

rock units of these two cratons on both margins of the Kibabide indicates that they were exotic to each other before their late Mesoproterozoic assembly. This paper focuses on sedimentary and igneous rocks exposed in the Mitwaba area (SE Congo), the type area of the Kibabide orogenic system, with special attention on the timing of deposition of sediments and the tectonic setting during the emplacement of strongly peraluminous granitoids and coeval mafic igneous rocks. The Kibabide Supergroup comprises three major lithostratigraphic units in the Mitwaba area: (1) Kibabide Group, (2) Nzilo Group and, (3) Hakansson Group. The Kibabide Group sedimentary rocks were intruded by widespread continental arc related gabbro-diorite and ca. 1.38 Ga syn-kinematic D1 strongly peraluminous (SP) granitoids similar to those documented in the Lachlan and Hercynian belts. A model involving underplating of arc mafic magma into the crust, causing heating and partial melting of metasedimentary rocks during the subduction stage of the Kibabide orogeny explain the close association of arc mafic rocks and SP granitoids in the Kibabides. The Nzilo and Hakansson Groups disconformably overlie the Mitwaba arc igneous rocks and their host sedimentary rocks of the Kibabide Group. The sedimentary rocks of these two groups contain detrital zircons yielding U-Pb SHRIMP dates between 3.2 and 1.36 Ga. The youngest date of 1.36 Ga is similar to that of zircons from Mitwaba arc igneous rocks, the source for these syn-orogenic sedimentary rocks. Late to post-kinematic D2 fertile granites and related pegmatites and greisens hosting tin-group ore deposits were emplaced after 1.08 Ga, that is the timing of M2 amphibolite facies metamorphism, and exhibit geochemical similarities with SE Asian collisional granites. The Kibabide orogenic system evolved between 1.4 (subduction) and 1.0 Ga (collision/exhumation) and, in contrast to some claims, we contend that it has played a key role in Rodinia supercontinent assembly.

188-35 Poster Santos, Edilton J. Dos

TECTONIC EVENTS PRECEDING THE BRASILIANO CYCLE IN THE BORBOREMA PROVINCE, NE BRAZIL: IMPLICATIONS FOR RODINIA RECONSTRUCTIONS
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Keywords: Mesoproterozoic anorogenic events; Grenville-age and Brasiliano (Late Neoproterozoic) events; Borborema Province; Rodinia supercontinent; Northeast Brazil

Recent data obtained in the Borborema Province, NE Brazil, a Late Neoproterozoic belt situated in the north edge of the São Francisco craton, have demonstrated the importance of several tectonic events preceding the terminal Brasiliano orogeny of this Province. In its central part, the oldest registers include disrupted anorogenic intrusives, varying from gabbro-anorthosites, A-type granites, trondhjemites, carbonatites (?) to mafic dike swarms intruding disperse remaining Paleoproterozoic terranes. The available geochronologic U-Pb data reflect ages that are more younger than 1.9 Ga (well documented ages vary from 1.7 Ga to 1.5 Ga). The next tectonic event is documented by volcano-sedimentary belts of Stenian-Tonian age, that form the Alto Pajeú terrane. These supracrustals show characteristics of mature arc and rifted back-arc sequences, which were affected subsequently by an expressive tectono-thermal event of amphibolite facies, the Cariris Velhos event. Sheets of peraluminous granites are conspicuous in this terrane, representing a vigorous event of syn-contractional anatexis. The anti-clockwise metamorphic path confirms the collisional nature of the event, well calibrated by several U-Pb determinations whose age determinations spread in a time interval between 950 and 920 Ma. It follows a period of extensional regime of brittle to ductile-brittle nature that gave place to mafic dike and granitic intrusions, with ages varying from 800 to 750 Ma. Finally the latest event, the Brasiliano orogeny, re-deforms the Cariris Velhos structures along significant transcurrent shear zones, that are also intruded by numerous granite intrusives, blurring the foregoing architecture. The pre-Brasiliano evolution shows a parallelism with other Grenville-age belts in the world, suggesting that part of the Borborema province would make part of the history of assembly and break-up of the Rodinia supercontinent.

