



# Big Ideas

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## Resources

### Books

- Donovan, S., & J. Bransford. 2005. *How Students Learn: Science in the Classroom*. National Academies Press, Washington, DC, [http://books.nap.edu/catalog.php?record\\_id=10126](http://books.nap.edu/catalog.php?record_id=10126).
- Wiggins, G. P., & J. McTighe. 2005. *Understanding by Design, 2nd edition*. Association for Supervision and Curriculum Development, Alexandria, VA, 382 pp.
- Wiske, M. S., ed. 1998. *Teaching for Understanding: Linking Research with Practice*. Jossey-Bass, San Francisco, CA, 379 pp.

### Websites

- Exploring Geoscience Methods with Secondary Education Students*, by J. Ebert, S. Linneman, & J. Thomas,  
[http://serc.carleton.edu/integrate/teaching\\_materials/geosci\\_methods/index.html](http://serc.carleton.edu/integrate/teaching_materials/geosci_methods/index.html).



## Resources

## Resources

### Books

- Bjornerud, M. 2005. *Reading the Rocks: The Autobiography of the Earth*. Westview Press, Cambridge, MA, 237 pp.
- Fortey, R. A. 2004. *The Earth, An Intimate History*. HarperCollins, London, 509 pp.
- Hazen, R. M. 2012. *The Story of Earth: The First 4.5 Billion Years, from Stardust to Living Planet*, Viking, New York, 306 pp.
- Kious, J., & R. I. Tilling. 1996. *The Dynamic Earth: The Story of Plate Tectonics*, US Geological Survey, Washington, DC, <http://pubs.usgs.gov/gip/dynamic/dynamic.html>.
- Maddougall, J. D. 1996. *A Short History of Planet Earth: Mountains, Mammals, Fire, and Ice*. Wiley, New York, 266 pp.
- Morton, J. L. 2004. *Strata: The Remarkable Life Story of William Smith, the Father of English Geology, new edition*. Brocken Spectre, Horsham, UK, 171 pp.
- Powell, J. 2001. *Mysteries of Terra Firma: The Age and Evolution of the Earth*. Free Press, New York, 256 pp.
- Winchester, S., & S. Vannithone. 2001. *The Map That Changed the World: William Smith and the Birth of Modern Geology*. HarperCollins, New York, 329 pp.

### Websites

- Color-coded Continents!* US Geological Survey, <http://geomaps.wr.usgs.gov/parks/pltec/scplseqai.html>. (Reconstructions of color-coded continental motions from 620 million years ago through the present; maps by C. Scotese.)
- Earth Viewer*, by BioInteractive at Howard Hughes Medical Institute, <http://www.hhmi.org/biointeractive/earthviewer>. (Free iPad application; an interactive paleogeographic atlas of the world; state and country overlays allow tracking the development of the Southeast States.)
- Geologic Maps of the 50 United States*, by Andrew Alden, <http://geology.about.com/od/maps/ig/stategeomaps/>.
- North America During the Last 150,000 Years*, compiled by J. Adams, <http://www.esd.ornl.gov/projects/gen/nercNORTHAMERICA.html>.
- The Paleomap Project*, by C. R. Scotese, <http://www.scotese.com>. (Maps and information about Earth's tectonic and climate history.)
- Paleogeography*, by R. Blakey, <https://www2.nau.edu/rcb7/RCB.html>. (The older, but free, version of *Reconstructing the Ancient Earth*.)
- Reconstructing the Ancient Earth*, by R. Blakey, Colorado Plateau Geosystems, <http://cpgeosystems.com/index.html>. (An updated version of *Paleogeography*.)
- Tour of Geologic Time*, University of California Museum of Paleontology, <http://www.ucmp.berkeley.edu/help/timeform.php>. (An online interactive geologic calendar exhibit.)

## Geologic History of the Southeast

### Books and Articles

- Bryan, J., T. Scott, & G. Means. 2008. *Roadside Geology of Florida*. Mountain Press Publishing Company, Missoula, MT, 368 pp.
- Cardwell, D. H. 1975. *Geologic History of West Virginia*. West Virginia Geological and Economic Survey, 64 pp.
- Dockery, D. T., III, & D. E. Thompson. 2016. *The Geology of Mississippi*. University Press of Mississippi, Jackson, MS, 692 pp.
- Frye, K. 1986. *Roadside Geology of Virginia*. Mountain Press Publishing Company, Missoula, MT, 256 pp.



# Geologic History

## Resources

- Gore, P. J., & W. D. Witherspoon. 2013. *Roadside Geology of Georgia*. Mountain Press Publishing Company, Missoula, MT, 360 pp.
- Hatcher, R. D., Jr., 2010. The Appalachian orogeny: A brief summary. In: *From Rodinia to Pangea: The Lithotectonic Record of the Appalachian Region*, edited by R. P. Tollo, M. J. Bartholomew, J. P. Hibbard, & P. M. Karabinos. *Geological Society of America Memoir* 206: 1–19.
- Hine, A., & C. Williams. 2013. *Geologic History of Florida: Major Events that Formed the Sunshine State*. University of Florida Press, Gainesville, 256 pp.
- Horton, J. W., Jr., & V. A. Zullo, eds. 1991. *The Geology of the Carolinas*. Carolina Geological Society 50th Anniversary Volume. University of Tennessee Press, Knoxville, 406 pp.
- Lacefield, J. 2013. *Lost Worlds in Alabama Rocks: A Guide to the State's Ancient Life and Landscapes, 2nd edition*. Alabama Museum of Natural History and the University of Alabama, Tuscaloosa, 276 pp.
- Lane, E., ed. 1994. Florida's geological history and geological resources. *Florida Geological Survey Special Publication* 35, 76 pp.
- Murphy, C. H. 1995. *Carolina Rocks! The Geology of South Carolina*. Sandlapper Publishing Company, Orangeburg, SC, 261 pp.
- Randazzo, A. F., & D. S. Jones. 1997. *The Geology of Florida*. University Press of Florida, Gainesville, FL, 400 pp.
- Stewart, K. G., & M.-R. Roberson. 2007. *Exploring the Geology of the Carolinas: A Field Guide to Favorite Places from Chimney Rock to Charleston*. University of North Carolina Press, Chapel Hill, 320 pp.

### Websites

- The Geological Evolution of Virginia and the Mid-Atlantic Region*, by L. S. Fichter & S. J. Baedke, 2000, [http://www.wvgs.wvnet.edu/www/geoeduc/Activities\\_in\\_Historical\\_Geology.PDF](http://www.wvgs.wvnet.edu/www/geoeduc/Activities_in_Historical_Geology.PDF).
- Geologic History of Georgia: Overview*, by P. J. W. Gore, 2006, <http://www.georgiaencyclopedia.org/articles/science-medicine/geologic-history-georgia-overview>.
- A Geology Field Trip [Across West Virginia]*, by J. J. Renton, [undated], GeoEducational Resources, West Virginia Geological Survey, <http://www.wvgs.wvnet.edu/www/geoeduc/FieldTrip/GeologyFieldTripGuide.pdf>.
- Introduction to the Mount Rogers [Virginia] Field Trip*, Radford University, <http://www.radford.edu/~fldsch/RUFIELDSCHOOL/fieldtrips/MountRogers/MRIntroduction/MtRogersIntro.html>.
- Plate Tectonics History of Virginia*, by P. Sethi, R. Whisonant, K. Cecil, & P. Newbill, 2014, Radford University, Geology of Virginia CD-ROM Web Edition, <http://www.radford.edu/jtso/GeologyofVirginia/Tectonics/GeologyOfVATectonics6-3d.html>.
- A Window to the Appalachians*, by J. J. Renton, [undated], I-68/I-70: GeoEducational Resources, West Virginia Geological Survey, [http://www.wvgs.wvnet.edu/www/geoeduc/FieldTrip/I68I70AWindowtotheAppalachians\\_10162014.pdf](http://www.wvgs.wvnet.edu/www/geoeduc/FieldTrip/I68I70AWindowtotheAppalachians_10162014.pdf).

### Activities

- Activities in Historical Geology*, 2001, West Virginia Geological & Economic Survey, 53 pp., [http://www.wvgs.wvnet.edu/www/geoeduc/Activities\\_in\\_Historical\\_Geology.PDF](http://www.wvgs.wvnet.edu/www/geoeduc/Activities_in_Historical_Geology.PDF). (A collection of activities for 4th to 12th grade, annotated with West Virginia Instructional Goals and Objectives.)
- Paleogeographic Mapping*, by L. Okland, 1991, in: *Hands-on Geology: K-12 Activities and Resources*, edited by R. H. Macdonald & S. G. Stover, Society for Sedimentary Geology (SEPM), Tulsa, OK, [https://www.beloit.edu/sepm/Fossil\\_Explorations/Paleogeographic\\_Mapping.html](https://www.beloit.edu/sepm/Fossil_Explorations/Paleogeographic_Mapping.html). (Constructing paleogeographic maps for elementary and middle school students.)
- Toilet Paper Analogy for Geologic Time*, by J. Wenner, in: *Teaching Quantitative Skills in the Geosciences*, Resources for Undergraduate Students and Faculty, SERC, <http://serc.carleton.edu/quantskills/activities/TPGeoTime.html>. (Demonstration of geological time using a 1000 sheet roll of toilet paper.)
- Understanding Geologic Time*, Texas Memorial Museum, University of Texas at Austin, <http://www.jsu.utexas.edu/glow/files/Understanding-Geologic-Time-6-8.pdf>. (Timeline activity for middle school students.)



## Resources

## Resources

### Books

Vernon, R. H. 2000. *Beneath Our Feet: The Rocks of Planet Earth*. Cambridge University Press, Cambridge, UK, 216 pp.

### Websites

*Atlas of Igneous and Metamorphic Rocks, Minerals and Textures*, University of North Carolina Geology Department, <http://leggeo.unc.edu/Petunia/IgMetAtlas/mainmenu.html>.

### Rock and Mineral Field Guides

- Bonewitz, R. L. 2008. *Rock and Gem*, Dorling Kindersley, NY, 360 pp.
- Chesterman, C. W. 1979. *National Audubon Society Field Guide to North American Rocks and Minerals*. Knopf, New York, 850 pp.
- Dixon, D., & R. L. Bernor. 1992. *The Practical Geologist: The Introductory Guide to the Basics of Geology and to Collecting and Identifying Rocks*, Simon and Schuster, New York, 160 pp.
- Johnsen, O. 2002. *Minerals of the World*. Princeton University Press, Princeton, NJ, 439 pp.
- Mitchell, J. 2008. *The Rockhound's Handbook, revised edition* Gem Guides Book Company, Baldwin Park, CA, 299 pp.
- Pellant, C. 2002. *Rocks & Minerals*. Dorling Kindersley (Smithsonian Handbooks), New York, 256 pp.
- Prinz, M., G. Harlow, & J. Peters, eds. 1978. *Simon & Schuster's Guide to Rocks & Minerals*. Simon and Schuster, New York, 607 pp.

