SE02-1

CORRELATION PALEOZOIC AND PROTEROZOIC TERRANES OF SOUTHERN MEXICO WITH THE NORTHERN ANDES BASED ON U-PB GEOCHRONOLOGY OF DETRITAL ZIRCONS

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Much has been written about the relationship of the Proterozoic Oaxaca complex and Paleozoic Acatlán Complex of southern Mexico with the northern Andes. Here we show new U-Pb geochronology of detrital zircons of all the units of the Acatlán Complex and some of the Paleozoic cover of the Oaxacan Complex that show that the provenance and the depositional history of the Acatlán Complex and the age of source rocks and their orogenic affinities is from either Gondwana, Laurentia or Oaxaquia, even though the sedimentary packages are presently juxtaposed. These new data clearly show that our understanding of the history of the Acatlán Complex is poor, at best.

The zircons from the Paleozoic strata of the Oaxaca Terrane have ages of 993 Ma with subordinate clusters of 358 and 472 Ma. The mid-Proterozoic ages suggest a proximity of this terrane with northwestern South America, as southwestern portions of the Amazon craton and possibly basement massifs in the northern Andes contain igneous rocks of appropriate age. Grenville rocks of North America yield older ages.

The U-Pb zircon ages from the Xayacatlán Formation range from 447 to 3115 Ma. Only five zircons show U/Th ratios >10 indicating that most zircons are magmatic. The cumulative age pattern shows the most important zircon clusters at 447-550 (peak at 477 Ma) and 590-795 (peaks at 603 and 708 Ma). Smaller but distinctive populations occur at 800-1400 (peaks at 946 and 1128 Ma) and 1651-1964 (peak at 1821 Ma) with a few grains in the range 2550-3115 Ma. Zircons from the Cosoltepec Formation yield U-Pb ages ranging from 341 to 3451 Ma. The age-probability curve shows important populations at 500-750 Ma (peaks at 543 and 568 Ma). Minor populations occur in the range 341-450 Ma (peaks at 345, 394 and ~410 Ma), 800-1000 Ma (peaks at 936 and 975 Ma) and 1780-2197 Ma (peaks at 1960, 2087 and 2197 Ma). Detrital zircons from two Chazumba samples (which likely correlates with the Silgará Fm of Colombia) yield nearly ages ranging from 249 to 1772 Ma. The large majority of zircons from Chazumba show low U/Th ratios typical of magmatic zircons. The cumulative age patterns show dominant zircon clusters in the range 249-440 Ma (peaks at 275 and 304 Ma) and 720-1400 Ma (peaks at 744, 922-943 and 1123-1171 Ma)

Our data show that the main units of the complex have different depositional histories and were deposited in contrasting paleogeographic locations at different times. The Xayacatlán Formation represents a Laurentian fragment, whereas that the Cosoltepec Formation is a South American (Gondwanan) suite. The Chazumba and the underlying Magdalena Formation contains zircons compatibles with both Laurentia and Gondwana sources. Our data further indicate that the Xayacatlán and Cosoltepec Formations evolved independently at least until the Silurian. The Chazumba and Magdalena Formations were deposited during Early Permian time and accordingly, their amalgamation with Cosoltepec and Xayacatlán Formations could not have occurred until the final assembly of Pangea.

SE02-2

C-ISOTOPE STRATIGRAPHY OF A VENDIAN CARBONATE SUCCESSION IN NORTHWESTERN ANDES: IMPLICATIONS FOR THE NW ANDES-MEXICO CONNECTION

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Geochemical, geochronologic, lithostratigraphic and paleontologic data have been used to investigate a paleogeographic connection between high-grade metamorphic terranes of Grenvillian age from southern Mexico and eastern Colombia from Late Mesoproterozoic to Early Paleozoic (1,2). Nevertheless, such a paleogeographic connection, although widely accepted, has remained controversial; and no consensus have been reached on the NW Gondwana paleogeography during the terminal Proterozoic-Early Paleozoic time span (3).

