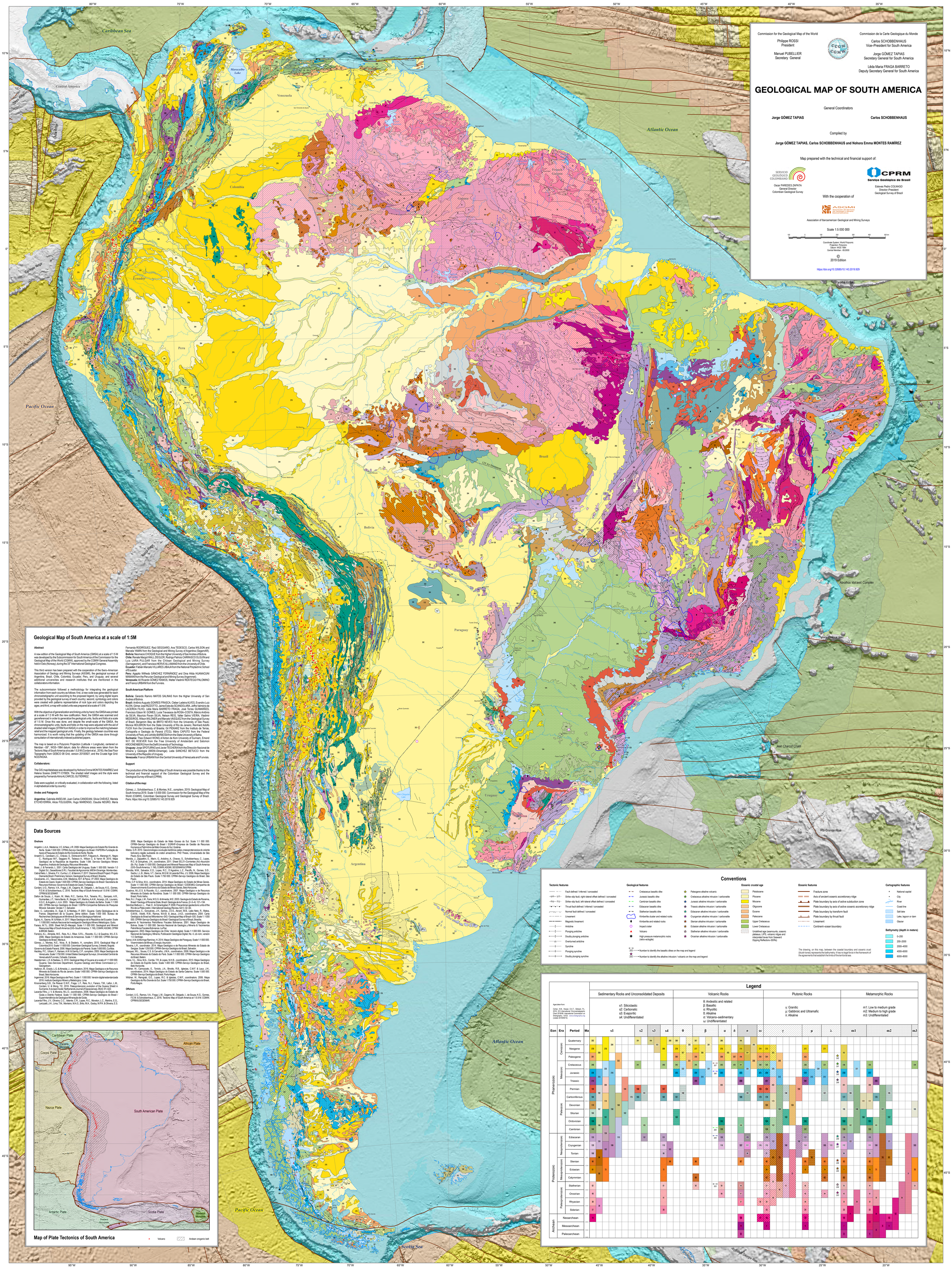
Caribbean Sea
Central America
Maracaibo Lake
Venezuela
Colombia
Ecuador
Peru
Brazil
Bolivia
Paraguay
Chile
Argentina
Uruguay
Guyana
Suriname
French Guiana
Atlantic Ocean
Pacific Ocean
Cocos Ridge
Coiba Ridge
Malpelo Ridge
Carnegie Ridge
Nazca Ridge
Paraiba Ridge
Abrolhos Volcanic Complex
Jean Charcot Chain
Rio Grande Rise
Scotia Sea
Commission for the Geological Map of the World
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GEOLOGICAL MAP OF SOUTH AMERICA
General Coordinators
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Map prepared with the technical and financial support of:
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Geological Survey of Brazil
With the cooperation of
ASGMI
Asociación de Servicios de Geología y Minería Iberoamericanos
Association of Iberoamerican Geological and Mining Surveys
Scale 1:5 000 000
Coordinate System: World Polyconic
Projection: Polyconic
Datum: WGS 1984
Central Meridian: -58,0000
2019 Edition
https://doi.org/10.32685/10.143.2019.929
Geological Map of South America at a scale of 1:5M
Abstract
A new edition of the Geological Map of South America (GMSA) at a scale of 1:5 M was developed by the Subcommission for South America of the Commission for the Geological Map of the World (CGMW), approved by the CGMW General Assembly held in Oslo (Norway), during the 33rd International Geological Congress.
This third version has been prepared with the cooperation of the Ibero–American Association of Geology and Mining Surveys (ASGMI), the geological surveys of Argentina, Brazil, Chile, Colombia, Ecuador, Peru, and Uruguay; and several additional universities and research institutes that are mentioned in the collaborators information.
