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Measurements of ozone and other trace gases using small low cost sensors and networks

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Many low cost, small and mobile sensors have come onto the market in the last few years and there are large discrepancies between the accuracy and the durability of these measurements. The automatic monitoring station at Leicester University, part of the UK's DEFRA Automatic Urban and Rural Network (AURN), has been used as a reference station for ozone, NO_x (NO+NO_2), CO and Particulate Matter (PM) measurements to compare with a variety of small sensors. The sensors have been installed on the roof of the station for over a year and calibrated against the reference instruments in the station. AQMesh, Elm, Cairclip and some home-made instruments have been calibrated at the station, taken out for mobile measurements around the city and then assessed for any drift. Results show an ability of these small sensors to capture ozone and other trace gas measurements, as long as they are calibrated. Using them as mobile measurements can be a problem as some need stabilisation time and are susceptible to the changing humid conditions of the British winter. There is plenty of scope for improvement, allowing them to expand current monitoring networks by complementing the standard monitoring stations.