

DID THE PRECAMBRIAN BASEMENT INLIER OF NORTHERN COLOMBIA PLAY ANY ROLE IN RODINIA'S FORMATION?

Umberto Cordani¹, Agustín Cardona¹, Diana María Jiménez^{1,2}, Dunyi Liu³

The global correlation of orogenic events attributed to the 1200-1000 age interval (the Grenville orogenic cycle) have been related to the successive continental collisions leading to agglutination of the Rodinia Supercontinent. The Grenville belt of North America is the more representative unit in this context, and includes a series of high-grade metamorphic units. Its tectonic evolution is described as a succession of three orogenic pulses, at about 1190-1140 Ma (Elzevirian), 1080-1020 Ma (Ottawan) and 1000-980 Ma (Rigolet).

Several of the basement units of Mexico and the Andean Cordillera have yielded radiometric ages of ca. 1000 Ma, a fact that has induced a correlation with, and the consequence palinspastic reconstruction of, a large collisional belt produced during the formation of Rodinia. In this work, additional radiometric ages, by U-Pb SHRIMP method on zircon, Rb-Sr whole-rock isochron work, Sm-Nd determinations in total rock and garnet, as well as Ar-Ar method in separated biotites and amphiboles, were performed on basement rocks from the termination of the Northern Andes of Colombia.

From the high-grade Dibuya Gneiss, within the Santa Marta inlier, U-Pb zircon, Rb-Sr and Ar-Ar ages indicated at least two metamorphic episodes at about 1145 and 990 Ma. In addition, Mesoproterozoic relict ages older than 1370 Ma were obtained, together with similar Sm-Nd TDM model ages, confirming an heritage from continental sources. From the Bucaramanga Gneiss, U-Pb zircon determinations yielded a very similar age pattern, indicating possible metamorphic episodes at about 1160 and 1000 Ma, and relict ages up to 1550 Ma.

The zircon grains of the Jojoncito gneiss, within the Guajira peninsula, showed the onset of at least two metamorphic episodes in the catodoluminescence images, where distinct overgrowths are clearly visible. The U-Pb SHRIMP determinations were again very similar, and the overgrowths yielded 1160 and 970 Ma. Once more, relict grains were detected, with apparent ages between 1230 and 1530 Ma.

Within the Guapotón orthogneiss in the western segment of the Garzón massif, U-Pb SHRIMP zircon magmatic ages of 1100 Ma, and zircon metamorphic overgrowths closed to 1000 Ma. Associated granulites show Sm-Nd garnet-whole rock and biotite Ar-Ar about 930 Ma and 917 Ma respectively. Thermobarometric constraints indicate peak conditions of 6 Kbar and 700°C, and an anticlockwise path.

On the Margaritas gneiss in the eastern segment of the massif, Sm-Nd garnet-whole rock isochron age of a garnet-biotite gneiss were practically concordant, positioning the main metamorphic event at about 1043 Ma, and a biotite Ar-Ar plateau age of 967 Ma confirmed cooling after metamorphism. Thermobarometric study indicated a retrograde clockwise P-T path from peak amphibolite-granulite conditions about 8.0 kb and 800°C.

It is apparent that the temporal tectonic evolution is quite similar in all studied terrains, and is totally compatible with the orogenic history of the Grenville belt. Moreover, their

medium to high-grade metamorphic character makes very likely that they actually took part of the process of agglutination of Rodinia, as portions of the inner collisional belt within the Grenville province. Although it is not

¹Corresponding author. Institute of Geoscience, University of São Paulo. Rua do Lago 562. E-mail: ucordani@usp.br

²INGEOMINAS, Bogota, Colombia.

³Chinese Institute of Geoscience, Beijing, China.

possible to clearly define the direct tectonic relations of these Colombian basement inliers, and following former ideas of different authors, it is tempting to include them in a very large continental terrain of Grenville age, that may be forming the basement of the eastern cordillera of Colombia.

Moreover, if we take into account other continental fragments of high-grade character and broadly Grenville age, such as the Oaxaca and Guichicovi in Mexico, and also the small basement outcrops in the Arequipa-Antofalla and related terranes in Peru, Argentina and Chile, the area that may be a key in the reconstruction of Rodinia is dramatically enlarged.

We are aware that correlations based essentially on similarities in radiometric age include a great deal of speculation. However, all of these continental fragments can be easily considered as parts of Rodinia that were left behind, in South America, when Laurentia separated from Gondwana in the latest Proterozoic, when the Iapetus Ocean was formed.

LAS METASEDIMENTITAS DE SANTA TERESA Y LA EDAD DEL COMPLEJO CAJAMARCA (CORDILLERA CENTRAL, DEPARTAMENTO DEL TOLIMA - COLOMBIA)

Jorge Gómez Tapias¹, Alberto Núñez Tello²

Las Metasedimentitas de Santa Teresa están localizadas en el flanco oriental de la Cordillera Central de Colombia, al norte del Departamento del Tolima, asociadas al Sistema de Fallas Otú-Pericos. La unidad aflora, de forma discontinua, paralela al rumbo principal del sistema, con límites tectónicos al oeste con el Complejo Cajamarca y al este con los Neises y Anfibolitas de Tierradentro.

La unidad está constituida por intercalaciones de metaladolitas negras, metareniscas, metareniscas conglomeráticas y metaconglomerados polimicticos de guijos-guijarros de color pardo. Debido al carácter fallado de sus contactos y a que no existe una sección estratigráfica donde esté expuesta la secuencia completa, no es posible determinar la base, el techo ni el espesor de la secuencia.

Los metaconglomerados y las metareniscas contienen cantos y fragmentos de cuarzo, feldespato potásico con textura mesopertítica; líticos volcánicos, principalmente tobas, y de esquistos cuarzosericíticos, esquistos cloríticos y cuarcitas con dos foliaciones; e intraclastos de lodoletas, en matriz lodoso y cemento en ocasiones calcáreo.

El tipo de metamorfismo determinado en la Metasedimentitas de Santa Teresa es dinámico, formado en un régimen dúctil y en el límite frágil-dúctil, desarrollando principalmente protomilonitas (foliación milonítica) y con un claro protolito sedimentario visible en afloramiento. Esta foliación impide diferenciar fácilmente la unidad de las metamorfitas del Complejo Cajamarca, por lo que es posible que en muchas ocasiones se haya incluido dentro del Complejo Cajamarca durante los trabajos de cartografía geológica.

¹ INGEOMINAS Diagonal 53 N° 34-53, Bogotá D. C. Tel: 091 2 200 115 jogomez@ingeomin.gov.co

² INGEOMINAS Diagonal 53 N° 34-53, Bogotá D. C. Tel: 091 2 200 115 anunez@ingeomin.gov.co