

## EARLY PALEOZOIC SOUTHERN MARGIN OF NORTH AMERICA

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No 104203

The Alabama (southern Appalachian) promontory and Ouachita embayment of the late Precambrian-early Paleozoic southern margin of North America reflect a northwest-trending transform offset of a northeast-trending rift. The northwest-trending Southern Oklahoma aulacogen is interpreted as the expression of inboard propagation of the transform fault from the Ouachita embayment (in contrast to earlier interpretations as the failed arm of a triple junction). In Oklahoma, Early and Middle Cambrian gabbros, granites, and rhyolites are unconformably overlain by the transgressive Late Cambrian Reagan Sandstone and younger carbonate rocks. In the southern Appalachians (present Blue Ridge outcrops), late Precambrian sedimentary and volcanic rift-fill rocks (Ocoee, Mt. Rogers, Grandfather Mountain, Mechum River, Catocctin) are overstepped by Early Cambrian sandstones (Chilhowee), defining a post-rift unconformity. The time of transition from rift to passive margin is constrained by the Early Cambrian age of the post-rift unconformity; however, extensional faulting of basement rocks and accumulation of graben-fill clastic sediments continued through Middle Cambrian time along the Rome-Rough Creek-Mississippi Valley graben system and the Birmingham basement fault system inboard from the passive margin. The southern Appalachian rift and inboard basement fault systems, as well as a northwest-trending transform propagating to the Southern Oklahoma aulacogen, are consistent with northwest-southeast extension. Differences in ages suggest a spreading-center shift from the southern Appalachian rift along the transform to the Ouachita rift in the Early Cambrian. Early and Middle Cambrian extension at the Ouachita rift is suggested by the age of igneous activity along the transform. Northeast of the transform, Early and Middle Cambrian extension continued along the Iapetus Ridge outboard from the southern Appalachian passive margin, but minor extension is reflected in the inboard fault systems.

HYDROTHERMAL PRECIPITATES FROM A BLACK SMOKER VENT,  
TAG AREA, MID-ATLANTIC RIDGE 26°N

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No 104473

In July of 1985 the first ever recovery of polymetallic sulfides were made from an active black smoker hydrothermal vent site on the Mid-Atlantic Ridge. Precipitates recovered in a dredge haul include poly-metallic sulfides, oxides, sulfates, carbonates and chlorides. The predominant chimney fragments are made up of pyrite, chalcocopyrite and lesser amounts of sphalerite often showing zonation as replacement textures. Pyrrhotite was not observed. Amorphous iron oxide is abundant in the dredge haul and probably represents much of the talus on the broad basal mound supporting the chimneys and observed in video coverage of the vent field. Other phases recovered include anhydrite, gypsum, quartz, amorphous silica, calcite, atacamite, paratacamite and marcasite. Aragonite is a common phase infilling many of the cavities in the chimney fragments. Chemically Fe, Cu, Zn and S predominate; Mn, Co, Ni, and Pb only occur in amounts less than 0.1% wt. Ag occurs in amounts up to a few hundred ppm particularly with Zn and Cu-rich phases. The bulk of the samples show a paragenesis as primary precipitates in chimney-like structures from hydrothermal solutions in excess of 300°C. Many appear to have reached a mature or dying stage and flow channels are infilled with phases such as aragonite and amorphous silica. Partial oxidation of many samples has occurred.

ADIRONDACKS-GEORGES BANK (TRANSECT E-1): WHERE DO WE  
GO FROM HERE?

