

**6 Título en español. Periods at the end of the headings even if those are used in the
7 sentence is not recommended**

⁸ Fernando Alirio ALCÁRCEL GUTIÉRREZ^{1*} & Nohora Emma MONTES RAMÍREZ^{1,2}

⁹ *¹Servicio Geológico Colombiano, Dirección de Geociencias Básicas, diagonal 53 n.º 34–53,*
¹⁰ *Bogotá D. C., falcarcel@sgc.gov.co, nmontes@sgc.gov.co. Preferible, do not translate*
¹¹ *proper names*

¹²*Universidad Nacional de Colombia Sede Bogotá, avenida 30 n.º 45–03, Bogotá D. C.,*
¹³*nemontesr@unal.edu.co*

14 *Corresponding author

Abstract

16 The abstract must have less than **300 words** in one single paragraph. Authors should use only
17 well-known abbreviations, otherwise the complete name should be written. It is
18 recommended not using references, since what is important is the contribution to the
19 Colombian geological knowledge. The abstract must be able to stand alone, thus specific
20 information does not have to be known by the reader. Figure and table callouts are not
21 recommended. Authors are encouraged to make a brief comment about the scientific
22 question/paradigm and purpose; to give a minimum of background; to make a brief statement
23 of the data that led to the conclusions, and to remark the contributions.

24 **Keywords:** less than 5 words separated by commas and ended with a period.

Resumen

26 Escribir el resumen en español en un solo párrafo.

27 **Palabras clave:** menos de 5 palabras.

28 **Introduction**

29 *If subheadings are needed authors should try to make them brief and informative. Neither*
30 *end with a period nor capitalize all words.*

31 In this section authors should write the purpose/objective of the manuscript, explain what are
32 they going to talk about, the scientific problem addressed and enough background to make
33 the information understandable for those not specialist in the field or the location.

34 Authors are strongly encouraged to cite the localization of the studied area in the morpho–
35 structural provinces of Colombia, as well as authors are encouraged to use maps in such way
36 each geometry (point, lines, and polygons), color and names of the map are clearly
37 distinguishable, have the complete label descriptions, and are included in the legend. Maps
38 must not be too specific, rather those must be generalized. Lastly, authors should verify if the
39 map is clearly related with the text and the issue addressed.

40 We encourage authors to use also stratigraphic columns that represent the stratigraphic
41 relation of the studied units. The stratigraphy, structural styles and geological evolution
42 should be also cleared up in the introduction.

43 Figures can be cited implicitly (Figure 1) or explicitly as Figure 2, likewise references can
44 be cited in the text explicitly as Horton et al. (2010) or implicitly in parenthesis (Maya &
45 González, 1995; Rodríguez, 2010; Jiménez et al., 2005), authors should be aware that if more
46 than one reference is needed those must be separated by a semicolon. Unpublished results
47 and personal communications are not allowed and definitely cannot be used to support key
48 proposals. Supplementary Material can be called out as Figure S1, Table S1, Video S1, and
49 so on. *Op. cit.* or *ibid* must not be used.

50 **Materials and Methods**

51 Authors must provide enough information to allow other experiments/results to be
52 reproduced or verified/proved, thus this section should be well-written and complete since it
53 is related with the credibility of the research.

54 Methods already published should be cited by using the corresponding reference, clearing up
55 if modifications were performed and, if so, authors should explain how was adapted. How
56 the data were collected has to be explained and it should be emphasized on why and how the
57 data were taken into account/used or discharged. If the study has less than 30 data, a table is
58 recommended; otherwise, different means should be preferable (e.g., supplementary
59 material). On the other hand, meaningful statistical values should be included and equations
60 must be introduced by using Word editor, numbering those consecutively.

61 **Results**

62 This is the section the readers are waiting for, this the **new information** that should be
63 presented in complete and transparent fashion, looking for the most useful format to other
64 colleagues. Authors should not include any explanation or proposal in this section, not
65 interpretative ideas are recommended. It is suggested to make the most relevant comments
66 about the figures and tables shown, specifying the standard error/confidence interval and
67 certainty of the data.