C-isotope chemostratigraphic data from lower amphibolite-facies marbles of the Cajamarca-Valdivia terrane (C-V), eastern flank of Central Cordillera of Colombia, were used, in this study, to constrain the depositional age for their sedimentary protoliths and to contribute to the paleogeographic reconstruction of NW South America during the terminal Proterozoic-Early Paleozoic time span.

Predominantly positive 13C values (~+4‰ PDB) conforming an isotopic plateau and interrupted just by a single negative shift to -3.6‰PDB, were observed. These chemostratigraphic pathways are comparable with those from well-calibrated Vendian limestone sequences, and suggests a depositional age between 560 and 545 Ma for the sedimentary precursors. This depositional age, and the presence of boulders of C-V metasediments in Ordovician metasediments (Santa Teresa), on the other hand, suggests that the former can no longer be correlated to Ordovician metasedimentary successions overlying the high-grade Grenvillian age basements in eastern Colombia (e.g. La Cristalina, El Higado and Santa Teresa Fms).

The depositional age here proposed, alternatively, suggests either that the C-V is autocthonous to para-autocthonous to the NW margin of Gondwana and that the studied marbles, and correlative successions from Ecuador and Peru (La Loja and Oro terranes), were deposited in the northwestern continental margin of Gondwana during the Vendian. If the C-V is considered as allocthonous or para-utocthonous, as so far proposed, it would have been accreted to the NW margin of Gondwana before early Ordovician times. This rules out the idea that the high grade Grenvillian-age terranes from southern Mexico, which lack Vendian-Cambrian carbonate successions, remained attached to northwestern Gondwana (eastern Colombia) from the terminal Proterozoic until the Early Paleozoic. Instead, it suggests that these terranes were rifted away from the western Gondwana margin before 570 Ma. The presence of similar Early Ordovician graptolite fauna in sedimentary successions overlying the Mexican Grenvillian-age massifs and in metasedimentary successions of eastern Colombia suggests that the Mexican terranes remained as float rafts out board the northwestern Gondwana during the Early Paleozoic. Faunal similarities resulted from ocean water circulation and/or biologic migration, a fact well documented in other regions of South America (4). Finally, the presence of Vendian carbonate successions in eastern-northeastern Colombia and western Argentina

(1, 5, 6), some of which have been dated by using C-isotope stratigraphy, suggests that a large continental margin was established along western Gondwana during the terminal Proterozoic.

SE02-3

REGISTRO TECTÓNICO Y CORRELACIONES REGIONALES DE LAS ROCAS GRENVILLIANAS DE LOS ANDES COLOMBIANOS

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Nuevos datos geológicos e isotópicos recientemente obtenidos en las rocas Proterozoicas dispersas en los Andes Colombianos, permiten la reconstrucción de los diferentes periodos de su evolución geológica, y su correlación con otros dominios y provincias tectónicas regionales.

La evolución geológica puede caracterizarse en tres eventos principales: (1) entre 1250-1170 Maformación de protolitos sedimentarios y volcanicos en cuencas extensivas, posiblemente de rift o back-arc, e inclusive arcos continentales, asociados al retrabajamiento de una margen continental con una historia magmatica entre 1250-1600 Ma, asi como componentes de evolución cortical mas antigua; (2) continuidad de un arco magmatico continental ha 1160 Ma, (3) inversión tectónica com la formación de dos eventos metamórficos, uno de ellos aparentemente contemporaneo com la evolución del arco magmático (1150-1190 Ma), y el otro de caracter colisional, con un registro temporal diacrónico entre 1100-1000 Ma.

Las correlaciones tectónicas y similutudes isotópicas sugieren que estas rocas Proterozoicoas podrian haber sido formadas en una margen continental semejante al SW del Craton Amazónico, y la existencia de una actividad de arco magmatico hasta ~1160 Ma, excluye las propuestas de una transferencia de estos dominios de Laurentia, donde los vestigios de los ultimos arcos magmaticos se extiende hasta ~1230 Ma.

