

GEOLOGY 431-SPRING 2002

SOUTHERN APPALACHIAN GEOLOGY

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This course is 4 credit hours.
 Office Hours: MW 3-4
 Other times by appointment

Texts: Tectonolithofacies map of the Appalachian orogen, Harold Williams.

Handouts from the literature will be distributed in class. Copies of these papers will also be placed on reserve at the USCA library. Several geology textbooks and glossaries will also be on reserve for your use.

		TOPIC	ASSIGNED READING
January	21/23	Introduction	Wilson; King
	28/30	Foreland deposition	Thomas, King et al
February	4/6	Foreland deformation	Rich; Cook et al
	11/13	Blue Ridge and easterly terranes	Hopson and Hatcher, Williams & Hatcher

Saturday 16 February Clarks Hill/Eastern Piedmont Transect 7a-7p

	18/20	Carolina and the Alleghanian	Secor, Dennis, Sacks & Secor, Steltenpohl
	25/27	Problems	Secor et al, Tull & Groszos, Unrugs
March	4/6	Big Picture Problems	Dalla Salda a, b, Dalziel, Astini et al

SPRING BREAK

	8	Leave for Dunlap, TN	Dunlap Inn, Dunlap, TN
	9	Valley and Ridge of TN	Knoxville, TN
	10	V&R, WBR	Motel, Townsend, TN
	11	Western Blue Ridge	Motel, Murphy NC
	12	Eastern Blue Ridge & Inner Piedmont	Spartanburg, SC
	13	Carolina terrane	Home

	18/20	Review and Discussion of field trip;	Comparisons across the App/Cal range Nance and Murphy, Williams
	25/27	Mesozoic, Tertiary	Olsen et al, Nelson, Colquhoun, Prowell
	1	Wrap up	

My objectives for this class are that

- 1) You develop an understanding of geological reasoning, and the nature of geological relations.
- 2) You get experience identifying igneous, metamorphic and sedimentary rocks.
- 3) You read and comprehend some recent and classic literature concerning the southern Appalachians.
- 4) You practice thinking critically and writing.

Each week you will be responsible for writing one page summaries for two of the assigned papers. I'll also ask you to prepare a vocabulary list composed of new geologic words or terms you read, learn and define in the readings. Finally, I'd like for you to prepare several questions based on your reading for the week. The questions need not be profound but should show that you read the

article and/or what additional background you need(ed) to understand the material. Two of these three-part assignments are due at the beginning of class.

These writeups will make up 75% of your grade. The remaining 25% will be your choice of either a discussion of the evolution of the Appalachians or a description of the field trip we take over Spring Break. Either should run between 5-10 pages. This paper will be due (to me) 8 April 2002.

I have made the list as short as possible, partly because many students have a limited geological background, and adding more readings would not help you understand better. Most of my selections are special to sites we will visit on our field trip. Several geology texts, glossaries, and additional materials are on reserve at the library. I will also distribute additional handouts, drawn from other (non-assigned) readings. Our discussion of topics will in general be from west to east, and from older to younger, and we will focus on current themes and research problems in the Appalachians.

If you miss more than two class meetings, it will be very difficult to pass the class.

