hazards Program, USGS, http://landslides.usgs.gov/.
Radon activities from the Alabama Radon Program, Alabama and Auburn Universities Extension.
http://www.aces.edu/fcs/hndh/radon/alradon.php.
Teaching Quantitative Concepts in Floods and Flooding, SERC Resources for Undergraduate Students and Faculty.
http://serc.carleton.edu/quantskills/methods/quantlit/floods.html.

Websites: State Resources on Earth Hazards

Illinois Emergency Management Agency, http://www.iema.illinois.gov/planning/HazardInfo.asp.
Illinois Natural Hazard Mitigation Plan 2013.
http://www.iema.illinois.gov/planning/documents/Plan_IllMitigationPlan.pdf.
Indiana State Environmental Health, Indiana State Department of Health.
http://www.in.gov/isdh/20389.htm.
Current Disasters in Iowa, Iowa Department of Natural Resources.
http://www.iowadnr.gov/InsideDNR/SocialMediaPressRoom/DisasterAssistance.aspx.
Iowa Disaster History, Iowa Homeland Security & Emergency Management.
http://homelandsecurity.iowa.gov/disasters//iowa_disaster_history.html.
Ohio Department of Public Safety.
http://ohiosharpp.ema.state.oh.us/OhioSHARPP/Hazards.aspx#overview.
Michigan Hazard Analysis, Michigan Emergency Management and Homeland Security Division, Michigan Department of State Police.
http://www.michigan.gov/documents/msp/Doc1_39416_7.pdf.
Minnesota Climate Hazards, Minnesota Department of Natural Resources.
http://www.dnr.state.mn.us/climate/index.html.
Minnesota Natural Disasters and Severe Weather, Minnesota Department of Health.
http://www.health.state.mn.us/divs/eh/emergency/natural/.
Wisconsin Emergency Management.
http://readywisconsin.wi.gov/Informed/Informed.asp?maintab=0.

Resources

Field Geology Teaching Practices

Greene, J. P., Kisida, B., & Bowen, D. H., 2014, The Educational Value of Field Trips. *Education Next*, *14*(1), 78–86.

Issigonis , M., 2006, Field Trips as an Aid to Teaching Earth Science Courses. *The Earth Scientist*, 22(3): 14–16.

Johnson, J.K., and Reynolds, S.J., 2005, Concept sketches – Using student- and instructor-generated annotated sketches for learning, teaching, and assessment in geology courses. *Journal of Geoscience Education*, 53: 85–95.

Orion, N., and Hofstein, A. (1994). Factors that influence learning during a scientific field trip in a natural environment. *Journal of Research in Science Teaching,* 31: 1097–1119.

Russell, H.R., 1998, *Ten-Minute Field Trips* (3rd ed.), National Science Teachers Association: Alexandria, VA. (Focused on elementary and junior high; chapter on Earth science p.113–137.)

Shulman, L. S., 2005, Signature pedagogies in the professions. *Daedalus*, 134(3): 52–59.

Whitmeyer, S.J., Pyle, E.J., Mogk, D.W. (eds.), 2009, *Field Geology Education: Historical Perspectives and Modern Approaches*, GSA Special Papers volume 461. (29 articles, focused on undergraduate education.)
Available at http://specialpapers.gsapubs.org/content/461.toc.

Extraordinary Science Field Trips, NSTA Reports, Summer 2013, 25(1): 1–2.
Available at http://www.nsta.org/docs/NSTAReports201307.pdf.

My Geologic Address: Locating Oneself in Geologic Time and Process, by Ault, K., SERC InTeGrate workshop "Teaching the Methods of Geoscience" activities.
http://serc.carleton.edu/integrate/workshops/methods2012/activities/ault.html.

Teaching in the Field, National Association of Geoscience Teachers. (Set of resources for teaching field geology.)
http://nagt.org/nagt/teaching_resources/field/index.html.

Guides to Fieldwork

(Mostly focused on post secondary education, but useful as references)

Coe, Angela; Argles, Thomas; Rothery, David and Spicer, Robert, 2010, *Geological Field Techniques*. Wiley Blackwell: Chichester. (This is a current standard.)

Compton, Robert R., 1962, *Manual of Field Geology*, John Wiley & Sons, Inc.: New York.(an old classic)

Compton, R., 1985, *Geology in the field*. Wiley: New York. (an updated version)

Lambert, David, 2006, *The field guide to geology*. The Diagram Group.

Lisle, R., Brabham, P. & Barnes, J., 2011, *Basic geological mapping.* Chichester, West Sussex Hoboken, NJ: Wiley-Blackwell.