La evolución geológica y temporal de los dominios Colombianos tambien presentan algunas semejanzas con las rocas Proterozoicas del terreno Oaxaquia en Mejico, aunque en contraste, las rocas Colombianas presentan un mayor componente de retrabajamiento de corteza continental mas antigua. Adicionalmente, el registro geológico de los Macizos Colombianos y Mejicanos tambien presenta semejanzas con macizos Proterozóicos de los Apalaches.

La presencia de un evento metamórfico entre 1100-1000 Ma, incluye estos dominios como fragmentos de los orogenos de tipo Grenvillianos asociados a la configuración de Rodinia, y es posible relacionarlos a la colisión de la margen del Craton Amazónico con otra masa continental. A partir de los modelos paleogeográficos regionales para la proto-margen Andina del NW de Suramérica, tres posibles esquemas colisionales: (1) una colisión con Laurentia, en la cual el basamento Proterozoico de algunos terrenos aloctonos de los Apalaches podria corresponder a fragmentos del Craton Amazónico transferidos durante la colisión continental, (2) colisión con Baltica, (3) colisión con um micro-continente.

La geológia del Paleozóico Inferior en las coberturas de los dominios Proterozóicos Colombianos, muestra posibles vestigios de una evolución tectono-sedimentraria de rift a margen pasiva, relacionadas há la presencia de condiciones estables despues del evento tectónico continental Grenvilliano, hasta el Cambrico. En contraste al NE, en los Andes de Mérida (Venezuela), existen vestigios de una convergencia activa durante el Neoproterozóico y el Paleozóico Inferior, sugiriendo la existencia de una segmentación en la configuración de la proto-margen continental del NW de América del Sur, que tiene importantes consecuencias en la reconstruccion de los eventos Neoproterozoicos y Cambrianos que incluyen la fragmentación de Rodinia y la constitución de los arcos intra-oceanicos y continentales perifericos a la aglutinación tambien de Rodinia.

SE02-4

THE METAMORPHIC BELTS OF THE CENTRAL PERUVIAN ANDES: REVIEW OF TECTONIC AND REGIONAL CORRELATIONS

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Pre-Mesozoic basement inliers dispersed along the Andean chain have been considered as tectonic tracers of continental and/or terrane interaction of the South American margin with other crustal domains. Within this perspective, broad scale tectonic models related the tectonic evolution of the the Peruvian proto-Andean margin to Proterozoic Laurentia-Amazon Craton continental collision, placing North American and Mexican terranes against this continental margin during Late Neoproterozoic times. Paleozoic tectonic evolution is interpreted in terms of terrane dispersion, followed by Middle Paleozoic arc magmatism, and Permo-Triassic rift formation.

Review of published data and new observations from an ongoing research project on Central Peru basement domains, provides new insights in these hypothesis.

Three main metamorphic terrains constitute the framework of the Peruvian Andes: (1) The southern Arequipa domain, that includes a granulite basement, with a main 1.8-2.0 Ga crustal formation event, followed by a 1,2-1,0 Ga Grenvillian accretionary orogenic evolution, related to the collision of the western Amazon Craton with Laurentia or other continental mass. Neoproterozoic-Cambrian glaciar related sediments cover this domains, and are in turned affected by Ordovician tectono-magmatic event, reseambling the tectonic reccord of the Fammatinian evolution of the Argentinan Andes. (2) The central domain (Marañon Complex) outcrops for at least 500 Km in a SW-NE trend, and it's made of different domains of meta-vulcano-sedimentary rocks with associated ultrmafic rocks, deformed in the greenschist-amphibolite facies, apparently during Neoproterozoic-Cambrian times. Deformed Ordovician and Devonian passive margin sedimentary rocks, and undeformed Late Devonian calc-alkaline granitoids, truncated this Complex. Lithostratigraphic constraints suggest that the older tectonic evolution may be related to a Cordilleran type tectonic evolution. (3) The Olmos-Salas complex outcrops in northernmost Peru, it's made of a low grade psammo-pelitic metamorphic sequence, with associated deformed felsic dykes, and locally amphibolitic rocks, cut by sin-tectonic granitoids. Fossil remmants suggest Ordovician and Devonian protoliths. Its tectonostratigraphic position, its akin to a Late Paleozoic to Triassic metamophic belt that characterized the Ecuadorian Andes.