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No 91847

Geologic and geophysical maps and profiles have been prepared from the Grenville terrane of the North American Craton to the ocean floor off Georges Bank. One of the principal problems offshore is the paucity of data on the pre-Mesozoic geology. The southwestward extension, into this area, of the Meguma terrane of Nova Scotia, is, for example, highly speculative, however plausible. On land there is much disagreement and controversy concerning the nature and significance of specific contacts, a

not-unusual problem in metamorphic terranes. More broadly, however, we must emphasize the difficulty of sorting out features of the various Paleozoic orogenic events that now overlap one another spatially. The northwestern limits of Taconian deformation, metamorphism and plutonism are fairly clear, but the corresponding limits for the Acadian and Alleghenian events are not easily located. Even the nature of the sedimentary basins that existed during the Taconian-Acadian interval needs much clarification. Did Iapetus still exist then -- or was it reduced to a series of restricted basins of lesser extent? Much of the extant radiometric geochronology dates the emplacements of plutonic masses. More work of this kind is needed on the volcanic terranes, particularly those in areas of poor biostratigraphic control, and more needs to be done in dating the several metamorphic belts and their P-T histories. The reason for the gravity anomaly along the Green Mountain axis could probably be determined by deep drilling.

## ADIRONDACKS TO GEORGES BANK: TRANSECT E1 IN A TRANSITION

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No 108682

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The rifting and passive-margin histories of the Appalachian System during the Mesozoic and (so far as we know it) earlier during the late Proterozoic and early Paleozoic appear to be much the same from north to south. The active-margin history however, from the mid-Ordovician to the formation of Pangaea in the Permian, shows marked differences between the various segments, although features such as the Blue-Green-Long (BGL) axis, and certain gravity and magnetic anomalies, are through-going. Evidence for an Acadian event is strong in New York, northern New England and Maritime Canada, but is less conspicuous farther south. The Alleghenian deformation of the Valley and Ridge province dies out northward. The last traces of it are possibly found east of the Catskills in the area of this transect. In Canada, by contrast, a flat-lying veneer of Late Devonian and Carboniferous strata overlies earlier Paleozoic deformed rocks of the New Brunswick platform. The BGL axis first became active in the Taconian and coincides in location with a prominent gravity high extending from the Long Range of Newfoundland to the Green Mountains of Vermont. Farther south this gravity high lies progressively farther southeast of the BGL axis so that the separation of the two features is some 60 km in the central and southern Appalachians. Some of us suggest that this separation may be the result of late Paleozoic, low-angle thrusting. The above phenomena are consistent with the consolidation of Laurasia as a single landmass during the Devonian. Northern Iapetus had then closed, but its southern part did not close until the end of the Paleozoic.

## ECOLOGICAL REINTERPRETATION OF THE DYSAEROBIC

LEIORHYNCHUS FAUNA: GENESOO BLACK SHALE, CENTRAL NEW YORK

No 89886

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The anomalous *Leiorhynchus* fauna of the Upper Devonian Genesee Shale, formerly considered an epiplanktonic biota, is here reinterpreted as a gregarious and opportunistic epifaunal suspension feeding assemblage that inhabited dysaerobic environments within the Appalachian basin. This reinterpretation is based on detailed petrography, x-radiography, scanning electron microscopy, paleoecologic, and organic analyses of the upper portion of the Genesee Shale. The majority of the *Leiorhynchus* are articulated and preserved as primary calcite with only minor distortion due to compaction. Abundant *Leiorhynchus* occur in aggregates or clumps with a mean density of 13.9 individual/m<sup>2</sup>. The *Leiorhynchus* also strongly appear to be aligned to some sort of weak current within the basin. The mean beak direction of *Leiorhynchus* is  $\bar{\alpha}_{\text{beak}} = 42^\circ$ , whereas, the mean hinge direction is  $\bar{\alpha}_{\text{hinge}} = 122^\circ$  or  $302^\circ$ . The presence of a weak current is also supported by small scale cross-laminations and small starved ripples in silty layers. The abundant *Leiorhynchus* zone also correlates with the highest measured weight percent organics (5.97%) within the section.

These suspension feeding gregarious brachiopods may have obtained some benefit from occupying the fringes of these ancient oxyclines. Water-mass stratification makes probable the development and propagation of internal waves and their interaction with sediments at sites where the waves strike the sea-floor (Woodrow, 1985). Material suspended by these internal waves probably contained abundant organic matter and bacteria that accumulated on the fringes of these boundaries, thereby, creating an ideal situation for gregarious opportunistic suspension feeding taxa that are capable of withstanding lower oxygen levels.