Maley, Terry S., 2005, Field Geology Illustrated, Second Edition, Mineral Land Publications: Boise, Idaho.

Mathur, S.M., 2004, *Guide to Field Geology*. New Delhi: Prentice Hall of India.

Spencer, E., 2006, *Geologic maps : a practical guide to the preparation and interpretation of geologic maps*. Long Grove, Ill: Waveland Press.

Walker, J. & Cohen, H., 2009, *The geoscience handbook AGI data sheets.* Alexandria, Va: American Geological Institute.

Walker, J. Douglas, and Harvey A. Cohen, 2007, *The Geoscience Handbook: AGI Data Sheets*, 4th edition, American Geological Institute.

How to read a geologic map, Wisconsin Geological and Natural History Survey.
http://wgnhs.uwex.edu/wisconsin-geology/bedrock-geology/read-geologic map/.

Appendix

Resources

Following are some of the most commonly used and cited publications on science education standards and benchmarks.

AAAS, 1993, *Benchmarks for Science Literacy*, Oxford University Press. (AAAS is American Association for Advance of Science.)
Available online at http://www/[rpkect2-61.org/publications/bsl/online/index.php.

Bransford, J.D., Brown, A.L., and Cocking, R.R. (eds), 2000, *How People Learn: Brain, Mind, Experience, and School: Expanded Edition*, National Academies Press: Washington, DC.
Available online at http://www.nap.edu/openbook.php?record_id=9853.

Common Core State Standards Initiative. (While not focused on science education directly, standards on math and non-fiction reading impact are importantly related.)
http://www.corestandards.org.

NCSE, 2013, *Evolution and climate change in the NGSS*, National Center for Science Education.
http://ncse.com/news/2013/04/evolution-climate-change-ngss-0014800.

NGSS@NSTA website, National Science Teacher Association, http://ngss.nsta.org/.

NRC, 1996, *National Science Education Standards*. National Academies Press: Washington, DC. (NRC is National Research Council, and body of the National Academy of Sciences)
Available online at http://www.nap.edu/openbook.php?record_id=4962.

NRC, 2011, *Successful K-12 STEM Education: Identifying Effective Approaches in Science, Technology, Engineering, and Mathematics*. National Academies Press: Washington, DC.
Available online at http://www.nap.edu/openbook.php?record_id=13158.

NRC, 2012, *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*, National Academies Press: Washington, DC.
Available at http://www.nap.edu/openbook.php?record_id=13165.

NRC, 2013, *Next Generation Science Standards: For States, By States*. National Academies Press: Washington, DC.
Available online at http://www.nextgenscience.org/.

Wysession, M., 2013, The Next Generation Science Standards and the Earth and Space Sciences, *The Science Teacher*, April/May issue. (Duggan-Haas, author of this Appendix, worked with Wysession on NRC's Conceptual Framework for New Science Education Standards.)
Available at http://nstahosted.org/pdfs/ngss/resources/201304_NGSS-Wysession.pdf.

General Resources

On the Earth System Science of North America

Books

Bally, A.W., and Palmer, A.R., eds., 1989, *The geology of North America—An overview, v. A of The geology of North America*. Geological Society of America: Boulder, CO, 619 p.

Maps (printed)

Thelin, G.P. and Pike, R.J., 1991, *Landforms of the Conterminous United States—A Digital Shaded-Relief Portrayal*. USGS Miscellaneous Investigations Series Map I-2206, http://pubs.usgs.gov/imap/i2206/.

Muehlberger, W.R., compiler, 1992, Tectonic map of North America, scale 1:5,000,000. American Association of Petroleum Geologists: Tulsa, OK.

Reed, J.C., and Bush, C.A., 2007, *Geology: The National Atlas of the United States* 32 x 28", http://pubs.usgs.gov/circ/1300/.

Reed, J.C., and Bush, C.A., 2007, About the geologic map in the National Atlas of the United States of America: *US Geological Survey Circular* 1300, 52 p., http://pubs.usgs.gov/circ/1300/pdf/Cir1300_508.pdf.

USGS, 2005, *Resources for the Geologic Map of North America*. http://ngmdb.usgs.gov/gmna/.

Vigil, J.F., Pike, R.J., and Howell, D.G., 2000, *A tapestry of time and terrain*. US Geological Survey Geologic Investigations Series 2720, 1 plate scale 1:2,500,000, 1 pamphlet, http://pubs.usgs.gov/imap/i2720/.

Maps (online)

American Geological Institute's *Earth Comm* 2nd edition, Map Resources. http://www.agiweb.org/education/earthcomm2/maps.html (a compilation of online map resources).

