

Table 1. Summary of the geologic history of the Santander Massif, Colombia

Time	Event	Fossil and sedimentary record	Radiometric Ages							
			This report	Merida Andes	Macarena, Quaviare	Perijá, Sta. Marta W. Venes.	S. de Perijá East side	Sta. Marta, S. de Perijá west side	Merida Andes	Macarena
Precambrian	1) Metamorphism and plutonism of Precambrian geosynclinal deposits. Formation of Bucaramanga Gneiss. Metamorphism reached upper amphibolite facies. Blended by uplift and erosion?		945 m.y. 680 m.y. may be retrograde		1205 m.y. 1300 m.y. ²	940 m.y. ³ 1300 m.y.	Perijá Series ⁵		Iglesias Series ⁶	Basement
Late Precambrian, Cambrian, Ordovician	2) Deposition of Silgará Formations: thin bedded, quartzose, geosynclinal. Thicker bedded in lower part.	No fossils in area; Cambrian and Ordovician fossils in Macarena and Venesuela					Perijá Series?	Cambro-Ordovician ⁷	Sierra Nevada Fm. Bella Vista ⁷ CANARY R. ⁷	Quejar Group ⁸ Quetam ⁹
Late Ordovician, Silurian	3) Regional metamorphism, plutonism. Metamorphism mainly low to middle grade, rarely reaching upper amphibolite facies. Areas of high metamorphic grade coincident with those in 1) event D.		410 m.y. 450 m.y.	410-420 m.y. ¹	450 m.y. ²					
Silurian, Early Devonian	4) Uplift and erosion	Silurian fossils in Venezuela ⁴								
Middle Devonian	5) Deposition of Floresta Formations: shallow marine deposits; thin to west, thicker to east	Upper Lower Devonian and Middle Devonian fossils					Río Cagahiri Group ⁹	Devonian ⁵	Mucachuchi Group ⁷	
Devonian, Pennsylvanian	6) Hiatus. Disconformity? Unconformity? Regional metamorphism?	No record								
Late Pennsylvanian to Permian	7) Deposition of Diamante Formations; widespread marine limestones	Middle Pennsylvanian to Middle Permian fossils		285-277 m.y. ¹			Tinacos ¹⁰	Carboniferous ⁵	Sabaneta ⁷ Palmarito ⁷	
Late Permian	8) Erosion of Diamante Formations; deposition of Tiburón Formation	Pebbles of Diamante Fm. in Tiburón Fm.		230-242 m.y. ¹		250 m.y. ³	Macoita ¹⁰	Permiano ³		
Late Permian to Triassic	9) Regional metamorphism of low grade; local granite intrusion. Metamorphism most intense on east side of center of massif. Diamante Fm. recrystallized, local slate.		221 m.y.							
Late Triassic?	10) Uplift, erosion, deposition of Bocon Formation.	Continental deposits, pebbles of granite in conglomerate				210 m.y. ⁴	La Quinta ¹⁰	Cornal R. ³ Los Imbos Fm. ³	La Quinta ⁷	
Triassic-Jurassic	11) Volcanism, intrusion of major batholiths along north-south trending lineaments.		192-198 m.y. 170 m.y. 160 m.y.			172-177 m.y. ³ 162-164 m.y.		Quatapuri Fm. ³		
Jurassic	12) Deposition of Jordán Formation toward end of plutonic episode	Continental deposits; pebbles of pink granite and porphyry in conglomerates of Jordán Fm.					Congl. de Seco ¹⁰ Río Negro ¹⁰			
Late Jurassic to Early Cretaceous	13) Uplift, erosion, denoofing of batholiths. Deposition of Girón Formation in local basins	Continental deposits. Material derived from batholiths in Girón Fm.				142 m.y. ³		Río Negro ³ Los Portales ³		
Early Cretaceous to middle Cretaceous	14) Marine transgression. Local igneous activity	Transgressive marine deposits; Lower Cretaceous on west side of massif, Middle Cretaceous on east side.	127 m.y.			131 m.y. ³				
Late Cretaceous	15) Continued marine deposition, interrupted by mild uplift and erosion before, during, and after deposition of the La Luna Formation, followed by shallower seas	Marine deposition, black shale-chert-phosphorite in the La Luna. Abundant foraminifers throughout.								
Latest Cretaceous and Paleocene	16) Withdrawal of seas, ending marine deposition. Mild uplift of massif.	Continental deposition on flanks of massif. Widespread thin coal beds. Paleocene pollen.								
Eocene, Oligocene, and Miocene	17) Progressively intensified regional diastrophism. Cretaceous rocks eroded from massif and much of the area west of the Bucaramanga fault.	Continental deposition on flanks of massif, coarser and thicker on the west. M. Magdalena Valley sections: Miocene-vertebrate remains, plant leaves late Oligocene-La Cira fossil horizon middle Oligocene-Murroa fossil horizon late Eocene-Los Corros fossil horizon Maracaibo Basin sections: late Eocene to early Oligocene mollusks, pollen early to middle Eocene-pollen								
Pliocene and Quaternary	18) Probably highest degree of regional diastrophism up to the present, and greatest relief. Pleistocene alpine glaciation above 3200 meters.	Bucaramanga terrace, with terrace remnants and glacial deposits in higher valleys possibly related to a single period of wet climate. Small terrace remnants at lower levels.								

1. Rans and Shanan, 1960

2. Pincon and others, 1962

3. Tschann written communication, 1968

4. Mencher, 1963

5. Sutton, 1946

6. Kundig, 1938

7. Pleron, 1960

8. Hubach, 1957

9. Trumpy, 1943

10. Rans and Whitman, 1960