### Rocks of the Southeast

- Anderson, W. H. 1994. Rocks and minerals of Kentucky. *Kentucky Geological Survey and University of Kentucky, Special Publication*, 82 pp.
- Andrews, E. M., Sr. 1966 (2011 reprint). *Georgia's Fabulous Treasure Hoards: A Compendium for Rockhounds, Prospectors, and Various Seekers of Gold, Silver, Diamonds, etc. With Known & Historic Locations*. CreateSpace Independent Publishing Platform, Seattle, WA, 130 pp.
- Common Rocks of Virginia*, Virginia Department of Mines, Minerals and Energy, <https://www.dmme.virginia.gov/dgmr/rocks.shtml>.
- Jacquot, R. 2005. *Rock, Gem, and Mineral Collecting Sites in Western North Carolina*. Land of the Sky Books, Alexander, NC, 192 pp.
- Renton, J. J., & T. E. Repine, Jr. 2011. *Sedimentary Rocks: Conceptual Understanding Series for West Virginia Science Teachers*, West Virginia Geological Survey, 50 pp., <http://www.wvgs.wvnet.edu/www/geoeduc/SedimentaryRocksED16a.pdf>.
- Renton, J. J., & T. E. Repine, Jr. 2013. *Igneous Rocks: Conceptual Understanding Series for West Virginia Science Teachers*, West Virginia Geological Survey, 22 pp., <http://www.wvgs.wvnet.edu/www/geoeduc/IgneousRocksED17a.pdf>.
- Rocks in Virginia*, by P. Sethi, R. Whisonant, K. Cecil, & P. Newbill, 2014, Radford University, Geology of Virginia CD-ROM Web Edition, <http://www.radford.edu/jtso/GeologyofVirginia/Rocks/GeologyOfVARocks2-6a.html>.
- Streeter, M. 2003. *A Rockhounding Guide To North Carolina's Blue Ridge Mountains*, Milestone Press, Almond, NC, 132 pp.
- Williams, D. D. 2013. *Rocks of the Piedmont: A Full Color Photo Guide to the Rocks of the Piedmont and Eastern Blue Ridge Provinces of Georgia and Adjacent States*. CreateSpace Independent Publishing Platform, Seattle, WA, 96 pp.
- Williams, D. D. 2013. *The Rocks of Georgia*. Possum Publications, Athens, GA, 132 pp.



## Resources

## Resources

### General Books on the Fossil Record and Evolution

- Allmon, W. D. 2009. *Evolution & Creationism: A Very Short Guide, 2nd edition*, Paleontological Research Institution (Special Publication 35), Ithaca, NY, 128 pp.
- Benton, M. J. 2008. *The History of Life: A Very Short Introduction*. Oxford University Press, Oxford, UK, 170 pp.
- Fenton, C. L., & M. A. Fenton. 1958. *The Fossil Book: A Record of Prehistoric Life*. Doubleday, Garden City, NY, 482 pp. (A well-illustrated classic.)
- Fortey, R. A. 1998. *Life: A Natural History of the First Four Billion Years of Life on Earth*. Alfred A. Knopf, New York, 346 pp.
- Knoll, A. H. 2003. *Life On a Young Planet: The First Three Billion Years of Evolution on Earth*, Princeton University Press, Princeton, NJ, 277 pp.
- Prothero, D. R. 2006. *After the Dinosaurs: the Age of Mammals*. Indiana University Press, Bloomington, 362 pp.
- Sampson, S. D. 2011. *Dinosaur Odyssey: Fossil Threads in the Web of Life*. University of California Press, Berkeley, CA, 352 pp.
- Shubin, N. 2009. *Your Inner Fish: a Journey into the 3.5-Billion-Year History of the Human Body*. Vintage Books, New York, 256 pp.
- Switek, B. 2010. *Written In Stone: Evolution, the Fossil Record, and Our Place In Nature*. Bellevue Literary Press, New York, 320 pp.
- Thomson, K. S. 2005. *Fossils: A Very Short Introduction*. Oxford University Press, Oxford, UK, 147 pp.

### Guides to Collecting and Identifying Fossils

- Arduini, P., G. Teruzzi, & S. S. Horenstein. 1986. *Simon & Schuster's Guide to Fossils*. Simon and Schuster, New York, 317 pp.
- Garcia, F. A., & D. S. Miller. 1998. *Discovering Fossils: How To Find and Identify Remains of the Prehistoric Past*. Stackpole Books, Mechanicsburg, PA, 212 pp.
- Lichter, G. 1993. *Fossil Collector's Handbook: Finding, Identifying, Preparing, Displaying*. Sterling Publishing Company, New York, 160 pp.
- Macdonald, J. R. 1983. *The Fossil Collector's Handbook: a Paleontology Field Guide*. Prentice-Hall, Englewood Cliffs, NJ, 193 pp.
- Murray, M. 1967. *Hunting for Fossils: A Guide to Finding and Collecting Fossils in All Fifty States*. Macmillan Company, Toronto, Canada, 348 pp.
- Nudds, J. R., & P. A. Selden. 2008. *Fossil Ecosystems of North America: A Guide to the Sites and their Extraordinary Biotas*. University of Chicago Press, Chicago, 288 pp.
- Parker, S. 1990. *The Practical Paleontologist: a Step-By-Step Guide To Finding, Studying, and Interpreting Fossils*. Simon and Schuster, New York, 159 pp.
- Parker, S. 2007. *Fossil Hunting: An Expert Guide to Finding and Identifying Fossils and Creating a Collection*, Southwater, London, 96 pp.
- Ransom, J. E. 1964. *Fossils In America: Their Nature, Origin, Identification and Classification and a Range Guide To Collecting Sites*. Harper and Row, New York, 402 pp.
- Thompson, I. 1982. *The Audubon Society Field Guide To North American Fossils*. Knopf, New York, 846 pp.
- Walker, C., D. Ward, & C. Keates. 2009. *Fossils*. Dorling Kindersley (Smithsonian Handbooks), New York, 320 pp.



## Resources

### Fossils of the Southeast

- Burns, J. 1991. *Fossil Collecting in the Mid-Atlantic States*. Johns Hopkins University Press, Baltimore, MD, 216 pp.
- The Paleontology Portal, <http://paleoportal.org>. (North American fossil record and geologic and climate histories, by state.)
- Ward, L. W. 1992. Molluscan biostratigraphy of the Miocene, middle Atlantic coastal plain of North America. *Virginia Museum of Natural History Memoir 2*, 159 pp.

#### Alabama

- Copeland, C. W., Jr. 1963. Curious creatures in Alabama rocks: a guide book for amateur fossil collectors. *Geological Survey of Alabama Circular 19*, 45 p.
- Ebersole, S. M., & J. L. King. 2011. A review of non-avian dinosaurs from the Late Cretaceous of Alabama, Mississippi, Georgia, and Tennessee. *Bulletin of the Alabama Museum of Natural History*, 28: 81–93.
- King, D. T., Jr. 2003. *Alabama Dinosaurs, 3rd edition*. Parsimony Press, Auburn, AL, 147 pp.
- Kopaska-Merkel, D. C., & R. J. Buta. 2012. *Field-trip Guidebook to the Steven C. Minkin Paleozoic Footprint Site, Walker County, Alabama*. Alabama Paleontological Society, 31 pp.
- Late Cretaceous Dinosaurs of the Southeastern United States, by D. T. King, Jr., [http://www.auburn.edu/~kingdat/dinosaur\\_webpage.htm](http://www.auburn.edu/~kingdat/dinosaur_webpage.htm).
- Thurmond, J. T., & D. E. Jones. 1981. *Fossil Vertebrates of Alabama*. University of Alabama Press, Tuscaloosa, 244 pp.

#### Florida

- Brayfield, L., & W. Brayfield. 1993. *A Guide for Identifying Florida Fossil Shells and Other Invertebrates, 3rd edition*. Florida Paleontological Society, Gainesville, FL, 112 pp.
- Brown, R. C. 1996. *Florida's Fossils: Guide to Location, Identification, and Enjoyment, revised edition*. Pineapple Press, Sarasota, FL, 208 pp.
- Fuqua, R. L. 2011. *Hunting Fossil Shark Teeth in Venice, Florida: the Complete Guide: On the Beach, Scuba Diving, and Inland*. Robert L. Fuqua, Venice, FL, 80 pp.
- Hulbert, R. C. 2001. *The Fossil Vertebrates of Florida*. University Press of Florida, Gainesville, FL, 384 pp. (Technical.)
- Renz, M. 1999. *Fossilizing in Florida: A Guide for Diggers and Divers*. University Press of Florida, Gainesville, FL, 216 pp.
- Renz, M. 2002. *Megalodon: Hunting the Hunter*. PaleoPress, Lehigh Acres, FL, 170 pp.

#### Georgia

- Martin, A. 2013. *Life Traces of the Georgia Coast: Revealing the Unseen Lives of Plants and Animals*. Indiana University Press, Bloomington, 692 pp.
- Life Traces of the Georgia Coast: Unseen lives of the Georgia Barrier Islands*, by A. Martin, Emory University, <http://www.georgialifetraces.com/tag/trackways/>. (Blog.)
- Paleontology of the Coastal Plain Province*, by D. R. Schwimmer, 2006, New Georgia Encyclopedia, <http://www.georgiaencyclopedia.org/articles/science-medicine/paleontology-coastal-plain-province>.

#### Kentucky

- Cincinnati Dry Dredgers, <http://drydredgers.org/>. (An unusually active fossil club that visits Kentucky and other regional sites.)
- Finding Fossils in Indiana and Kentucky: Falls of the Ohio State Park*, <http://www.fallsoftheohio.org/collecting.html>.
- Fossils of Kentucky*, Kentucky Geological Survey and University of Kentucky, <https://www.uky.edu/KGS/fossils/>.
- Hedeon, S. 2008. *Big Bone Lick: The Cradle of American Paleontology*. University Press of Kentucky, Lexington, KY, 182 p.
- Meyer, D. L., & R. A. Davis. 2009. *A Sea Without Fish: Life in the Ordovician Sea of the Cincinnati Region*. Indiana University Press, Bloomington, 346 pp.
- The Stratigraphy and Fossils of the Upper Ordovician near Cincinnati, Ohio (including Kentucky)*, UGA [University of Georgia] Stratigraphy Lab, <http://strata.uga.edu/cincy/index.html>.





### Mississippi

Dockery, D. T., III, & D. E. Thompson. 2016. *The Geology of Mississippi*. University Press of Mississippi, Jackson, 692 pp. (Contains extensive coverage of fossils.)

### North Carolina

Aurora Fossil Museum, <http://aurorafossilmuseum.org/>.

Carter, J. G., P. E. Gallagher, R. E. Valone, & T. J. Rossbach, with contributions by P. G. Gensel, W. H. Wheeler, & D. Whitman. 1988. Fossil collecting in North Carolina. *North Carolina Department of Natural Resources and Community Development, Geological Survey Section, Bulletin 89*, 89 pp.

Chandler, R., & J. Timmerman. 2011. *Neogene and Quaternary Fossils of North Carolina—A Field Guide*. North Carolina Fossil Club, Raleigh, 58 pp.

Olsen, P. E., & A. K. Johansson. 1994. Field guide to Late Triassic tetrapod sites in Virginia and North Carolina. In *In the Shadow of the Dinosaurs*, edited by N. C. Fraser & H.-D. Sues. Cambridge University Press, Cambridge, UK, pp. 408–443.

Ray, C. E., ed. 1987. Geology and paleontology of the Lee Creek Mine, North Carolina, II. *Smithsonian Contributions to Paleobiology*, 61, 529 pp.

Timmerman, J., & R. Chandler. 2008. *Cretaceous and Paleogene Fossils of North Carolina—A Field Guide, corrected edition*. North Carolina Fossil Club, Raleigh, 70 pp.

### South Carolina

Cicumurri, D. J., & J. L. Knight. 2009. Two shark-bitten whale skeletons from Coastal Plain deposits of South Carolina. *Southeastern Naturalist*, 8(1): 71–82.

Howe, J. T., & A. S. Howard. 1978. Fossil locations in South Carolina. *South Carolina State Museum Bulletin 3*, 59 pp.

### Tennessee

Brister, R., & R. Young. 2007. *The Fossils of Coon Creek: An Upper Cretaceous Mississippi Embayment Marine Site in McNairy County, Tennessee*. Coon Creek Science Center, Adamsville, TN, 66 pp., 65 pls., [http://www.memphismuseums.org/coon\\_creek-overview/](http://www.memphismuseums.org/coon_creek-overview/).