Google Earth. http://www.google.com/earth/.

The National Atlas of the United States. http://nationalatlas.gov/mapmaker (custom-make maps).

The National Map. http://nationalmap.gov.

The National Map: Historical Topographic Map Collection. http://nationalmap.gov/historical/index.html (on-line historic topographic maps).

US Topo Quadrangles—Maps for America. http://nationalmap.gov/ustopo/index.html (on-line topographic maps).

Geologic time resources online

Correlated History of the Earth Chart, v 8, 2013 (Laminated).

International Commission on Stratigraphy, http://www.stratigraphy.org/.

The Paleontology Portal, paleoportal.org.

Dictionaries

Allaby, M.,2013, *A dictionary of geology and Earth sciences*. Oxford University Press: Oxford, UK.

Bates, R. Latimer, & Jackson, J. A.,1984, *Dictionary of geological terms* (3rd ed.), Anchor Press: Garden City, NY.

McGraw-Hill Education, 2003, *McGraw-Hill dictionary of geology and mineralogy*. McGraw-Hill: New York.

Earth system science organizations

American Association of State Geologists, http://www.stategeologists.org/.

American Geological Institute (AGI is an umbrella organization representing over 40 other geological organizaitons), http://agiweb.org.

American Geophysical Union, http://agu.org.

Association for Women Geoscientists, http://awg.org.

Geological Society of America, http://geosociety.org.

Natural Resources Conservation Service, http://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/ (NRCS helps US farmers, ranchers and forest landowners conserve soil, water, air and other natural resources).

Paleontological Research Institution, http://priweb.org (publisher of this volume).

Paleontological Society, http://paleosoc.org.

US Geological Survey, http://usgs.gov.

General Earth Science Education Resources

Websites

Digital Library for Earth System Education (DLESE), http://dlese.org.

Resources for Earth science and geography instruction, by Mike Francek, Mike, Central Michigan University, http://webs.cmich.edu/resgi/.

SERC (The Science Education Resource Center) K-12 resources, http://serc.carleton.edu/k12/index.html. (Hundreds of classroom activities organized by grade level and topic as well as guidance on effective teaching.)

SERC Earth Exploration Toolbook, http://serc.carleton.edu/eet/index.html. (Collection of online Earth system science activities introducing scientific data sets and analysis tools.)

Science education organizations

National Association of Geoscience Teachers, http://nagt.org. (Focuses on undergraduate geoscience education, but includes active secondary school educators.)

National Earth Science Teacher Association, http://nestanet.org. (Focused on secondary school Earth science education.)

National Science Teacher Association, http://nsta.org.

Resources by State

Geologic maps of individual US states. (Digital geologic maps of US states with consistent lithology, age, GIS database structure, and format.) http://mrdata.usgs.gov/geology/state.

Illinois

Frankie, W., 2004, *Guide to Rocks and Minerals of Illinois*. Geoscience Education Series 16. 69 p.
Illinois Geological Survey, https://www.isgs.illinois.edu.
Illinois Department of Natural Resources, http://www.dnr.illinois.gov/Pages/default.aspx.

Indiana

Camp, M. J., & Richardson, G. T., 1999, *Roadside geology of Indiana*. Mountain Press Publ.: Missoula, MT.
Bedrock Geology of Indiana, Indiana Geological Survey, http://igs.indiana.edu/Bedrock.
Indiana Geological Survey, http://igs.indiana.edu.
Indiana Department of Natural Resources, http://www.in.gov/dnr/.

Iowa

Anderson, W.I., 1998, *Iowa's geological past: Three billion years of change*. University of Iowa Press, Iowa City, 440 p.
Iowa Geological Survey, http://www.iihr.uiowa.edu.
Iowa Department of Natural resources, Environment, http://www.iowadnr.gov/Environment.aspx.

Michigan

Barker, C. F.,2005, *Under Michigan the story of Michigan's rocks and fossils*. Wayne State University Press: Detroit.
Mueller, B., & Gauthier, K.,2010, *Lake Huron rock picker's guide*. University of Michigan Press: Ann Arbor.
Michigan Geological Survey, http://wmich.edu/geologysurvey.
Michigan Department of Natural Resources, http://www.michigan.gov/dnr.

