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The metamorphic basement from the Santander Massif (Colombian Eastern Cordillera): a new stratigraphic framework

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The Santander Massif (SM), located in the Colombian eastern cordillera, encompasses metamorphic rocks that traditionally have been grouped into the Bucaramanga Gneisses, Silgará Schist and Orthogneis units [1]. The overlying Middle Devonian sedimentary record without regional metamorphism, has been accepted as the main argument to points out that these metamorphic rocks are pre-Middle Devonian in age.

New geochronology studies carried out on the metamorphic sequence from the Silgará Schist unit outcropping across the SM, using detrital zircons [2] and metamorphic minerals [3], may suggest that some rocks strips have different paleogeographic, sedimentological and metamorphic history. Based on the accumulated geochronological data up to now, as well on the observed lithological differences between rocks strips, a new stratigraphic framework has been proposed.

The oldest metamorphic rocks recognized in the SM, belonging to the Bucaramanga Gneisses unit, have a Meso-Proterozoic maximum age of deposition (~1200-1300 Ma) and its metamorphic peak (at upper amphibolite facies) reached at about ~1100 y ~980 Ma during the Grenville orogenic event [4], although recently it has been related to the Putumayo Orogeny event [5]. The younger metamorphic rocks grouped into the Silgará Schist Unit has a Neo-Proterozoic (Tonian) maximum age of deposition (with U-Pb detrital zircons ages from 906.5 ± 10.5 to 1610.3 ± 9.8 Ma); meanwhile the tentatively denominated Chicamocha Schists Unit has a Middle Cambrian maximum age of deposition (with U-Pb detrital zircons ages from 506.7± 9.3 to 2586.9±10.2 Ma). The metamorphic peak reached by these two units (at medium to upper amphibolite facies) was at about ~470 Ma during the main Fammatinian orogenic event (although older regional metamorphic events are not ruled out).

The youngest metamorphic rocks recognized in the SM, belonging to the San Pedro Phyllites Unit, have an Ordovician maximum age of deposition (with U-Pb detrital zircons ages from 451.6±7.7 to 1611.5±13.6 Ma) and its metamorphic peak reached (at green schist facies) was at about ~450-442 Ma, during the late Fammatinian orogenic event.

Younger tectono-thermal events (mainly dynamo-thermal) have been also recognized in the SM, as have been evidenced by the presence of late Paleozoic sedimentary rocks affected by slate cleavage.

References:

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