



Simulation of West African air pollution during the DACCIWA experiment with the GEOS-Chem West African regional model.

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Pollutant emissions from West African cities are forecast to increase rapidly in future years because of extensive economic and population growth, together with poorly regulated industrialisation and urbanisation. Observational constraints in this region are few, leading to poor understanding of present-day air pollution in this region.

To increase our understanding of the processes controlling air pollutants over the region, airborne observations were made from three research aircraft based out of Lomé, Togo during the DACCIWA field campaign in June-July 2016. A new 0.25x0.3125 degree West Africa regional version of the GEOS-Chem offline chemical transport model has also been developed to explore the processes controlling pollutants over the region. We evaluate the model using the aircraft data and focus on primary (CO, SO₂, NO_x, VOCs) and secondary pollutants (O₃, aerosol). We find significant differences between the model and the measurements for certain primary compounds which is indicative of significant uncertainties in the base (EDGAR) emissions. For CO (a general tracer of pollution) we evaluate the role of different emissions sources (transport, low temperature combustion, power generation) in determining its concentration in the region. We conclude that the leading cause of uncertainty in our simulation is associated with the emissions datasets and explore the impact of using differing datasets.