Geophysical Research Abstracts
Vol. 17, EGU2015-2790, 2015
EGU General Assembly 2015

SDAR 1.0 a New Quantitative Toolkit for Analyze Stratigraphic Data

John Ortiz (1,2,3), Carlos Moreno (2), Andres Cardenas (4,3), and Carlos Jaramillo (2)

(1) Institute for Geoinformatics, University of Münster, Münster, Germany, (2) Smithsonian Tropical Research Institute, Balboa, Ancon, Republic of Panama, (3) Corporación Geológica ARES, Bogotá, Colombia, (4) Department of Geological Sciences, EAFIT University, Medellín, Colombia.

Title: SDAR 1.0 a New Quantitative Toolkit for Analyze Stratigraphic Data

Keywords: Quantitative Stratigraphy, Stratigraphic log, Geosciences software.

1 Institute for Geoinformatics, University of Münster, Münster, Germany
2 Smithsonian Tropical Research Institute, Balboa, Ancon, Republic of Panama
3 Corporación Geológica ARES, Bogotá, Colombia
4 Department of Geological Sciences, EAFIT University, Medellín, Colombia.

Research abstract

Since the foundation of stratigraphy geoscientists have recognized that data obtained from stratigraphic columns (SC), two dimensional schemes recording descriptions of both geological and paleontological features (e.g., thickness of rock packages, grain size, fossil and lithological components, and sedimentary structures), are key elements for establishing reliable hypotheses about the distribution in space and time of rock sequences, and ancient sedimentary environmental and paleobiological dynamics. Despite the tremendous advances on the way geoscientists store, plot, and quantitatively analyze sedimentological and paleontological data (e.g., Macrostrat [http://www.macrostrat.org/], Paleobiology Database [http://www.paleodb.org/], respectively), there is still a lack of computational methodologies designed to quantitatively examine data from a highly detailed SCs. Moreover, frequently the stratigraphic information is plotted "manually" using vector graphics editors (e.g., Corel Draw, Illustrator), however, this information although store on a digital format, cannot be used readily for any quantitative analysis. Therefore, any attempt to examine the stratigraphic data in an analytical fashion necessarily takes further steps. Given these issues, we have developed the sofware 'Stratigraphic Data Analysis in R' (SDAR), which stores in a database all sedimentological, stratigraphic, and paleontological information collected from a SC, allowing users to generate high-quality graphic plots (including one or multiple features stored in the database). SDAR also encompasses quantitative analyses helping users to quantify stratigraphic information (e.g. grain size, sorting and rounding, proportion of sand/shale). Finally, given that the SDAR analysis module, has been written in the open-source high-level computer language "R graphics/statistics language" [R Development Core Team, 2014], it is already loaded with many of the crucial features required to accomplish basic and complex tasks of statistical analysis (i.e. R language provide more than hundred spatial libraries that allow users to explore various Geostatistics and spatial analysis). Consequently, SDAR allows a deeper exploration of the stratigraphic data collected in the field, it will allow the geoscientific community in the near future to develop complex analyses related with the distribution in space and time of rock sequences, such as lithofacial correlations, by a multivariate comparison between empirical SCs with quantitative lithofacial models established from modern sedimentary environments.