Minnesota

Gauthier, K., & Mueller, B., 2007, *Lake Superior rock picker's guide*. University of Michigan Press: Ann Arbor.
Ojakangas, R. W., 2009, *Roadside geology of Minnesota*. Mountain Press Publ.: Missoula, MT.
Ojakangas, R. W., & Matsch, C. L., 1982, *Minnesota's geology*. Minneapolis: University of Minnesota Press.
Sansome, C. J., & Sansome, K. N., 1983, *Minnesota underfoot: a field guide to the state's outstanding geologic features*. Boyageur Press: Bloomington, MN.
Natural History: Minnesota's Geology, Minnesota Department of Natural Resources. http://www.dnr.state.mn.us/snas/naturalhistory.html.
Minnesota Geological Survey, http://www.mngs.umn.edu.
Minnesota Department of Natural Resources, http://www.dnr.state.mn.us/index.html.

Ohio

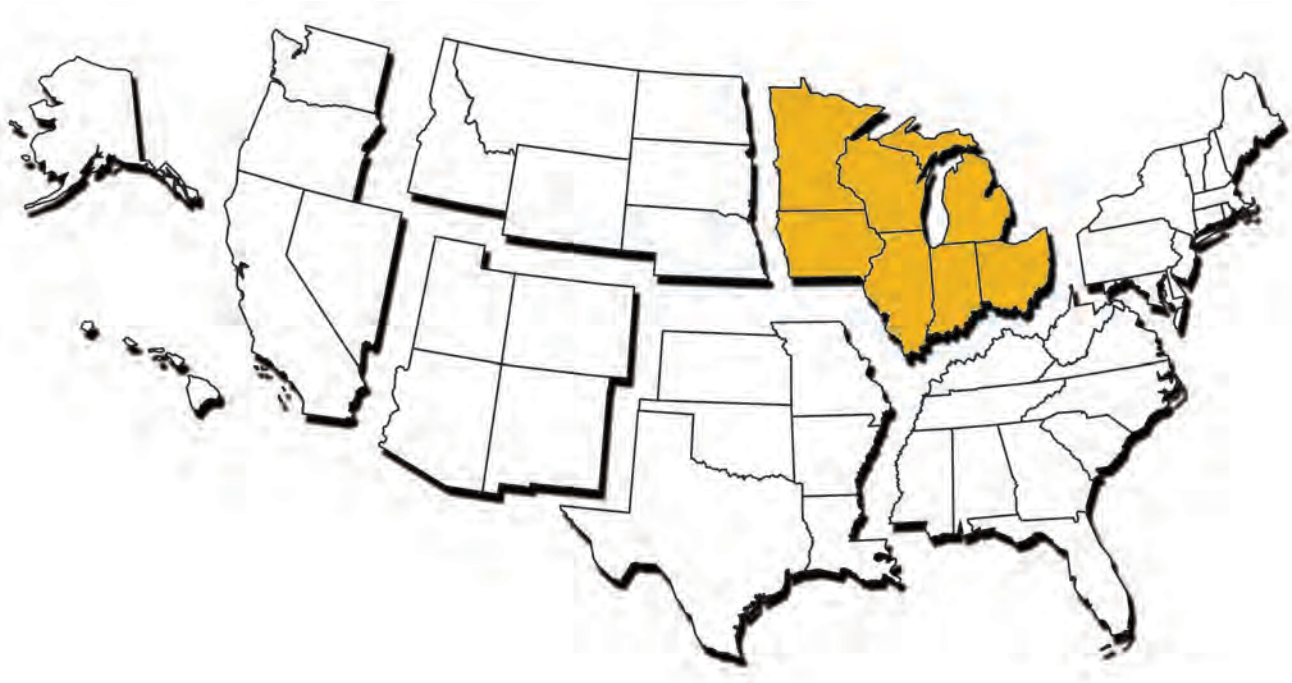
Camp, M. J., 2006, *Roadside geology of Ohio*. Mountain Press Publ.: Missoula, MT.
Ohio Department of Natural Resources, Division of Geological Survey. http://www2.ohiodnr.com/geosurvey/.
Ohio Department of Natural Resources, Soil and Water Resources. http://soilandwater.ohiodnr.gov/.

Wisconsin

Dott, R. H., & Attig, J. W., 2004, *Roadside geology of Wisconsin*. Mountain Press Publ.: Missoula, MT.
LeBerge, G.L.,1994, *Geology of the Lake Superior Region*, Geoscience Press, 309 p.
Wisconsin Geology, Wisconsin Geological & Natural History Survey, http://wgnhs.uwex.edu/wisconsin-geology/
Wisconsin Geological Survey and Natural History, http://wgnhs.uwex.edu.
Wisconsin Department of Natural Resources, http://dnr.wi.gov.

The **Teacher-Friendly** Guide™

to the Earth Science of the Midwestern US



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