68 It is recommended to include research findings divided into clear the subthemes, if it so. All
69 the data should be showed, authors should not take into account not showed data. The text
70 must stand alone and enough well-supported.

71 **Discussion**

72 Here the research questions are solved and the models are presented. This should explore the
73 significance of the results, and should be written with harmony. New data must not be showed
74 in this section! Remark the limitations of the study. It is recommended to contrast the author's
75 ideas and with proposals of other authors. Here should be cleared up the contribution!

76 When read the discussion, author should ask her/his self if is the discussion robust enough.
77 Lastly, it is not recommended to give excuses about missing information e.g., access to the
78 study area, technology available, etc.

79 **Conclusions**

80 This is one of the section the readers will read when they make a fast check of the article.
81 Conclusions should reflect the main ideas of the manuscript and the advances in the research
82 field achieved with the research. Make it preferable short extension in one or few paragraphs.
83 Do not include new information in this section! If that happens, it has to be necessary to
84 review the complete manuscript.

85 **Acknowledgments**

86 Write the acknowledgements in one single paragraph. Cite all the funding institutions with
87 the appropriate project number, if so.

88 **References**

89 In the **Reference** list must be included the bibliography cited in the text, figures, tables,
90 figure/table captions, and supplementary material. References must be organized in order to
91 facilitate the readers to find cite as follows.

92 Authors must organize the reference list firstly by alphabetic order, then by chronologic order
93 (e.g., first Jaramillo, J.J. 2005 after Jaramillo, J.J. 2014), after by alphabetic order of the
94 second author and if it is necessary the third, fourth, up to the last author. Finally, the
95 alphabetic order of the title must be used.

96 The terms a, b, c, etc. e.g., Jaramillo (2005a, 2005b) should be used to differentiate identical
97 cites in the text. The letter **a** should be used to cite the first reference mentioned in the text,
98 and **b** to the second, and so on.

99 It is highly encouraged authors that all the articles have its URL or its DOI, except those
100 articles that do not have or not have been digitalized. References cited as “in press” should
101 have been accepted and have a DOI. Papers that are in preparation or only submitted must
102 not be cited. For web references the full URL should be given and the date when the reference
103 was last accessed.

104 Do not use foot notes in any reference; otherwise write it in the **Submission letter** to evaluate
105 how it can be shown.

106 Please ensure that the references are complete (journals and titles should be given in full),
107 missing information or inaccuracies might cause delays.

108 In the following will be presented some examples showing the style of citing, if author's
109 references do not fit the next examples provide the enough information to let other
110 geoscientist to find the cite.

111 ***Geological Maps***

112 Gómez, J., Montes, N.E., Nivia, Á. & Diederix, H., compilers. 2015. Geological Map of
113 Colombia. Scale 1:1 000 000. Servicio Geológico Colombiano, 2 sheets. Bogotá.

114 Montoya, D. & Reyes, G. 2003. Geología de la plancha 209 Zipaquirá. Scale 1:100 000.
115 Ingeominas. Bogotá.

116 Rodríguez, G., Bermúdez, J., Zapata, G., Ramos, K., Ramírez, C., Arango, M.I. & Sepúlveda,
117 M.J. 2012. Mapa geológico de la plancha 82 Montelíbano. Scale 1:100 000. Servicio
118 Geológico Colombiano. Bogotá.

119 Zuluaga, C.A., Ochoa, A., Muñoz, C.A., Dorado, C.E., Guerrero, N.M., Martínez, A.M.,
120 Medina P.A., Ocampo, E.F., Pinilla, A., Ríos, P.A., Rodríguez, B.P., Salazar, E.A. &
121 Zapata, V.L. 2008. Geología de la plancha 2 Puerto Bolívar. Scale 1:100 000.
122 Ingeominas & Universidad Nacional de Colombia. Bogotá.

