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## Africa's pollution in the spotlight

Human activity in Africa significantly contributes to air pollution. However, no detailed data regarding country-by-country pollutant emissions in the continent was available until now. To remedy this, a joint French-Ivory Coast team headed by the Laboratoire d'Aérodologie (CNRS / Université Toulouse III – Paul Sabatier)<sup>1</sup> mapped these emissions in Africa for 2005, before estimating them for 2030, using three scenarios. The researchers showed that the climate change models used by the IPCC underestimate Africa's emissions, which could account for 20-55% of global anthropogenic emissions of gaseous and particulate pollutants by 2030. This work, published on 11 March 2014 in the journal *Environment Research Letters*, will help not only to improve existing climate models, but also to assess the health impacts of pollution in Africa's urban areas.

Air pollutant emission inventories are essential in measuring the impact of pollution on air quality and the climate, as they are fed into atmospheric and climate models to make projections for the future. Although regional inventories for Europe, Asia and North America are extremely detailed, those for Africa were only global until now.

In order to fill this gap, the researchers drew up anthropogenic emission maps for 2005 for every country in Africa. To do this, they used a variety of data, such as fuel consumption questionnaires submitted to the authorities of various countries, field surveys, and the results of research programs such as AMMA (West African Monsoon program) and POLCA (African Capitals Pollution program). The scientists also included highly polluting gas and particle emission sources in Africa, such as two-wheeled vehicles and old cars and trucks in cities, as well as charcoal making for cooking. Today, depending on the particles and gases considered (black carbon, organic carbon, sulfur dioxide, nitrogen oxide, carbon monoxide, etc), all these anthropogenic emission sources account for between 5 and 20% of the world's pollution. Africa's contribution to climate change cannot therefore be overlooked.

On the basis of the inventories for 2005, the researchers estimated African pollutant emissions for 2030 using three scenarios. Two of these, featured in the POLES economic model, either describe a world with no environmental policy, or one that includes the commitments of the Kyoto Protocol (in other words, a 5.5% reduction of greenhouse gas emissions over the 2008-2012 period compared to 1990 levels). The scientists constructed a third scenario involving specific emission reductions.

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<sup>1</sup> In collaboration with Laboratoire de Physique de l'Atmosphère et de Mécanique des Fluides (Université Houphouët Boigny-Cocody, Ivory Coast), Laboratoire 'Politiques Publiques, Actions Politiques, Territoires' (CNRS/Université Pierre Mendès France/Université Joseph Fourier/Sciences Po Grenoble), Laboratoire 'Atmosphères, Milieux, Observations Spatiales' (CNRS/UPMC/UVSQ) which is part of Institut Pierre-Simon Laplace, Laboratoire NOAA/ESRL & CU/CIRES, Boulder, USA and the Max-Planck Institute for Meteorology, Hamburg, Germany.

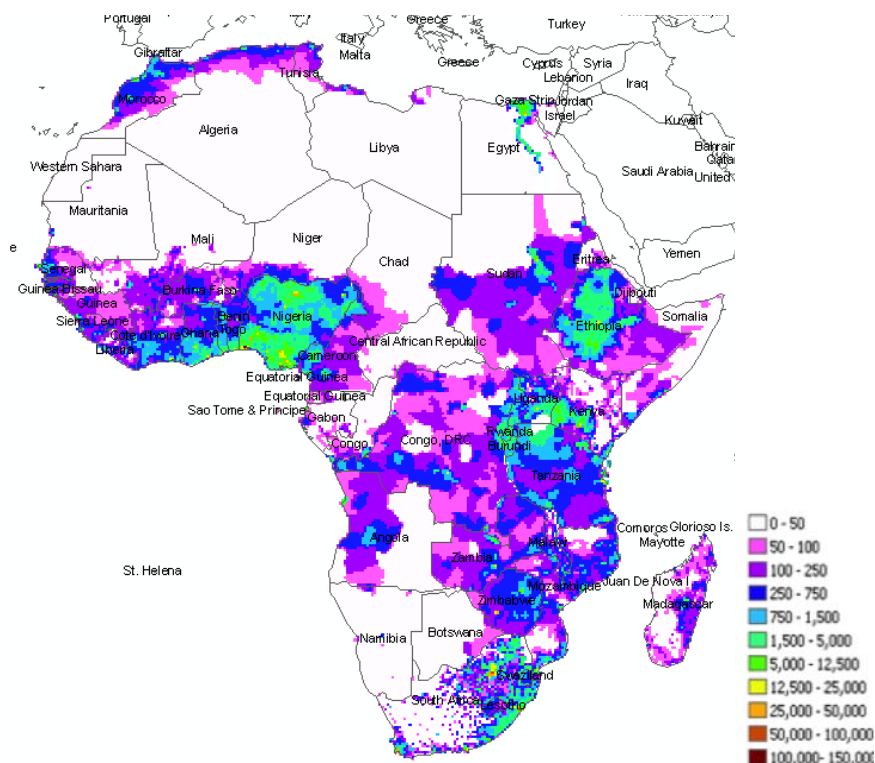


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The main conclusion of the assessment is that, in the absence of any effective regulatory measures, the African continent could contribute 20-55% of global anthropogenic emissions of gaseous and particulate pollutants by 2030. These figures significantly exceed the estimates on which climate change models are currently based.

This work, which will be used in future publications by the IPCC (Intergovernmental Panel on Climate Change), will help develop improved models. The researchers also aim to rely on the inventories to better assess the impact of pollutant emissions on the health of Africa's urban populations. They hope that their findings will enable African decision-makers to make enlightened choices about vehicle populations and fuels used, so as to improve air quality in African cities.



Regional estimates of organic particle emissions from fossil fuel and biofuel combustion in tonnes of carbon per year, in a scenario for 2030.

## Reference

**African combustion emission explosive growth from 2005 to 2030.** C. Liousse, E. Assamoi, P. Criqui, C. Granier and R. Rosset. *Environment Research Letters*. 11 March 2014

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