# Measurement of air pollutant emissions from Lome, Cotonou and Accra

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High concentrations of airborne pollutants (e.g. the oxides of nitrogen, sulphur dioxide and carbon monoxide) in existing and evolving cities along the Guinea Coast cause respiratory diseases with potentially large costs to human health and the economic capacity of the local workforce. It is important to understand the rate of emission of such pollutants in order to model current and future air quality and provide guidance to the potential outcomes of air pollution abatement strategies. Often dated technologies and poor emission control strategies lead to substantial uncertainties in emission estimates calculated from vehicle and population number density statistics. The unreliable electrical supply in cities in the area has led to an increased reliance on small-scale diesel powered generators and these potentially present a significant source of emissions. The uncontrolled open incineration of waste adds a further very poorly constrained emission source within the cities.

The DACCIWA (Dynamics–Aerosol–Chemistry–Cloud Interactions in West Africa) project involved a field campaign which used highly instrumented aircraft capable of in situ measurements of a range of air pollutants. Seven flights using the UK British Antarctic Survey's Twin Otter aircraft specifically targeted air pollution emissions from cities in West Africa (4 x Accra, Ghana; 2 x Lome, Togo and 1 x Cotonou, Benin). Measurements of NO, $NO_2$, $SO_2$, CO, CH4 and $CO_2$ were made at multiple altitudes upwind and downwind of the cities, with the mass balance technique used to calculate emission rates. These are then compared to the Emissions Database for Global Atmospheric Research (EDGAR) estimates. Ultimately the data will be used to inform on and potentially improve the emission estimates, which in turn should lead to better forecasting of air pollution in West African cities and help guide future air pollution abatement strategy.