123 ***Scientific Journals***

124 Cardona, A., Valencia, V.A., Garzón, A., Montes, C., Ojeda, G., Ruiz, J. & Weber, M. 2010.
125 Permian to Triassic I to S-type magmatic switch in the northeast Sierra Nevada de
126 Santa Marta and adjacent regions, Colombian Caribbean: Tectonic setting and
127 implications within Pangea paleogeography. Journal of South American Earth
128 Sciences, 29(4): 772–783. <https://doi.org/10.1016/j.jsames.2009.12.005>

129 Dueñas, H. & Césari, S.N. 2005. Palynological evidence of early Carboniferous
130 sedimentation in the Llanos Orientales Basin, Colombia. Review of Palaeobotany and
131 Palynology, 138(1): 31–42. <https://doi.org/10.1016/j.revpalbo.2005.10.002>

132 Etayo-Serna, F., Barrero, D., Lozano, H., Espinosa, A., González, H., Orrego, A.,
133 Ballesteros, I., Forero, H., Ramírez, C., Zambrano-Ortiz, F., Duque-Caro, H., Vargas,
134 R., Núñez, A., Álvarez, J., Ropain, C., Cardozo, E., Galvis, N., Sarmiento, L., Alberts,
135 J.P., Case, J.E., Singer, D.A., Bowen, R.W., Berger, B.R., Cox, D.P. & Hodges, C.A.
136 1985. Mapa de terrenos geológicos de Colombia. Publicaciones Geológicas Especiales
137 del Ingeominas, 14(1): 1–135. Bogotá.

138 Horton, B.K., Saylor, J.E., Nie, J., Mora, A., Parra, M., Reyes-Harker, A. & Stockli, D.F.
139 2010. Linking sedimentation in the northern Andes to basement configuration,
140 Mesozoic extension, and Cenozoic shortening: Evidence from detrital zircon U-Pb
141 ages, Eastern Cordillera, Colombia. Geological Society of America Bulletin, 122(9–
142 10): 1423–1442. <https://doi.org/10.1130/B30118.1>

143 Ibañez-Mejia, M., Ruiz, J., Valencia, V.A., Cardona, A., Gehrels, G.E. & Mora, A.R. 2011.
144 The Putumayo Orogen of Amazonia and its implications for Rodinia reconstructions:
145 New U-Pb geochronological insights into the Proterozoic tectonic evolution of
146 northwestern South America. Precambrian Research, 191(1–2): 58–77.
147 <https://doi.org/10.1016/j.precamres.2011.09.005>

148 ***Edited Books***

149 Cordani, U.G., Cardona, A., Jiménez, D., Liu, D. & Nutman, A.P. 2005. Geochronology of
150 Proterozoic basement inliers from the Colombian Andes: Tectonic history of remnants
151 from a fragmented Grenville belt. In: Vaughan, A.P.M., Leat, P.T. & Pankhurst, R.J.
152 (editors), Terrane processes at the margins of Gondwana. Geological Society of
153 London, Special Publication 246, p. 329–346.
154 <https://doi.org/10.1144/GSL.SP.2005.246.01.13>

155 López, M.C. & Audemard, F.A. 2011. Evidence of Holocene compression at Tuluá, along
156 the western foothills of the Central Cordillera of Colombia. In: Audemard, F.A.,
157 Michetti, A.M. & McCalpin, J.P. (editors), Geological criteria for evaluating seismicity
158 revisited: Forty years of paleoseismic investigations and the natural record of past
159 earthquakes. Geological Society of America Special Paper 479, p. 91–107.
160 [https://doi.org/10.1130/2011.2479\(04\)](https://doi.org/10.1130/2011.2479(04))

161 Restrepo-Pace, P.A., Colmenares, F., Higuera, C. & Mayorga, M. 2004. A fold-and-thrust
162 belt along the western flank of the Eastern Cordillera of Colombia: Style, kinematics,
163 and timing constraints derived from seismic data and detailed surface mapping. In:
164 McClay, K.R. (editor), Thrust tectonics and hydrocarbon systems. American
165 Association of Petroleum Geologists, Memoir 82, p. 598–613. Tulsa, USA.
166 <https://doi.org/10.1306/M82813C31>

167 van der Hammen, T. 1984. Datos sobre la historia de clima, vegetación y glaciación de la
168 Sierra Nevada de Santa Marta. In: van der Hammen, T. & Ruiz, P.M. (editors), La
169 Sierra Nevada de Santa Marta (Colombia), Transecto Buriticá–La Cumbre. J. Cramer,
170 Studies on Tropical Andean Ecosystems–Estudios de Ecosistemas Tropandinos 2, p.
171 561–580. Berlin.

