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## Ambient air pollution: a global assessment of exposure and burden of disease

Air pollution has become a growing concern in the past few years with an increasing number of acute air pollution episodes in many cities worldwide. As a result, data on air quality is becoming increasingly available and the science underlying the related health impacts is also evolving rapidly. In September 2016, the World Health Organization (WHO) released a new report that summarized the methods and results of the latest global assessment of ambient air pollution exposure and the resulting burden of disease. Data were drawn from satellites, air transport models and ground-based air quality monitoring stations. The model showed that approximately 92% of the world's population lives in places where air quality levels exceed the WHO Ambient Air Quality Guidelines. An estimated 3 million deaths per year were linked to exposure to outdoor air pollution. Nearly 90% of air-pollution-related deaths occurred in low and middle-income countries.

The report was released simultaneously with a series of interactive maps. These maps give information on population-weighted exposure to PM<sub>2.5</sub> for all countries. In addition, PM<sub>10</sub> data for about 3000 cities and towns with ground-based monitoring stations is indicated geographically.

*Reference: World Health Organization, 2016. <http://who.int/phe/publications/air-pollution-global-assessment/en/> Accessed on 15 November 2016.*

## Shale gas development in the Central Karoo: A scientific assessment of the opportunities and risks

A Strategic Environmental Assessment (SEA) for shale gas development in the Karoo was commissioned in February 2015 by the South African government. The SEA has three phases, i) the preparation phase, ii) scientific assessment and 3) decision making framework. The online version of the final scientific assessment was released in November 2016. This assessment has 18 chapters and was drafted by a 146 author-team, underwent peer-review by 75 independent experts, and was open for public comment. The resulting document assessed the potential opportunities and risks to the environment, economy, society, human health, and infrastructure from shale gas development utilizing existing local and international information. Chapter 3 of the report focused on air quality and GHG impacts. NACA members Katye Altieri, Rebecca Garland and Gerrit Kornelius were co-authors of this chapter.

For air quality considerations, the assessment did find potential

risks to workers and the local communities from shale gas development. In addition, it was highlighted there is a potential opportunity to reduce indoor air pollution if natural gas replaces “dirtier” domestic fuels. However, these risks and opportunities were assessed with very little local information. Currently in the SEA study area, there are no operational air quality monitoring stations reporting to SAAQIS. A key gap highlighted in the chapter, for both air quality and GHG impacts, is the urgent need for the establishment of a baseline in the area. There were very limited local studies available that could be included in this assessment. This and other gaps that the NACA community can assist with addressing are highlighted in the full report.

*Reference for the Air Quality and GHG chapter: Winkler, H., Altieri, K., Clarke, S., Garland, R.M., Kornelius, G. and Meas, M. 2016. Air Quality and Greenhouse Gas Emissions. In Scholes, R., Lochner, P., Schreiner, G., Snyman-Van der Walt, L. and de Jager, M. (eds.). 2016. Shale Gas Development in the Central Karoo: A Scientific Assessment of the Opportunities and Risks. CSIR/IU/021MH/EXP/2016/003/A, ISBN 978-0-7988-5631-7, Pretoria: CSIR. Available at <http://seasgd.csiir.co.za/scientific-assessment-chapters/>*

## Updated emissions inventory of diffuse and inefficient combustion in Africa (DICE-Africa)

Diffuse and inefficient combustion sources contribute greatly to anthropogenic emissions in Africa, but are poorly represented in global emission inventories. A new emissions inventory of Diffuse and Inefficient Combustion Emissions in Africa (DICE-Africa) has been developed for 2006 and 2013. The inventory was created at 0.1° x 0.1° resolution, this resolution helped to distinguish between rural and urban pollution sources. Emissions from solid biofuels (wood, crop residue, charcoal), charcoal production, kerosene, backup generators, cars, motor-cycles, gas flaring and ad hoc oil refining were included in DICE-Africa. It was found that residential biofuel contributed substantially to all pollutants in 2006, and that while fuelwood use increased from 2006 to 2013, its growth was slower than the growth in charcoal use, charcoal production and transport fuel. The DICE-Africa inventory was compared to previously published emission inventories. This comparison provides an interesting perspective on the large range of estimates of emissions from this source in Africa, and highlights the need for further research. The detailed methods applied as well as country-level data are provided as supporting information.

*Reference: Marais, E.A and Wiedinmyer, C. 2016. Air quality impact of diffuse and inefficient combustion emissions in Africa (DICE-Africa), Environmental Science and Technology, 50, doi:10.1021/acs.est.6b02602*