Corgan, J. X. 1976. Vertebrate fossils of Tennessee. *Tennessee Department of Conservation Bulletin 77*, 100 pp.

Corgan, J. X., & E. Breitburg. 1996. Tennessee's prehistoric vertebrates. *Tennessee Department of Environment and Conservation, Division of Geology, Bulletin 84*, 170 pp.

Gray Fossil Site in Tennessee, by M. Kohl, Tennessee Department of Environment and Conservation, <https://www.tn.gov/environment/topic/geology-gray-fossil-site-in-tennessee>.

Moore, H. 2004. *The Bone Hunters: the Discovery of Miocene Fossils in Gray, Tennessee*. University of Tennessee Press, Knoxville, 144 pp.

Schubert, B. W., & J. I. Mead. 2011. *The Gray Fossil Site: 10 Years of Research*. Don Sunquist Center of Excellence in Paleontology, East Tennessee State University, Johnson City, TN, 98 pp.

### Virginia

Burns, J. 2014. *Virginia Through Time: a Natural History Atlas*. Pietas Publications, Waynesboro, VA, 74 pp.

McLoughlin, T. F. 2013. *A Guide to Pennsylvanian (Carboniferous) Age Plant Fossils of Southwest Virginia*. Trafford Publishing, Bloomington, IN, 138 pp.

Olsen, P. E., & A. K. Johansson. 1994. Field guide to Late Triassic tetrapod sites in Virginia and North Carolina. In *In the Shadow of the Dinosaurs*, edited by N. C. Fraser & H.-D. Sues. Cambridge University Press, Cambridge, UK, pp. 408–443.

Sethi, P., R. Whisonant, K. Cecil, & P. Newbill. 2014. *Selected Virginia Fossils*. Geology of Virginia CD-ROM Web Edition, by Radford University,

<http://www.radford.edu/jtso/GeologyofVirginia/Fossils/GeologyOfVAFossils3-4a.html>.

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# Fossils

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## Resources

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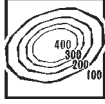
### West Virginia

Amjad, H. 2006. *Fossils of West Virginia, Vol. 1: Invertebrates & Vertebrates*. Ayne Amjad, Beckley, WV, 400 pp.

Amjad, H. 2006. *Fossils of West Virginia, Vol. 2: Plant Life & Paleobotany*. Ayne Amjad, Beckley, WV, 338 pp.

*Concise Guide to Plant Fossils of West Virginia: Images from Plant Fossils of West Virginia*, WVGES ED-3A; Gillespie, Clendening, and Pfefferkorn, 1978, Illustrations by B. Schleger, <http://www.wvgs.wvnet.edu/www/geoeduc/AdaptiveEarthScienceActivities/Extras/ConciseGuideToPlantFossilsWV.pdf>.





# Topography

## Elevations

## Resources

### Books

- de Blij, H. J., P. O. Muller, J. E. Burt, & J. A. Mason. 2013. *Physical Geography of the Global Environment*. Oxford University Press, New York, 626 pp.
- Wyckoff, J. 1999. *Reading the Earth: Landforms in the Making*. Adastr West, Mahwah, NJ, 352 pp.

### Maps

- Color Landform Atlas of the US*, <http://fermi.jhuapl.edu/states/states.html>. (Low resolution shaded relief maps of each state.)
- Topoquest*, <https://www.topoquest.com/>.

### Websites

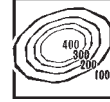
- OpenLandform Catalog*, Education Resources, OpenTopography, <http://www.opentopography.org/index.php/resources/lidarlandforms>. (High resolution topographic images that may be useful in teaching.)
- Teaching Geomorphology in the 21st Century*, On the Cutting Edge' Strong Undergraduate Geoscience Teaching, SERC, <http://serc.carleton.edu/NAGTWorkshops/geomorph/index.html>. (A set of resources for college level, some of which may be adaptable to secondary education.)
- Teaching with Google Earth*, On the Cutting Edge' Starting Point: Teaching Entry Level Geoscience, SERC, [http://serc.carleton.edu/introgeo/google\\_earth/index.html](http://serc.carleton.edu/introgeo/google_earth/index.html).
- United States Geography*, by S. S. Birdsall & J. Florin, <http://countrystudies.us/united-states/geography.htm>.

## Topography of the Southeast

- Fall Line/Coastal Plain*, Chattahoochee River Greenway Planning and Implementation Handbook, Section 2: Comprehensive Inventory, Chapter 4, pp.123–132, [http://www1.gadnr.org/greenspace/c\\_pdfs/21ciCh2Fall.pdf](http://www1.gadnr.org/greenspace/c_pdfs/21ciCh2Fall.pdf).
- Geologic Regions of Georgia: An Overview*, by W. J. Frazier, 2006, New Georgia Encyclopedia, <http://www.georgiaencyclopedia.org/articles/science-medicine/geologic-regions-georgia-overview>.
- The History of the Glades of the Central Tennessee Basin*, Middle Tennessee State University, <http://w1.mtsu.edu/glade-center/gladehistory.php>.
- How The Ohio River Was Formed*, PBS LearningMedia, lesson adapted from *Where the River Bends: A History of Northern Kentucky*, [http://www.pbslearningmedia.org/resource/ket08\\_sci\\_ess.earthsys.ohioriver/how-the-ohio-river-was-formed/](http://www.pbslearningmedia.org/resource/ket08_sci_ess.earthsys.ohioriver/how-the-ohio-river-was-formed/).
- Karst Hydrology*, by G. H. Shaw, *Water Encyclopedia: Science and Issues*, <http://www.waterencyclopedia.com/Hy-La/Karst-Hydrology.html>.
- Karst in Florida*, by E. Lane, 1986, *Florida Geological Survey Special Publication 29*, 100 pp., <http://ufdc.ufl.edu/UF00000144/00001>.
- Landforms in Virginia*, by P. Sethi, R. Whisonant, K. Cecil, & P. Newbill, 2014, Radford University, *Geology of Virginia CD-ROM Web Edition*, <http://www.radford.edu/jtso/GeologyofVirginia/Weathering/GeologyOfVAWeathering5-7a.html>.
- Physical Features [of Alabama]*, *Encyclopedia of Alabama*, <http://www.encyclopediaofalabama.org/category/PhysicalRegions>. (A list of links to specific features.)
- Physiographic Map of Kentucky*, Kentucky Geological Survey and University of Kentucky, <https://www.uky.edu/KGS/geoky/physiographic.htm>.

# Topography

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# 4

*Physiographic Sections of Alabama*, by M. Nielson, Encyclopedia of Alabama,

<http://www.encyclopediaofalabama.org/article/h-1362>.

*Physiography [of Virginia]*, by P. Sethi, R. Whisonant, K. Cecil, & P. Newbill, 2014, Radford University, Geology of Virginia CD-ROM Web Edition,

<http://www.radford.edu/jtso/GeologyofVirginia/Physiography/PhysioIntro-1.html#>.

*Sinkholes: West-central Florida*, by A. B. Tihansky, 1999, in *Land Subsidence in the United States*, edited by D. Galloway, D. R. Jones, & S. E. Ingebritsen, *US Geological Survey Circular 1182*, pp. 121–140, [http://fl.water.usgs.gov/PDF\\_files/cir1182\\_tihansky.pdf](http://fl.water.usgs.gov/PDF_files/cir1182_tihansky.pdf).

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## Resources

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## Resources

## Resources

### Books and Articles

- Frank D., Galloway, J., and Assmus, K. 2005. The life cycle of a mineral deposit—a teacher's guide for hands-on mineral education activities, *US Geological Survey General Information Product 17*, 40 pp.
- Hausel, W. D. 2014. *A Guide to Finding Gemstones, Gold, Minerals, and Rocks*. Gemhunter Publications, Gilbert, AZ, 370 pp.
- Long, K. R., B. S. Van Gosen, N. K. Foley, & D. Cordier. 2010. The principal rare earth elements deposits of the United States—a summary of domestic deposits and a global perspective. *US Geological Survey Scientific Investigations Report 2010–5220*, 96 pp., <http://pubs.usgs.gov/sir/2010/5220/>.
- Skinner, B. J. 1989. Mineral Resources of North America, in *The Geology of North America: an Overview, Vol. A*, edited by A. W. Bally & A. R. Palmer, Geological Society of America, Boulder, CO, pp. 575–584.

### Websites

- The Gem Hunter*, by W. D. Hausel, <http://gemhunter.webs.com>.
- Handbook of Mineralogy*, <http://www.handbookofmineralogy.org>. (Technical information on 420 minerals available as free individual pdfs.)
- Mineral Data*, Hudson Institute of Mineralogy, <http://www.mindat.org>. (Claims to be the world's largest public database of mineral information.)
- Mineral Gallery*, Amethyst Galleries, <http://www.galleries.com/>.
- Mineralogy Database*, <http://webmineral.com/>.
- Mineralpedia—a Mineral Photo Database and Identification Guide*, by T. Loomis & V. Loomis, Dakota Matrix Minerals, Inc., <http://www.dakotamatrix.com>.
- Mining History Association*, <http://www.mininghistoryassociation.org/links.htm#museums>.
- The New International Mineralogical Association List of Minerals—a Work in Progress* (updated July 2015), [http://nrmima.nrm.se/IMA\\_Master\\_List\\_2015-07.pdf](http://nrmima.nrm.se/IMA_Master_List_2015-07.pdf).
- Some Definitions of Common Terms Used in Describing Mineral Deposits*, Earth Science Australia, [http://earthsci.org/mineral/mindep/depfile/ore\\_def.htm](http://earthsci.org/mineral/mindep/depfile/ore_def.htm).
- US Geological Survey*, <http://minerals.usgs.gov/>. (A wide range of data on mineral distribution and mining.)

### Mineral Resources of the Southeast

(See also Resources at end of Chapter 2: Rocks.)

- Comfort, I. T. 1998. *Florida's Geological Treasures*. Gem Guides Book Company, Baldwin Park, CA, 128 pp.
- Eckert, A. W. 2000. *Earth Treasures Volume 2: The Southeastern Quadrant [of the US]*. iUniverse.com, Lincoln, NW, 516 pp.
- Hilton, B., Jr. 1995. Hidden treasures: rocks and minerals of the South Carolina Piedmont. *South Carolina Wildlife*, 42(2): 34–36, <http://www.hiltonpond.org/ArticleMineralsSCMain.html>.
- Jacquot, R. 2005. *Rock, Gem, and Mineral Collecting Sites in Western North Carolina*. Land of the Sky Books, Alexander, NC, 192 pp.
- Minerals of Alabama*, by L. Dean, [undated], Encyclopedia of Alabama, <http://www.encyclopediaofalabama.org/article/h-1273>.
- Monaco, J. M., & J. H. Monaco. 2010. *Fee Mining and Mineral Adventures in the Eastern US, 2nd ed.* Gem Guide Books Company, Upland, CA, 264 pp.
- Oles, F., & H. Oles. 1967. *Eastern Gem Trails: a Guide to the Most Attractive and Productive Gem and Mineral Collecting Areas of Central-Eastern United States*. Gembooks, Mentone, CA, 80 pp.

# Mineral Resources

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# 5

Rygle, K. J., & S. F. Pedersen. 2011. *Southeast Treasure Hunter's Gem & Mineral Guide: Where & How to Dig, Pan, and Mine Your Own Gems & Minerals, 5th ed.* GemStone Press, Woodstock, VT, 192 pp.

*Selected Virginia Minerals*, by P. Sethi, R. Whisonant, K. Cecil, & P. Newbill, 2014, Radford University, Geology of Virginia CD-ROM Web Edition,  
<http://www.radford.edu/jtso/GeologyofVirginia/Minerals/GeologyOfVAMinerals1-4.html>.