172 ***Books and Bookles***

173 Cáceres, C., Cediel, F. & Etayo-Serna, F. 2003. Mapas de distribución de facies
174 sedimentarias y armazón tectónico de Colombia a través del Proterozoico y del
175 Fanerozoico. Ingeominas, 45 p. Bogotá.

176 Gradstein, F.M., Ogg, J.G., Schmitz, M.D. & Ogg, G.M. 2012. The Geologic Time Scale
177 2012, 2-Volume Set. Elsevier, 1176 p. Boston.

178 Greeley, R. 2013. Introduction to planetary geomorphology. Cambridge University Press,
179 252 p. New York.

180 Neuendorf, K.K.E., Mehl Jr, J.P. & Jackson, J.A. 2005. Glossary of Geology, 5th edition.
181 American Geological Institute, 800 p. Alexandria, Virginia, USA.

182 ***Proceedings from a Congress, Symposium, or Conference***

183 Gómez, J. & Montes, N.E. 2011. Geological Map of Colombia, 2nd edition. XIV Congreso
184 Latinoamericano de Geología and XIII Congreso Colombiano de Geología. Memoirs,
185 p. 258–259. Medellín.

- 186 Gómez, J., Nivia, A. & Montes, N.E. 2009. Geological Map of Colombia. X Simposio
187 Bolivariano Exploración Petrolera en las Cuencas Subandinas. Resúmenes, p. 48.
188 Cartagena.
- 189 Gómez, J., Galán, B. & Muñoz, G. 2012. Geological Atlas of Colombia. In: Proceedings of
190 the 34th International Geological Congress 2012. Memoirs CD ROM, p. 790. Brisbane.
- 191 Ordóñez-Carmona, O., Frantz, J.C. & Londoño, H.C. 2009. Serranía de San Lucas:
192 Mineralizaciones auríferas, intrusiones de 1500 Ma, metamorfismo Grenville y
193 magmatismo Jurásico. XII Congreso Colombiano de Geología. Resúmenes CD ROM,
194 T003–R117. Paipa.
- 195 López, E. & Barrero, D. 2003. Transectas regionales de la corteza superior de Colombia. VIII
196 Simposio Bolivariano Exploración Petrolera en las cuencas subandinas. Asociación
197 Colombiana de Geólogos y Geofísicos del Petróleo, Memorias, II, p. 279–289. Geólogos y
198 Geofísicos del Petróleo, Memorias, II, p. 279–289.
- 199 Restrepo, J.J., Ibañez-Mejia, M. & García, A. 2012. U–Pb zircon ages of the Medellín
200 amphibolites (Central Cordillera of Colombia) reveal mid–Cretaceous tectonic
201 juxtaposition of Triassic and mid–Cretaceous metamorphic complexes. VIII South
202 American Symposium on Isotope Geology. Pendrive, 33 slides. Medellín.
- 203 **Theses**
- 204 Leal-Mejía, H. 2011. Phanerozoic gold metallogeny in the Colombian Andes: A tectono–
205 magmatic approach. Doctorade theses, Universitat de Barcelona, 989 p. Barcelona.
- 206 Muñoz, J. & Vargas, H., 1981. Petrología de las anfibolitas y neises precámbricos presentes
207 entre los ríos Mendarco y Ambeima (Tolima). Bachelor theses, Universidad Nacional
208 de Colombia, 128 p. Bogotá.
- 209 Nivia, A. 1987. Geochemistry and origin of the Amaime and Volcanic Sequences,
210 Southwestern Colombia. Master Thesis, University of Leicester, 163 p. Leicester, UK.
- 211 van der Wiel, A.M., Hebeda, E.H. & Andriessen, P.A.M. 1991. Geochronology of the
212 Neogene deposits of the S Neiva basin. In: van der Wiel, A.M. (editor), Uplift and

213 volcanism of the SE Colombian Andes in relation to Neogene sedimentation in the
214 Upper Magdalena Valley. Doctorade theses, Wageningen University, p. 65–70.
215 Amsterdam.