- 5 Steven H. Edelman\*, Warren D. Sharp: GEOMETRIES AND AGES OF TERRANE BOUNDARIES IN THE WESTERN SIERRA NEVADA METAMORPHIC BELT: CONSTRAINTS ON MECHANISMS OF OCEANIC-CONTINENT SUTURING [108025] ..... 9:00 A
- 6 Kevin A. Maher\*, Jason Saleeby: GEOLOGY OF THE JACKSON MOUNTAINS, NW NEVADA [99283] ..... 9:15 A
- 7 John E. Marzolf\*: THE JURASSIC CORDILLERAN OROGENIC - VOLCANIC ARC: THE VIEW FROM THE BACK SIDE [98265] ..... 9:30 A
- 8 M. B. Underwood\*: TEMPORAL CHANGES IN GEOTHERMAL GRADIENT, FRANCISCAN SUBDUCTION COMPLEX, NORTHERN CALIFORNIA [90958] ..... 9:45 A
- 9 Mark Cloos\*, Brian H. Reck, Trevor Dumitru: THERMAL STRUCTURE OF ACCRETIONARY PRISMS AT ACTIVELY CONVERGENT PLATE MARGINS [109450] ..... 10:00 A
- 10 V. M. Seiders\*, C. D. Blome: CONSTRAINTS ON FRANCISCAN TECTONICS, CALIFORNIA, FROM CONGLOMERATE CLAST COMPOSITIONS [103700] ..... 10:15 A
- 11 Mark A. Helper\*: EARLY CRETACEOUS METAMORPHIC AGES FOR HIGH P/T SCHISTS IN THE CONDREY MOUNTAIN WINDOW, KLAMATH MOUNTAINS, NORTHERN CALIFORNIA: AN INLIER OF FRANCISCAN? [99074] ..... 10:30 A
- 12 R. A. Schweickert\*, W. P. Irwin: TERTIARY DETACHMENT FAULTING IN THE KLAMATH MOUNTAINS, CALIFORNIA: A NEW HYPOTHESIS [108799] ..... 10:45 A
- 13 Vicki L. Hansen\*: METAMORPHIC AND STRUCTURAL EVIDENCE OF A MESOZOIC TRANSPRESSIONAL NORTH AMERICAN MARGIN [102091] ..... 11:00 A
- 14 George M. Smith\*, C. M. Graubard, S. B. Keith: PATTERN OF LARAMIDE MAGMATISM AND TECTONICS IN SOUTHERN ALASKA: THE EFFECT OF CHANGING SLAB DIP WITH INCREASED CONVERGENCE RATE [109675] ..... 11:15 A
- 15 K. R. Wirth\*, D. J. Harding, A. E. Blythe, J. M. Bird: BROOKS RANGE OPHIOLITE CRYSTALLIZATION AND EMPLACEMENT AGES FROM  $^{40}\text{Ar}/^{39}\text{Ar}$  DATA [92216] ..... 11:30 A
- 16 William Harbert\*, Allan Cox: EARLY OLIGOCENE PALEOLATITUDE OF THE ALEUTIAN ISLANDS, ALASKA [103124] ..... 11:45 A

**COCORP SPECIAL POSTER SYMPOSIUM**

South Hall, Convention Center, Poster Booth 1, 8:00 A.M. - 5:30 P.M. A speaker will be present from 11:00 A.M. to 12:00 Noon daily. For list of contributors and speakers, please see Poster Session I.

**DNAG SPECIAL POSTER DISPLAY**  
South Hall, Convention Center, Poster Booth 2  
8:00 A.M. - 5:30

**ODP SPECIAL POSTER DISPLAY**  
South Hall, Convention Center, Poster Booth 3  
8:00 A.M. - 5:30

**POSTER SESSION V**

South Hall, Convention Center, 8:00 A.M. - 12:00 Noon

Authors will be present from 9:00 A.M. to 11:00 A.M.