188-36 Poster Silva, Juan Carlos

C AND O-ISOTOPE STRATIGRAPHY OF VENDIAN CARBONATE SEQUENCES IN NORTHWESTERN ANDES: IMPLICATIONS FOR THE TERMINAL PROTEROZOIC EVOLUTION OF THE NORTHWESTERN SOUTH AMERICA

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Keywords: Stable Isotopes; Vendian; Colombia; South America; W. Gondwana C and O- isotopes and geochemistry from marble sequences of the Cajamarca-Valdivia Terrane (CVT), Central Cordillera of Colombia, were used to constrain depositional age and propose a terminal Proterozoic paleogeographic picture for northwestern South America. Two C-isotope pathways were identified: (1) a plateau with values varying from +3.1‰ to +4 ‰ PDB and (2) a negative C-isotope excursion (~ -3.6‰PDB), that subdivides the plateau into two parts. O-isotope values fluctuate between -6‰ and -8‰PDB, but with some shifts to -4‰PDB. Mn/Sr ratios < 1.5 and decoupled C and O chemostratigraphic pathways suggest that the C and O-isotope values are primary and thus, represent the isotope composition of the seawater from which original limestone deposited. The chemostratigraphic pathways are very close to those reported from well-known Vendian (560-545 Ma) carbonate sequences worldwide. One proposes that these sequences, which overlie the Grenvillian Chicamocha terrane (GCT) in central Colombia and extend into Ecuador (La Loja terrane, Chiguinda) and Peru (El Oro terrane); were deposited in a passive margin west of the Guiana shield right after the separation of Laurentia from the Amazonian craton (~570 Ma) and formation of the Iapetus ocean. This implies that by the 560-545 Ma time span, the Oaxaquia terrane (southern Mexico), which contains Grenvillian rocks similar to those of the GCT but lacks sedimentary sequences similar to those of the VCT, had already been rifted away from western Gondwana margin (WGM). The Oaxaquia terrane, however, was not located far away from the WGM and should have converged towards the GCT during early Ordovician. This hypothesis is supported by the presence of similar graptolite fauna in sedimentary sequences from both, the VCT (e.g La Cristalina, El Higado, Santa Teresa Fms) and Mexico (Oaxaquia), which have been indistinctly correlated to the VCT metasedimentary sequences.

188-37 Poster Misi, Aroldo

THE NEOPROTEROZOIC CARBONATE SEQUENCES OF SOUTH AMERICA: EVOLUTION AND CHEMOSTRATIGRAPHIC CORRELATION

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Keywords: Chemostratigraphy; Neoproterozoic sequences; South America

The Neoproterozoic sequences of South America, most of which are associated with extensional events during Rodinia breakup and Gondwana formation, occur in the following geotectonic settings: (1) carbonatic and siliciclastic sequences deposited on tectonically stable terranes (cratonic areas); (2) intensely deformed siliciclastic and carbonatic sequences in passive margin basins surrounding the cratonic areas; (3) siliciclastic + volcanoclastic infills associated with marginal fold belts. Three mega-stratigraphic sequences are represented in the cratonic as well as in the passive margin basins (1 and 2 above): The Glaciogenic, the Carbonate/Siliciclastic and the Molassic-Type Sequences. At least two transgressive-regressive marine cycles appear to have occurred during the evolution of the Carbonate/Siliciclastic Sequence above a glaciogenic diamictite (Sturtian glaciation?). They are represented by two shallowing-upward sub-sequences. The most significant ages available are constrained between an upper limit of 950 My (detrital Zr from basal diamictites of the Araçuaí Gr., and Vendian fossils of the genus Cloudina and Corumbella (580 to 543 Ma.) reported in the Corumbá and Arroyo del Soldado groups. A Pb-Pb isochron age from carbonates of the Bambuí Group of 740 ± 22 Ma. (MSDW = 0.66), which probably means the depositional age, was recently published. We report high resolution isotope chemostratigraphic data of the concerned Neoproterozoic successions. In this study we have used samples from high quality stratigraphic sections and with clear indication of good preservation, on the basis of trace element determination: only samples retaining the lowest Mn/Sr ratios (<1) and/or the highest Sr concentration (>500ppm) were selected, especially in consideration of their 87Sr/86Sr ratios. Excepting for the Corumbá Basin, the 87Sr/86Sr least radiogenic set of data range from 0.70684 to 0.70780 indicating that the age of sedimentation lies between the Sturtian (~750 Ma) and the Varanger ice age of ca. 600 Ma ago, or have been deposited immediately after the first Varanger glaciation. In the Corumbá Basin, the best preserved carbonates of the Polanco and Tamengo Formations (Corumbá Group) show ratios around 0.70850, suggesting younger ages for these sequences. This is confirmed by the presence of Vendian fossils. d13C and d18O studies in the same sequences revealed some remarkable excursions that may also be used for stratigraphic correlation.

