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Presenting Author:

Jorge Vargas, Universidad Nacional de Colombia, Grupo de Investigación de Calidad del Aire (GICA), Bogotá, Colombia, JVARGASGO@UNAL.EDU.CO

Early Career Scientist

Applied for Travel Support

Abstract Title:

Evaluation of air quality in Colombia based on data from the Copernicus Atmosphere Monitoring Service (CAMS) and surface monitoring

Co-Authors:

Marco Guevara, Universidad Nacional de Colombia, Grupo de Investigación de Calidad del Aire (GICA), Bogotá, Colombia

Luis Carlos Belalcazar Ceron, Universidad Nacional de Colombia, Grupo de Investigación de Calidad del Aire (GICA), Bogotá, Colombia

Abstract

One of the main tools to define air quality policies is the monitoring of atmospheric pollutants and meteorological variables. However, in many cities of the world and especially in developing countries there are no measurements. Satellite information and modeling of air quality are viable, economical and fast alternatives to obtain information for the analysis of the behavior and composition of the atmosphere. The CAMS system (Copernicus Atmosphere Monitoring Service) provides information on air quality and meteorology parameters for the entire planet with a spatial resolution of 11x11 km and a temporal resolution of 1 hour.

This work evaluates air quality in Colombia through the use of data provided by the CAMS model and surface monitoring in three Colombian cities (Bogotá, Medellín, and Bucaramanga) for the period 2003-2017. Among the objectives is to analyze air quality and meteorological data recorded on the surface in the three cities, analyze the results provided by the CAMS model for the same spatial and temporal range, evaluate the performance of the model and finally, after a validation process, use CAMS data to identify points in Colombia with high levels of air pollution and therefore require monitoring. The validation is done by comparing the CAMS data with the data recorded on surface, and it is with this validation that it is intended to fill the gaps present in Colombia through information from CAMS. The study analyzes parameters of air quality and meteorology such as PM_{2.5}, PM₁₀, CO, NO₂, temperature, relative humidity, solar radiation, and pressure; for which the study shows that there is a statistically significant correlation with R coefficients close to 0.7 for some of the variables analyzed. These results indicate that it is possible to use CAMS data to analyze the state of air quality in Colombia and possibly other regions of the world.