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## Resources

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## Resources

## Resources

### Books

- Bird, K. J. 1989. North American fossil fuels, in: *The Geology of North America: an Overview, The Geology of North America, Vol. A*, edited by A. W. Bally & A. R. Palmer, Geological Society of America, Boulder, CO, pp. 555–574.
- Duggan-Haas, D., R. M. Ross, & 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 pp.
- Hinrichs, R., & M. H. Kleinbach. 2012. *Energy: Its Use and the Environment, 5th edition*. Thomson, Brooks/Cole, Belmont, CA, 640 pp.
- Nye, D. E. 1998. *Consuming Power: a Social History of American Energies*. Massachusetts Institute of Technology Press, Cambridge, MA, 331 pp.
- Richards, J. 2009. *Wind Energy*. Macmillan Library, South Yarra, Victoria, Canada, 32 pp. (For primary school age.)
- Smil, V. 2006. *Energy: a Beginner's Guide*. Oneworld, Oxford, UK, 181 pp.
- Smil, V. 2010. *Energy Myths and Realities: Bringing Science To the Energy Policy Debate*. AEI Press, Washington, DC, 213 pp.
- Wohletz, K., & G. Heiken. 1992. *Volcanology and Geothermal Energy*, University of California Press, Berkeley, 432 pp., <http://ark.cdlib.org/ark:/13030/ft6v19p151/>.

### Websites

- American Association of Petroleum Geology (AAPG), <http://aapg.org>.
- Get the Facts, American Wind Energy Association, <http://www.awea.org/Resources/Content.aspx?ItemNumber=5059>.
- Climate Literacy & Energy Awareness Network (CLEAN), <http://www.cleanet.org>. (A rich collection of resources for educators.)
- Coal Bed Methane, Montana State University Extension, <http://waterquality.montana.edu/energy/cbm/>.
- Coalbed Methane Outreach Program (EPA), <http://www.epa.gov/coalbed/faq.html>.
- Energy Literacy: Essential Principles and Fundamental Concepts for Energy Education, at Energy.gov, [http://www1.eere.energy.gov/education/energy\\_literacy.html](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/>.
- Renewable and Alternative Fuels, US Energy Information Administration, <http://www.eia.gov/renewable/state/>.
- Renewable Energy, Center for Climate and Energy Solutions, <http://www.c2es.org/energy/source/renewables>.
- State-by-State CO<sub>2</sub> Emissions Data From Fossil Fuel Combustion, US Environmental Protection Agency, [http://www.epa.gov/statelocalclimate/documents/pdf/CO2FFC\\_2011.pdf](http://www.epa.gov/statelocalclimate/documents/pdf/CO2FFC_2011.pdf).
- State-level Energy-related Carbon Dioxide Emissions, 2000–2011, Independent Statistics and Analysis, US Energy Information Administration (EIA), 2014, <http://www.eia.gov/environment/emissions/state/analysis/pdf/stateanalysis.pdf>.
- US Department of Energy (DOE), <http://energy.gov>.
- US Energy Information Administration (EIA), <http://www.eia.gov/>. (A wealth of information on energy production and use in the United States).
- US Energy Information Administration (EIA), by state, <http://www.eia.gov/state/>.
- US Fuel Ethanol Plant Production Capacity (EIA), <http://www.eia.gov/petroleum/ethanolcapacity/>.
- US Geological Survey Energy Resources Program, <http://energy.usgs.gov/>.
- What is geothermal? Geothermal Resources Council, <http://www.geothermal.org/what.html>.
- Wind Energy Resource Atlas of the United States: Regional Summaries, <http://rredc.nrel.gov/Wind/pubs/atlas/chp3.html>.



## Resources

### Energy in the Southeast

(For detailed production and capacity data for power plants, see the interactive map at <http://www.eia.gov/state>.)

- McLaren, J. 2011. *Southeast Regional Clean Energy Policy Analysis*. National Renewable Energy Laboratory, Technical Report NREL/TP-6A20-49192, 100 pp., <http://www.nrel.gov/docs/fy11osti/49192.pdf>.
- Nester, P. 2002. Is there oil in your backyard? The Southeast US. In: *The World of Oil: Oil in Your Backyard*, <https://www.priweb.org/ed/pgws/backyard/sections/southeast/southeast1.html>.
- Oil Sands in Alabama*, Alabama Cooperative Extension System, report ANR-2192, <http://www.aces.edu/pubs/docs/A/ANR-2192/ANR-2192.pdf>.
- Renewable Energy Production by State*, US Department of Energy, <http://energy.gov/maps/renewable-energy-production-state>.
- Southeast Energy News*, <http://southeastenergynews.us/>. (A daily collection of the region's top energy headlines.)
- Southeast Wind Energy Fact Sheet*, 2014, by Southeastern Wind Coalition, Southeast Wind Energy Resource Center, 2 pp., [http://www.sewind.org/images/fact\\_sheets/SEWC%20SE%20Regional%20Wind%20Energy%20Fact%20Sheet%20-%20Dec%202014.pdf](http://www.sewind.org/images/fact_sheets/SEWC%20SE%20Regional%20Wind%20Energy%20Fact%20Sheet%20-%20Dec%202014.pdf).
- Southeast National Marine Renewable Energy Center, College of Engineering and Computer Science, Florida Atlantic University, <http://coet.fau.edu/>.
- Southeastern Energy Society, <http://www.seesorg.org/>.
- The Southeastern United States Can Benefit from a National Renewable Electricity Standard*, by Union of Concerned Scientists, 4 pp., [http://www.eesi.org/files/Southeast\\_States\\_Rebuttal-Final.pdf](http://www.eesi.org/files/Southeast_States_Rebuttal-Final.pdf).
- Tennessee Valley Authority Energy, <https://www.tva.gov/Energy>.





## Resources

## Resources

### Books and Articles

- Lindbo, D. L. 2012. *Know Soil, Know Life*. Soil Science Society of America, Madison, WI, 206 pp.
- Lindbo, D. L., & J. Mannes. 2008. *Soil! Get the Inside Scoop*. Soil Science Society of America, Madison, WI, 32 pp.
- Logan, W. B. 1995. *Dirt: the Ecstatic Skin of the Earth*, Riverhead Books, New York, 202 pp.
- Soil Survey Staff. 2014. *Keys to Soil Taxonomy, 12th edition*. US Department of Agriculture, Natural Resources Conservation Service, Washington, DC, 362 pp., [http://www.nrcs.usda.gov/wps/PA\\_NRCSCConsumption/download?cid=stelprdb1252094&ext=pdf](http://www.nrcs.usda.gov/wps/PA_NRCSCConsumption/download?cid=stelprdb1252094&ext=pdf).
- Soil Survey Staff. 2014. *Illustrated Guide To Soil Taxonomy*. US Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE, 498 pp., [http://www.nrcs.usda.gov/wps/PA\\_NRCSCConsumption/download?cid=stelprdb1247203&ext=pdf](http://www.nrcs.usda.gov/wps/PA_NRCSCConsumption/download?cid=stelprdb1247203&ext=pdf).

### Websites

- K-12 Soil Science Teacher Resources*, Soil Science Society of America, <http://www.soils4teachers.org/>.
- Soil Survey Reports (by state and county/parish)*, The Cooperative Soil Survey, <http://soils.missouri.edu/survey/selectstate.asp>.
- Soil Sustains Life*, Soil Science Society of America, <https://www.soils.org>.
- Soils Tutorial*, The Cooperative Soil Survey, <http://soils.missouri.edu/tutorial/index.asp>.
- The Twelve Soil Orders Soil Taxonomy*, University of Idaho College of Agricultural and Life Sciences, <http://www.cals.uidaho.edu/soilorders/>.
- Soils*, USDA Natural Resources Conservation Service, <http://www.nrcs.usda.gov/wps/portal/nrcs/site/soils/home/>. (Soil surveys by state, technical publications, soil data, and much more.)

### Soils of the Southeast

- Busscher, W. J., H. H. Schomberg, R. L. Raper, & D. Bumpe. 2010. Soil and water conservation in the southeastern United States: a look at conservation practices past, present, and future, in *Soil and Water Conservation Advances in the United States*, edited by T. M. Zobeck & W. F. Schillinger. *Soil Science Society of America Special Publication* 60: 183–200, <http://www.ars.usda.gov/SP2UserFiles/Place/60820000/Manuscripts/2010/Man828.pdf>.
- Soil in Georgia*, Georgia Soil and Water Conservation Commission, <https://gaswcc.georgia.gov/soil-georgia>.
- Soils in Mississippi*, Mississippi Agricultural and Forestry Experimental Station, Mississippi State University Extension Service, <http://msucares.com/crops/soils/>.
- Soils of Alabama*, by C. C. Marshall, Jr., 2014, Alabama A&M and Auburn Universities Extension, <https://store.aces.edu/ItemDetail.aspx?ProductID=14604>.
- Soils of West Virginia*, by John Sencindiver, 2010, e-WV: The West Virginia Encyclopedia, <http://www.wvencyclopedia.org/articles/509>.
- Springer, M. E., & J. A. Elder. 1980. *Soils of Tennessee*. University of Tennessee Agricultural Experiment Station, Knoxville, TN, 66 pp.
- Virginia State Soil: The Pamunkey Soil Series*, Virginia Association of Professional Soil Scientists, <http://vapss.org/StateSoil.html>.
- Watts, F. C., & M. E. Collins. 2008. *Soils of Florida*. Soil Science Society of America, Madison, WI, 88 pp.



## Future

## Resources

### Books and Articles

- Allmon, W. D., T. A. Smrecek, & R. M. Ross. 2010. *Climate Change—Past Present & Future: a Very Short Guide*. Paleontological Research Institution (Special Publication 38), Ithaca, NY, 200 pp.
- 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*. National Academies Press, Washington, DC, [http://www.nap.edu/download.php?record\\_id=13111](http://www.nap.edu/download.php?record_id=13111).
- Karl, T. R., J. M. Melillo, & T. C. Peterson, eds. 2009. *Global Climate Change Impacts in the United States*. Cambridge University Press, New York, 188 pp., <http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf>.
- Kottek, M., J. Grieser, C. Beck, B. Rudolf, & F. Rubel. 2006. World map of Köppen-Geiger climate classification updated. *Meteorologische Zeitschrift*, 15: 259–263, <http://koeppen-geiger.vu-wien.ac.at/>.
- Melillo, J. M., T. C. Richmond, & G. W. Yohe, eds. 2014. *Climate Change Impacts in the United States: the Third National Climate Assessment*. US Global Change Research Program, 841 pp., <http://www.globalchange.gov/nca3-downloads-materials>.
- Retallack, G. J. 2007. Cenozoic paleoclimate on land in North America. *Journal of Geology*, 115: 271–294, <http://blogs.uoregon.edu/gregr/files/2013/07/cenozoicnorthamerica-gmt02r.pdf>.
- Rosenzweig, C., A. Iglesias, X. B. Yang, P.R. Epstein, & E. Chivian. 2001. Climate change and extreme weather events—implications for food production, plant diseases, and pests. *Global Change and Human Health*, 2(2): 90–104, and *NASA Publications Paper 24*, <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1023&context=nasapub>.
- Ruddiman, W. F. 2014. *Earth's Climate: Past and Future, 3rd edition*. W. H. Freeman, New York, 445 pp.