From a regional perspective, the main 1.8-2.0 Ga isotopical fingerprints from the Arequipa protoliths shows some affinities with Appalachian Blue Ridge Proterozoic rocks, that link its evolution to Laurentia Collision.

The apparent presence of Neoproterozoic accretionary orogeny on the Marañon Complex, suggest that the Mesoproterozoic configuration of this proto-Andean margin follow a different trend, with an active convergent margin with an open sea, bearing possible correlations with the Avalonian related terranes. This trend contrasts with the mentioned Arequipa and Northern Andes Proterozoic domains, where stable tectonic configuration follow the Grenvillian collisional event, until Cambrian times.

Finally, the tectonostratigraphic record of the northern Olmos-Salas Complex may be related to the northern Amotape and Loja terranes of Ecuador, that reccord a possible Permo-Triassic collisional related tectonics, and contrast with the contemporaneous rift related tectonic evolution of the eastern Peru, authoctonous domain, suggesting that this segment can be also related to this suspect terrane.

SE02-5

NEW INSIGHTS ON THE PROVENANCE OF THE SOUTHERN MAYA TERRANE AND ITS IMPLICATIONS ON SOUTHERN MEXICO–SOUTH AMERICA CONNECTIONS

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Most of the southern Maya terrane is constituted of igneous and metaigneous rocks of the Chiapas massif, a large batholithic structure parallel to the Pacific coast of the states of Chiapas and eastern Oaxaca. Towards the west of the Tehuantepec isthmus similar plutonic rocks of Late Permian to Early Triassic age are intruded into granulite facies rocks of Oaxaquia. The latter was formed 1.3 to 1.0 Ga ago and metamorphosed during the Grenville orogeny at ~990 Ma (e.g. Solari et al., 2003). Zircon geochronology on orthogneisses from the Chiapas massif has shown that the average age of zircon cores is ~1.05 Ga, indicating that the protoliths of the Chiapas massif are probably part of Oaxaquia (Weber et al., 2004). However, no granulite facies Grenville-age basement is exposed within the Chiapas massif. The major tectonothermal event in the Chiapas massif is ~250-254 Ma old leading to medium- to high-grade metamorphism and anatexis in meta-sedimentary protoliths. East of the NE limit of the Chiapas massif, unmetamorphosed Permian sandstones of the Santa Rosa formation are exposed. A direct connection between Santa Rosa formation and Chiapas massif is therefore impossible during the Permian.

We present U-Pb SHRIMP data of zircons from a sandstone from the Santa Rosa formation and anatectic paragneisses from the Chiapas massif. The youngest concordant zircon of the Santa Rosa sandstone sample is 366 Ma old, making this the maximum age of sedimentation. Most of the zircons of the Santa Rosa sample have Pan-African ages (550-680 Ma). Other populations are of Silurian, Grenville, early Mid-Proterozoic, Early Proterozoic, and Late Archean age. One paragneiss sample from the Chiapas massif (north of Tonalá) has zircon cores of only one provenance age ~1.0 Ga. Another paragneiss (close to Custepec) has zircon cores of Grenville age and another major population of ~1.4-1.5 Ga plus one 2.3 Ga grain.

The maximum age of sedimentation of both paragneiss protoliths is about 950 Ma, but the absence of any Pan-African grain makes it probable that sedimentation is of Late Proterozoic age along the passive margin of rifting Rodinia. We further conclude that the sediments of the Custepec sample cannot come from Oaxaquia because no 1.4-1.5 Ga zircons are known from Oaxaquia. Instead, we consider a provenance from the SW Amazon craton, where 1.4-1.5 Ga old rocks are widespread and in connection with rocks from the 1.0 Ga Sunsás event (Geraldes et al., 2001). This may also indicate that Oaxaquia had a position close to the SW Amazon craton during the breakup of Rodinia. The sediments of the Santa Rosa sandstone, without doubt, come from Gonwana but they do not have the same provenance than the Chiapas massif metasedimentary protoliths and they have a Paleozoic sedimentation age. Therefore, we consider different paleogeographic positions for the northern and the southern Maya terrane in the Late Paleozoic, but in any case in close connection with Gondwana.