188-38 Poster Li, Huaikun

BREAKUP OF RODINIA-GEOCHRONOLOGICAL CONSTRAINTS FROM THE SOUTH QINLING OROGEN, CENTRAL EAST CHINA

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Keywords: U-Pb zircon dating; Rodinia breakup; South Qinling Orogen; Central East China

Rodinia, the earliest well documented supercontinent, has been one of the key subjects of common interests in Earth Sciences since the early 1990s. Our recent study has revealed abundant geological records of Rodinia assembly and breakup events in the Qinling Orogen that can be subdivided into South Qinling and North Qinling orogens with the early Paleozoic Shang-Dan suture zone as the boundary. Interestingly, a 980-840Ma geochemically syn-collisional or volcanic arc type granitoid belt exclusively occurs in the North Qinling Orogen; in contrary, a series of 810-710Ma rifting event records are widespread in the South Qinling Orogen. This paper will focus on the 810-710Ma rifting events. The 810-710Ma rifting event records in the South Qinling Orogen include basic dike swarms, bimodal volcanics, A-type granite and coeval granodiorite, quartz diorite and tonalite and granitic gneiss, with which a systematic U-Pb zircon TIMS (Thermal Ionization Mass Spectrometry) and SHRIMP (Sensitive High Resolution Ion MicroProbe) dating work has been carried out except the basic dike swarms. The basic volcanic rock and the acid tuff from the Yaolinghe Group bimodal volcanics yield U-Pb zircon TIMS ages of 808.1±5.7Ma and 745.8±1.5Ma respectively. A TIMS age of 737.3±2.4Ma for the basic volcanic rock from the Bikou Group bimodal volcanics was obtained. A SHRIMP U-Pb zircon age of 711±11Ma for the Tuwushan A-type granite, which is in good agreement with a previously published TIMS age of 725±39Ma within 2σ analytical error; a SHRIMP age of 717±10Ma for granodiorite and a TIMS age of 716.6±3.9Ma for diorite from the Laojundian intrusive rock complex some 60km to the NNW of the Tuwushan A-type granite, which are in good agreement with each other and are consistent with a SHRIMP age of 713.7±6.6Ma for the Douling granitic gneiss coexisting with the Laojundian intrusive rock complex. We also obtained a TIMS age of 723.3±2.7Ma for a tonalitic granite from the Hannan intrusive complex. Based on our newly obtained U-Pb zircon dating data, we fully believe that a series of strong breakup events of the Rodinia supercontinent took place in the South Qinling Orogen in the late Neoproterozoic at some 810-710Ma.

SESSION 189

G14.01 - Mineral deposits associated with black shales
WEDNESDAY, August 25, 2004 - 9:00

Room: 10

Conveners:

Coveney Raymond M. JR., Pašava Jan

189-1 Key Lecture Coveney, Raymond Martin

PETROGRAPHIC EVIDENCE FROM BLACK SHALES AND ASSOCIATED STRATA FOR A NEAR-CONTINENTAL-SCALE PALEOZOIC HYDROTHERMAL EVENT IN THE US MIDWEST

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Keywords: black shales; lead-zinc ores; hydrothermal mineralization; fluid inclusions

The Mississippi Valley-type (MVT) carbonate-hosted lead-zinc ores of the American Midwest such as those of Joplin and Viburnum, Missouri, occur mainly in Cambrian to Pennsylvanian strata and are confined to discrete areas no more than thousands of sq km in aerial extent. Much more widespread minor and trace occurrences of MVT minerals are found in the surrounding region throughout an area exceeding a million sq km. Once dismissed as non-hydrothermal, minerals from the more widespread occurrences contain fluid