### Websites

- Climate*, National Oceanic and Atmospheric Administration, <http://www.noaa.gov/climate.html>.
- Climate has Changed Throughout Earth's History*, National Park Service, [http://nature.nps.gov/geology/nationalfossilday/climate\\_change\\_earth\\_history.cfm](http://nature.nps.gov/geology/nationalfossilday/climate_change_earth_history.cfm).
- Climate Literacy & Energy Awareness Network (CLEAN), <http://www.cleanet.org>. (A rich collection of resources for educators.)
- Envisioning Climate Change Using a Global Climate Model*, by B. Youngman, M. Chandler, L. Sohl, M. Hafen, T. Ledley, S. Ackerman, & S. Kluge, SERC Earth Exploration Toolkit, <http://serc.carleton.edu/eet/envisioningclimatechange/index.html>.
- Global Climate Change: Vital Signs of the Planet*, National Oceanographic and Atmospheric Administration, <http://pmm.nasa.gov/education/websites/global-climate-change-vital-signs-planet>. (Information about global climate change, including spectacular satellite images.)
- Global Greenhouse Gas Reference Network, Global Monitoring Division, National Oceanographic and Atmospheric Administration Earth System Research Laboratory, <http://www.esrl.noaa.gov/gmd/ccgg/data-products.html>. (Data and visualizations.)
- Global Weather, Jetstream—Online School for Weather*, National Weather Service, [http://www.srh.noaa.gov/jetstream/global/global\\_intro.htm](http://www.srh.noaa.gov/jetstream/global/global_intro.htm).
- Intergovernmental Panel on Climate Change, Fifth Assessment Report (AR5)*, <http://www.ipcc.ch/>.
- JetStream—Online School for Weather, National Weather Service, National Oceanographic and Atmospheric Administration, <http://www.srh.noaa.gov/jetstream/index.htm>.
- National Climate Assessment, <http://nca2014.globalchange.gov>. (Reports summarizing impacts of climate change.)
- National Weather Service, National Oceanographic and Atmospheric Administration, <http://www.weather.gov>.
- NOAA's El Niño Portal*, National Oceanographic and Atmospheric Administration, <http://www.elnino.noaa.gov/>.
- North America During the Last 150,000 Years*, compiled by J. Adams,




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Resources

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<http://www.esd.ornl.gov/projects/gen/nercNORTHAMERICA.html>.

*The Paleomap Project*, by C. R. Scotese, <http://www.scotese.com>. (Maps and information about Earth's tectonic and climate history.)

*Regional Climate Trends and Scenarios for the US National Climate Assessment*, National Oceanographic and Atmospheric Administration, [http://www.nesdis.noaa.gov/technical\\_reports/142\\_Climate\\_Scenarios.html](http://www.nesdis.noaa.gov/technical_reports/142_Climate_Scenarios.html).

*US Map of Köppen-Geiger Climate Classification*, [http://koeppen-geiger.vu-wien.ac.at/pics/KG\\_USA.gif](http://koeppen-geiger.vu-wien.ac.at/pics/KG_USA.gif).

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

*Weatherunderground Maps*, <http://www.wunderground.com/maps>. (A variety of types of weather maps, including surface, temperature, moisture, wind, cloud cover, and precipitation.)

## Climate of the Southeast

*Effects of Climate Change on the Southeast*, Climate Education for K-12, North Carolina State University, <https://climate.ncsu.edu/edu/k12/climatechange.SE>.

*Extreme Weather and Climate Change: The Southeast*, 2011, Climate Central, <http://www.climatecentral.org/library/climopedia/extreme-weather-and-climate-change-the-southeast>.

Ingram, K. T., K. Dow, L. Carter, & J. Anderson. 2013. *Climate of the Southeast United States: Variability, Change, Impacts, and Vulnerability*. Island Press, Washington, DC, 341 pp.

Kunkel, K. E., L. E. Stevens, S. E. Stevens, L. Sun, E. Janssen, D. Wuebbles, C. E. Konrad II, C. M. Fuhrman, B. D. Keim, M. C. Kruk, A. Billel, H. Needham, M. Schafer, & J. G. Dobson. 2013. Regional climate trends and scenarios for the US National Climate Assessment. Part 2. Climate of the southeast US. *NOAA Technical Report NESDIS 142-2*, 94 pp., <http://scenarios.globalchange.gov/regions/southeast-and-caribbean>.

*NOAA United States Climate Page*, <http://www.esrl.noaa.gov/psd/data/usclimate/states.fast.html>. (Clickable state map of the US to get city-by-city climate data, 1961–1990.)

*Our Changing Climate: Southeast and the Caribbean*, National Climate Assessment, <http://nca2014.globalchange.gov/report/regions/southeast>.

*The Paleontology Portal*, <http://paleoportal.org/>. (North American fossil record and geologic and climate histories, by state.)

*Southeast and Caribbean, Regional Impacts*, Climate Nexus: Changing the Conversation, <http://climatenexus.org/learn/regional-impacts/southeast-and-caribbean>.

Southeast Climate Science Center, North Carolina State University, US Department of the Interior, <http://globalchange.ncsu.edu/secsc/>.

Weatherbase, <http://www.weatherbase.com/weather/state.php3?c=US&s=&countryname=United-States>. (Monthly averages and forecasts for cities for each state.)



## Resources

## Resources

### General Resources

- Gunn, A. M. 2001. *The Impact of Geology on the United States: A Reference Guide to Benefits and Hazards*. Greenwood Press, Westport, CT, 296 pp.
- Maddougall, J. D. 2011. *Why Geology Matters: Decoding the Past, Anticipating the Future*. University of California Press, Berkeley, 285 pp.
- NASA Earth Observatory Natural Hazards Map, <http://earthobservatory.nasa.gov/NaturalHazards/>. (Monthly images of Earth hazards occurring globally.)
- Stover, C. W., & J. L. Coffman. 1993. Seismicity of the United States, 1568–1989, revised ed. *US Geological Survey Professional Paper 1527*, 418 pp.

### Floods

- Effects of Urban Development on Floods, 2012, *US Geological Survey Fact Sheet FS-076-03*, <http://pubs.usgs.gov/fs/fs07603/>.
- Floods: Recurrence Intervals and 100-year Floods, 2014, US Geological Survey, <http://water.usgs.gov/edu/100yearflood.html>.
- Hazards Associated with Flooding, by S. Nelson, 2012, <http://www.tulane.edu/~sanelson/Natural-Disasters/floodhaz.htm>.
- Hurricane Flooding: A Deadly Inland Danger, Office of Hydrographic Development, National Weather Service, NOAA, [http://www.nws.noaa.gov/ohd/hurricane/inland\\_flooding.html](http://www.nws.noaa.gov/ohd/hurricane/inland_flooding.html).
- West Virginia Flood Tool, West Virginia University Department of Geology & Geography, <http://www.mapwv.gov/flood/>.

### Tornados

- Gagan, J. P., A. Gerard, & J. Gordon, 2010, A historical and statistical comparison of "Tornado Alley" to "Dixie Alley," *National Weather Digest*, 34(2): 146–155, <http://www.nwas.org/digest/papers/2010/Vol34No2/Pg145-Gagan-et-al.pdf>.
- The Most "Important" US Tornadoes by State, Tornado Project Online, <http://www.tornadoproject.com/alltorns/worstts.htm>.
- Tornado History Project, <http://www.tornadohistoryproject.com/>. (A searchable database of reported US tornadoes since 1950.)
- Tornadoes, Florida Climate Center, Florida State University, <http://climatecenter.fsu.edu/topics/tornadoes>.
- TWC's Exclusive Tor:Con Index, by G. Forbes, 2014, Weatherunderground, <http://www.wunderground.com/news/tornado-torcon-index>. (Tornado forecast.)

### Hurricanes

- Central Florida Hurricane Center, <http://flhurricane.com>.
- Doran, K. S., H. F. Stockdon, K. L. Sopkin, D. M. Thompson, & N. G. Plant. 2012. National assessment of hurricane-induced coastal erosion hazards: southeast Atlantic Coast. *US Geological Survey Open-File Report 2013-1131*, 28 pp., <http://pubs.usgs.gov/of/2013/1131>.
- Hurricanes and Tropical Systems, Southeast Regional Climate Center, <https://www.sercc.com/hurricanes>.
- Hurricanes, Mississippi Emergency Management Agency, <http://www.msema.org/be-prepared/hurricanes/>.
- National Hurricane Center, National Weather Service, NOAA, <http://www.nhc.noaa.gov/>.
- Hurricanes: Science and Society, University of Rhode Island Graduate School of Oceanography, <http://www.hurricanescience.org/>.



## Resources

*South Carolina Hurricane Guide*, South Carolina Emergency Management Division, [http://www.scemd.org/files/Public%20Information/Publications/Hurricane\\_Guide/Hurricane\\_Guide\\_2015.pdf](http://www.scemd.org/files/Public%20Information/Publications/Hurricane_Guide/Hurricane_Guide_2015.pdf).

### Expansive Soils

*Expansive Soil and Expansive Clay: the Hidden Force Behind Basement and Foundation Problems*, by H. King, Geologic Hazards, Geology.com, <http://geology.com/articles/expansive-soil.shtml>.

*Expansive Soils and Frost Heave*, Division of Geology and Mineral Resources, Virginia Department of Mines Minerals and Energy, <https://www.dmme.virginia.gov/dgmr/expansivesoils.shtml>.

### Landslides

Highland, L. M., & P. Bobrowsky. 2008. The landslide handbook—a guide to understanding landslides. *US Geological Survey Circular 1325*, 129 pp.

*Landslide Hazard Maps of Western North Carolina (BETA)*, Appalachian Landslide Consultants PLLC, <http://appalachianlandslide.com/landslide-hazard-maps/>.

*Landslide Hazards in Kentucky*, Kentucky Geological Survey and University of Kentucky, [https://www.uky.edu/KGS/geologic Hazards/landslide\\_factsheet.pdf](https://www.uky.edu/KGS/geologic Hazards/landslide_factsheet.pdf).

*Landslides*, Virginia Department of Mines Minerals and Energy, Division of Geology and Mineral Resources, <https://www.dmme.virginia.gov/dgmr/landslides.shtml>.

*Landslides in the United States since 2007* (map), National Geographic, <http://news.nationalgeographic.com/news/2014/04/140422-surveying-american-landslides-interactive/>.

*Landslide Types and Processes*, by L. Highland, 2004, *US Geological Survey Fact Sheet 2004-3072*, 4 pp., <http://pubs.usgs.gov/fs/2004/3072/pdf/fs2004-3072.pdf>.

### Earthquakes

Incorporated Research Institutions for Seismology (IRIS) Education and Public Outreach, <http://www.iris.edu/hq/programs.epo>.

*IRIS Seismic Monitor*, Incorporated Research Institutions for Seismology (IRIS), <http://www.iris.edu/seismon/>.

Stover, C. W., & J. L. Coffman. 1993. Seismicity of the United States, 1568–1989, revised ed. *US Geological Survey Professional Paper 1527*, 418 pp, <http://pubs.usgs.gov/pp/1527/report.pdf>.

*Today in Earthquake History*, Earthquake Hazards Program, US Geological Survey, <http://earthquake.usgs.gov/learn/today>. (Content abridged from Stover & Coffman, 1993.)

*US Earthquake Monitor*, US Geological Survey, <http://earthquake.usgs.gov/earthquakes/map/>.

USGS National Earthquake Information Center, US Geological Survey, <http://earthquake.usgs.gov/regional/neic/>.

### Karst and Sinkholes

Brinkmann, R. 2013. *Florida Sinkholes: Science and Policy*. University Press of Florida, Gainesville, FL, 256 pp.

*Florida Sinkhole Maps*, Florida Center for Instructional Technology, University of South Florida, <http://fcit.usf.edu/Florida/maps/galleries/sinkholes/index.php>.

*Hazards – Sinkholes*, Florida Geological Survey, Florida Department of Environmental Protection, <http://www.dep.state.fl.us/geology/geologictopics/hazards/sinkholes.htm>.