SE02-6

THE 'SEPULTURA' UNIT - A MEDIUM TO HIGH GRADE METASEDIMENTARY SEQUENCE IN THE CHIAPAS MASSSIF, SE MEXICO

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The Chiapas massif, a large batholitic structure at the southern margin of the Maya terrane in southern Mexico, is thought to form part of a Late Permian active continental margin that extents from northern Mexico to northern South America (Torres et al., 1999). In the last years metasedimentry rocks ('Sepultura' unit) were described in the centre of the Chiapas massif (Weber et al. 2002). The type locality is situated 50 km west of Villaflores (Chiapas). Recently, we discovered several outcrops of similar metasediments in the entire Chiapas massif, demonstrating that metasediments are a common rock type; however, they are always surrounded by orthogneisses and intruded by deformed granitoids. The sequence is mainly composed of metapelites and metapsammites with intercalated marbles, calcsilicates, and minor metagreywackes. The calcsilicate rocks have two assemblages: (1) garnet, clinopyroxene, ±wollastonite and (2) feldspar, clinozoisite, clinopyroxene, and quartz. Calcic marbles locally contain olivine or garnet lumps. Metagreywacke, composed of quartz, feldspars, pyroxene (partly amphibolized), is associated with the calcsilicate rocks. The metapelites show medium to high-grade metamorphic conditions with partial anatexis. The mineral assemblage is feldspar, biotite, garnet, sillimanite and sometimes cordierite and spinel. White mica occurs as secondary mineral, i.e. replacing sillimanite. The migmatites often show a neosom with garnet surrounded by K-feldspar and quartz that indicates a melt building reaction like: biotite+sillimanite+plagioclase+quartz = garnet+K-feldspar+melt. Garnet-biotite thermometry and GASP barometry yielded peak metamorphic conditions at 730-780°C and ~5.8 kbar, whereas retrograde assemblages revealed thermal overprinting at ~540°C and ~4.5 kbar. Retrograde conditions are further indicated by chloritization of biotite and garnet.

The main strike direction of mostly subvertical foliation in the Sepultura unit is E-W and therewith angular to the NW-SE elongated Chiapas Massif and the Pacific coast. Isoclinal folding, often of melt layers, indicate compressive tectonics following to or contemporaneous with anatexis. Pervasive E-W striking foliation is younger than the latter event as most of the intrusive rocks are affected by this deformation.

U-Pb geochronology (SHRIMP) of zircons from anatectic paragneisses revealed the age of the high-grade event at 252-254 Ma, forming new igneous zircons or rims around Precambrian cores. Metamorphic rims of an orthogneiss sample have the same age whereas igneous zones of the same zircons are 271±3 Ma old, interpreted as the age of the plutonic precursor (Weber et al., 2004). Uplift and cooling of the Chiapas massif is documented by 40Ar/39Ar ages of hornblende (246±2 – 240±2 Ma) and biotite (238±3 Ma).

A Late Permian high-grade tectonothermal event is unique in Mexico as plutons of similar age in Mexico are mostly undeformed. A possible scenario for compressive tectonics, high-grade metamorphism, and anatexis of the continental sedimentary basement of the Chiapas massif might be local tectonic switching along the Permian Pacific subduction zone. Changing subduction angle from steep to flat may be responsible for compression, stacking of hot crust, and anatexis in the Chiapas massif.