**NORTH AMERICAN CONTINENT-OCEAN TRANSECTS PROGRAM:  
ATLANTIC, GULF AND ARCTIC MARGINS (SYMPOSIUM)**

- J. F. Sweeney\*, L. W. Sobczak, U. Mayr, H. R. Balkwill: TRANSECT G: CANADIAN SHIELD TO ARCTIC BASIN [92533] ..... Booth 4
- C. Keen\*, R. T. Haworth, Harold Williams: CONTINENT-OCEAN TRANSECTS D1-4: NORTHERN APPALACHIANS AND ATLANTIC MARGIN [86527] ..... Booth 5
- James B. Thompson, Jr.\*, Wallace A. Bothner, Yngvar W. Isachsen, William S.F. Kidd, Kim D. Klitgord, John B. Lyons, Peter Robinson, John S. Schlee: ADIRONDACKS-GEORGES BANK (TRANSECT E-1): WHERE DO WE GO FROM HERE? [91847] ..... Booth 6
- A. A. Drake, Jr.\*, J. A. Grow, N. M. Ratcliffe, R. T. Faill, W. Manspeizer, D. R. Hutchinson, K. D. Klitgord, W. E. Bonini: CONTINENT-OCEAN TRANSITION: N.Y. APPALACHIAN BASIN TO THE BALTIMORE CANYON TROUGH, GEODYNAMICS TRANSECT E-2 [86420] ..... Booth 7

- Lynn Glover III\*, Kim Klitgord, J. K. Costain, C. Coruh, S. S. Farrar, N. Evans, L. Pavlides, R. B. Mixon, M. J. Bartholomew: GEODYNAMICS TRANSECT E-3: PITTSBURGH, PA - WASHINGTON, D.C. - BALTIMORE CANYON TROUGH: SELECTED PROBLEMS FOR THE FUTURE [107779] ..... Booth 8
- D. W. Rankin\*, K. C. Bayer, D. F. Black, S. E. Boyer, J. R. Butler, D. L. Daniels, W. P. Dillon, D. W. Elliott, R. Goldsmith, J. A. Grow, J. W. Horton, Jr., D. R. Hutchinson, K. D. Klitgord, R. C. McDowell, R. C. Milici, D. J. Milton, J. P. Owens, J. D. Phillips: CONTINENT-OCEAN TRANSITION, CENTRAL KENTUCKY TO CAROLINA TROUGH: GEODYNAMICS TRANSECT E-4 [107374] ..... Booth 9
- Robert D. Hatcher, Jr.\*, D. J. Colquhoun, F. A. Cook, W. P. Dillon, Carl Merschat, R. C. Milici, A. E. Nelson, D. T. Secor, R. E. Sheridan, A. W. Snoke, L. S. Wiener: DNAG CONTINENT-OCEAN TRANSITION GEODYNAMICS TRANSECT E-5: CUMBERLAND PLATEAU, TENNESSEE TO BLAKE PLATEAU BASIN [108022] ..... Booth 10
- Ray G. Martin\*, William A. Thomas, Stuart A. Hall: TRANSECT F-2: MISSISSIPPI TO CUBA [108257] ..... Booth 11
- R. T. Bufferler\*, D. B. Rosenthal, C. D. Winker, G. W. Viele, R. H. Pilger, R. J. Lillie, M. Alavarad, R. G. Martin, A. E. Miles, R. L. Nicholas, D. S. Sawyer, S. Suter, J. S. Watkins: CONTINENT-OCEAN TRANSPECT F-1: OUACHITAS TO YUCATAN [92535] ..... Booth 12