*Karst Occurrence in Kentucky* (map), Kentucky Geological Survey, [http://kgs.uky.edu/kgsweb/olops/pub/kgs/mc33\\_12.pdf](http://kgs.uky.edu/kgsweb/olops/pub/kgs/mc33_12.pdf).

*Sinkholes*, North Carolina Division of Water Resources, <http://www.ncwater.org/?page=567>.

*Sinkholes and Karst Terrain*, Virginia Department of Mines Minerals and Energy, Division of Geology and Mineral Resources, <https://www.dmme.virginia.gov/dgmr/sinkholes.shtml>.

*The Science of Sinkholes*, 2013, US Geological Survey, [http://www.usgs.gov/blogs/features/usgs\\_top\\_story/the-science-of-sinkholes](http://www.usgs.gov/blogs/features/usgs_top_story/the-science-of-sinkholes).





Weary, D. J. 2008. Preliminary Map of Potentially Karstic Carbonate Rocks in the Central and Southern Appalachian States. *US Geological Survey Open-File Report 2008-1154*, <http://pubs.usgs.gov/of/2008/1154/>.

## Earthquakes

*Earthquakes [in Virginia]*, Virginia Department of Mines Minerals and Energy, Division of Geology and Mineral Resources, <https://www.dmme.virginia.gov/dgmr/earthquakes.shtml>.

*Earthquakes in the Southeastern United States*, Virginia Tech Seismological Observatory, [http://www.magma.geos.vt.edu/vtso/seus\\_quakes.html](http://www.magma.geos.vt.edu/vtso/seus_quakes.html).

Incorporated Research Institutions for Seismology (IRIS) education and public outreach, <http://www.iris.edu/hq/programs.epo>.

IRIS Seismic monitor, Incorporated Research Institutions for Seismology (IRIS), <http://www.iris.edu/seismon/>.

Stover, C. W., & J. L. Coffman. 1993. Seismicity of the United States, 1568–1989 (revised). *US Geological Survey Professional Paper 1527*, 418 pp., <http://pubs.usgs.gov/pp/1527/report.pdf>.

*South Carolina Earthquake Guide*, South Carolina Emergency Management Division, [http://www.scemd.org/files/Public%20Information/Publications/Earthquake\\_Guide/EQ%20Guide%202012.pdf](http://www.scemd.org/files/Public%20Information/Publications/Earthquake_Guide/EQ%20Guide%202012.pdf).

*Today in Earthquake History*, US Geological Survey, Earthquake Hazards Program, <http://earthquake.usgs.gov/learn/today>. (Content abridged from Stover & Coffman, 1993.)

*US Earthquake Information by State/Territory*, USGS Earthquake Hazards Program, <http://earthquake.usgs.gov/earthquakes/states/>.

*US Earthquake Monitor*, US Geological Survey, <http://earthquake.usgs.gov/earthquakes/map/>.

## Radon

*North Carolina Radon Map and Information*, North Carolina Department of Health and Human Services, <http://www.ncradon.org/ncradon/>.

*Radon Fact Sheet*, Air Check Inc., 2009, [http://www.radon.com/radon/radon\\_facts.html](http://www.radon.com/radon/radon_facts.html).

*Radon: Health Risks*, Environmental Protection Agency, 2013, <http://www.epa.gov/radon/healthrisks.html>.

*Radon Information*, Environmental Protection Agency, <http://www.epa.gov/radon/index.html>.

*Radon (Rn)*, Environmental Protection Agency, <http://www.epa.gov/radon/>. (Includes state radon maps with county-level data, <http://www.epa.gov/radon/whereyoulive.html>.)

## 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](http://austintexas.gov/sites/default/files/files/Watershed/youth_education/karst_lesson_high_school.pdf).

*Landslide Hazards Program*, US Geological Survey, <http://landslides.usgs.gov/>.

*Natural Hazards and Risks: Hurricanes*, by L. Gilbert, J. Galster, & J. Ramage, SERC Module on Hurricane Hazards, [http://serc.carleton.edu/integrate/teaching\\_materials/hazards/index.html](http://serc.carleton.edu/integrate/teaching_materials/hazards/index.html).

*Radon Activities*, Alabama Radon Program, Alabama and Auburn Universities Extension, <http://www.aces.edu/fcs/hndh/radon/alradon.php>.

*Science Serving Coastal Communities*, National Centers for Coastal Ocean Science (NCCOS), <http://coastalscience.noaa.gov/>.

*Teaching Quantitative Concepts in Floods and Flooding*, SERC Resources for Undergraduate Students and Faculty, <http://serc.carleton.edu/quantskills/methods/quantlit/floods.html>.





## Resources

### Earth Hazards of the Southeast

- Bush, D. M. 2004. *Living with Florida's Atlantic Beaches: Coastal Hazards from Amelia Island to Key West*. Duke University Press, Durham, NC, 360 pp.
- Coastal Hazards*, Georgia Department of Natural Resources, Coastal Resources Division, <http://coastalgadnr.org/cm/hazard>.
- Coastal Hazards*, Gulf of Mexico Coastal Ocean Observing System (GCOOS), [http://gcoos.tamu.edu/?page\\_id=5041](http://gcoos.tamu.edu/?page_id=5041).
- Coastal Hazards*, South Carolina Department of Health and Environmental Control, <https://www.scdhec.gov/HomeAndEnvironment/Water/CoastalManagement/CoastalZoneManagement/CoastalHazards/>.
- FloridaDisaster.org, Florida Division of Emergency Management, <http://www.floridadisaster.org/>.  
*Florida's Severe Weather Awareness Guide*, Florida State Emergency Response Team, <http://usfweb2.usf.edu/Adminsvc/publicsafety/docs/flweatherguide.pdf>.
- Geologic Hazards*, Virginia Department of Mines Minerals and Energy, <https://www.dmme.virginia.gov/dgmr/hazards.shtml>.
- Geologic Hazards in Kentucky* (map), by D. I. Cary, T. D. Hounshell, & J. D. Kiefer, Kentucky Geological Survey and University of Kentucky, [http://kgs.uky.edu/KGSWEB/OLOPS/PUB/KGS/MC185\\_12.PDF](http://kgs.uky.edu/KGSWEB/OLOPS/PUB/KGS/MC185_12.PDF).
- Geologic Hazards of the South Carolina Coastal Plain*, 2012, South Carolina Department of Natural Resources, [http://www.dnr.sc.gov/geology/Pubs/GGMS/GGMS\\_Web\\_Pamphlet.pdf](http://www.dnr.sc.gov/geology/Pubs/GGMS/GGMS_Web_Pamphlet.pdf).
- Geologic Threats*, Tennessee Emergency Management Agency, <http://www.tnema.org/public/geologic.html>.
- Georgia Coastal Hazards Portal (interactive map), <http://gchp.skio.usg.edu/>.
- Geological Hazards of Alabama*, Geological Survey of Alabama, <http://gsa.state.al.us/gsa/geologicHazards/>.
- Grymes, C. A., *Barrier islands*, Virginia Places (Geography of Virginia), <http://www.virginiaplaces.org/geology/barrier.html>.
- Hazard Mitigation*, Mississippi Emergency Management Agency, <http://www.msema.org/about/hazard-mitigation/>.
- Fonner, R. F. 2007 (published 1987, revised 1999). Homeowner's Guide to Geologic Hazards. West Virginia Geological Survey, <http://www.wvgs.wvnet.edu/www/geohaz/geohaz3.htm>.
- Non-Flood Geologic Hazards in Kentucky and Information Resources at the Kentucky Geological Survey* (presentation), by W Andrews Jr., Kentucky Geological Survey and University of Kentucky, <http://www.kymitigation.org/wp-content/uploads/2013/08/KentuckyGeologicHazards-Andrews.pdf>.



## Resources

## Resources

### Field Geology Teaching Practices

- Extraordinary Science Field Trips, Summer 2013, *National Science Teachers Association Reports*, 25(1): 1–2, <http://www.nsta.org/docs/NSTARReports201307.pdf>.
- Greene, J. P., B. Kisida, & D. H. Bowen. 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., & S. J. Reynolds. 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.
- My Geologic Address: Locating Oneself in Geologic Time and Process*, by K. Ault, SERC InTeGrate workshop “Teaching the Methods of Geoscience” activities, <http://serc.carleton.edu/integrate/workshops/methods2012/activities/ault.html>.
- Orion, N., & A. Hofstein. 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: A Teacher’s Guide to Using the School Grounds for Environmental Studies*, 3rd edition, National Science Teachers Association, Alexandria, VA, 163 pp. (Focused on elementary and junior high; chapter on Earth science pp.113–137.)
- Shulman, L. S. 2005. Signature pedagogies in the professions. *Daedalus*, 134(3): 52–59.
- Teaching in the Field*, National Association of Geoscience Teachers, [http://nagt.org/nagt/teaching\\_resources/field/index.html](http://nagt.org/nagt/teaching_resources/field/index.html). (Set of resources for teaching field geology.)
- Whitmeyer, S. J., E. J. Pyle, & D. W. Mogk, eds. 2009. Field geology education: historical perspectives and modern approaches. *Geological Society of America Special Papers* 461, <http://specialpapers.gsapubs.org/content/461.toc>. (29 articles focused on undergraduate education.)

### Guides to Fieldwork

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

- Coe, A., T. Argles, D. Rothery, & R. Spicer. 2010. *Geological Field Techniques*. Wiley-Blackwell, Chichester, UK, 336 pp. (This is a current standard.)
- Compton, R. R. 1962. *Manual of Field Geology*. John Wiley & Sons, New York, 378 pp. (An old classic.)
- Compton, R. R. 1985. *Geology in the Field*. Wiley, New York, 398 pp. (An updated version of Compton, 1962.)
- How to Read a Geologic Map*, Wisconsin Geological and Natural History Survey, <http://wgnhs.uwex.edu/wisconsin-geology/bedrock-geology/read-geologic-map/>.
- Lambert, D. 2006. *The Field Guide to Geology, new edition*. Infobase Publishers, New York, 298 pp.
- Lisle, R., P. Brabham, & J. Barnes. 2011. *Basic Geological Mapping*. John Wiley & Sons, Chichester, UK, 217 pp.
- Maley, T. S. 2005. *Field Geology Illustrated, 2nd edition* Mineral Land Publications, Boise, ID, 704 pp.
- Mathur, S. M. 2004. *Guide to Field Geology*. Prentice Hall of India, New Delhi, 220 pp.
- Spencer, E. 2006. *Geologic Maps: A Practical Guide to the Preparation and Interpretation of Geologic Maps, 2nd edition*. Waveland Press, Long Grove, IL, 148 pp.
- Walker, J., & H. Cohen. 2009. *The Geoscience Handbook: AGI Data Sheets, 4th edition*. American Geological Institute, Alexandria, VA, 316 pp.