SE02-7

CRUSTAL EVOLUTION AND TECTONIC HISTORY OF THE PERMO-TRIASSIC GRANITOIDS OF THE COLOMBIAN CENTRAL ANDES

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New U-Pb SHRIMP ages in zircon, Ar-Ar ages in micas and amphibole, Nd-Sr isotopes and major and REE geochemistry results in granitic gneisses and granitic stocks of the central Cordillera of Colombia, suggest the presence of a collisional orogeny in Permo-Triassic times in the Northern Andes related to the construction of the Pangea supercontinent. The collision is recorded by metamorphic U-Pb SHRIMP ages in inherited zircons around 280 Ma and magmatic U-Pb SHRIMP ages in neoformed zircons around 250 Ma in syntectonic crustal granitic gneisses. Magmatic U-Pb SHRIMP and Ar-Ar Triasic ages around 228 Ma in granitic stocks indicate the presence of a late-tectonic mantle-crustal magmatism related to orogenic collapse and the beginning of the distension of the supercontinent. During this period of time, the Central cordillera of Colombia would have be located between southern United States and northern Venezuela in the core of the collision.

SE02-8

CONTROL DE EDAD DE ACRECENTAMIENTO DE BLOQUES AL OESTE DEL SISTEMA DE FALLAS DEL BORDE LLANERO: RESULTADOS PRELIMINARES DE PALEOMAGNETISMO EN ROCAS DEL TRIASICO-JURASICO EN EL VALLE SUPERIOR DEL MAGDALENA Y CORDILLERA ORIENTAL DE COLOMBIA

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La mayoria de los modelos paleogeográficos propuestos para la esquina noroccidental de Suramérica "asumen" la continuidad lateral del basamento cristalino de la Cordillera Central y Oriental de Colombia desde finales del Paleozoico. Esta investigación utiliza técnicas de paleomagnetismo en rocas sedimentarias y volcaniclásticas de edad Triásico–Jurásico para determinar si los terrenos comprendidos entre la paleosuturas de Guaicaramo (sigue aproximadamente el rumbo de la cordillera Oriental) y Romeral han tenido translación o rotación significativas. El estudio de la inclinación del componente magnético característico de unidades Triasico-Jurásico examinada en varios terrenos geológicos de Colombia y Venezuela permite considerar viable la hipótesis de translacción de terrenos. Adicionalmente, eventos de metamorfismo y secuencia sedimentarias pre-Jurásicas, así como el registro fósil entre estos terrenos difieren y hacen mas viable la hipótesis de translacción que de continuidad lateral.

En el macizo de Santander se ha muestreado las formaciones Bocas, Jordan, Girón de edad Jurásica y la Formación Tambor (Cretácico Inferior); en el macizo de Floresta se han tomado muestras en las Formación Girón (Jurásico) y Tibasosa (Cretácico Inferior); en el Valle Superior del Magdalena se van a colectar muestras en la Formación volcaniclástica Saldaña (Triásica-Jurásica) y Yavi-Caballos (Cretácico medio). El muestreo esta diseñado para realizar tests de campo (pliegue, discordancia) con el fin de determinar la edad relativa de los componentes de magnetización.

Resultados preliminares en la Fm. Bocas y la secuencia clástica roja Jordan-Giron indican que se puede aislar componentes característicos de alta temperatura, registrados por hematita. Sin embargo, aun no hay resultados suficientes para detemrianr el tiempo de magnetización. Estos resultados se van a comparar con aquellos obtenidos en rocas del Triásico del Valle Superior del Magdalena y rocas del Jurásico en la Sierra Nevada de Santa Marta.

Muy poca atención se ha puesto al estudio de la estructura y armazón estratigráfico pre-Cretácico en Colombia, pero varios estudios reconocen que estos factores juegan un papel importante en los cambios que se observan en la estructura actual de la Cordillera Oriental. Los datos de declinación del componente magnético característico tambien nos permitirá documentar rotaciones relativas de bloques regionales que ocurrieron durante los diferentes eventos de deformación de la Cordillera Oriental de Colombia.