The subcommission followed a methodology for integrating the geological information from each country as follows: first, a new code was generated for each chronostratigraphic unit according to the proposed legend, by using digital layers provided by the geological survey of each country; second, symbology and colors were created with patterns representative of rock type and colors depicting the ages; and third, a map with coded units was prepared at a scale of 1:5 M.
With the objective of generalization and linking units by hand, the GMSA was printed at a scale of 1:3 M with the new codification. Next, the GMSA was scanned and georeferenced in order to generalize the geological units, faults and folds at a scale of 1:5 M. Once this was done, and despite the small–scale of the GMSA, the chronostratigraphic units, faults and folds on the map were adjusted with the aid of shaded relief images (STRM from NASA) in order to improve the matching between relief and the mapped geological units. Finally, the geology between countries was harmonized. It is worth noting that the updating of the GMSA was done through consultation of internationally indexed published papers.
The map is based on a Polyconic Projection (Latitude × Longitude), centered on Meridian –59°, WGS–1984 datum; data for offshore areas were taken from the Tectonic Map of South America at scale 1:5,9 M (Cordani et al., 2016); the Sea Floor Topography from GEBCO 08 Grid, version 20100927, and the Crustal Age Grid: NCEI/NOAA.
Collaborators:
The GIS map/database was developed by Nohora Emma MONTES RAMÍREZ and Helena Soares ZANETTI EYBEN. The shaded relief images and the style were prepared by Fernando Alirio ALCÁRCEL GUTIÉRREZ.
Data were supplied, or critically evaluated, in collaboration with the following, listed in alphabetical order by country:
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Offshore
Cordani, U.G., Ramos, V.A., Fraga, L.M., Cegarra, M., Delgado, I., de Souza, K.G., Gomes, F.E.M. & Schobbenhaus, C. 2016. Tectonic Map of South America at 1:5.9 M. CGMW, CPRM & SEGEMAR.
Conventions
Tectonic features
Fault defined / inferred / concealed
Strike–slip fault, right–lateral offset defined / concealed
Strike–slip fault, left–lateral offset defined / concealed
Thrust fault defined / inferred / concealed
Normal fault defined / concealed
Lineament
Magnetic lineament
Anticline
Plunging anticline
Doubly plunging anticline
Overturned anticline
Syncline
Plunging syncline
Doubly plunging syncline
Geological features
Cretaceous basaltic dike
Jurassic basaltic dike
Cambrian basaltic dike
Ediacaran basaltic dike
Statherian basaltic dike
Kimberlite cluster and related rocks
Kimberlite and related rocks
Impact crater
Volcano
High pressure metamorphic rocks (retro–eclogite)
Number to identify the basaltic dikes on the map and legend
Number to identify the alkaline intrusion / volcanic on the map and legend
Paleogene alkaline volcanic
Cretaceous alkaline intrusion / carbonatite
Jurassic alkaline intrusion / carbonatite
Triassic alkaline intrusion / carbonatite
Ediacaran alkaline intrusion / carbonatite
Cryogenian alkaline intrusion / carbonatite
Steinian alkaline intrusion / carbonatite
Ectasian alkaline intrusion / carbonatite
Statherian alkaline intrusion / carbonatite
Orosirian alkaline intrusion / carbonatite
Oceanic crustal age
Pleistocene
Pliocene
Miocene
Oligocene
Eocene
Paleocene
Upper Cretaceous
Lower Cretaceous
Undefined age (seamounts, oceanic plateaus, LIPS, volcanic ridges and interpreted lavas from Seaward Dipping Reflectors–SDRs)
Oceanic features
Fracture zone
Axis of ancient oceanic accretionary ridge
Plate boundary by axis of active subduction zone
Plate boundary by axis of active oceanic accretionary ridge
Plate boundary by transform fault
Plate boundary by thrust fault
Lineament
Continent–ocean boundary
The drawing, on this map, between the coastal boundary and oceanic crust (bluish tones) represents the bathymetry. It has no legal force in the framework of the agreements that establish the limits of the territorial sea.
Cartographic features
National capital
City
River
Coast line
Salt lake
Lake, lagoon or dam
Glacier
Bathymetry (depth in meters)
0–200
200–2000
2000–4000
4000–6000
6000–8000
Legend
Ages taken from:
Cohen, K.M., Harper, D.A.T., Gibbard, P.L. 2018. ICS International Chronostratigraphic Chart 2018/08. International Commission on Stratigraphy, IUGS. www.stratigraphy.org (visited 20/08/09/10)
Sedimentary Rocks and Unconsolidated Deposits
s1: Siliciclastic
s2: Carbonatic
s3: Evaporitic
s4: Undifferentiated
Volcanic Rocks
θ: Andesitic and related
β: Basaltic
α: Rhyolitic
δ: Alkaline
σ: Volcano–sedimentary
ω: Undifferentiated
Plutonic Rocks
γ: Granitic
μ: Gabbroic and Ultramafic
λ: Alkaline
Metamorphic Rocks
m1: Low to medium grade
m2: Medium to high grade
m3: Undifferentiated
Eon
Era
Period
Ma
Phanerozoic
Cenozoic
Mesozoic
Paleozoic
Proterozoic
Neoproterozoic
Mesoproterozoic
Paleoproterozoic
Archean
Neoarchean
Mesoarchean
Paleoarchean
Caribbean Plate
Cocos Plate
African Plate
Nazca Plate
South American Plate
Antartic Plate
Scotia Plate
Map of Plate Tectonics of South America
Volcano
Andean orogenic belt