# Appendix

## Resources

**(Following are some of the most commonly used and cited publications on science education standards and bench-marks.)**

- American Association for Advance of Science. 1993. *Benchmarks for Science Literacy*. Oxford University Press, <http://www/irpkeect2-61.org/publications/bsl/online/index.php>.
- Bransford, J. D., A. L. Brown, & R. R. Cocking, eds. 2000. *How People Learn: Brain, Mind, Experience, and School, expanded edition*. National Academies Press, Washington, DC, [http://www.nap.edu/openbook.php?record\\_id=9853](http://www.nap.edu/openbook.php?record_id=9853).
- Common Core State Standards Initiative*, <http://www.corestandards.org>. (While not focused on science education directly, standards on math and non-fiction reading impact are importantly related.)
- National Center for Science Education. 2013. *Evolution and Climate Change in the NGSS*, <http://ncse.com/news/2013/04/evolution-climate-change-ngss-0014800>.
- National Research Council. 1996. *National Science Education Standards*. National Academies Press, Washington, DC, [http://www.nap.edu/openbook.php?record\\_id=4962](http://www.nap.edu/openbook.php?record_id=4962). (NRC is a body of the National Academy of Sciences.)
- National Research Council. 2011. *Successful K-12 STEM Education: Identifying Effective Approaches in Science, Technology, Engineering, and Mathematics*. National Academies Press, Washington, DC, [http://www.nap.edu/openbook.php?record\\_id=13158](http://www.nap.edu/openbook.php?record_id=13158).
- National Research Council. 2012. *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. National Academies Press, Washington, DC, [http://www.nap.edu/openbook.php?record\\_id=13165](http://www.nap.edu/openbook.php?record_id=13165).
- National Research Council. 2013. *Next Generation Science Standards: For States, By States*. National Academies Press, Washington, DC, <http://www.nextgenscience.org>.
- NGSS@NSTA website, National Science Teacher Association, <http://ngss.nsta.org/>.
- Wysession, M. 2013. The Next Generation Science Standards and the Earth and Space Sciences. *The Science Teacher*, April/May issue, [http://nstahosted.org/pdfs/ngss/resources/201304\\_NGSS-Wysession.pdf](http://nstahosted.org/pdfs/ngss/resources/201304_NGSS-Wysession.pdf). (Duggan-Haas, author of this Appendix, worked with Wysession on NRC's Conceptual Framework for New Science Education Standards.)

# General Resources

## On the Earth System Science of North America

### Books and Websites

Bally, A. W., & A. R. Palmer, eds. 1989. *The Geology of North America: An Overview*. Vol. A of The Geology of North America, Geological Society of America, Boulder, CO, 619 pp.  
National Park Geologic Resources, National Park Service, <http://www.nature.nps.gov/geology/>.  
*United States Geography*, by S. S. Birdsall & J. Florin,  
<http://countrystudies.us/united-states/geography.htm>.

### Maps (printed)

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., & C. A. Bush. 2007. *Geology: The National Atlas of the United States*,  
<http://pubs.usgs.gov/circ/1300/>.  
Reed, J. C., & C. A. Bush. 2007. About the geologic map in the National Atlas of the United States of America. *US Geological Survey Circular 1300*, 52 pp.,  
[http://pubs.usgs.gov/circ/1300/pdf/Cir1300\\_508.pdf](http://pubs.usgs.gov/circ/1300/pdf/Cir1300_508.pdf).  
Thelin, G. P., & R. J. Pike. 1991. Landforms of the conterminous United States: digital shaded-relief portrayal. *USGS Miscellaneous Investigations Series Map I-2206*,  
<http://pubs.usgs.gov/imap/i2206/>.  
US Geological Survey. 2005. *Resources for the Geologic Map of North America*,  
<http://ngmdb.usgs.gov/gmna/>.  
Vigil, J. F., R. J. Pike, & D. G. Howell. 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, *Earth Comm, 2nd edition*, Map Resources,  
<http://www.agiweb.org/education/earthcomm2/maps.html>. (A compilation of online map resources).  
*Geologic Maps of the 50 United States*, by A. Alden, About.com,  
<http://geology.about.com/od/maps/ig/stategeomaps/>.  
*Geologic Provinces of the United States: Records of an Active Earth*, US Geological Survey,  
<http://geomaps.wr.usgs.gov/parks/province/>.  
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>. (Online historic topographic maps.)  
*US Topo Quadrangles: Maps for America*, <http://nationalmap.gov/ustopo/index.html>. (Online topographic maps.)  
Vigil, J. F., R. J. Pike, & D. G. Howell. 2000. A tapestry of time and terrain. *US Geological Survey Geologic Investigations Series 2720*, <http://pubs.usgs.gov/imap/i2720/>.

### Geologic Time Resources

Gradstein, F. M., J. G. Ogg, M. D. Schmitz, & G. M. Ogg, 2012. *The Geologic Time Scale 2012*, 2 vols. Elsevier, New York,  
[https://engineering.purdue.edu/Stratigraphy/charts/Stratigraphic\\_Chart\\_GTS2012.pdf](https://engineering.purdue.edu/Stratigraphy/charts/Stratigraphic_Chart_GTS2012.pdf).  
International Commission on Stratigraphy, <http://www.stratigraphy.org/>.  
Janke, P. R. 2013. *Correlated History of the Earth Chart (laminated)*, vol. 8. Pan Terra, Hill City, SD.  
The Paleontology Portal, <http://paleoportal.org>.  
Walker, J. D., J. W. Geissman, S. A. Bowring, & L. E. Babcock, compilers. 2012. *Geologic Time Scale Poster*. Geological Society of America, Boulder, CO.

### Dictionaries

Allaby, M. 2013. *A Dictionary of Geology and Earth Sciences*. Oxford University Press, New York, 672 pp.  
Bates, R. Latimer, & J. A. Jackson. 1984. *Dictionary of Geological Terms, 3rd edition*. Anchor Press, Garden City, NY, 576 pp.  
McGraw-Hill Education. 2003. *McGraw-Hill Dictionary of Geology and Mineralogy*. McGraw-Hill, New York, 420 pp.

Neuendorf, K. K. E., J. P. Mehl Jr., & J. A. Jackson. 2011. *Glossary of Geology, 5th edition revised*. American Geological Institute, Alexandria, VA, 800 pp.

### **Earth System Science Organizations**

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

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

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 series.)

The 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>.

*Earth Science World Image Bank*, American Geological Institute,

<http://www.earthscienceworld.org/imagebank/>.

*Resources for Earth Science and Geography Instruction*, by Mike Francek, Central Michigan University, <http://webs.cmich.edu/resgi/>.

*Science in Your Backyard*, US Geological Survey, <http://www.usgs.gov/state/>. (State-by-state compilation of Earth science-related data, most of which will need to be adapted for education uses.)

*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 Toolkit*, <http://serc.carleton.edu/eet/index.html>. (A collection of online Earth system science activities introducing scientific data sets and analysis tools.)

*Windows to the Universe*, National Earth Science Teachers Association,

<http://www.windows2universe.org/>.

### **Blogs**

AGU Blogosphere, American Geophysical Union, <http://blogs.agu.org/blogs/>. (A collection of over one dozen blogs by geoscientists on recent events and perspectives on the geosciences.)

*The Best of Geology and Earth Science on the Web: The Latest from the Blogosphere*,

<http://all-geo.org/>.

*Geobulletin: News from the Geoblogosphere*, by stratigraphy.net,

<http://www.geobulletin.org/?action=news>.

*Geotripper: News and Views from the Geologic Realm*, by Garry Hayes, Modesto Junior College,

<http://geotripper.blogspot.com/>. (Many, but not all, postings pertain to the western US.)

### **Science education organizations**

National Association of Geoscience Teachers, <http://nagt.org>. (Focused 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, <http://mrdata.usgs.gov/geology/state>. (Digital geologic maps of the US states, with consistent lithology, age, GIS database structure, and format.)

## Resources for Multistate Areas of the Southeastern US

Chew, V. C. 2010. *Underfoot: A Geologic Guide to the Appalachian Trail*. Appalachian Trail Conference, Harpers Ferry, WV, 268 pp.

Davis, R. A. 2014. *Beaches of the Gulf Coast*. Harte Research Institute for Gulf of Mexico Studies Series, Texas A&M University Press, College Station, TX, 244 pp.

National Park Service. 2014. *Birth of the Mountains: The Geologic Story of the Southern Appalachian Mountains*. CreateSpace Independent Publishing Platform, Seattle, WA, 24 pp.

Rygle, K.J., & A. Matlins. 2011. *Southeast Treasure Hunter's Gem & Mineral Guide: Where & How to Dig, Pan and Mine Your Own Gems & Minerals, 5th edition*. GemStone Press, Woodstock, VT, 224 pp.

Thomas, W. A., R. D. Hatcher, Jr., & G. W. Viele. 1990. *The Appalachian-Ouachita Orogeny in the United States*. Geological Society of America, Boulder, CO, 781 pp. (Technical.)

## Alabama

### Books and Articles

Lacefield, J. 2013. *Lost Worlds in Alabama Rocks: A Guide to the State's Ancient Life and Landscapes, 2nd edition*. Alabama Museum of Natural History and the University of Alabama, Tuscaloosa, AL, 276 pp.

### Websites

Alabama Geological Society, <http://alageolsoc.org/>.

Geological Hazards of Alabama, Geological Survey of Alabama, <http://gsa.state.al.us/gsa/geologic Hazards/>.

Geological Survey of Alabama, <http://www.gsa.state.al.us/>.

Groundwater Assessment Program of Alabama, Geological Survey of Alabama, <http://gsa.state.al.us/gsa/water/index.html>.

## Florida

### Books and Articles

Bryan, J., T. Scott, & G. Means. 2008. *Roadside Geology of Florida*. Mountain Press Publishing Company, Missoula, MT, 368 pp.

Hine, A. C., & C. Williams. 2013. *Geologic History of Florida: Major Events that Formed the Sunshine State*. University Press of Florida, Gainesville, FL, 256 pp.

Randazzo, A. F., & D. S. Jones. 1997. *The Geology of Florida*. University Press of Florida, Gainesville, FL, 400 pp.

### Websites

Florida Department of Environmental Conservation: Geology, <http://www.dep.state.fl.us/geology/>.

*Geological Topics*, Florida Geological Survey, <http://www.dep.state.fl.us/geology/geologictopics/index.htm>.

*Geologic Map of the State of Florida*, by T.M. Scott and others, Florida Geological Survey, [http://sofia.usgs.gov/publications/maps/florida\\_geology/](http://sofia.usgs.gov/publications/maps/florida_geology/).

## Georgia

### Books and Articles

Gore, P. J., & W. D. Witherspoon. 2013. *Roadside Geology of Georgia*. Mountain Press Publishing Company, Missoula, MT, 360 pp.

Andrews, E. M., Sr. 1966 (2011 reprint). *Georgia's Fabulous Treasure Hoards: a Compendium for Rockhounds, Prospectors, and Various Seekers of Gold, Silver, Diamonds, etc. with Known & Historic Locations*. CreateSpace Independent Publishing Platform, Seattle, WA, 130 pp.

Williams, D. D. 2011. *Rocks of the Piedmont: a Full Color Photo Guide to the Rocks of the Piedmont and Eastern Blue Ridge Provinces of Georgia and Adjacent States*. CreateSpace Independent Publishing Platform, Seattle, WA, 96 pp.

Williams, D. D. 2012. *The Rocks of Georgia: a Full-color Photo Guide to Georgia's Rocks, Including What they Look Like, How they Formed and Where to Find Them*. Possum Publications, Athens, GA, 132 pp.

### Websites

*Appalachian Plateau Geologic Province*, by T. Chowns, 2006, New Georgia Encyclopedia, <http://www.georgiaencyclopedia.org/articles/science-medicine/appalachian-plateau-geologic-province>.

*Blue Ridge Geologic Province*, by T. E. LaTour, 2006, New Georgia Encyclopedia, <http://www.georgiaencyclopedia.org/articles/science-medicine/blue-ridge-geologic-province>.



- Coastal Plain Geologic Province, by W. J. Frazier, 2006, New Georgia Encyclopedia, <http://www.georgiaencyclopedia.org/articles/science-medicine/coastal-plain-geologic-province>.
- Geologic Regions of Georgia: An Overview, by W. J. Frazier, 2006, New Georgia Encyclopedia, <http://www.georgiaencyclopedia.org/articles/science-medicine/geologic-regions-georgia-overview>.
- Georgia Geologic Survey Information Circulars, <https://epd.georgia.gov/georgia-geologic-survey-information-circulars>.
- Georgia Geologic Survey Maps, <https://epd.georgia.gov/georgia-geologic-survey-maps>.
- Georgia Geology, New Georgia Encyclopedia, <http://www.georgiaencyclopedia.org/topics/geology>.
- Georgia State Fact Sheet, US Geological Survey, <http://pubs.usgs.gov/fs/FS-010-96/>.
- Valley and Ridge Geologic Province, by T. Chowns, 2006, New Georgia Encyclopedia, <http://www.georgiaencyclopedia.org/articles/science-medicine/valley-and-ridge-geologic-province>.