SE02-9

CONPLEJO MÁFICO-ULTRAMÁFICO DEL CABO DE LA VELA, PENINSULA DE LA GUAJIRA COLOMBIA: REGISTRO OCEÁNICO DE LA SEPARACIÓN DE NORTE Y SURAMERICA

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La evolución tectónica Meso-Cenozóica de la margen NW del continente suramericano, esta marcada fundamentalmente por la formación de un nuevo océano relacionado a la separación de Norte y Suramérica durante la fragmentación del supercontinente Pangea, seguida por una compleja evolución intra-oceánica, dentro de la cual serian superpuestos y acrecionados ambientes tectónicos contrastantes (arcos de islas, "plateaus" oceánicos, islas oceánicas, complejos de subducción). Esta dinámica se encuentra registrada en los diferentes complejos de naturaleza ofiolítica dispersos a lo largo de la margen continental de Ecuador, Colombia y Venezuela.

En el segmento NW de la Península de la Guajira (región mas septentrional del Caribe Colombiano), se encuentra expuesto un Complejo Máfico-Ultramáfico constituido por cuerpos de serpentinitas (Srp+Op+Mgs±Cc), cortados por diques de gabro de grano grueso a pegmatíticos (Cpx+Plg), de carácter bandeado (SW-NE), y con evidencias de deformación dúctil y recristalización en condiciones de la facies anfibolita alta-granulita, afectados posteriormente por procesos de rodingitizacion y metasomatismo. Diques de microgabro no deformados (Plg+Cpx) orientados en dirección SE-NW cortan ambas unidades.

Las relaciones litoestratigraficas, petrológicas y geoquímicas de la porción ultramafica y gabróica es comparable a los "low spreading ridges" y las ofiolitas alpinas formadas en zonas de corteza transicional relacionadas a rift continentales. Los diques de microgabro además de presentar orientaciones contrastantes, presentan características geoquímicas afines con magmatísmo de arco.

Este conjunto de características geológicas sugieren que las rocas máfica-ultramáficas de esta región, registrarían los procesos de rift continental asociados a la separación de Pangea durante el Mesozoico Medio, y la posterior inversión tectónico e instalación de una margen continental activa en el Cretácico Superior–Paleogeno.

Aunque la posición actual de este fragmento se encuentra modificada por los procesos de dispersión tectónica que caracterizan la región NW de Suramérica; en la misma región se encuentran fragmentos del basamento Precámbrico y Paleozoico correlacionable con la margen continental y los terrenos alóctonos presente en Méjico y Cuba, indicando de manera indirecta que la geología de esta región registra la transferencia de terrenos entre las Americas asociada a procesos de rift y formación de nueva corteza oceánica.

SE02-10

TECTONIC CONSTRAINTS FOR A AN EARLY MESOZOIC PRE-BREAKUP CONFIGURATION OF THE NORTHANDEAN BLOCK

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Current restorations of a pre-breakup constellation of the circum-Caribbean provinces imply a considerable overlap between Centromerican terranes and cratonic South America, presupposing an intracontinental origin for the Northandean block. The Northandean block hosts, however, the northern continuation of a well-evolved Late Triassic-Early Jurassic magmatic arc, which characterises a regional subduction setting all along the Early Mesozoic Andean border. The Northandean block likely occupied, therefore, a position along the continental margin.

The magmatic activity associated to this Early Mesozoic magmatic arc reached a climax shortly after its Triassic-Jurassic inception. Concomitantly, the continental edge underwent a significant uplift, assuming the shape of a W-vergent monocline. The magnitude of this event is documented by a regional unconformity, which beveled all Paleozoic units and part of the metamorphic basement. The formation of this monocline documents an isostatic rebound, possibly triggered by the formation of an asthenospheric wedge at a steeply inclined or receding slab.

