



Urban air quality, climate, and pollution: from measurement to modeling applications

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This special issue on air pollution and modeling applications is dedicated to publishing selected abstracts presented at the 4th Community Modeling and Analysis System (CMAS) South America (<https://cmasconference.com.br>). The 4th CMAS South America event was held in Belo Horizonte, Minas Gerais State, Brazil, from 22 to 24, 2019. Previous CMAS events in South America were in Sao Paulo (Brazil – 2013), Bogota (Colombia – 2015), and Vitória (Brazil – 2017), with a significant number of participants each year. In Belo Horizonte, we had a total number of 180 posters, 90 oral presentations, five Keynote Speakers, and six special sessions. Previous to the conference, we had 5-day courses on air quality numerical modeling and industrial ventilation. After the conference, we had a 1-day course about aerosol measurements and source apportionment for air quality management. Also, a technical tour was offered to evaluate the impacts on the physical environment resulting from the collapse of the Fundão Dam, Mariana, Minas Gerais.

The conference sections included: Air Quality, Climate and Energy; Emissions Inventories, Models, and Processes; Model Development; Model Development; Modeling to Support Exposure and Health Studies and Community-scale Applications; Regulatory Modeling and SIP Applications; Remote Sensing /Measurements Studies/New Sensors Technologies; Atmospheric Boundary Layer: Observing and

Modeling; Environmental Odors; Management of Gaseous Emissions in Sewage Treatment Plants; Air Pollution Control; and Air Pollution at Critical Infrastructure Sites and Its Influence for the Society. The abstracts presented in the Conference are available on-line in the proceedings (<https://cmasconference.com.br/wp-content/uploads/2019/10/Livro-Air-Pollution-2019-Final-V03-min.pdf>).

It was considered very valuable also for the tightening of groups from South America with other countries and institutions, in particular, the CMAS in the USA. The previous conference of CMAS South America focused mainly in the field of air quality modeling. Still, the recognition of its importance in South America turned it to an Air Pollution meeting, bringing together most of the involved researchers and students. Moreover, it was an opportunity to improve the knowledge and skills involved in the air quality modeling field. At that time, there was not enough expertise in the subject of Chemical Atmospheric Modeling. It was a very inspiring experience that brought to the field students from different groups from Brazil and South America.

In this special issue, we can have an idea of the maturity and innovation research that is underway in South America. Authors from Brazil, Bolivia, Colombia, and Chile present their results from regional to high-resolution modeling, including new experimental setups and databases. Presented in this special issue is the discussions related to air pollution effects due to changing the transport system and monitoring of PM₁₀ and PM_{2.5} in Bogotá, Colombia, and the modeling of air quality in the Andes, bringing new information related to areas with few published data available.

The state-of-art developments of emission inventories were also presented to South America, and to Brazil in particular, including the industrial emission of particles and even the emissions of burning wood in pizzerias that have an impact on air quality in Latin America cities. The health impact of pollutants was also addressed in the study of mortality rate due to sulfur dioxide and the prevention of hospital admissions due to the implementation of new air quality standard

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regulations. Biomonitoring considering the role of magnetic properties of the particles is presented, illustrating the possibilities of this new approach. Finally, the importance of studying atmospheric aerosols is worth emphasizing due to many important aspects that have not been resolved mainly in the South Hemisphere, where we have a lack of experimental data and human resources in the experimental and modeling areas.

The world is facing new challenges related to diseases disseminated by a virus, and this example of the COVID-19 showed that the population that was more exposed to air pollution during the lifetime was more susceptible to face worst respiratory outcomes. Another analysis related to the transportation of the virus as an aerosol is a significant interrogation to be addressed. We must invest in science, forming the new generations of researches to be prepared to complicate and multi-discipline problems, among them the issues related to air quality and its impacts.



Taciana Toledo de Almeida Albuquerque is a graduate of Meteorology from the Federal University of Alagoas and got her master's and Ph.D. in Atmospheric Sciences at the Institute of Astronomy, Geophysics and Atmospheric Sciences of the University of São Paulo. She is an adjunct Professor at the Federal University of Minas Gerais of the Department of Sanitary and Environmental Engineering. She has experience in Atmospheric Sciences with a

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