**COAL GEOLOGY**

- Alan Bailey\*, John F. Sherrill, John Blackson: FORMS OF SULFUR AND PYRITE FORMATION IN SOME RECENT MISSISSIPPI DELTA SEDIMENTS [91012] ... Booth 13
- J. F. Whelan\*, P. C. Lyons: TOP-TO-BOTTOM INCREASES IN THE  $\delta^{34}\text{S}$  VALUES OF PYRITE, LOWER BAKERSTOWN COAL BED, MARYLAND [103530] . Booth 14
- Sandra G. Neuzil\*, C. Blaine Cecil: HYDROLOGY OF A PEAT DEPOSIT: IMPLICATIONS FOR MECHANISMS OF FORMATION AND CHEMICAL COMPOSITION OF COAL PRECURSORS [107337] ..... Booth 15
- P. K. Mukhopadhyay\*: CHARACTERIZATION OF TERTIARY COALS FROM TEXAS BASED ON ORGANIC PETROGRAPHY, PYROLYSIS, AND GAS CHROMATOGRAPHY [104547] ..... Booth 16
- Wolfgang D. Kalkreuth\*, Margaret E. McMechan: PETROGRAPHIC CHARACTERISTICS, TECHNOLOGICAL PROPERTIES AND REGIONAL RANK PATTERN OF CRETACEOUS COALS FROM PEACE RIVER COALFIELD, BRITISH COLUMBIA, CANADA [102501] ..... Booth 17
- William H. Gillespie\*, Cortland F. Eble: SMALL SPORES ASSOCIATED WITH PENNSYLVANIAN AGE COAL BEDS IN ALABAMA AND GEORGIA [104893] .... Booth 18
- Cortland F. Eble\*: MIOSPORE ASSEMBLAGES OF SELECTED COAL BEDS IN NORTHERN WEST VIRGINIA, CENTRAL APPALACHIAN BASIN, AND THEIR STRATIGRAPHIC IMPLICATIONS [97643] ..... Booth 19
- Paul C. Lyons\*, Curtis A. Palmer, Michael A. Millay: IMPLICATIONS FOR MACERAL CHEMISTRY OF THE PITTSBURGH COAL BED AS INDICATED BY HISTOLOGICAL FRACTIONATION OF ELEMENTS IN THE NEW ZEALAND TREE FERN *Alsophila tricolor* [109016] ..... Booth 20

**GEOPHYSICS**

- Mark W. Eisner\*: GRAVITY MODELING OF THE MARTIC REGION, LANCASTER COUNTY, PENNSYLVANIA [108502] ..... Booth 21
- Isidore Zietz\*, Kevin Bond, P. R. Johnson: ENHANCED MAGNETIC ANOMALY MAP OF THE WESTERN UNITED STATES AND OFFSHORE AREAS [107341] .... Booth 22
- Ali A. Nowroozi\*, Arnold D. Wong: GRAVITY AND MAGNETIC SURVEY OF THE RICHMOND TRIASSIC BASIN [92133] ..... Booth 23
- R. A. Laws\*, J. A. Dockal, T. R. Worsley: APPLICATION OF A GENERAL MATHEMATICAL MODEL OF ISOSTASY TO INTERPRETATION OF CRUSTAL STRUCTURE [88297] ..... Booth 24
- Cydney L. Faul\*, Brooks B. Ellwood, Robert W. Scott, Joseph E. Hazel: A PALEOMAGNETIC STUDY OF THE REMAGNETIZED JURASSIC-CRETACEOUS BOUNDARY LIMESTONE SECTION AT NUEVO LEÓN, MEXICO [98107] ..... Booth 25

# ABSTRACTS with PROGRAMS 1986

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99th ANNUAL MEETING AND EXPOSITION



## GEOLOGICAL SOCIETY OF AMERICA

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Meeting with the Associated Societies

The Paleontological Society (78th)

The Mineralogical Society of America (67th)

The Society of Economic Geologists (65th)

Cushman Foundation (36th)

Geochemical Society (31st)

National Society of Geology Teachers (27th)

Geoscience Information Society (21st)



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November 10-13, 1986

San Antonio Convention Center

San Antonio, Texas