By its voluminous magma generation, this Early Mesozoic arc should represent a regional reference for establishing a correlation between South- and Centroamerican terranes. In its northern part this arc defines by the nested batholiths of the Sierra Nevada de Santa Marta a well evolved segment. Further north, in the Guajira Peninsula, an intrusive belt is virtually absent, though a volcanic activity is still manifest in Jurassic deposits overlying the metamorphic basement. By its low-grade sequences the metamorphic basement the Chortís block closely correlates to the low-grade units of the Northandean basement and forms thus a possible link to the Northandean block. Preliminary observations report here on a Middle to Late Jurassic deformation phase in the Honduras group. This deformation likely reflects a transpressional deformation regime and fits into a regional scenario of an oblique convergence between the Farallon-Kula plate and this Centroamerican terrane. Approaching the Southamerican craton, beyond a fracture zone identified by a biotic exchange in the Middle Jurassic ("Hispanic corridor"), the continental margin is supposed to have swung into a near convergence-normal position, according to the intensive Triassic-Jurassic magmatic imprint on the Southamerican continental margin.

This scenario should be validated in the light of the Late Triassic-Early Jurassic rift phase that pervasively affected the Southamerican plate margin. Its most outstanding feature was a NNW-trending, single-stranded precursor of the Bucaramanga fault which accommodated an oblique, right-lateral displacement between two tectonic domains. Accordingly, the western block of this strike-slip fault underwent, as a consequence of its free board, a pronounced back-arc spreading, while this NW-directed extension was much more constrained on the continentward eastern block.

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P-T-T PATHS CONSTRAINTS FROM THE NORTHWESTERN BASEMENT OF THE CENTRAL CORDILLERA OF THE COLOMBIAN ANDES AROUND THE CITY OF MEDELLÍN: INSIGHTS ON THE TECTONIC EVOLUTION OF A POLYOROGENIC PALEOZOIC DOMAIN

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Reconstruction of metamorphic trajectories based on integrated geothermobarometry and microstructural analyses, commonly improves the understanding of physical and geotectonic settings of a specific crustal segment.

Paleozoic tectonic evolution of the NW Andes is commonly related to a series of accretionary orogens that ends with the Late Paleozoic Pangea agglutination.

In the western flank of the Central Cordillera in the Colombian Andes near the city of Medellín, outcrops two juxtaposed Pre-Mesozoic metamorphic belts that record contrasting metamorphic and temporal evolutions. A western amphibolite facies metabasite and metapelitic one, group in the Caldas Amphibole Schists (CAS) and Ancón Schists (ASC), intruded by an associated meta-granite (La Miel Gneiss); and an easternmost, composed also of metabasic and metapelitic rocks, metamorphosed in the amphibolite-granulite facies with associated migmatites (El Retiro Group).

Microstructural, geothermobarometric studies with internally consistent thermodynamic databases and conventional thermobarometry from the CAS follows a counterclockwise P-T-path, with pressures between 6,3-13,5 kbar, and narrow temperature variations (550-630ºC). The ASC exhibit a complex P-T path, with heating accompanied by pressure increase within the sillimanite, and a counterclockwise return in the kyanite field, showing metamorphic T conditions of progressive metamorphism between 400-570ºC, whereas the retrograde path is between 640-635°C and 7,4-7,2 kbar.

From El Retiro migmatites, geothermobarometric calculations indicate a strong decompression (8,7 to 2,7 kbar), with a narrow variation in the temperature field (740-633ºC).

The obtained metamorphic paths and available geochronological data, suggest that the tectonic evolution of the CAS and ASC could be related to a Pre-Devonian subduction environment. This belt was subsequently intruded by a Devonian syn-tectonic granitoid of collisional character.

The Permo-Triassic evolution of El Retiro Group is included within a broader metamorphic and granitoid belt that has been related to a late collisional event. The strong isothermal decompression found on the studied migmatites, and the presence of associate middle to lower crust fragments could be related to melt assisted exhumation of the orogen.

Geologic relations between the two studied belts remain a matter of speculation, and their juxtaposition probably related to Devonian or earlier times, or can be part of a late Paleozoic event. In either cases, the Triassic migmatite belt could be a manifestation of the regional Permo-Triassic event that also locally reset some isotopic systems.

Within a regional paleogeographic perspective, these three main tectonic environments can be interpreted in terms of a subduction orogen, followed by a Devonian accretionary orogen, and a late collisional event that can be related to the formation of Pangea.