## Kentucky

### Books and Articles

- McFarlan, A. C. 1943. *Geology of Kentucky*. University of Kentucky, Lexington, KY, 531 p.
- McGrain, P. 1954. *Geology of the Carter and Cascade Caves Area*. Kentucky Geological Survey, Lexington, KY, 40 pp. (The 2014 electronic version of the 1966 reprint is available for Kindle e-book.)
- McGrain, P. 1966. *The Geologic Story of Diamond Caverns*. Kentucky Geological Survey, Lexington, KY, 27 pp. (The 2011 electronic version is available for Kindle.)
- McGrain, P. 1983. *The Geologic Story of Kentucky*. Kentucky Geological Survey, Lexington, 74 pp., <http://kgs.uky.edu/kgsweb/olops/pub/kgs/GeoStory.pdf>.

### Websites

- Educational Resources for K–16, Kentucky Geological Survey, <http://www.uky.edu/KGS/education/index.htm>.
- Geologic Map of Kentucky, Kentucky Geological Survey and University of Kentucky, <http://www.uky.edu/KGS/geoky/geologymap.htm>.
- Geology of Kentucky, Kentucky Geological Survey and University of Kentucky, <http://www.uky.edu/KGS/geoky/>.
- Kentucky Geological Survey, <http://www.uky.edu/KGS/>.
- Popular Kentucky Earth Science Publications, Kentucky Geological Survey, <http://www.uky.edu/KGS/education/poppubs.htm>.

## Mississippi

### Books and Articles

- Dockery, D. T., III, & D. E. Thompson. 2016. *The Geology of Mississippi*, University Press of Mississippi, Jackson, MS, 692 pp.

### Websites

- Maps and Charts, Mississippi Office of Geology, [http://www.deq.state.ms.us/mdeq.nsf/page/Geology\\_maps\\_and\\_charts\\_publications?OpenDocument](http://www.deq.state.ms.us/mdeq.nsf/page/Geology_maps_and_charts_publications?OpenDocument).
- Mississippi Geology, Mississippi Geology Open File Report 15, quarterly publication available as pdfs, 1980–1999, [http://www.deq.state.ms.us/MDEQ.nsf/page/Geology\\_MississippiGeology?OpenDocument](http://www.deq.state.ms.us/MDEQ.nsf/page/Geology_MississippiGeology?OpenDocument).
- Mississippi Office of Geology, Mississippi Department of Environmental Quality, [http://www.deq.state.ms.us/MDEQ.nsf/page/Geology\\_home?OpenDocument](http://www.deq.state.ms.us/MDEQ.nsf/page/Geology_home?OpenDocument).

## North Carolina

### Books and Articles

- Beyer, F., 1991, *North Carolina: the Years Before Man*, Carolina Academic Press, Durham, NC, 243 pp.
- Carpenter, P.A., III, 1989, A geologic guide to North Carolina's State Parks, *North Carolina Geological Survey Bulletin* 91, 69 pp.
- Horton, J. W., Jr., & V. A. Zullo, eds., 1991, *The Geology of the Carolinas: Carolina Geological Society 50th Anniversary Volume*. University of Tennessee Press, Knoxville, TN, 406 pp. (Technical.)
- Stewart, K. G., & M.-R. Roberson, 2007, *Exploring the Geology of the Carolinas: A Field Guide to Favorite Places from Chimney Rock to Charleston*, Southern Gateways Guides, University of North Carolina Press, Chapel Hill, NC, 320 pp.

### Websites

- Geologic Maps in GeoPDF Format, Division of Energy, Mineral and Land Resources, <http://portal.ncdenr.org/web/lr/geopdfs-geologic-maps>.
- Geoscience Education Resources, North Carolina Geological Survey, <http://www.geology.enr.state.nc.us/web/lr/earth-science-outreach>.
- The Natural History of North Carolina*, by David Walbert, <http://www.learnnc.org/lp/editions/nchist-twoworlds/1671>.
- North Carolina Geological Survey, Division of Energy, Minerals, and Lands Resources, <http://www.geology.enr.state.nc.us/>.

## South Carolina

### Books and Articles

- Horton, J. W., Jr., & V. A. Zullo, eds., 1991, *The Geology of the Carolinas: Carolina Geological Society 50th Anniversary Volume*. University of Tennessee Press, Knoxville, TN, 406 pp. (Technical.)
- Murphy, C. H., 1995, *Carolina Rocks! The Geology of South Carolina*, Sandlapper Publishing Company, Orangeburg, SC, 261 p.
- National Park Service. 2014. *Birth of the Mountains: The Geologic Story of the Southern Appalachian Mountains*. CreateSpace Independent Publishing Platform, Seattle, WA, 24 pp.
- Stewart, K. G., & M.-R. Roberson. 2007. *Exploring the Geology of the Carolinas: A Field Guide to Favorite Places from Chimney Rock to Charleston*. Southern Gateways Guides, The University of North Carolina Press, Chapel Hill, NC, 320 pp.

### Websites

- Education and Outreach, South Carolina Geological Survey, <http://www.dnr.sc.gov/geology/Education.htm>.
- Generalized Geologic Map of South Carolina, 2005, <http://www.dnr.sc.gov/geology/images/GGMS-1%20Page%20Size.pdf>.
- South Carolina Geological Survey, <http://www.dnr.sc.gov/geology/index.htm>.

## Tennessee

### Books and Articles

- Cox, W. E., 1998. *Great Smoky Mountains: the Story Behind the Scenery, 6th printing*. K. C. Publications, Las Vegas, NV, 48 pp.
- Moore, H. L. 1992. *A Roadside Guide to the Geology of the Great Smoky Mountains National Park*. University of Tennessee Press, Knoxville, TN, 178 pp.

### Websites

- Generalized Geologic Map of Tennessee, Tennessee Department of Environment and Conservation, [https://www.tn.gov/assets/entities/environment/images/geology\\_geologic-map-lg.jpg](https://www.tn.gov/assets/entities/environment/images/geology_geologic-map-lg.jpg).
- Great Smoky Mountains: Geology, National Park Service, <http://www.nps.gov/grsm/learn/nature/geology.htm>.
- Tennessee Geological Survey, Department of Environment and Conservation, <https://www.tn.gov/environment/section/geology>.

## Virginia

### Books and Articles

- Dietrich, R. V. 1970. *Geology and Virginia*. University Press of Virginia, Charlottesville, VA, 213 pp.
- Frye, K. 1986. *Roadside Geology of Virginia*. Mountain Press Publishing Company, Missoula, MT, 256 pp.
- Sethi, P. S., R. C. Whisonant, & K. K. Cecil. 1999. *Geology of Virginia*. Commonwealth of Virginia, Department of Mines, Minerals and Energy, Division of Mineral Resources, Radford University.

### Websites

- Interactive Geologic Map, Geology and Mineral Resources, Virginia Division of Mines Minerals and Energy, <https://www.dmme.virginia.gov/webmaps/DGMR/>.
- The Geological Evolution of Virginia and the Mid-Atlantic Region*, by L. S. Fichter, Department of Geology and Environmental Studies, James Madison University, <http://csmres.jmu.edu/geollab/vageol/vahist/index.html>.
- The Geology of Virginia*, Department of Geology, College of William & Mary, <http://web.wm.edu/geology/virginia/>.
- Virginia Division of Geology and Mineral Resources, <https://www.dmme.virginia.gov/dgmr/divisiongeologymineralresources.shtml>.

## West Virginia

### Books and Articles

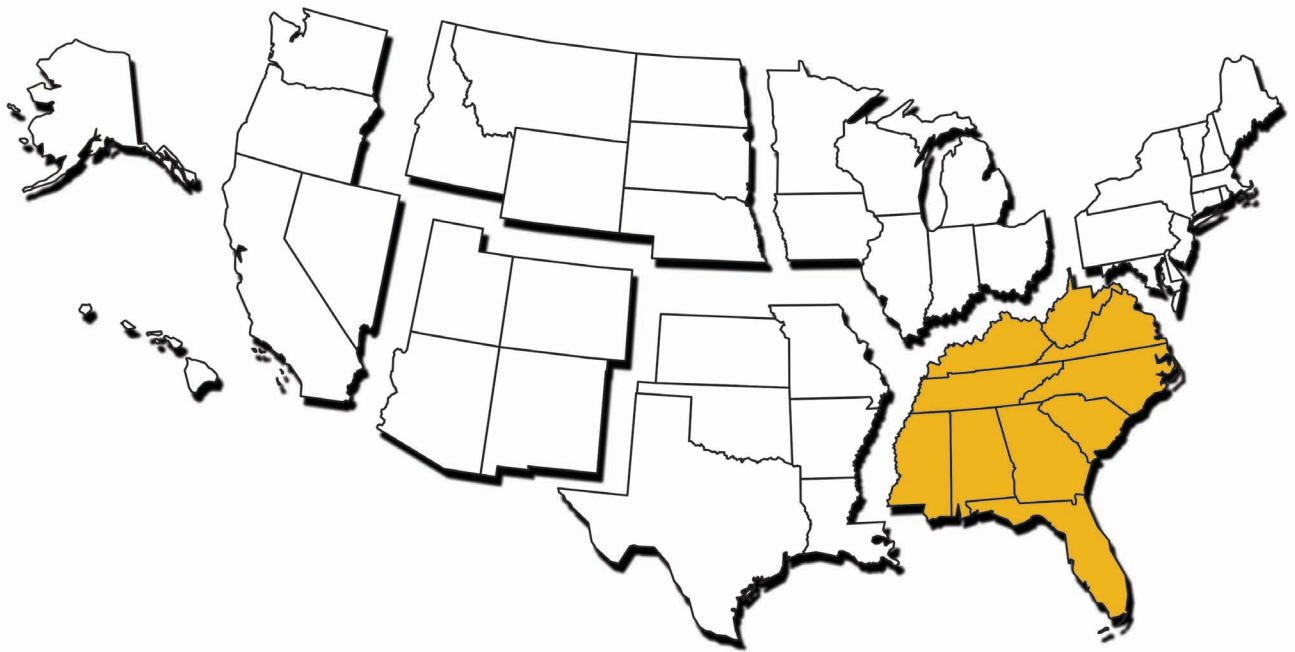
- Hemler, D. 2001. *West Virginia Through Geologic Time: a Teacher's Guide*. West Virginia Geological and Economic Survey, Morgantown, WV.

### Websites

- GeoEducational Resources, West Virginia Geological Survey, <http://www.wvgs.wvnet.edu/www/geoeduc/geoeduc.htm>.
- Geologic Map of West Virginia, <http://www.wvgs.wvnet.edu/www/geology/geolgeom.htm>.
- West Virginia Geological and Economic Survey, <http://www.wvgs.wvnet.edu/>.
- West Virginia Geology, <http://www.wvgs.wvnet.edu/www/geology/geology.htm>.

The  
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Guide™

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**On the back cover:** Blended geologic and digital elevation map of the Southeastern US. Each color represents the age of the bedrock at the surface. Adapted from Barton, K. E., Howell, D. G., Vigil, J. F., *The North America Tapestry of Time and Terrain*, US Geological Survey Geologic Investigations Series I-2781, <http://pubs.usgs.gov/imap/i2781>.