READING LIST

- Astini, R.A. and others, 1995, The early Paleozoic evolution of the Argentine Precordillera as a Laurentian rifted, drifted and collided terrane: A geodynamic model: *Geological Society of America Bulletin*, 107, p. 252-273.
- Colquhoun, D.J., 1995, Review of Cenozoic evolution of the southeastern US Atlantic Coast north of the Georgia Trough: *Quaternary International*, 26, p.35-41.
- Cook, F.A., Albaugh, D.S., Brown, L.D., Kaufman, S. Oliver, J.E., and Hatcher, R.D., 1979, Thin-skinned tectonics in the crystalline southern Appalachians: COCORP seismic reflection profiling of the Blue Ridge and Piedmont: *Geology*, 7, 563-567.
- Dalla Salda, Luis, Cingolani, C., Varela, R., 1992, Early Paleozoic orogenic of the Andes in southwestern South America: Result of Laurentia-Gondwana collision?: *Geology*, 20, 617-620.
- Dalla Salda, L.H., Dalziel, I.W.D., Cingolani, C.A., Varela, R., 1992, Did the Taconic Appalachians continue into southern South America?: *Geology*, 20, 1059-1062.
- Dalziel, I. and others, 1994, Paleozoic Laurentia-Gondwana interaction and the origin of the Appalachain-Andean mountain system: *geological Society of America Bulletin*, 106, p. 243-252.
- Dalziel, I., 1997, Neoproterozoic-Paleozoic geography and tectonics: Review, hypothesis, environmental speculation: *Geological Society of America Bulletin*, 109, p. 16-42.
- Dennis, A.J., 1991, Is the central Piedmont suture a low-angle normal fault?: *Geology*, 19, 1081-1084.
- Dennis, A.J. and Wright, J.E., 1996, The Carolina terrane in northwestern South Carolina, USA: Age of deformation and metamorphism in an exotic arc: *Tectonics*, 15, in press.
- Hatcher, R.D., 1972, Developmental model for the southern Appalachians, *Geological Society of America Bulletin*, 83, 2735-2760.
- Hopson and Hatcher, 1988, Structural and stratigraphic setting of the Alto allochthon, northeast Georgia: *Geological Society of America Bulletin*, 100, p. 339-350.
- King, P.B., 1955, A geologic section across the southern Appalachians: An outline of the geology in the segment Tennessee, North Carolina and South Carolina, in Russell, R.J., ed. *Guides to Southeastern geology: Geological Society of America 68th Annual Meeting*, p. 332-373.
- King, P.B. and others, 1968, *Geology of the Great Smoky Mountains National Park, tennessee and North Carolina: USGS Professional Paper 587*, 23 p.
- Nance, R.D. and Murphy, J.B., 1994, Contrasting basement isotopic signatures and the palinspastic restoration of peripheral orogens: An example from the neoproterozoic Avalonian-Cadomian belt: *Geology*, 22, p. 617-622.
- Olsen, P.E. and others, 1991, Rift basions of Early Mezozoic age, in Horton, J.W., and Zullo, V.A., eds. *The Geology of the Carolinas: Knoxville Univ. Tennessee Press*, p. 142-170.
- Prowell, D.C. and Obermeier, S.F., 1991, Evidence of Cenozoic tectonism, in Horton, J.W., and Zullo, V.A., eds. *The Geology of the Carolinas: Knoxville Univ. Tennessee Press*, p. 309-318.
- Rich, J.L., 1934, Mechanics of low-angle overthrusting as illustrated by the Cumberland overthrust block, Virginia, Kentucky and Tennessee: *American Association of Petroleum Geologists Bulletin*, 18, 1584.
- Rodgers, J., 1949, Evolution of thought on structure of middle and southern Appalachians: *American Association of Petroleum Geologists Bulletin*, 33, 1643-1654.
- Rodgers, J., 1989, The Appalachian-Ouachita orogenic belt: Episodes, 10, 259-266.
- Secor, D.T., 1988, Geology of the eastern Piedmont in central South Carolina, in *Southeastern Geological Excursions*, D.T. Secor, ed., Columbia: South Carolina Geological Survey, 204-214.
- Sacks, P.E. and Secor, D.T., 1990, Kinematics of Late Paleozoic continental collision between Laurentia and Gondwana: *Science*, 250, 1702-1705.
- Secor, D.T., Samson, S.L., Snoke, A.W., and Palmer, A.R., 1983, Confirmation of the Carolina slate belt as an exotic terrane: *Science*, 221, 649-651.

- Thomas, W.A., 1977, Evolution of Appalachian-Ouachita salients and recesses from reentrants and promontories in the continental margin: *American Journal of Science*, 277, 1233-1278.
- Tull, J.F. and Groszos, M.F., 1990, Nested Paleozoic "successor" basins in the southern Appalachian Blue Ridge, *Geology*, 18, 1046-1049.
- Unrug, R. and Unrug, S., 1990, Paleontological evidence of Paleozoic age for the Walden Creek Group, Ocoee Supergroup, Tennessee, *Geology*, 18, 1041-1045.
- Williams, H. 1978, Tectonolithofacies map of the Appalachian orogen, St Johns, Newfoundland, Memorial University Map No. 1, 1:1,000,000.
- Williams, H. and Hatcher, R.D., 1982, Suspect terranes and accretionary history of the Appalachian orogen: *Geology*, 10, 530-536.
- Wilson, J. T., 1966, Did the Atlantic close and then reopen?: *Nature*, 211, 676-681.