216 ***Maps Memoirs***

217 Gómez, J. 2003. Memoria explicativa: Levantamiento geológico de la plancha 322 Santa
218 María. Ingeominas, 154 p. Ibagué.

219 Montoya, D. & Reyes, G.A. 2003. Geología de la plancha 209 Zipaquirá. Ingeominas, 151
220 p. Bogotá.

221 Reed, J.C.Jr., Wheeler, J.O. & Tucholke, B.E. 2005. Geologic Map of North America:
222 Perspectives and explanation. The Geological Society of America, Decade of North
223 American Geology, 28 p. Boulder, USA.

224 ***Unpublished Reports***

225 Barrero, D., Cáceres, C. & Cediel, F. 1998. Seismic atlas of Colombia: Seismic expression
226 of structural styles in the basins of Colombia. Ecopetrol, Geotec Ltda. & Robertson
227 Research International Ltd., unpublished. Bogotá.

228 Suárez, M. 1985. Interpretación fotogeológica de la plancha 174 Paz de Ariporo. Ingeominas,
229 unpublished report 1964, 49 p. Bogotá.

230 ***Web Links***

231 Gutiérrez-Marco, J.C., Sociedad Geológica de España, Instituto Geológico y Minero de
232 España, Instituto de Geociencias (CSIC–UCM) & Real Academia de Ciencias. 2013.
233 Traducción al castellano de la International Chronostratigraphic Chart 2013. In: Cohen,
234 K.M., Finney, S. & Gibbard, P.L. Tabla Cronoestratigráfica Internacional 2013:
235 <http://www.stratigraphy.org/ICSchart/ChronostratChart2013-01Spanish.pdf>
236 (consulted in January 2013).

237 Juteau, Th. 2009. Evolución histórica del concepto de ofiolita a lo largo de más de dos siglos
238 de geología: http://www.ehu.es/pizarro/GeoBizirik/Juteau_Conf2_es_eus.pdf
239 (consulted in August 2011).

240 **Others**

241 Cohen, K.M., Finney, S.C., Gibbard, P.L. & Fan, J.-X. 2013, (updated v2016/04). The ICS
242 International Chronostratigraphic Chart. Episodes, 36(3): 199–204.

243 FGDC (prepared for the Federal Geographic Data Committee by the U.S. Geological
244 Survey). 2006. Federal Geographic Data Committee Digital cartographic standard for
245 geologic map symbolization. Federal Geographic Data Committee Document Number
246 FGDC-STD-013-2006, 290 p. Reston, USA.

247 USGS. 2004. Shuttle Radar Topography Mission, 1 Arc Second–República de Colombia,
248 Unfilled Unfinished 2.0, Global Land Cover Facility. University of Maryland,
249 February 2000. Maryland, USA.

250 **List of Figure and Table Captions**

251 **Figure 1.** Figures or tables must not be inserted in the Word document. Authors should not
252 use more than 200 words in figure captions. For multipart figures can be used bold letters 8
253 points as the final size in the upper left preferable, then upper right and so on. **(a)** Figure
254 captions should be intelligible without reference to the text; **(b)** where abbreviations need to
255 be explained in the figure caption can be used this style: (fa) first abbreviation; (sa) second
256 abbreviation.

257 **Table 1.** Figures and tables must be named by numerical order, and coherently as cited in the
258 text.

259 **Authors' Biographical Notes**

260 Biographic notes of all authors must be provided, it is recommended to write briefly authors'
261 curriculum, interest, etc. As well, it is solicited a passport picture of the authors where can
262 be seen clearly the researcher face.