



## INTER-AMERICAN INSTITUTE FOR GLOBAL CHANGE RESEARCH

### SAEMC: South American emissions, megacities and climate (CRN2017)

Deteriorating air quality in South American mega-cities is receiving increasing attention from local decision makers, scientists and the public. SAEMC provides regional scale past, present and future climate change scenarios, with emphasis on the evolution of air quality in South American megacities, and on the implementation of coordinated regional chemical weather forecast tools.

#### Goals

- Establish the basis for operational chemical weather forecasting for South American megacities
- Provide accurate regional emission and climate change scenarios for South America, with emphasis on the impacts of and on megacities
- Strengthen and expand an active research and capacity building network on Earth System Modeling in the Americas

#### First results

- An on-line emission data base has been compiled for Bogotá, Buenos Aires, Lima, Medellín, Santiago, and São Paulo that will be used to develop automated emission scenarios; so far available for Medellín (<http://modemed.upb.edu.co/>).
- Factors affecting local emissions have been compiled which helps environmental authorities manage air pollution. Urbanization maps for the main Brazilian cities have been constructed from satellite images. Inventories for traffic emissions and aerosols including black carbon particles are being developed for Buenos Aires, São Paulo, and Bogotá.
- The Chilean Weather Office is now providing chemical weather forecasting for Santiago based on SAEMC work (<http://www.meteochile.cl/modeloPOLYPHEMIUSozono.html>)
- A fully linked climate modeling system is now operational for South America, providing a sound basis for the comparison of emissions.
- A grid-based computational system is being tested.

#### Principal investigator and lead agency

Laura Gallardo - [laura@dfch.uchile.cl](mailto:laura@dfch.uchile.cl)

Centro de Modelamiento Matemático (UMI), Universidad de Chile

#### Co-investigators

K. Longo, S. Freitas, L. Flavio, E. S. Almeida, J. Hoelzemann (CPTEC, Brazil), M. Rojas, L. Gallardo (DGF, Chile), M. Andrade, J. Martins, L. Doprichinski, P. Vasconcellos (USP, Brazil), R. Alcafuz (DMC, Chile), MV Toro (PUB, Colombia), M. Osses (DIMEC, Chile), L. Dawidowski, D. Gómez, P. Smichowski (CNEA, Argentina), E. Behrentz (UDLA, Colombia), E. Concepción (SENAMHI, Peru), R. Delgado, C. Baeza, A. Osses (CMM, Chile), G. Torres (UCO, Argentina), G. Pétron (NOAA, USA), G. García (USACH, Chile), M. Mena (UNAB, Chile), H. Elbern (UKOLN, Germany), A. Córdova (UV, Chile)

#### Links to other IAI projects

Research in this project is complemented by the *Human Dimensions* component **2017-HD ADAPTE**

**Project site:** <http://saemc.cmm.uchile.cl/>

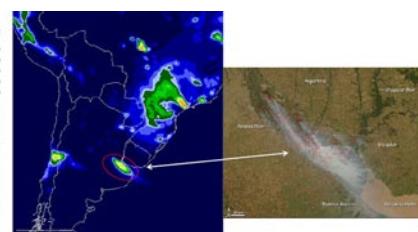
**List of publications:** [http://saemc.cmm.uchile.cl/index.php?option=com\\_docman&Itemid=46](http://saemc.cmm.uchile.cl/index.php?option=com_docman&Itemid=46)  
or <http://iaibr1.iai.int/bs?publications/CRN2017.pdf>



The large urban centers in South and Central America keep growing posing serious environmental and health problems



Traffic emissions are substantial contributors to the burden of pollutants in all megacities. SAEMC has developed and compiled consistent emission inventories that provide the basis for air quality assessments and chemical weather forecasting at various scales



C-CATT-BRAMS running in operational mode is able to capture meso-scale events of transport. In this case, a smoke plume advected over Buenos Aires in the fall of 2008 is captured by the model. (photo on the right: [http://earthobservatory.nasa.gov/NaturalHazards/Archive/Apr2008/Argentina\\_AMO\\_2008107\\_lrg.jpg](http://earthobservatory.nasa.gov/NaturalHazards/Archive/Apr2008/Argentina_AMO_2008107_lrg.jpg))

